

ANNUAL REPORT

2019–2020



University of
Pittsburgh

School of Pharmacy

Fall 2020



Dear Friends,

I wonder whether our School of Pharmacy has ever in its 142-year history undergone such a rapid shift in how we function. FY20 has been a year that will not be forgotten in American and World history.

The presidential campaign heightened political divisiveness in our country. The year 2020 is now marked forever by the nationally televised murders of Black men and women at the hands of police, causing the acceleration of the Black Lives Matter movement. And as I write this letter, the COVID-19 pandemic rages on, claiming lives and livelihoods while burdening the health care system and families in ways never before challenged.

Since March, the people of PittPharmacy have shown exceptional creativity and agility as individuals and as teams that meet challenges. And we have excelled. Notably, our modes of communicating, teaching and learning, providing patient care, and conducting research have all changed dramatically.

When teaching, learning, research and working became remote, I started a daily all-school Zoom hour that morphed from an initial set of Zoom meetings to daily Zoom hours that continued until the fall term began. The early focus was rapid communication, garnering input to better plan all aspects of daily operations, and learning new methods to enhance the remote student experience. The sense of community grew and the sessions began to include some social hours with Music Fridays and Interviews by Dr. Venkat. These daily Zoom sessions created an even **greater sense of community**, given that people PittPharmacy previously generally saw only those in their immediate physical location.

That sense of community also grew by having new and sometimes **difficult conversations** about diversity as well as learning from past students about their experiences at PittPharmacy. I learned that we can and must do better for our under-represented minority students. We pledged our commitment to anti-racism and accelerating the PittPharmacy agenda for creating a just and equitable community.

Experiential learning was challenged because many sites closed their facilities to students. International travel was restricted. Faculty and staff creativity kicked in. The result were new ways for students to provide care to patients and experience the interprofessional environment remotely. **National recognition** came in the form of an invited plenary session presentation on the methodology.

PittPharmacy experienced an increase in **research funding of 150 percent and national rankings of #8 in NIH funding, #5 in total federal and #6 in total grants.**

COVID-19 also provided opportunity for **pharmacists to be part of a solution for the pandemic** through new opportunities for immunization and point-of care (POC) testing. And the fact that pharmacists and pharmacies became part of the essential work force and PittPharmacy offered POC training nationally. Amidst all of this, extensive planning sessions for the exciting and **extensive renovation of Salk Hall** continue.

Yes. PittPharmacy has been challenged and it is thriving. We are meeting our mission of excellence, innovation and leadership all the while creating an even greater sense of community. So now let's keep innovating and leading in FY21. Hail to Pitt!

A handwritten signature in cursive script that reads "Patricia Kroboth".

Patricia D. Kroboth, Dean

Dr. Gordon J. Vanscoy Distinguished Service Professor

UNIVERSITY OF PITTSBURGH
SCHOOL OF PHARMACY

Mission

The School of Pharmacy is committed to
improving health through
excellence, innovation, and leadership
in education of pharmacists and pharmaceutical scientists,
in research and scholarship,
in care of patients, and
in service to our communities.

*Adopted July 2006
Revised July 2009*

Vision

To be an outstanding school of pharmacy renowned for excellence in
discovery and advancement of science-based use of medicines and
other interventions to enhance the vitality and quality of life.

Adopted July 2006

Values

Integrity guides our daily work.

We foster:

Passion, commitment, and diligence;
Creativity and personal growth;
Collaboration and teamwork;
A culture of respect for the individual.

Adopted July 2006

Commitment to A Safe, Equitable and Just Community

We at PittPharmacy recognize the challenges of systemic racism, bias and structural inequality. We stand with Black, Indigenous and People of Color against racism. We take an anti-racist stance. We must reflect on our own beliefs, words, actions and interactions. We MUST do more. We WILL do more.

We are listening. We are learning. We are taking immediate steps. At the center of everything we do is assuring a safe, equitable and just community.

Adopted June 2020

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Leading Pharmacy Education



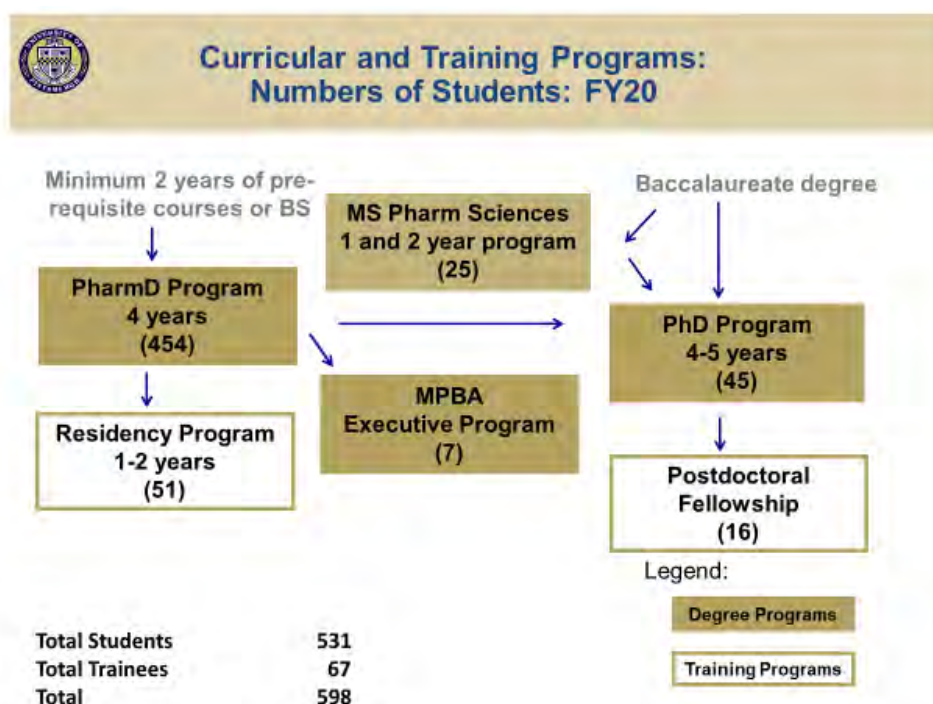


Leading Pharmacy Education

PittPharmacy builds on its rich tradition of excellence in education, producing innovators and leaders who solve the complex medication-based problems of today and tomorrow and who enhance the health and well-being of individuals and communities.

The School of Pharmacy has adopted two broad goals for our PharmD, residency, and graduate programs - **Personalizing Education** and **Getting to Expert Faster**.

The chart below shows the number of students and trainees in each program in FY20; it also shows the usual pathways to each degree or training program.

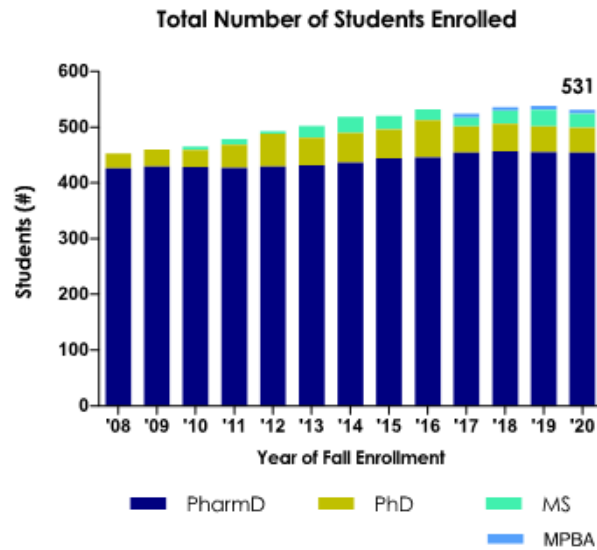


EDUCATION BY THE NUMBERS FOR FY20

- The total number of students in degree granting programs reached 531. When combined with resident and post-doctoral trainees (67), the total number of trainees is 598.
- 72 full-time faculty members educate students in the professional and graduate programs. (check with foundational strength number)

PharmD Program by The Numbers

In FY20:



- **118** students matriculated for the PharmD class of 2024; average GPA and PCAT scores of 3.6 and 81%, respectively.
- **4.3** –The number of applicants per seat through open admission.
- **136** PharmD students received a total of **\$615,866** in scholarship funds
- **76** PharmD students presented **63** posters at **3** national and regional meetings.
- **389** pharmacists in **28** states and **10** countries provided **904** APPE rotations for **113** fourth professional year students.
- **25** students in the Class of 2020 completed APPE rotations at **9** different Indian Health Service sites.
- P4 students provided care for a total of **26,458** patients during their 8 APPE rotations.
- **113** students graduated with the PharmD degree.
- **79** students chose to receive the Bachelor of Science in Pharmaceutical Sciences after their second professional year.
- **146 (43%)** of **338** students in the P2, P3, and P4 years were enrolled in Areas of Concentration.
- **23** P4 students had international APPE rotation experiences in 9 countries and **3** P1, P2, and P3 students had international experiences.

Residency Program

In FY20:

- **51** incoming residents (**34** PGY1 and **17** PGY2) came from **26** schools of pharmacy in **18** states.
- The **11** residency programs were in partnership with **15** institutions/entities.
- **12** residents presented their research results at national or regional meetings.
- **24** residents participated in training programs to enhance their teaching and clinical precepting skills.
- **18** residents were accepted into PGY2 specialty programs and **2** were accepted into a fellowship program.
- **2** residents accepted faculty positions at schools of pharmacy.
- **5** residents passed the Board Certified Pharmacotherapy Specialist Exam during their residency. Once they are eligible, **9** plan to take their specialty board certification.
- Of **14** residents taking clinical positions, **8** accepted clinical positions at an academic medical center, **3** of which were in the UPMC Health System; **3** accepted positions in community hospital settings, **3** in managed care, and **1** in independent pharmacy. A total of **11** residents accepted positions in the UPMC Health System.

Graduate Program

In FY20:

- **70** full-time students were enrolled: **45** PhD students; **25** Master of Science students.
- **9** MS and **14** PhD degrees were awarded.
- **37%** (**17/45**) of the full-time PhD students are U.S. citizens or permanent residents.
- **62%** (**28/45**) of the full-time PhD students have degrees from schools of pharmacy
- **68** peer-reviewed publications published by graduate students.
- Graduate students gave **24** presentations at regional and national scientific meetings.
- **16** postdoctoral fellows were engaged in research in School of Pharmacy laboratories.

BS IN PHARMACEUTICAL SCIENCES

In April of 2020, 79 students elected to receive the Bachelor of Science in Pharmaceutical Sciences after their second professional year of the PharmD Program. PittPharmacy offers the degree only to students enrolled in the PharmD program.

PHARM D PROGRAM

Accreditation from the Accreditation Council for Pharmacy Education (ACPE)

In 2016, an ACPE evaluation team visited the School of Pharmacy and based on the School's Self Study and the Evaluation Team Report, the Board of ACPE awarded the PharmD Program the full eight-year term of accreditation (June 2017 through June 2025).

The Value of a PharmD Education

PittPharmacy has employed several approaches to assure the quality and value of the PharmD education including:

- personalizing education;
- deploying instructional approaches so that students “get to expert faster;”
- adopting the philosophy of “cost of PharmD education” vs. the credit-based tuition. Through the “cost” mechanism, students may take courses above a standard credit limit and during the summer with no additional tuition;
- designing instructional environments that facilitate active learning and engagement.

1. Personalizing Education

We believe that personalized education will enrich individual student experiences and will better prepare them for success as they navigate the rapidly changing health care landscape and post-graduate environment.

Long Range Plan 2012

The faculty is enabling students to personalize their education through a growing array of opportunities.

- A. Areas of Concentration
- B. Special Topics
- C. Presentations of Research at Regional or National Meetings
- D. International Experiences
- E. Professional Development through Advising
- F. A wide array of electives

A. AREAS OF CONCENTRATION (ARCOs)

In FY20:

- PittPharmacy continued eight Areas of Concentration (Community Leadership, Innovation, and Practice; Geriatrics and Palliative Care; Global Health; Pediatrics; PharmacoAnalytics; Pharmacotherapy Scholars; Pharmacy Business Administration; Research).
- One hundred forty-six (146) or 43% of P2, P3 and P4 students enrolled in Areas of Concentrations. Six students are pursuing two ARCOs each.

Area of Concentration	Number of P2 students enrolled	Number of P3 students enrolled	Number of P4 students enrolled	Total Enrollment (Number)
Community Leadership, Innovation, and Practice		13	9	22
Geriatrics and Palliative Care	9	8	7	24
Global Health	14	8	12	34
Pediatrics		6	4	10
PharmacoAnalytics		5	4	9
Pharmacotherapy Scholars		20	16	36
Pharmacy Business Administration		3	2	5
Research		6	6	12
Total Across All Years and ARCOs	23	69	60	152

B. SPECIAL TOPICS

During FY20, **112** students enrolled in **197** Special Topics courses.

Special Topics elective courses allow students the opportunity to personalize their education by engaging in a mentored experience in a particular area of pharmaceutical science, pharmacy practice, or pharmacy education under the direction of a faculty member. Special Topics courses may be designed for one, two, or three credits each.

C. STUDENT PRESENTATIONS AT NATIONAL AND REGIONAL MEETINGS

76 PharmD students presented **63** posters at **3** national and regional meetings in FY20. See Education Appendix for details.

D. STUDENT PROFESSIONAL DEVELOPMENT

Advising and career development are key to the School's goal of personalizing education.

Professional Development. In FY20, Professional Development Groups engaged all P1, P2, and P3 students. Faculty advisors work with the same students throughout the years of the curriculum to create a community of learners and near-peer mentors within each Group. Faculty mentors are drawn from both departments have expanded from program inception from 23 to 40 faculty members.

Portfolios. Since the 1990s, PittPharmacy has used portfolios as a means for students to demonstrate achievement. Students use a customized e-portfolio platform to show integration of learning across

courses and progressive development across the curriculum. P1 and P2 students meet each term with portfolio advisors and receive mentoring and feedback on progress.

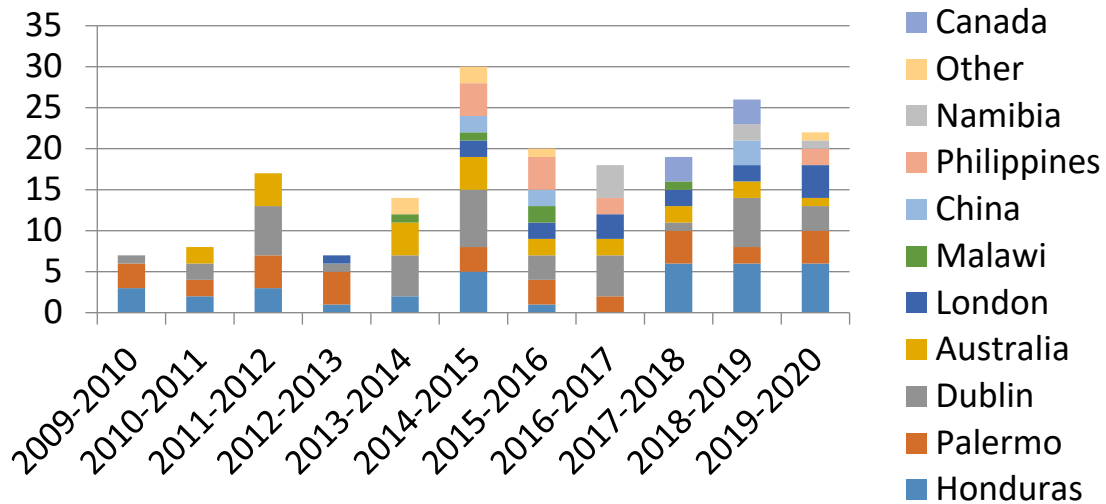
P3 and P4 students use professional presentation portfolios in preparation for interviews. Every P3 and P4 student meets with either a faculty member or practitioner for focused career planning and mentoring.

E. INTERNATIONAL EXPERIENCES

In FY20, a total of 26 students (P1 through P4) had international academic experiences.

- 3 students (P2, P3, P4) engaged in international experiences that were not part of the APPE program in FY20.
 - All 3 students participated in exchanges with the Student Exchange Program (SEP), a program sponsored by the International Pharmaceutical Students Federation (IPSF). Sites included Costa Rica, Japan, and Singapore.
 - A total of 7 students (3 P1s, 1 P2, and 3 P3s) were planning to participate in the Spring 2020 Namibia experience, however that experience was cancelled with the emergence of COVID19.
- Pitt faculty hosted 1 student from Portugal for the SEP through the IPSF
- Twenty-nine (29) P4 students chose international APPE rotation experiences, across nine different countries.
 - Travel advisories from the CDC and the state of Pennsylvania have always been a core part of our international experience program at Pitt Pharmacy. The Experiential Learning Team closely monitors these advisories, as student safety is our utmost priority. The COVID-19 pandemic impacted our international program at the end of the Spring 2020 semester.
 - A total of **23** of the original 29 students were able to complete these experiences.
 - Two of the 23 students completed the experiences remotely from the US, with the guidance of their international preceptors from Australia and Switzerland.
 - Six students, scheduled to go abroad for a March 16, 2020 start in Ireland, Italy, and Australia, unfortunately had their APPEs cancelled due to COVID-19. These students were rescheduled into elective APPE rotations in their personalized interest areas.

P4 International Rotations FY10 – FY20



2. Getting to Expert Faster

PittPharmacy has taken a number of steps to increase the value of the education. See Education Appendix for detailed explanation.

PittPharmacy’s Readiness Assessment received the national Excellence in Assessment Award in FY17 from the American Association of Colleges of Pharmacy and the PittPharmacy and WISER Center authors of a manuscript on the approach, including cohort comparisons, were awarded the Rufus A. Lyman Award for the best paper in the *American Journal of Pharmaceutical Education* in FY2018. This assessment is now part of PittPharmacy's comprehensive assessment program. Data are used to inform student-specific education plans, as well as improvements to the curriculum to accelerate student development.

FY19 PATIENT CARE EXPERIENCES

INTRODUCTORY PHARMACY PRACTICE EXPERIENCES (IPPEs) AND IMPACT ON PATIENTS

Student experiences with patients depend greatly on preceptors, some of whom are faculty.

- 42 preceptors supervised 115 P1 students (Class of 2023).
- 90 preceptors supervised 111 P2 students (Class of 2022).
- 115 preceptors supervised 113 P3 students (Class of 2021).

Students interact with patients in the P1, P2, P3 and P4 years. In the P2 and P3 years, respectively, students also study operational and advanced practice aspects of community pharmacy (P2 year) and health-system pharmacy (P3 year).

In FY20 in the **Community Pharmacy Practice 2** course,

- 114 P2 students documented **2,153 patient encounters** in their community pharmacy practice experiences, identifying 838 drug therapy problems and delivering 1,011 enhanced services. This was all accomplished prior to the COVID-19 pandemic. We then worked closely with students to complete 1-week, 40-hour immersion experiences in selected Giant Eagle Pharmacy and Rite Aid Pharmacy locations where 70 students provided patient care and education to nearly **200 additional patients**.

The PittPharmacy Class of 2022 was awarded the national **Script Your Future Interprofessional National Award** at the 2020 American Association of Colleges of Pharmacy Annual Meeting held virtually in July 2020. This is the 7th year PittPharmacy participated in this campaign, and the 7th national award earned by PittPharmacy students.

SilverScripts, a longitudinal Introductory Pharmacy Practice Experience for first- and second-year student pharmacists, provides an early immersion experience for students to engage with older adults at senior community centers in Pittsburgh. At four unique visits (February/March/October/November), students offer comprehensive medication reviews, targeted medication reviews, and blood pressure assessments to help seniors manage their medications. Students are precepted on-site by more than 25 participating PittPharmacy faculty, staff, residents, and fellows. Student pharmacists work with students from other healthcare disciplines including audiology each term of the program.

SilverScripts Program Impact during FY20

SilverScripts Spring FY20 P1/P2 Students	
Comprehensive Medication Reviews	391
Targeted Medication Reviews	19
Blood Pressure Assessments	363
Referrals to Other Health Care Providers	16
Total Unique Encounters	391
Total Unique Senior Centers	13

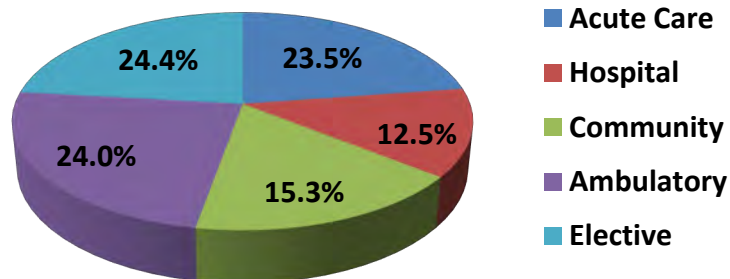
Advanced Pharmacy Practice Experiences (APPEs)

In their P4 year, students interact with patients in a variety of settings. Results from the PITT form for tracking patient interactions show the impact of students on patients in various settings.

P4 Class Patient Impact FY20	
Patient interactions	26,458
<ul style="list-style-type: none"> • Patients \geq 65 years of age 	9,761
<ul style="list-style-type: none"> • Diverse population patients 	7,150
Drug therapy problems identified	15,437
Drug therapy recommendations	11,642
Adverse drug events identified	1511
Disease states of focus (patients may have \geq 1)	
<ul style="list-style-type: none"> • Cardiovascular 	24,470
<ul style="list-style-type: none"> • Endocrine (ex. diabetes) 	8805
<ul style="list-style-type: none"> • Behavioral health 	8053
Interprofessional interactions (ex. MD, RN)	3659

In FY20, **389** preceptors supervised 113 P4 students during 904 five-week rotations. The types and proportions of rotations are shown in the pie chart below.

APPE Distribution by Rotation Type



The **COVID-19 pandemic** significantly impacted the Experiential Learning Program in Spring 2020. As events unfolded across the globe, learning sites within the state of Pennsylvania, across the US, and internationally, suspended all in-person learning. This unprecedented action was essential to flatten the curve of this dangerous virus spread, and was critical for patient, healthcare worker, and learner safety. With innovative and collaborative thinking, our preceptors, faculty and Experiential Learning team nimbly made the transition from in-person learning to remote and telehealth experiences wherever possible. Safety precautions and training were provided by our sites, Pitt Pharmacy, and the University of Pittsburgh to ensure our students were equipped in this new healthcare environment.

Critical care faculty members Dr. Pam Smithburger and Dr. Amy Seybert, along with simulation specialist Larry Kobulinski, created a remote, real-time, intensive care unit (ICU) learning experience to replace the acute care APPEs that were immediately suspended. The experience, called **“APPEAL,”** for **“APPE At-Large,”** used the Zoom platforms for real-time, real-patient interaction with the ICU interdisciplinary team, and integrated simulation and the EHRGo electronic medical record platform for additional learning. Dr. Melissa McGivney and Dr. Brandon Antinopoulos collaborated to create a community pharmacy remote telehealth experience. Dr. Amanda Korenoski and preceptor Dr. Joan Mapel created a remote hospital/Poison Center triage experience to continue foundational institutional learning. Preceptors from hospitals, community pharmacies, health clinics, industry, managed care, Indian Health Service, and many other settings recreated their learning experiences to accommodate our Pitt Pharmacy learners. A total of 33 P4 students needed to be rescheduled into the new APPEAL series, and 70 students had their existing APPEs modified to remote learning or hybrid models. Proudly, the Class of 2020 was continued their learning through these unique experiences to complete their final P4 APPE rotation on-time and safely as of April 17, 2020. Pitt Pharmacy was one of the few schools of the pharmacy in the country where the Class of 2020 graduated on-time. Graduation day was Friday, April 24, 2020.

The need to continue creative precepting strategies continued throughout the May and June 2020 months, as Pennsylvania continued its stay-at-home orders and suspension of in-person learning until mid-June. For the rising P4 class, the Class of 2021, their March and May 2020 final introductory hospital pharmacy practice experiences were largely cancelled, and an **IPPEAL** (for “introductory”) experience was created for 41 students so they could progress to P4 year. As usual, our P4 year started immediately in early May, and our preceptors continued their dedication to Pitt Pharmacy and accommodated our learners largely in a remote or telehealth method. New APPEAL rotations were created for ambulatory care and independent pharmacy (a longitudinal “master class”). A total of 48 acute care, 28 ambulatory care, and 14 independent pharmacy students completed the APPEAL curriculum. Precepting partners across Pittsburgh and neighboring states continued to teach our students remotely throughout these challenging months. Pennsylvania lifted its suspension of in-person learning on June 8, 2020, and work began to re-integrate learners on-site with new precautions for safety.

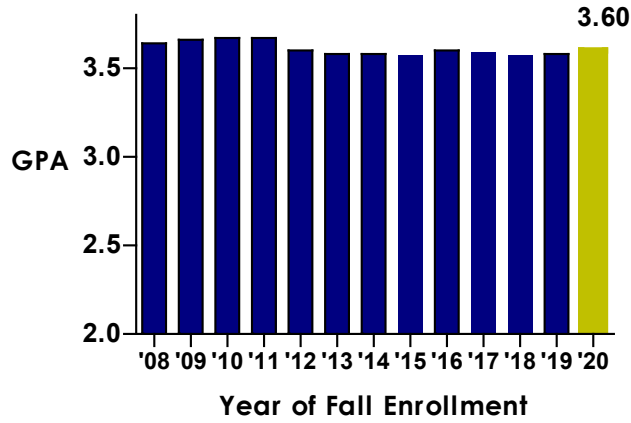
Students

RECRUITMENT AND ENROLLMENT

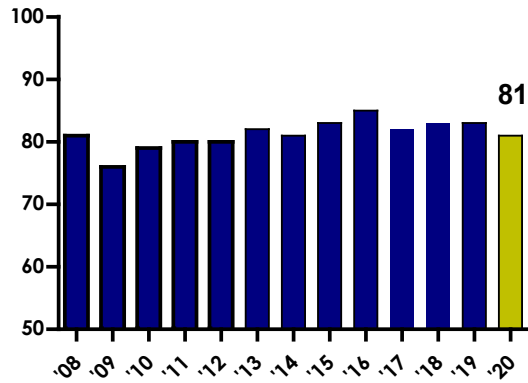
Great programs start with great students. PittPharmacy continues to find the best and brightest to become the future innovators and leaders of pharmacy.

The work of the Admissions Committee and faculty and staff who interviewed applicants resulted in an excellent group of 118 newly admitted students for the class of 2024.

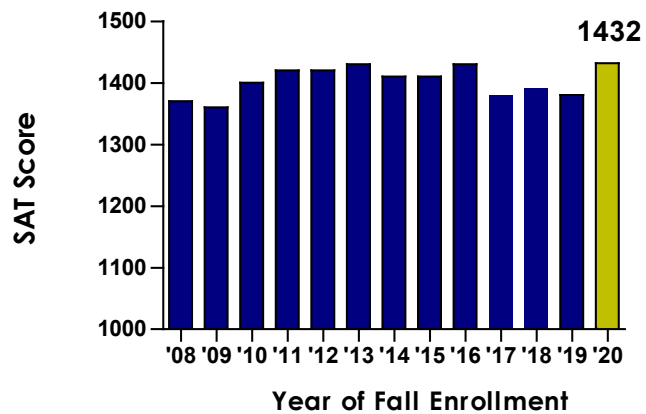
Entering PharmD Class GPA



PCAT Composite Score



SAT Scores of P1 Students As Freshmen: Early Assurance



The SAT is not required for our open admission application; hence, the table shows the average scores only for the students who matriculated as a result of the Guaranteed Admit through high school applications.

During FY20, we recruited the class of 2024 for fall enrollment.

- Pharmacy guaranteed admissions to the class of 2024
 - 75 students applied for PharmD Program; 72 in the second year of college and three in the first year of college
 - 74 were interviewed
 - 62 met the guarantee admission criteria and were offered admission
 - 8 applicants did not meet the admission criteria and were offered admission in the open pool
 - 70 of 70 students who were offered admission accepted the offer.

- Open admissions to the class of 2024
 - 169 applied to the PharmD program
 - 133 were invited to interview
 - 21 declined to interview
 - One was a no-show for an interview
 - 111 were interviewed
 - 89 were offered admission
 - 48 accepted the offers

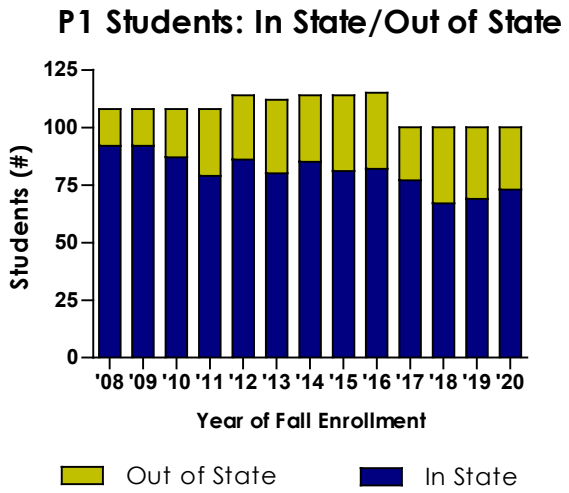
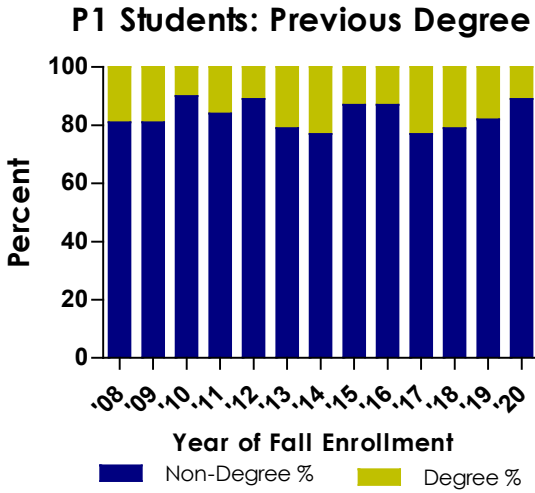
Of the students in the class of 2024, 31% identify as male and 69% identify as female (compared to 33% and 67%, respectively, in the class of 2023); 6% are from an underrepresented minority (10% in the class of 2023).

First-Year (P1) Class Enrollments 2002-2020

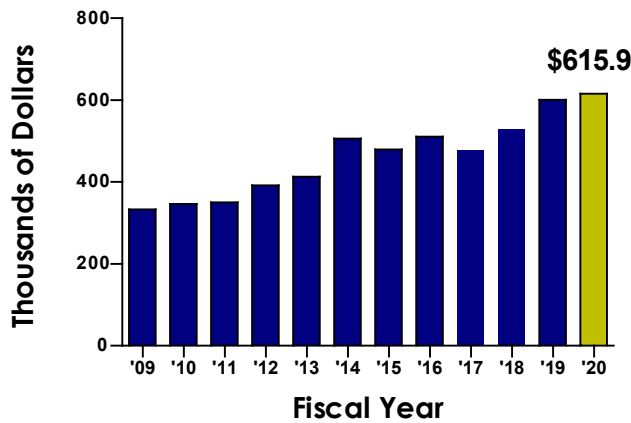
Fall Term	Residency Status		Application Pathway*					Students with 4-Year Degree (% of class)
			Early Assurance	Educational Institution or Type for Students Accepted through Open Admission				
	PA (%)	Non-PA (%)		Pitt	Community College	AAU-member Institution	Other	
2002	92	8	37	37	5	5	12	16
2003	86	14	36	38	3	7	18	13
2004	85	15	52	28	0	4	13	15
2005	92	8	60	28	0	8	6	13
2006	87	13	50	44	1	3	10	11
2007	88	12	42	53	0	4	9	15
2008	86	14	47	42	0	2	17	19
2009	85	15	51	39	0	4	11	19
2010	81	19	47	51	0	2	9	11
2011	73	27	49	44	0	5	9	16
2012	77	23	54	46	0	1	11	8
2013	71	29	45	50	1	7	9	21
2014	75	25	43	46	0	10	14	23
2015	71	29	46	56	1	5	6	*15

2016	69	31	39	61	0	4	11	13
2017	77	23	47	46	0	12	10	21
2018	67	33	56	40	3	3	11	18
2019	69	31	53	41	0	7	14	18
2020	73	27	62	44	1	3	8	11

*Total across Applications Pathway sums to the total students enrolled



Scholarship Awards from PittPharmacy



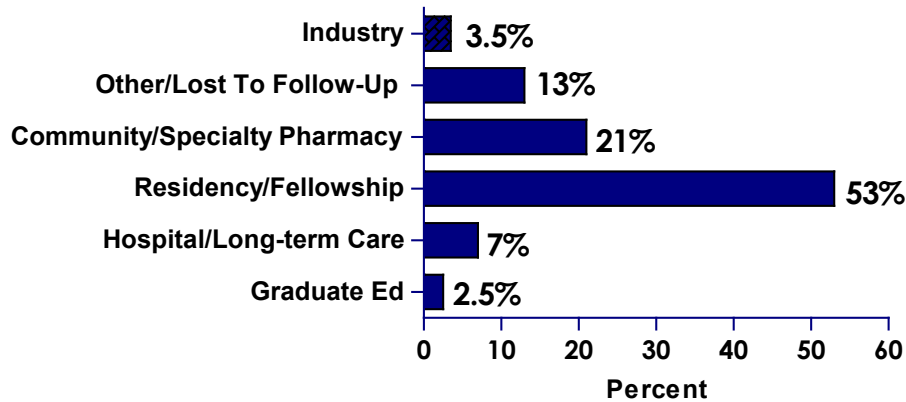
GRADUATING CLASS OF 2020

In April 2020, 113 students were awarded the PharmD degree.

96.2% of PittPharmacy graduates taking the North American Pharmacist Licensure Exam (NAPLEX) for the first time in calendar 2020 passed on their first attempt and 95.4% passed the Multistate Pharmacy Jurisprudence Examination on their first attempt. PittPharmacy graduates have consistently exceeded national averages for scores and pass rates on these two examinations.

53% of the class of 2019 continued training in a post-PharmD residencies or fellowships. Other graduates obtained employment in a variety of pharmacy practice settings.

Class of 2020



Comparison of NAPLEX Pass Rates: First-Time Candidates

Calendar Year	Pitt Candidates Pass/Total	Pitt Pass Rate (%)	National Pass Rate (%)
2020*	100/104	96.2	91.0
2019	101/111	91.0	87.2
2018	108/116	93.1	88.5
2017	98/106	92.5	87.6
2016	100/110	90.9	87.3
2015	107/108	99.0	92.6
2014	102/102	100	94.4
2013	104/107	97.2	95.4
2012	106/106	100	96.4
2011	103/105	98.0	96.6
2010	104/107	97.2	91.5
2009	102/102	100	97.5

* Includes all data available from NABP as of 9-30-2020

Comparison Multistate Pharmacy Jurisprudence Examination® (MPJE®) Results:

Calendar Year	Pitt Candidates Pass/Total**	Pitt Pass Rate (%)	National Pass Rate (%)
2020*	83/87	95.4	85.2
2019	84/90	93.3	82.2
2018	81/84	96.4	82.6
2017	82/85	96.5	88.1
2016	89/93	95.7	84.1
2015	82/83	98.8	93.5
2014	95/96	99.0	93.2
2013	83/84	98.8	92.8
2012	91/91	100	92.5
2011	89/89	100	95.6
2010	70/73	95.9	93.9
2009	77/77	100	92.1

* Includes all data available from NABP as of 9-30-2020

** Includes University of Pittsburgh School of Pharmacy graduates taking the MPJE® in Pennsylvania as a first-time candidate.

Student Selections of Faculty for Awards

Students in the P1 through P4 years select faculty members and preceptors who are exceptional role models and who have made outstanding teaching contributions during the year for various teaching awards. The FY20 awardees were:

- **Stanford I. Cohen Teacher of the Year (selected by the graduating class).** Scott R. Drab, PharmD, CDE, BC-ADM, Associate Professor, Pharmacy and Therapeutics
- **Faculty Member of the Year (selected by the members of APhA-ASP).** Lucas A. Berenbrok, PharmD, MS, BCACP, TTS, Assistant Professor, Pharmacy and Therapeutics
- **Faculty Preceptor of the Year (APPE).** Jennifer Pruskowski, PharmD, BCPS, BCGP, CPE, Assistant Professor, University of Pittsburgh School of Pharmacy, Department of Pharmacy and Therapeutics and Palliative Care Clinical Pharmacy Specialist, UPMC Palliative and Supportive Institute (PSI)
- **Volunteer Preceptor of the Year (APPE).** Joan Mapel, PharmD, Medicine and Transplant Service Line Lead Pharmacist, UPMC Presbyterian
- **Preceptor of the Year (IPPE).** Stephanie Ballard, PharmD, BCPS, Primary Care Clinical Pharmacist, Faculty at UPMC Shadyside Family Medicine residency, Associate Director of the UPMC Shadyside PGY1 Pharmacy Residency.

PROFESSIONAL DEVELOPMENT: EDUCATING THE NEXT GENERATION OF PRACTITIONERS

Online Continuing Education for Practitioners

Preceptor Development Home Study Modules

This year, the Experiential Learning Program continued expansion of its on-line, ACPE-accredited, home study continuing education modules for preceptors. The content is focused on principles and practices for successful precepting and experiential education, along with advances in pharmacy practice. A total of 8.0 contact hours of continuing pharmacy education credit are available in this educational series. To date, 95 different preceptors and interprofessional health care clinicians enrolled to complete one or more of the following modules, for a total of 373 Pitt Pharmacy educational modules delivered:

- An Introduction to Precepting at Pitt Pharmacy
- Leading the Way in Experiential Education
- Preceptor Roles and Responsibilities
- Creating (and Improving) Your Rotation
- Providing Student Feedback and Evaluations
- Integrating the Patient Care Process into Daily Practice
- Do You Have Time to Speak to the Pharmacist? Initiating Conversations About Substance Use
- Precepting: The Pharmacy Student Perspective
- Assessing Student Performance in Experiential Learning: The PittPharmacy Mastery Scale
- Opioid Overdose: Background, Statistics, and Use of Naloxone
- Preventing and Treating Opioid Use Disorders
- Entrustable Professional Activities

Live Continuing Education for Practitioners

The School of Pharmacy partnered with the UPMC Center for Continuing Education in the Health Sciences (CCEHS) to deliver live continuing education programs in FY19:

Fall Continuing Education Seminar

PittPharmacy hosted a three-hour program, “Updates in Pharmacy Practice and Education,” on Sunday, October 20, 2019. The program featured presentations by

- Kristine Schonder, PharmD, from the School of Pharmacy and Thomas E. Starzl Transplant Institute;
- Luke Berenbrok, PharmD, MS, BCACP, CTTS, from the School of Pharmacy;
- George Zlupko, MD, FCCP, Director, Lung Disease Center of Central Pennsylvania, and Altoona Lung Specialists.

The goal of this continuing education program was to educate attendees about the latest advances in immunizations, emerging information about the use of electronic cigarettes, and a new framework for student pharmacist assessment in experiential learning. The 46 participants were awarded 3.0 contact hours of continuing pharmacy education credit.

Spring Continuing Education Seminar

Due to COVID-19, the Spring Continuing Education seminar scheduled for May 3, 2020, was postponed and rescheduled the event as a Zoom webinar for Fall 2020. “Current Events in Pharmacy Practice” will The goal of this two-part program is to educate attendees about the pharmacologic challenges in the management of patients with COVID-19 and the updated immunization recommendations for pneumococcal vaccination.

Community Leadership, Innovation, and Practice (CLIP) Workshop Series

The workshops, which are run like one-day national meetings with a keynote speaker, usually provide continuing education for pharmacists and are required for P2 students; CE was not offered this year.

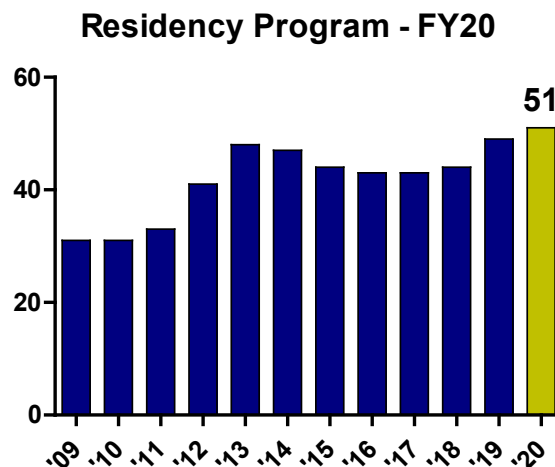
- January 10, 2020: “Community Pharmacy Practice Transformation: PA” Panel presented by Chris Antypas, Asti’s South Hills Pharmacy, Stephanie McGrath, PPCN, Melissa McGivney, PittPharmacy. 127 student pharmacists and pharmacist attended.
- February 7, 2020: “Community Engagement at Pitt” presented by Ms. Daren Ellerbee, M.S., Community Engagement Center in Homewood, University of Pittsburgh. 239 student pharmacists and pharmacist attended.
- March 6, 2020: “Flip the Pharmacy” and Evolving Community Pharmacy Services presented by Randy McDonough, PharmD, MS, BCGP, FAPhA, Co-Owner and Director of Clinical Services Towncrest, Solon Towncrest, and Towncrest Compounding Pharmacies, and PittPharmacy ’04 Alum, Suzanne Feeny, PharmD, Vice President of Business Development, CE Impact. 123 student pharmacists and pharmacist attended.
- April 17, 2020: “Future Vision and Opportunities in Pharmacy Practice” presented by Dan Buffington – Online platform. 122 student pharmacists and pharmacist attended.

RESIDENCY PROGRAM: EDUCATING THE NEXT GENERATION OF PRACTITIONERS

In FY20, PittPharmacy and its health care provider organizations partners had its highest ever number of residents in residency training program that provide outstanding training in research and teaching. The School provides three programs to enhance the training provided at each residency site:

- Resident Seminars
- Teaching Mastery
- Resident Research Series

Additional information can be found in the Education Appendix.



GRADUATE PROGRAM: EDUCATING THE NEXT GENERATION OF SCIENTISTS

Graduate Program in Pharmaceutical Sciences

This program prepares students for positions in academia, government, non-governmental organizations, and industry. The PhD program provides students with the skills to become independent researchers in the pharmaceutical sciences. The MS program provides students with the research skills necessary for entry into doctoral level (clinical doctorate or PhD training) or employment.

The MS and PhD degree programs offer six tracks:

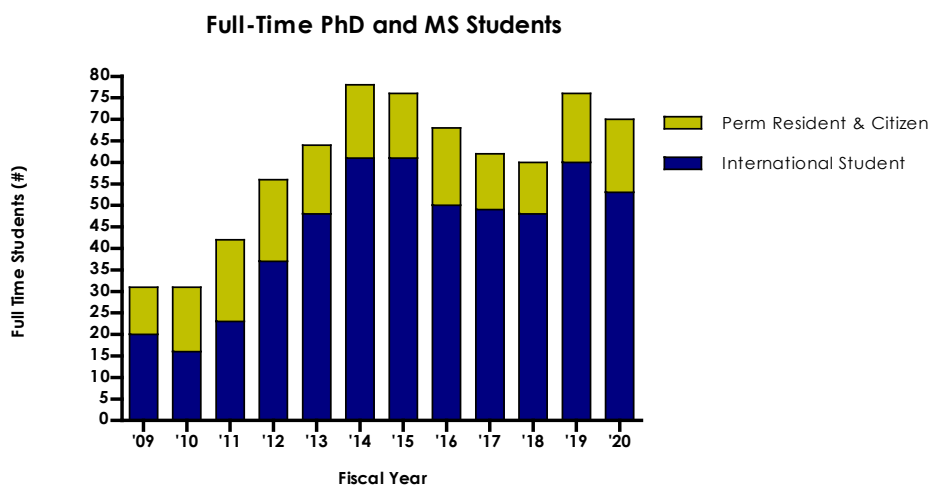
- biochemical pharmacology
- clinical pharmaceutical sciences (a specialized program to train students in clinical and translational science)
- medicinal chemistry
- pharmaceutical outcomes and policy research
- pharmaceuticals and pharmacometrics
- systems pharmacology

ADMISSION AND ENROLLMENT DEMOGRAPHICS

The total number of students enrolled in the graduate program for In FY20, students included 1 part-time and 70 full-time students. The part-time student was enrolled in the PhD program.

Of the 70 full-time students: 45 are PhD students; 25 are Master of Science students; none are non-thesis MS students.

- 37% (17/45) of the PhD students are U.S. citizens or permanent residents.
- 62% (28/45) of the PhD students have degrees from schools of pharmacy.
- 5 students passed the comprehensive examination and 4 achieved PhD candidate status.



FY20 Admission Demographics

For the class that enrolled in the fall of 2019:

- The school received 101 applications for the PhD program, 50 for the MS program and 6 for the non-thesis MS.
- 22 PhD students received admission offers; 16 enrolled (72% yield).
 - 6 of the 15 are US citizens.
 - 4 of the 15 have a PharmD degree.
 - One is a part-time student.
- 29 MS students received admission offers and 13 students enrolled (45% yield)
- No NTMS students were offered admission.

FY21 Admission Demographics

For the class that will enroll in the fall of 2020:

- The school received 93 applications for the PhD program, 62 for the MS program and 16 for the non-thesis MS.
- 21 PhD students received admission offers; nine enrolled (43% yield) and two deferred until fall 2021.
 - Five of the nine are US citizens or green-card holders.
 - One of the nine has a PharmD degree.
 - One is a part-time student.
- 31 MS students received admission offers and 11 students enrolled (35% yield). A further four deferred until the Spring 2021 semester and two deferred until the fall 2021 semester.
- 12 NTMS students were offered admission and eight enrolled (67% yield)

Students completing Graduate Degrees in 2019-2020

In FY20,

- 9 students completed Master of Science degrees.
- 14 students completed PhD degrees.

A comprehensive listing of all graduates can be found in the Education Appendix.

Awards to Graduate Students

In FY20, graduate students received 24 awards including:

- 6 research or presentation awards
- 10 competitive fellowships/scholarships
- 4 travel awards
- 4 other awards

A comprehensive listing of all awards can be found in the Education Appendix.

Graduate Student Publications and Presentations

In FY20, the research efforts of our graduate students resulted in:

- 68 publications.
- 24 presentations, posters, and podium presentations.

A comprehensive listing of all publications and presentations can be found in the Education Appendix.

Master of Pharmacy Business Administration Program

The Master of Pharmacy Business Administration Program (MPBA) is designed to prepare students from a variety of backgrounds for senior leadership roles in the pharmacy industry. MPBA offers a balanced curriculum that blends finance, leadership, strategy, data analytics, specialized pharmacy topics and experiential learning.

Since its January 2016 inception, the program has graduated 27 students residing in six states and two countries. The recently graduated (fourth) MPBA cohort included seven students with an average age of 38 years. Focus areas for the seven students who graduated in December 2019 are: Specialty Pharmacy Management (4 students), Community Pharmacy Management (1 student), and Pharmacy Benefit Management (2 students).

The current MPBA class consists of six students, five of whom are domestic and one who is international (UAE). The international student is the first in program history to remotely join the program from her home country and her aspirations include creating the first specialty pharmacy in the Middle East. The average age of the current cohort is 32 years. Focus areas for students include four students who are enrolled in Specialty Pharmacy Management, one student who is enrolled in Community Pharmacy Management and one student who is enrolled in Pharmacy Benefits Management.

The MPBA program has continued its collaboration with the Katz Graduate School of Business despite the 2020 pause of the Katz Executive MBA Worldwide (EMBA WW) program; it is expected that EMBA WW will re-start in 2021. The Katz faculty provide students with MPBA program-tailored materials for courses in Organizational Behavior, Financial Management, Accounting, Predictive Analytics, Marketing and Management Simulation.

C-suite perspective and insight are provided to students via the considerable support of distinguished PittPharmacy alumni and their contacts in the program's Graduate Executive Boardroom course. Generous MPBA scholarship funding is also provided by CVS Caremark, Rich Kruzynski, PANTHERx Rare Pharmacy and Allergan.

Due to COVID-19, the program transitioned in June 2020 to a remote hybrid format using both synchronous and asynchronous curricular elements. This model dramatically reduced the number of required in-person classes and offers the opportunity to expand MPBA's geographic recruiting reach. Katz faculty shared that both online learning and lifelong learning trends support a remote hybrid format and they enthusiastically supported the 2020-21 remote learning delivery model.

Dr. Gordon Vanscoy, whose vision and support for improving training for pharmacy industry professionals led to the creation of the MPBA program, officially retired from PittPharmacy in June 2020.

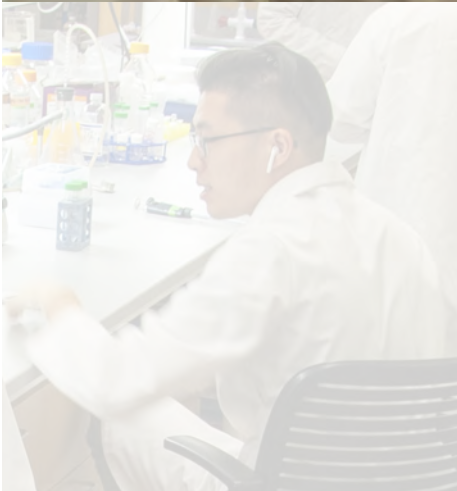
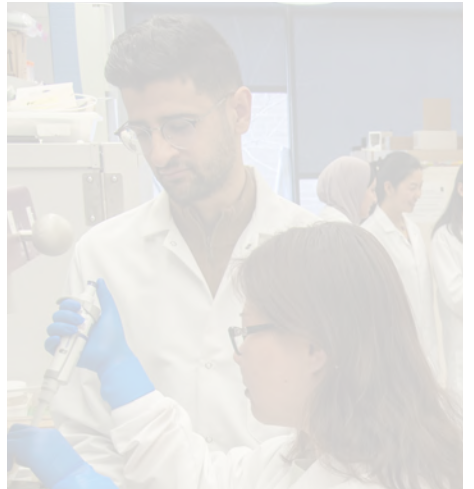
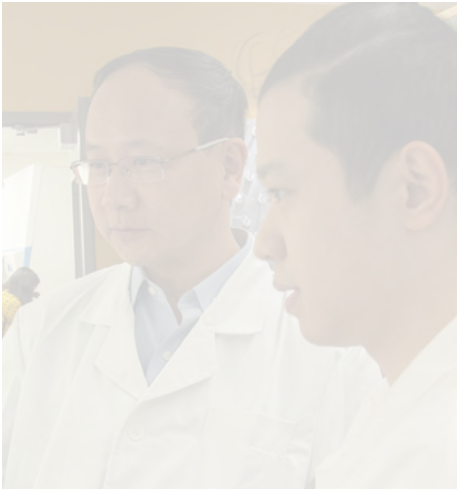
POSTDOCTORAL FELLOWS

In FY20, the School of Pharmacy hosted **16** postdoctoral associates from **12** universities in **5** countries.

A comprehensive listing of all postdoctoral associates can be found in the Education Appendix.

Engage in Research of Impact





Engage in Research of Impact

The overall goal of the School of Pharmacy’s research programs is to advance human health through a portfolio of research that ranges from computational drug discovery to preclinical development and patient outcomes. Supported by diversified funding sources, School of Pharmacy investigators are using state-of-the-art techniques to answer important questions that lead to new drug targets and improved drug therapy. Faculty are identifying sources of variability to improve patient outcomes and creating evidence-based guides for therapy. The quality of the science is shown through successful competition for NIH and other funding to support research.

RESEARCH BY THE NUMBERS FOR FY20

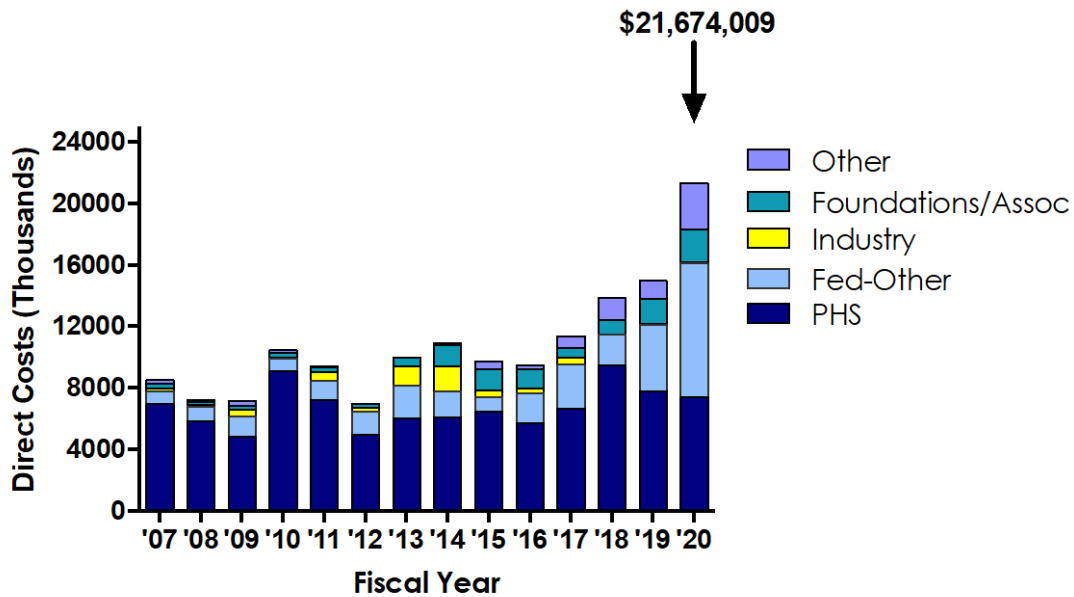
- Funded research projects generated **\$28,172,155** in total support (**\$21,674,009 million** in direct costs and **\$6,498,146** in indirect costs).
- PHS research funding was **\$7,380,210** in direct costs and **\$2,739,160** in indirect costs.
- **103**: the number of active research projects.
- **#8** among schools of pharmacy in NIH support for FY20 with **\$14.9 million** in funding (**#6** in overall funding and **#5** in total federal funding).
- **30** faculty members were principal investigators.
- **237** publications appeared in peer-reviewed journals
- Measures of innovation
 - 19 Invention Disclosures
 - 6 U.S. Patents Issued
 - 9 U.S. Patent Applications Filed and 3 PCT Applications Filed
 - 3 Deals (Licenses, Options, other Agreements recorded by the Innovation Institute as an FY20 Deal)

RESEARCH FUNDING

Direct Costs for Research by Funding Category

Source	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20
PHS	\$6,006,199	\$6,058,477	\$6,450,467	\$5,737,220	\$6,666,708	\$9,497,284	\$7,809,574	\$7,380,210
Federal-Oth	\$2,143,548	\$1,702,706	\$967,894	\$1,889,666	\$2,842,624	\$1,986,291	\$4,291,225	\$8,747,485
Industry	1,253,199	\$1,649,131	\$425,862	\$330,430	\$432,412	\$17,950	\$70,558	\$367,349
Found/Assoc	\$584,447	\$1,347,135	\$1,363,123	\$1,286,688	\$662,703	\$918,145	\$1,604,890	\$2,141,194
Other	0	\$180,224	\$507,487	\$251,459	\$777,283	\$1,454,871	\$1,204,801	\$3,037,771
TOTAL	\$9,987,393	\$10,937,673	\$9,714,833	\$9,495,463	\$11,381,730	\$13,874,541	\$14,981,048	\$21,674,009

Direct Costs: Research Funding



RESEARCH OVERVIEW

PittPharmacy is home to eight centers, through which the people of the School conduct much of the research. Significant accomplishments for the centers appear in this section. They include:

- Center for Pharmacogenetics
- Center for Clinical Pharmaceutical Sciences
- Community Leadership and Innovation in Pharmacy (CLIP) Center
- National Center of Excellence for Computational Drug Abuse Research (CDAR)
- Program Evaluation and Research Unit (PERU)
- Pharmacogenomics Center of Excellence
- Pharmaceutics Group and Microbicide Clinical Trials Network Central Laboratory Core
- Center for Education and Drug Abuse Research

Center for Pharmacogenetics (CPG)

Faculty

Christian Fernandez

Song Li, Director

Xiao-chao Ma

Wen Xie

Da Yang

Research Instructor

Jingjing Sun

Research Associate

Yixian Huang

Postdoctoral Research Associates

Weiwei Guo

Naveen Kumar

Pengfei Xu

Zehua Wang

Graduate Students

Anne Barbosa

Xinran Cai

Yuang Chen

Keito Hoshitsuki

Haozhe Huang

Sihan Li

Apurva Pardeshi

Hung-Chun Tung

Zhuoya Wan

Jingyuan Wang

Xiaofei Wang

Yifei Wang

Yue Wang

Gregory Young

Bei Zhang

Zigian Zhang

Visiting Scholars

Bo Liang

Jianhua Li

Jing Li

Pengfei Ren

Chaogang Wei

Yue Xi

Significant Research Results

- Dr. Xie's lab identified the long non-coding RNA ERINA (estrogen inducible lncRNA) as an estrogen responsive oncogenic lncRNA, whose elevated expression contributes to resistance to CDK inhibitor breast cancer drug palbociclib (IBRANCE®) and poor survival of ER positive breast cancer patients.
- Dr. Ma's team has uncovered an essential role of ABCG2 in the pathophysiology of erythropoietic protoporphyria (EPP). EPP is an inherited disease caused by loss-of-function mutations of ferrochelatase, an enzyme in the heme biosynthesis pathway that converts protoporphyrin IX (PPIX) into heme. PPIX accumulation in patients with EPP leads to phototoxicity and hepatotoxicity, and to date, there is no cure. Dr. Ma's team found that ABCG2 deficiency decreases PPIX distribution to the skin and therefore prevents EPP-associated phototoxicity. Dr. Ma's team also found that ABCG2 deficiency protects against EPP-associated

hepatotoxicity by modulating PPIX distribution, metabolism, and excretion. The current work provided novel strategies in the development of therapy for EPP.

- In the past year, Dr. Yang's lab focused on using computational tools to identify the genomic markers to predict drug resistance and to infer the potential drug combination for anti-cancer therapy. They successfully identified two FDA-approved drugs that could be effectively repurposed for use in triple-negative breast cancer. Yang is now collaborating with UPMC Hillman cancer center clinician and pharmaceutical company to conduct clinical trial.
- The Fernandez lab has moved the field of immunotoxicity forward by making two key discoveries with respect to identification of pharmacological targets that can prevent these immune-mediated clinical adverse drug reactions. First, the lab validated their previously published clinical studies, which suggest that modulating protein levels of the NFATC2 transcription have a corresponding effect on immunotoxicity. Their research demonstrated that inhibiting NFATC2 activation leads to decreased IL-4 levels and attenuates the development of anti-drug antibodies and onset of anaphylaxis in mice. Second, the team showed that rheumatoid arthritis patients that develop autoantibodies to the hinge region of human IgG1 (i.e., anti-hinge antibodies) are protected from TNF α inhibitor immunotoxicity, suggesting that this autoantibody may have anti-inflammatory properties through unknown mechanism.
- Dr Li's lab has developed an ultrasmall nanocarrier platform for codelivery of both hydrophilic and hydrophobic anticancer drugs. This technology helps to facilitate penetration into tumors with dense stroma which has proven to be of limited efficiency with most existing nanocarriers (~100 nm).

Representative Publications

- Fang Z, Wang Y, Wang Z, Xu M, Ren S, Yang D, Hong M, **Xie W**. *ERINA* is an estrogen-responsive lncRNA that drives breast cancer through the E2F1/RB1 pathway. *Cancer Res* 2020 Aug 21;canres.1031.2020. Online ahead of print PMID: 32826278.
- Wu Z, Li S, Tang X, Wang Y, Guo W, Cao G, Chen K, Zhang M, Guan M, **Yang D**. Copy Number Amplification of DNA Damage Repair Pathways Potentiates Therapeutic Resistance in Cancer. *Theranostics* 2020;10(9):3939-3951. doi: 10.7150/thno.39341. eCollection 2020. PubMed PMID: 32226530; PubMed Central PMCID: PMC7086350.
- Rathod SB*, Ramsey M*, Finkelman FD, **Fernandez CA**. Genetic inhibition of Nfatc2 attenuates asparaginase hypersensitivity in mice. *Blood Adv* 2020 4 (18): 4406–4416. PMID: 32931581.
- Wang P, Sachar M, Lu J, Shehu AI, Zhu J, Chen J, Liu K, Anderson KE, Xie W, Gonzalez FJ, Klaassen CD, **Ma X**. The essential role of the transporter ABCG2 in the pathophysiology of erythropoietic protoporphyria. *Sci Adv*. 2019 Sep 18;5(9):eaaw6127. Doi 10.1126/sciadv.aaw6127. eCollection 2019 Sep.
- Sun J, Chen Y, Xu J, Song X, Wan Z, Du Y, Ma W, Li X, Zhang L, **Li S**. High Loading of Hydrophobic and Hydrophilic Agents via Small Immunostimulatory Carrier for Enhanced Tumor Penetration and Combinational Therapy. *Theranostics* 2020 Jan 1;10(3):1136-1150. doi: 10.7150/thno.38287. eCollection 2020.PMID: 31938056.

Significant Invited Presentations

- **Wen Xie** was an invited speaker at Salk Symposium on Nuclear Receptors, The Salk Institute for Biological Sciences, La Jolla, CA. November 7-8, 2019
- **Christian Fernandez** was an invited speaker at The American Society for Pharmacology and Experimental Therapeutics (ASPET) Annual Meeting, San Diego, CA. April 4-7, 2020.
- **Song Li** was an invited speaker at 1st Asian Young Investigator Symposium on Pharmaceutical Science and Technology (AYISPST 2019) & the 1st Young Editorial Board Conference of the Asian Journal of Pharmaceutical Sciences (AJPS), Chengdu, China, September 20-22, 2019.

Selected Grants:

- 07/01/19 - 06/30/20
“Credentialing Long non-coding RNAs as Biomarkers for Invasive Lobular Breast Cancer”, UPMC Cancer Center Support Grant Pilot (Oesterreich & Yang, PI).
- 01/01/20 - 12/31/20
“Targeting Epigenetic Heterogeneity to Improve TNBC Immunotherapy Response”, UPMC Breast Cancer SPORE Pilot Project (Yang, PI).
- 07/01/20 – 06/30/21
“Determinants of COVID-19 Clinical Outcomes”, The Clinical and Translational Science Institute (CTSI) at the University of Pittsburgh COVID-19 Pilot Program, (Ernesto Marques & Fernandez, PI).

Innovations

- A novel therapy for Erythropoietic Protoporphyrin (EPP) and X-Linked Protoporphyrin (XLP) (PCT/US20/33746) (Ma’s lab).
- Polymeric carriers for delivery of therapeutic agents (US Provisional Patent Application: 63/048,374) (Li’s lab).
- Christian Fernandez has developed and is the process of implementing Pharmacy Innovation Experience and Research (PIER) PhD Program
 - Description: This 8-week interprofessional biomedical research internship aspires to increase the representation of underrepresented minority students in graduate programs at the University of Pittsburgh by providing participants from our various branch campuses and other local or national underrepresented minority undergraduate students with a strong foundation in basic laboratory skills, increasing their awareness of the graduate school application process, and assuring that participants are prepared to be competitive and successful graduate student.
 - Partners: Faculty from the Schools of Health Science
 - Estimated Number of participants: 10-20 students per year

Center for Clinical Pharmaceutical Sciences

Faculty

Jan Beumer	Samuel Poloyac, Director
Kerry M. Empey	Lisa Rohan
Philip E. Empey	Raman Venkataramanan
Thomas D. Nolin	

Graduate Students

Jonathan Birabaharan	Jessica Kosanovich
Morgan Casal	Madeline Kreider
Karryn Crisamore	Madeline Lipp
Josh Deppas	Lingjue Li
Yoko Franchetti	Chenxiao Tang

Fellows/Post-Docs

Katherine Eichinger
Melanie Weltman
Firuz Feturi
Imam Shaik
Xueming Xu

Significant Research Results

- The **Small Molecule Biomarker Core**
 - Assayed over 4,200 biospecimens to support 11 Pitt investigators
 - Received an NIH shared instrumentation grant to purchase a TSQ Altis UPLC triple quadrupole mass spectrometer.
- The clinical pharmacokinetics laboratory provided clinical service to nearly 1000 UPMC patients.

Representative Publications

- Good M, Kolls JK, **Empey KM**. Neonatal Pulmonary Host Defense Mechanisms. In: *Fetal & Neonatal Physiology, 6th Ed.* Chap 123, Elsevier Ed. By Polin, Fox, Abman. 2020.
 - Invited chapter of a leading textbook for medical education.
- Hagos FT, Horvat CM, Au AK, Conley YP, Li L, **Poloyac SM**, Kochanek PM, Clark RSB, **Empey PE**. Factors Contributing to Fentanyl Pharmacokinetic Variability Among Diagnostically Diverse Critically Ill Children. *Clin Pharmacokinet.* 2019 Dec;58(12):1567-1576.
 - Shows the utility of using electronic record data and remnant blood samples to construct population pharmacokinetic models for a heterogeneous cohort of critically ill children.
- Franchetti Y, **Nolin TD**. Simultaneous assessment of hepatic transport and metabolism pathways with a single probe using individualized PBPK modeling of ¹⁴CO₂ production rate data. *J Pharmacol Exp Ther* 2019;371(1):151-161. PMID: 31399494.
 - A novel individualized physiologically-based pharmacokinetic modeling approach incorporating rate data (iPBPK-R) that enables us to distinguish and simultaneously estimate the activity of multiple non-renal elimination pathways in humans using a single probe.
- Zhang H, Bastian Pharm D JR, Zhao W, Chen H, Caritis SN, Shaik I, Chaphekar N, **Venkataramanan R**. Pregnancy Alters CYP and UGT Mediated Metabolism of Buprenorphine. *Ther Drug Monit.* 2020 Jan 9.
 - Describes important changes in metabolism of a commonly used drug during pregnancy.

Significant Invited Presentations

- “Pragmatic Assessment of Kidney Impairment Effects on Drug Exposure and Response”. Keynote lecture at the Janssen 21st Annual Quantitative Sciences Conference, Spring House, PA, Oct 2019. **Nolin TD**
- “To Treat or Not to Treat: Medication Toxicity and Clinical Conundrums”. American Society of Nephrology Annual Meeting, Kidney Week 2019, Washington, D.C., Nov 2019. **Nolin TD**
- “*Choices, Choices, Choices: Seeking Synergy in PharmD and PhD Admissions.*” AACP Annual Meeting. Chicago, IL. Jul 2019. **Poloyac SM**
- “*Developing a Plan for Career Success.*” AACP Early Career Faculty Workshop. AACP Annual Meeting. Chicago, IL. Jul 2019. **Poloyac SM**
- “Polymeric Films for Drug Delivery.” 2019 NICHD Annual Contraceptive Development Meeting, Houston, TX. Nov 2019, **Rohan L**
- “Buprenorphine PK in pregnancy.” Thomas Jefferson University, Philadelphia, Jan 2020. **Venkataramanan R**

Significant Grants

- NIH/NICHD R01 (R01HD099284-02) “Pharmacokinetics of sedatives – Understanding a modifiable risk factor for pediatric delirium.” 2019-2024. **Empey PE (PI)**.
- NIH/NIGMS S10 (OD028540-01) “Small Molecule Biomarker Core: TSQ Altis LC-MS/MS” 2020-2021. **Poloyac SM (PI)**.
- Calder Biosciences Inc. “Maternal RSV Vaccination with a Stabilized RSV PreF Protein” 2020-2021. **Empey KM (PI)**.
- NIH/NCI UM1 (CA186690) “NCI ETCTN Pittsburgh Cancer Consortium (PCC)” 2020-2026. **Beumer JH (PI)**.
- NIH/NCI U24 (CA247643) “PITT-CAL ETCTN PK Resource Lab” 2020-2026. **Beumer JH (PI)**.
- R.K. Mellon. “Development of a nasally administered antiviral drug.” 2020. **Rohan L (PI)**.
- United Therapeutics. “I/R injury prevention of lungs”. 2020. **Venkataramanan R (PI)**.
- CPS trainees were awarded highly competitive pre- or post-doctoral fellowships from the NIH (TL1) **Birabaharan J, Crisamore KC, Eichinger K, and Hoshitsuki K**; (T32) **Lipp M**; FDA (ORISE) **Franchetti Y**, and the American Foundation for Pharmaceutical Education: **Crisamore KC and Hoshitsuki KC**.

Innovations

- Patent executed in US: Compositions and methods for vaccination against respiratory syncytial virus infection. In collaboration with Calder Biosciences Inc. and Vaxine Pty, Ltd. PCT/US2019/022549. Inventors: **Empey KM**, Petrovsky N, Marshall C, Yondola M.
- Completed a provisional patent on our compounds discovered as part of our R21/R33 NINDS grant for novel therapies for neuroprotection after pediatric cardiac arrest. R21/R33 NS107785 (MPI: **Poloyac SM**, McDermott L)

- **Nolin T** is Editor of the textbook *Pharmacotherapy: A Pathophysiologic Approach*, which is the #1 textbook in the PharmD educational space worldwide and one of the top books in the McGraw-Hill Medical portfolio of health-related textbooks; 11th ed published June 2020.
- **Poloyac SM** served as the Chair of the AACP Council of Deans Task Force on Successful Practices in Applying Competencies for Graduate Education in Pharmacy
- **Empey KM** organized the International Autumn Immunology Conference, Chicago, US 2019.
- **Beumer JH** serves as US Editor-in-chief of the journal *Cancer Chemotherapy and Pharmacology*

COMMUNITY LEADERSHIP AND INNOVATION IN PHARMACY (CLIP) CENTER

Faculty

Lucas Berenbrok	Inmaculada Hernandez
Kim C. Coley	Lauren Jonkman
Sharon Connor	Melissa S. McGivney, Director
Scott Drab	Karen Pater
Philip Empey	Catherine Rebitch
Victoria Grieve	Christine Ruby-Scelsi
Deanne Hall	

Staff

Brandon Antinopoulos	Renee Fry	Alison Zappa
Natalie Capozzolo	Stephanie McGrath	
Joni Carroll	Ravi Patel	

Fellows

Sophia Cothrel Herbert
Ryley Uber

Residents

Precious Dadzie	Kelsey Hake
Kayla Davis	Jennifer Ko
Carly Gabriel	Evan Turco

Patient Care:

In FY20, School of Pharmacy faculty members:

- Served approximately **3,500 patients** at local health centers, clinics, shelters and drop-in-centers, dispensed over **6,000 prescriptions, at no cost** to the patient; value of prescriptions exceeds \$500,000. **[Jonkman, Connor, Pater, Carroll, Rebitch]**
- Engaged over **250 student pharmacists and pharmacy residents** in the provision of patient care and oversaw **over 3,000 volunteer hours** provided by pharmacists and student pharmacists. **[Jonkman, Connor, Pater, Carroll, Rebitch]**
- Participated in the provision of **over 2,000 influenza vaccinations** with the Allegheny County Health Department, Giant Eagle Pharmacy, Rite Aid Pharmacy and Asti's South Hills Pharmacy. **[Carroll, Gabriel, Herbert, Hake, Turco]**

- Coordinated and provided **over 4,500 influenza vaccinations** to Pitt and UPMC faculty, staff and students. [**Hall, Berenbrok, Dadzie, Davis, Ko**]
- Engaged over **90 community pharmacy locations** with 114 student pharmacists **providing care to over 4,000 people**. [**McGivney, Antinopoulos, Herbert**]
- Supported the Pennsylvania Pharmacist Care Network with over **150 pharmacies statewide** who have **provided care to over 10,000 people** with Medicaid since 2017. [**McGrath, McGivney, Coley, Carroll, Antinopoulos, Herbert**]
- Provided **over 800 documented interventions for over 250 senior citizens at 14 senior center locations** through the Silver Scripts Program. [**Berenbrok, Coley, Hake, Turco, Gabriel**]
- Enrolled **nearly 1000 people into the NIH All of Us research registry** through our partnership with Giant Eagle pharmacy and CTSI. [**Antinopoulos, Gabriel**]

Representative Publications:

- **Coley KC, Gessler C, McGivney M, Richardson R, DeJames J, Berenbrok LA.** Increasing adult vaccinations at a regional supermarket chain pharmacy: A multi-site demonstration project. *Vaccine*. 2020;38(24):4044-4049. PMID: 32093985.
- Aungst, T. D., **Patel, R.** (2020). Integrating Digital Health into the Curriculum—Considerations on the Current Landscape and Future Developments. *Journal of Medical Education and Curricular Development*, 7, 2382120519901275.
- Sutt AR*, Pagliaro AM*, Wilson E*, Renner H*, **Hall D, Berenbrok LA, McGivney MS, Coley KC.** Facilitating Pandemic Influenza Vaccination Implementation in Grocery Store Chain Community Pharmacies. *J Am Pharm Assoc* 2019;59(6):848-851. Available at: [https://www.japha.org/article/S1544-3191\(19\)30335-8/fulltext](https://www.japha.org/article/S1544-3191(19)30335-8/fulltext)
- **Carroll JC, McGivney MS, Coley KC.** Stakeholder-guided formation of a statewide community pharmacy practice-based research network. *Pharmacy*. 2019 Aug 17;7(3).
- Ko J, **Connor SE, Jonkman LJ,** Abraham O. Student Pharmacists’ Perspectives of Service-Learning Experiences in Free Clinics. *Am J Pharm Ed*. 2019; 83 (9) Article 7379.
- Mishra SD, **Rebitch CB,** Choi I. Exploring student perceptions and attitude towards various aspects of peer feedback in a pharmacotherapy course. *Currents in Pharmacy Teaching and Learning*. 2020 June;12(6):701-708. doi: j.cptl.2019.10.007.

Significant Invited Presentations:

- **Connor S,** Covvey J, Kahaleh A, Ryan M, **Jonkman L,** Seed S. Soft Skills need Hard Tools: Assessment in Global Health. Public Health SIG/Global Pharmacy Education SIG Joint Session. American Association of Colleges of Pharmacy Annual Meeting. Virtual meeting. July 2020.
- **Berenbrok L.** March 2020, Preparing for OTC hearing aids: Are you ready? American Pharmacists Association Annual Meeting and Exposition, National Harbor, MD (Conference cancelled, presentation available online May 2020)
- **McGivney MS.** “Schools and Colleges Partnering to Support Community Pharmacy Practice Transformation: Updates from the ACT Pharmacy Collaborative”. Invited speaker. American Association of Colleges of Pharmacy (AACCP) Interim Meeting. San Juan, Puerto Rico. February 12, 2020.

- **McGivney MS.** “Pennsylvania: a CPESN/ACT/FtP Collaboration Case Study”. Invited Speaker. National Association of State Pharmacy Associations (NASPA). San Diego, CA. October 26, 2019.

Significant Grants:

- The impact of a multimedia educational campaign on meningococcal group B vaccination rates in a University population. Premier Healthcare Solutions, Inc.
Berenbrok L [PI], Coley C, et al. \$250,000 2019-2021
- CDC Overdose Data to Action: Allegheny County Overdose Prevention Collaborative. Centers for Disease Control (CDC). Subcontractor to Allegheny County Health Department.
Carroll JC [PI], Coley K, McGivney MS \$100,649 2019-202
- A statewide community pharmacy research network aligning patients, providers and researchers. PCORI (Patient-Centered Outcomes Research Institute).
Coley K [PI], Carroll JC, McGivney MS. \$249,937 2018-2020
- Implementing a Hepatitis B Vaccination Program at a Regional Chain Community Pharmacy. National Association of Chain Drug Stores (NACDS).
Coley K [PI], Berenbrok LB. \$300,818 2019-2020
- Flip the Pharmacy. Community Pharmacy Foundation.
McGrath SH [PI], Antinopoulos BA, Cothrel SM. \$115,772 2019-2021

Significant Innovations

- Created CHAMP: Championing Hearing Using Accessible Medication Experts at the Community Pharmacy – a highly interactive, online program teaches pharmacists to safely and effectively help patients seeking hearing aids at the community pharmacy by addressing professional competencies created and agreed upon by professional pharmacy and audiology organizations, hearing aid industry experts, and persons with hearing loss. **[Berenbrok L]**
- Established a telepharmacy program for underserved patients to continue to receive medications and medication-related care during COVID-19. **[Jonkman L, Connor S, Pater K, Rebitch C]**
- Established the ACT (Academia-CPESN Transformation) Pharmacy Collaborative: the **first nationwide collaborative of schools/college of pharmacy** to partner together to foster community pharmacy practice transformation. To date, **89 schools of pharmacy nationwide, including over 260 faculty** have joined. **[McGivney, Cothrel, Zappa, McGrath, Coley, Carroll]**
- Launched the fourth Medicaid contract for the Pennsylvania Pharmacists Association’s Pennsylvania Pharmacists Care Network (PPCN) serving over 2,000 people in over 100 local pharmacies. Nine students served as the Quality Engagement Team for PPCN contacting pharmacists bi-weekly to support provision of patient care: **[McGrath, Antinopoulos, Coley, Carroll, Cothrel, McGivney]**
- Established a partnership with the Allegheny County Health Department to provide pharmacy services to the County: **[Carroll, Cothrel, McGivney]**

National Center of Excellence for Computational Drug Research (CDAR)

Faculty

Xiang-Qun (Sean) Xie, Director
Junmei Wang
Terence McGuire
Lirong Wang
Zhiwei Feng
Jaden Jun
Ying Xue

Graduate Students

Shifan Ma	Beihong Ji	Tianjian Liang
Changrui Xing	Peihao Fan	Xiguang Qi
Yuemin Bian	Shuhan Liu	Xiaojiang Guo
Yankang Jing	Yuchen Sun	Yuzhao Zhang
Ziheng Hu	Siyi Wang	Jingchen Zhai
Jacob Cuyler	Mingzhe Shen	Tianling Hou

Visiting Scholars & Postdoctoral Fellows

Jin Cheng
Jing Tian
Ying Xue

Research Scientists

Xibing He
Viet Man

PharmD Students

Weiwei Lin
Hui Chen

Significant Research Results

- **Advances in Cannabinoid Receptor 2 (CB2) research publication in CELL 2020**
 - Obtained the 3.2 Å high-resolution Cryo-EM structure of the human cannabinoid receptor CB2-Gi signaling complex & reported these findings in *Cell* (see Publication #1, below).
 - Developed a novel CB2 inverse agonist that has demonstrated activity toward attenuating cocaine addiction collaborative with NIDA (see Publication #6, below).
 - Developed several computational tools constructed for development of orthosteric and allosteric small molecules selectively targeting CB2, as well as to analyze the systems pharmacology of cannabidiol (3 Publications, not listed below).

- Re-submitted an R01 (previously scored) focusing on obtaining the 3-D structure of allosteric modulator-bound CB2 & computationally-guided development of novel CB2 PAMs and NAMs (preliminary data has recently been obtained).
 - Worked with CASIS toward launching an experiment into NASA International Space Lab to study crystallization of activated CB2 in microgravity.
- **Pharmacometrics & Systems Pharmacology (PSP) Program** (XQ Xie, JM Wang, ZW Feng, LR Wang, Y Xue)
 - Constructed robust models for predicting substance use disorder and substance use severity (a newly established substance use/drug abuse outcome) (see Publications # 2 and 3, below).
 - Used PSP & physiologically-based pharmacokinetic (PBPK) modeling *to elucidate opioid drug-drug interaction mechanisms* for:
 - opioids and benzodiazepines (see Publication #4, below)
 - fentanyl-laced cocaine (Publication not listed)
 - **Novel Platforms or Tools for Computer-Aided Drug Design** (XQ Xie, JM Wang, ZW Feng)

Constructed several computational tools to facilitate drug design & development, including:

 - Virus-CKB – an integrated bioinformatics platform and analysis resource for COVID-19 drug re-purposing research (see Publications #5)
 - MCCS – a novel Molecular Complex Characterizing System scoring function-based algorithm that characterizes the recognition pattern of protein-ligand interactions through calculating the energy contribution from either an individual amino acid residue or a fragment of a small molecule (see “Innovations”, below). (see Publications #7)
 - PAIN-CKB - A Pain-Domain-Specific Chemogenomics Knowledgebase for target identification and systems pharmacology research (Publication not shown)
 - Extended linear interaction energy method to calculate protein-ligand binding affinities
 - **Computational Studies in and Tool Development for Alzheimer’s Disease (AD) Research**
 - Virtual oligomerization inhibition to identify potent inhibitors of A β oligomerization
 - Rat model of AD - Computational systems pharmacology analysis & Experimental validation
 - Simulation study of Amyloid- β 42 Aggregate Formation
 - All-atom molecular mechanics force fields – effects on amyloid peptide assembly

Representative Publications

- Xing, C.; Zhuang, Y.; Xu, T.-H.; **Feng, Z.**; Zhou, X. E.; Chen, M.; Wang, L.; Meng, X.; **Xue, Y.**; **Wang, J.**; Liu, H.; **McGuire, T. F.**; Zhao, G.; Melcher, K.; Zhang, C.; Xu, H. E.; **Xie, X.-Q.***, Cryo-EM Structure of the Human Cannabinoid Receptor CB2-Gi Signaling Complex. *Cell (Cambridge, MA, U. S.)* **2020** Feb 20, 180 (4), 645-654.e13. PMID:32004460. DOI: [10.1016/j.cell.2020.01.007](https://doi.org/10.1016/j.cell.2020.01.007) (IMPACT FACTOR 38.23)
- Hu, Z.; Jing, Y.; **Xue, Y.**; Fan, P.; **Wang, L.**; Vanyukov, M.; Kirisci, L.; **Wang, J.**; Tarter, R. E.; **Xie, X.-Q.***, Analysis of substance use and its outcomes by machine learning: II. Derivation and prediction of the trajectory of substance use severity. *Drug Alcohol Depend* **2020** Jan 1, 206, 107604. PMID:31615693. PMCID:PMC7476073. DOI:[10.1016/j.drugalcdep.2019.107604](https://doi.org/10.1016/j.drugalcdep.2019.107604)

- Jing, Y.; Hu, Z.; Fan, P.; **Xue, Y.**; **Wang, L.**; Tarter, R. E.; Kirisci, L.; **Wang, J.**; Vanyukov, M.; **Xie, X.-Q.***, Analysis of substance use and its outcomes by machine learning I. Childhood evaluation of liability to substance use disorder. *Drug Alcohol Depend.* **2020** Jan 1, *206*, 107605. PMID:31839402. PMCID:PMC6980708. DOI: [10.1016/j.drugalcdep.2019.107605](https://doi.org/10.1016/j.drugalcdep.2019.107605)
- Ji, B.; Liu, S.; **Xue, Y.**; He, X.; Man, V. H.; **Xie, X.-Q.**; **Wang, J.***, Prediction of Drug-Drug Interactions Between Opioids and Overdosed Benzodiazepines Using Physiologically Based Pharmacokinetic (PBPK) Modeling and Simulation. *Drugs R&D* **2019** Sept, *19* (3), 297-305. PMID:31482303. PMCID:[PMC6738369](https://pubmed.ncbi.nlm.nih.gov/PMC6738369/).
- **Feng ZW**, Chen M, Liang T, Shen M, Chen H, **Xie XQ***. Virus-CKB: an integrated bioinformatics platform and analysis resource for COVID-19 research [published online ahead of print, 2020 Jul 27]. *Brief Bioinform.* **2020**;bbaa155. doi:10.1093/bib/bbaa155. PMID:32715315. PMCID: [PMC7454273](https://pubmed.ncbi.nlm.nih.gov/PMC7454273/)
- Jordan CJ, **Feng ZW**, Galaj, E., Bi, G.H., **Xue, Y.**, Liang, Y., **McGuire, T.**, **Xie, X.Q.*** and Xi, Z.X.* Xie2-64, a novel CB2 receptor inverse agonist, reduces cocaine abuse-related behaviors in rodents. *Neuropharmacology* **2020** 176:108241. [10.1016/j.neuropharm.2020.108241](https://doi.org/10.1016/j.neuropharm.2020.108241)
- Chen M, **Feng ZW**, Wang S, Lin W, **Xie XQ***. MCCS, a novel characterization method for protein-ligand complex. *Brief Bioinform.* **2020** Oct, bbaa239. PMID:33051641. DOI: [10.1093/bib/bbaa239](https://doi.org/10.1093/bib/bbaa239)

Significant Invited Presentations

- Xie, X-Q (Invited), “**AI Disease-specific Chemogenomics KB and Pharmacometrics System Pharmacology (PSP) Platform**” Horizon 2020 Meeting, Workshop on Knowledge Translation in Cancer Study, **July 30, 2020**, Teeside University (UK) (Online Meeting).
- Xie, X-Q (Invited), “**Novel Target-specific Anti-Multiple Myeloma Drug Sequesta106®**” in Venture Show Case Convention by joint initiative of NIH National Cancer Institute (NCI) Small Business Innovation Research (SBIR) center and Johnson & Johnson Innovation Center, Boston Innovation Center in Cambridge, MA. It was designed to connect a selection of promising NCI SBIR companies focused on early stage oncology solutions with corporate and venture investors. **June 19-20, 2019**, Boston Cambridge, MA.
- Xie, X-Q (Invited). “**Chemogenomics Systems Pharmacology Approach for TBI and AD Research**”. FY19 PRARP in Progress Review Annual Meeting, DOD grant Contract #: W81XWH-16-1-0490. **Sept 29, 2019**. 1076 Patchel Street, Fort Detrick, MD 21702.
- Xie, X-Q (Invited), **Charter Member of the FDA Science Advisory Board meeting**. FDA White Oak Campus, Building 31, The Great Room (Rm. 1503). 10903 New Hampshire Ave, Silver Spring, Maryland 20993. **October 7, 2019**.
- Xie X-Q (Invited). “**Pharmacometrics & System Pharmacology(PSP) -- An Integrated PSP Platform of GPU Computational Chemogenomics Knowledgebased Drug Discovery.**” The 6th Clarivate China Pharmaceutical Industry Conference **29-30 August 2019**, in Beijing, China.

Significant Grants

- **30 DA035778 (Director: Xie)** 09/01/2014-08/31/2019 (1 Year No Cost Extension)
09/01/2021-08/31/2026 (Renewal Pending)
NIDA Center of Excellence of Computational Drug Abuse Research (CDAR)
National Institutes of Health
The overall goal of the Computational Drug Abuse Research (CDAR) Center is to advance state-of-the-art computational technologies for research toward the prevention and treatment of drug abuse (DA) and DA-related diseases.
- **DOD W81XWH-16-1-049 (Xie)** 09/01/2016-08/30/20
Chemogenomics Systems Pharmacology Approach for TBI and AD Research
Military personnel and other individuals who suffer from traumatic brain injury (TBI) face an increased risk for developing several long-term health problems including AD-like dementia, aggression, memory loss, depression, and symptoms similar to those of AD. We have obtained significant results through application of computational approaches and have published these findings (*J Neurotrauma* 2018 Sep 6. doi: 10.1089/neu.2018.5757).
- NASA Space CASIS (The Center for the Advancement of Science in Space) (Xie)
Crystallization of G-protein coupled CB2 receptor and co-crystallization with ligands
Funds Requested: \$70,000
Submitted: May, 2019
Status: Funded for ready to be launched in summer 2021
We are actively engaged in planning an experiment for the rocket launch in spring of 2021 which entails growing crystals of agonist-bound CB2 in microgravity. A successful outcome would permit the very high resolution of the active CB2 structure and would greatly facilitate the discovery of drugs targeting CB2.
- **1955260 (Wang, J) National Science Foundation** 07/01/2020-06/30/2023
CDS&E: D3SC: Developing A Molecular Mechanics Modeling Platform (MMMP) for Studying Molecular Interactions
Award Amount: \$500,000 (*Funded*)
Submitted: 10/1/2019
The major goal of the project is to improve and redevelop a set of computational tools to facilitate users from a broad range of disciplines to generate high quality molecular mechanical force field parameters.
- **3R01MH113857 - 02W1 (Price, Rebecca)** 12/01/18-06/30/22 0.7 calendar
NIH/NIMH \$46,648
Improving Precision of Ketamine Metabolite Assays
Role: Pharmacokinetics Expert (Junmei Wang)
This project seeks to identify the neural and cognitive changes that accompany rapid relief from depressive symptoms following intravenous ketamine.

Innovations

- **First structural signaling complex elucidation of CB2 bound with agonist and Gi using cryo-EM.** After several years of effort by the Xie lab, we have succeeded in obtaining the high resolution cryo-EM 3-D structure for the agonist-bound human CB2/G_i signaling complex. Information obtained from this study will greatly aid us in obtaining the cryo-EM structure of positive allosteric modulator (PAM)-bound CB2 and in discovery the key residues involved with PAM binding to the CB2 allosteric pocket, and aid in new CB2 drug development. Dr. Xie's team has recently already discovered new CB2 NAMs which may serve as drug leads for various human diseases regulated by CB2.
- **Molecular Complex Characterizing System (MCCS) Algorithm** – developed by the Sean Xie lab, MCCS is a novel scoring function-based algorithm that characterizes the recognition pattern of protein-ligand interactions through calculating the energy contribution from either an individual amino acid residue or a fragment of a small molecule. MCCS has the capability of identifying the most important residues of a receptor pocket and the most important fragment/scaffold of a small molecule. Thus, MCCS can report: **(i)** the common residues that contribute to both the agonist and antagonist binding, and **(ii)** the distinguishing residues for agonist or antagonist binding.
- **SmartSUD** – A prototype of artificial intelligent (AI)-guided mobile application monitoring substance use disorder (SUD) in adolescents and young adults (patent pending). SmartSUD is in the finalist and pending for pitch to UPMC Enterprise Initiative.

Program Evaluation Research Unit (PERU)

Faculty

Janice L. Pringle

Patient Care:

Measurement	Patients Impacted
Number of Healthcare Professionals Trained	1,716
Number of Students Trained	337
Number of Screenings	64,842
Number of Brief Interventions	3,975
Number of Patients Referrals to Treatment	790

Representative Publications:

- Warwick, J. “A Framework for Systems Transformation as a Facilitator to Overcome Barriers Related to the Implementation of Medication-Assisted Treatment within Rural Primary Care Practices. In: Garets M, Archer S, Kitchens C, Cochran G, Gordon AJ. The 2019 Addiction Health Services Research Conference: Insights, review, and abstracts.” *Substance Abuse* (2019): 40(4):469-472 (Supp 113).
 - *Significance: The Systems Transformation Framework, developed by Dr. Janice Pringle, and strategies, such as concierge technical assistance, expert teleconsultation, and performance measurement, can be used to overcome barriers encountered during implementation of medication-assisted treatment in primary care settings.*
- Cole, E. S., DiDomenico, E., Cochran, G., Gordon, A. J., Gellad, W. F., Pringle, J. L., Warwick, J., Chang, C. H., Kim, J. Y., Kmiec, J., Kelley, D., Donohue, J. M. (2019, March). The Role of Primary Care in Improving Access to Medication-Assisted Treatment for Rural Medicaid Enrollees with Opioid Use Disorder. *Journal of General Internal Medicine*. 34(6), 936-43. Published electronically, DOI: 10.1007/s11606-019-04943-6.
- Pringle, J. L., Cochran, J., Aruru, M. (2019). Role of Pharmacists in the Opioid Use Disorder (OUD) crisis. *Research in Social & Administrative Pharmacy*, 15(2), 228-229.
- Cochran, G., Warwick, J. ... & Pringle, J. (2019). Rural Access to MAT in Pennsylvania (RAMP): A Hybrid Implementation Study Protocol for Medication Assisted Treatment Adoption among Rural Primary Care Providers. *Addiction Science and Clinical Practice*. Accepted.

Significant Invited Presentations:

- Oral Presentation, “A Systems-change Implementation Framework to Address Substance Misuse in Clinical Settings,” American Public Health Association Annual Meeting and Expo. Philadelphia, PA. November 2019.
- Oral Presentation, “Pharmacy Students’ Knowledge and Perceived Competency in Conducting SBIRT for Substance Use Disorders,” Poster. American Public Health Association Annual Meeting. Philadelphia, PA. November 2019.
- “Opioids, Overdoses and the Role of Pharmacists.” American Pharmacists Association, Academy of Student Pharmacists. October 2019.
- Oral Presentation, “Using A Systematic Continuous Quality Improvement Process to Improve the Provision of Medication-Assisted Treatment for Opioid Use Disorder Within Rural Primary Care Practices,” Academy Health Annual Conference on the Science of Dissemination and Implementation. Arlington, VA. December 2019.
- Workshop, Panel-Presenter, Pennsylvania Representative, “Medication Assisted Treatment in Rural Communities: Lessons Learned from AHRQ-Supported Implementations in Five States,” North American Primary Care Research Group Annual Conference. Toronto, ON. November 2019.
- Oral Presentation, “Strategies to Mitigate Diversion of Buprenorphine and Improve Treatment Adherence,” Pennsylvania Department of Health Medication-Assisted Treatment Summits. Erie, PA. November 2019.
- Oral Presentation, “Continuity of Medication-Assisted Treatment: Frequency, Patterns of Provider Switching, and Impact on a Medicaid-Enrolled Population,” Addiction Health Services Research Conference. Park City, UT. October 2019.

- Oral Presentation, “A Framework for Systems Transformation as a Facilitator to Overcome Barriers Related to the Implementation of Medication-Assisted Treatment within Rural Primary Care Practices,” Addiction Health Services Research Conference. Park City, UT. October 2019.
- Oral Presentation, “SCOPE First Responder Project,” National Collegiate EMS Foundation Conference. Boston, MA. February 2020.
- Oral Presentations, “Data Updates,” Regional COE Learning Network Sessions, various locations. October – November 2019; May 2020.
- Oral Presentation, “Emerging Threats,” United in Recovery Virtual Conference. Columbia, Montour. May 2020.
- Webinar, “Coe Outcomes Survey,” Regional COE Learning Network Session, remote. April 2020.

Significant Grants:

- The Supporting Overdose Recovery and Substance Use Prevention (SUPPORT) Program will integrate prevention, treatment, and recovery service throughout Greene County, a very rural county in Southwestern Pennsylvania. PERU will lead the implementation and evaluation of activities that aim to improve the coordination of care for substance use disorder and co-mental disorders to ultimately reduce prevalence and incidence of disease caused by drug and alcohol misuse.
- The Pennsylvania Medications for Opioid Use Disorder Technical Assistance and Quality Improvement Expansion Project will support MOUD treatment implementation and optimization throughout urban and rural Pennsylvania. This program will provide increased access to the highest quality MOUD through 15 high-capacity clinic sites. PERU will lead the program’s implementation, evaluation, and quality improvement activities, including electronic health record data extraction and performance reporting.
- The SCOPE Pennsylvania project aims to train First Responders in order to improve access and utilization of naloxone and facilitate effective connection of patients with Opioid Use Disorder (OUD) to treatment. First responders include law enforcement, emergency medical services (EMS) and fire departments in a thirtythree county catchment area comprising 43% of overdoses in the Commonwealth. Training objectives include utilizing naloxone in a culturally competent and patient-centered manner, using motivational interviewing principles to conduct referrals and “warm handoffs” to treatment, increasing access to naloxone through “leave behinds,” and training first responders on safety around fentanyl, carfentanil, and other dangerous/illicit drugs.
- Commonwealth Opioid Medical Medication-Assisted Treatment Integration and Training Program. The COMMIT Program is implementing an innovative medication assisted treatment (MAT) hub and spoke model within Washington County, a large rural county in southwest Pennsylvania. PERU will serve as the “Uber Hub” and will lead COMMIT’s implementation, evaluation and sustainability. Project Period: September 2018-2021 Sponsor: Substance Abuse and Mental Health Services Administration Award: \$1,550,000 (3 year).

- Strategies to Coordinate Overdose Prevention through Emergency Medical Services (SCOPE) in Westmoreland and Surrounding Counties. PERU will provide technical assistance to participating county agencies through education workshops for EMS personnel, assistance in collecting and analyzing data, implementing sustainable protocols, assisting in the development of tailored implementation plans, and providing ongoing technical assistance. Project Period: September 30, 2018 – September 29, 2022 Award: \$859,971 Sponsor: Substance Abuse and Mental Health Services Administration (SAMHSA)/Subaward through the Westmoreland Drug & Alcohol Commission.
- Centers of Excellence Technical Assistance and Learning Network Development. In order to support the Centers of Excellence in their efforts to integrate physical and behavioral healthcare, expand access to medication-assisted treatment, and engage individuals along the continuum of care through the use of community-based care management teams, the University shall provide direct one-to-one technical assistance to each Center of Excellence, using methodologies that identify and address the individualized needs of each Center. Project Period: March 8, 2019 – March 7, 2020 Award: \$755,000 Sponsor: The Pennsylvania Department of Human Services.
- The Community Coalition-Based Harm Reduction Activities program expands harm reduction programming in counties throughout Pennsylvania. PERU and Vital Strategies will be collaborating to provide funding to counties across Pennsylvania to support capacity building projects and implementation of harm reduction initiatives. PERU and Vital Strategies will also provide technical assistance and learning opportunities to support the uptake of harm reduction activities to reduce overdose deaths.
- The SCOPE Blair County project aims to provide training and on-going technical assistance to Emergency Medical Service (EMS) agencies and law enforcement in the greater Altoona area to better identify and serve individuals who may have a Substance Use Disorder (SUD) by connecting these individuals to local drug and alcohol services. Specifically, EMS agencies will implement a screening and referral protocol to connect patients to Blair County Drug and Alcohol while law enforcement will implement the Post Overdose Response Team diversion protocol.
- The Drug Chemistry Surveillance for Public Health and Public Safety project will focus on building collaboration between NMS Labs and three counties (Beaver, Franklin, and Washington) to depict an accurate understanding of geographical distribution of drugs being used. This information will ultimately be used to prepare and educate healthcare providers. This project will yield protocols that will allow for actionable forensic drug chemistry information to be collected quantitatively, in real-time, to identify responsive strategies that enhance investigations and to predict emerging health crises.

Pharmacogenomics Center of Excellence

Faculty

Lucas A. Berenbrok
James C. Coons

James M. Stevenson
Philip E. Empey, Director

Graduate Students

Karryn Crisamore
Keito Hoshitsuki
Madeline Kreider

Clinical Fellow

Ryley Uber

Staff

Linda Prebehalla
Phani Komaravolu

Major Accomplishments

- Genotyped >6000 patients using a novel preemptive pharmacogenomic panel developed by our team that interrogates >1200 genes within the Pitt-Thermo-Fisher Scientific PGx Center of Excellence, the first academic-industry partnership focused on pharmacogenomics nationally. **Empey PE. Coons JC. Stevenson JM. Crisamore K. Hoshitsuki K.**
- Developed recruitment methods and enrolled >6000 patients into a new DNA Biobank (Pitt+Me Discovery) in partnership with the Clinical and Translational Science Institute (CTSI). **Empey PE.**
- Trained >2000 learners to apply pharmacogenomics in practice using our innovative Test2Learn program in a cumulative 36 programs, in partnership with NACDS, and at multiple other universities nationally. **Empey PE. Coons JC. Stevenson JM. Berenbrok L.**
- Key contributor to the NHGRI's IGNITE PGx working group. Empey PE. Coons JC. Stevenson JM. Invited member of the national Omics Workgroup for the All of Us® research program. Empey PE. Co-Chair of the PGx group of the NIH Inter-Society Coordinating Committee for Practitioner Education in Genomics (ISCC) **Empey PE.**

Significant Publications

- **All of Us Research Program Investigators (Empey PE).** The "All of Us" Research Program. *N Engl J Med.* 2019 Aug 15;381(7):668-676.
 - *This landmark paper details the preeminent precision medicine program in the US.*
- **Empey PE** and Sylvester P. Precision prescribing with pharmacogenomics. *Journal of Precision Medicine.* 2019 Aug; (3).
 - *Expert Q&A interview on the design of Pitt's Pharmacogenomics Center of Excellence.*
- Ginsburg GS, Madden E, **Empey PE** Affiliate network members as force amplifiers of genomic medicine research. *Per Med.* 2019 Nov;16(6):431-433.
 - *An evaluation of the successful efforts of NHGRI to expand genomics through network inclusion.*
- Johnson A, Broughton S, Aponte-Soto L, Watson K, Pinto C, **Empey PE**, Reis S, Winn R, Massart M. Participatory Genomic Testing Can Effectively Disseminate Cardiovascular Pharmacogenomics Concepts within Federally Qualified Health Centers: A Feasibility Study. *Ethn Dis.* 2020;30(Suppl 1):167–176. Published 2020 Apr 2.
 - *Demonstrates the effectiveness of our Test2Learn teaching model in diverse populations.*
- Cavallari LH, Van Driest SL, Prows CA, Bishop JR, Limdi NA, Pratt VM, Ramsey LB, Smith DM, Tuteja S, Duong BQ, Hicks JK, Lee JC, Owusu Obeng A, Beitelshes AL, Bell GC, Blake K, Crona DJ, Dressler L, Gregg RA, Hines LJ, Scott SA, Shelton RC, Weitzel KW, Johnson JA, Peterson JF, **Empey PE**, Skaar TC. Multi-site investigation of strategies for the clinical

implementation of CYP2D6 genotyping to guide drug prescribing. *Genet Med.* 2019 Oct;21(10):2255-2263.

- *Disseminates strategies for the effective implementation of CYP2D6 pharmacogenomic testing.*

Invited Significant National/International Presentations

- “Forward-thinking strategies for pharmacogenomics implementation”, Association of Molecular Pathologists, Washington, DC, November 2019. **Empey PE**
- “Independent or Integrated?: Debating the Optimal Approach to Pharmacogenomics Education in the Pharm.D. Curriculum.” American Association of Colleges of Pharmacy, Chicago, IL. July 2019. **Stevenson JM. Empey PE**
- “Test2Learn: Community-based Pharmacogenomics Certificate Program”. American Association of Colleges of Pharmacy, Chicago, IL. July 2019. **Stevenson JM. Empey PE**
- “Advancing high-fidelity personalized PGx education through the Test2Learn platform.” ASCPT Pharmacogenomics & Translational Informatics Webinar, ASCPT, December 2019. **Empey PE**
- “Implementing Pharmacogenomics at Population-Scale.” Precision Medicine World Congress. Santa Clara, CA, February 2020. **Empey PE**

Grants

- R. K. Mellon Foundation. “Accelerating Whole Genome Sequencing Adoption Through Innovative Education”. 2019-2022. **Empey PE (PI). Stevenson JM (Co-I)**
- Precision Medicine Pilot Award Program, University of Pittsburgh Institute for Precision Medicine. “Whole Genome Sequencing to Explore Variability in Trepstinil Response in Patients with Pulmonary Arterial Hypertension.” 2019-2020. **Coons JC (PI). Empey PE (Co-I)**
- Awarded highly competitive post-doctoral fellowships from the NIH (TL1) as well as the American Foundation for Pharmaceutical Education. **Crisamore KC and Hoshitsuki KC**

Innovations

- 4 invention disclosures for Test2Learn involving novel methods of training clinicians using real genetic data. **Empey PE. Coons JC. Stevenson JM. Berenbrok L.**

Pharmaceutics Group and Microbicide Clinical Trials Network Central Laboratory Core

Faculty

Lisa Rohan, Director
Sravan Patel
Vinayak Sant

Research Staff

Lin Wang
Christina Bagia
Elaine Xu
Phillip Graebing
Junmei Zhang
Amanda Micklo

Postdoctoral Fellows

Doaa Alantary
Hima Ruttala
Guru RaghavendraValicherla

PharmD Students

Rhea Bedi
Joshua Cinicola
Ashley Yao

Graduate Students (PhD)

Prithvirajan Durairajan
Xin Tong
Kunal Jhunjhunwala
Mohammed Nammas
Ruohui Zheng

Graduate Students (MS)

Yun-Shan Chiang
Zhongfang Zhang

Undergraduate Students

Nathan Lampenfeld (Pitt)
Julia Gibbs (Pitt)
Haowei Sun (Pitt)

Significant Research Results

- International Partnership for Microbicides received approval from the European Medicines Agency (EMA) for their Dapivirine Intravaginal Ring for prevention against HIV acquisition in women. The pharmaceuticals group has assisted with generation of supportive data toward the dapivirine vaginal ring development. Additionally, several critical clinical trials were conducted through the Microbicide Trials Network, where Dr. Rohan serves as the PI for the MTN Laboratory Center.
- Through the Film Antiretroviral Microbicide Evaluation (FAME) Program Preclinical/Clinical Program for HIV Topical Microbicides (IPCP) (U19) grant from NIAID led by Drs. Lisa Rohan and Sharon Hillier, an extended release vaginal film drug delivery platform was developed. The first clinical trial (FAME-101) evaluating this platform was completed and demonstrated its safety and acceptability in women. The film platform has been further developed for delivery of an integrase inhibitor developed by Merck & Co. for prevention of HIV infection. This platform has been scaled-up in a GMP environment. The IND was accepted by the FDA and clinical studies have been initiated. Two placebo product formats and two integrase inhibitor-loaded films are being tested in women in two clinical studies (FAME-103B and FAME-103 respectively).
- The group has been at the forefront of fight against COVID-19. Since the beginning of the pandemic, the Pharmaceuticals group has leveraged its expertise in development of prevention products against infectious diseases and embarked on a journey to create an intranasally administered prevention product against infection with SARS-CoV-2. This product design concept is extremely novel and futuristic given that it is likely to be active not only against SARS-CoV-2 but also other potential future coronaviruses. Efforts from the group have led to several grants from local, regional, and federal agencies. The clinical trials for this product are set to start in early part of 2021. Dr. Rohan has been interviewed by many media outlets for this work.

Representative Publications

- J Li, G Regev, SK Patel, D Patton, Y Sweeney, P Graebing, S Grab, L Wang, V Sant, LC Rohan. Rational Design of a Multipurpose Bioadhesive Vaginal Film for Co-Delivery of Dapivirine and Levonorgestrel. *Pharmaceutics*. 2019 Dec 18;12(1):1. doi: 10.3390/pharmaceutics12010001.
- G Günaydın, G Edfeldt, DA Garber, M Asghar, L Noël-Romas, A Burgener, C Wählby, L Wang, LC Rohan, P Guenther, J Mitchell, N Matoba, JM McNicholl, KE Palmer, A Tjernlund, K Broliden. Impact of Q-Griffithsin anti-HIV microbicide gel in non-human primates: In situ analyses of epithelial and immune cell markers in rectal mucosa. *Sci Rep*. 2019 Dec 2;9(1):18120. doi: 10.1038/s41598-019-54493-4.
- A Patel, V Sant, S Velankar, M Dutta, V Balasubramanian, P Sane, V Agarwal, J Wilson, LC Rohan, S Sant. Self-assembly of multiscale anisotropic hydrogels through interfacial polyionic complexation. *J Biomed Mater Res A*. 2020 May 17. doi: 10.1002/jbm.a.37001.

Significant Invited Presentations

- Dr. Rohan was invited to speak by the Eunice Kennedy Shriver National Institute of Child Health and Human Development at the 2019 Annual Contraceptive Development Meeting held at the Bayer College of Medicine, Houston, TX, from November 3-6 2019, where she presented a talk entitled: “Polymeric Films for Drug Delivery”
- Dr. Rohan was invited by the Controlled Release Society Young Scientist Committee (CRS YSC) to act as a mentor for the Assist Platform Event as part of the 2020 Annual Controlled Release Society Meeting, held virtually due to COVID, June 23, 2020.
- Dr. Rohan delivered a talk at the Women, Children and Global Health Technical Session, Controlled Release Society Annual Meeting, held virtually due to COVID, June 29-July 2, 2020.
- Dr. Patel presented an on-demand talk at CRS Annual Meeting, 2020, Virtual, entitled: “Reproducible Dissolution Methods for Microparticles Administered Locally in the Periodontal Pocket.”
- Research Associate, Ms. Christina Bagia presented a podium presentation at CRS Annual Meeting, 2020, Virtual, entitled: “Development of Novel Accelerated Stability Testing Models for Tenofovir Alafenamide (TAF) in Long-Acting Implants for HIV Prevention.”
- Graduate Student, Mr. Xin Oliver Tong presented an on-demand talk at CRS Annual Meeting, 2020, Virtual, entitled: “Overcoming drug efflux to improve tissue uptake using nanoparticles in film for extended protection against HIV infection.”
- Dr. Rohan was invited to participate in the NICHD Utilizing Behavioral, Social, and Marketing Research to Advance Contraceptive Development Workshop which was held virtually.
- Dr. Rohan served as the external reviewer for the proposed Doctor of Philosophy (PhD) in Pharmaceutical Sciences at Texas A&M University/Texas A&M University Health Science Center. Charged by the Texas Higher Education Coordinating Board, Academic Quality and Workforce.

Significant Grants

- The Pharmaceutics group was awarded a \$250,000 from the Richard King Mellon Foundation for the project entitled “Development of a nasally administered antiviral drug”. This grant supports

development and preclinical biodistribution assessment of a novel intranasal prevention product against SARS-CoV-2.

- Drs. Lisa Rohan and Sravan Patel secured an intramural grant from the Clinical and Translational Science Institute (CTSI), COVID-19 Pilot Program and David Scaife Family Foundation for a total of \$50,000. In this work entitled “Q-GRFT Nasal Spray for SARS-CoV-2 Prevention”, early feasibility of nasal formulation of a broad-spectrum lectin, that has shown activity against coronaviruses including SARS-CoV-2, is planned.
- In the past year several grants were awarded to the Pharmaceutics group by industry partners.
 - Mapp Biopharmaceutical (\$30,000) for the project entitled “Release and Stability Testing of MB 66 Film.
 - Strategic Science & Technologies, LLC/Dare Bioscience (\$56,435) for evaluation of “L-arginine permeability in excised human cervix from Sildenafil Cream”
 - Bayer US LLC (Provision of IUDs to support research efforts) for “Levonorgestrel IUD in vitro Dissolution and Quantification”

Patents & Invention Disclosures

- US patent entitled ““Vaginal Films”. Publication number: US-2020-0253885-A1.

Center for Education and Drug Abuse Research

Faculty

Levent Kirisci
Maureen D. Reynolds
Ralph E. Tarter, Director
Michael Vanyukov

Graduate Students

Xiguang Qi
Xinyun Chen

Postdoctoral Fellows

Kristine Marceau
Jill Rabinowitz
Prevesh Sharma

Significant Research Results

- Prospective analysis showed that using two variables in 16-year old youth, heritable vulnerability and substance use, prediction of opioid disorder exceeds 85% at age 25.
- The symptoms comprising the polythetic syndrome of opioid dependence constitute a unidimensional continuous trait; the score on this trait forecasts severity of health, psychological and social problems.

- A cardinal liability phenotype predisposing to substance use and addiction is low psychological self-regulation.
- CEDAR data aggregated into a population sample consisting of 300,000 individuals participating in genome-wide analysis reveals two loci-associated with risk for cannabis use disorder.

Representative Publications

- Kirisci L., Tarter R, Reynolds M, Hayes K, Cochran G, Vanyukov M. (2020). Derivation and Assessment of the Opioid Use Disorder Severity Scale: Prediction of Health, Psychological and Social Adjustment Problems. The American Journal of Drug and Alcohol Abuse. Jan 22:1-9
- Suffoletto B, Huber J, Kirisci L, Clark D, Chung T. (2020). The effect of SMS behavior change techniques on event-level desire to get drunk in young adults. Psychology of Addictive Behaviors. Mar;34(2):320-326.
- Cochran, G., Qi, C., Field, C., Seybert, A., Hruschak, V-., Jaber, A., Gordon, A., & Tarter, R. (2019). A Community pharmacy-led intervention for opioid medication misuse: A small-scale randomized clinical trial. Drug and Alcohol Dependence, 205, 107570.
- Hu, Z., Jing, Y., Xue, Y., Fan, P., Wang, L., Vanyukov, M., Kirisci, L., Wang, J., Tarter, R., & Xie, X-Q (2020). Machine learning on hazardous substance use II. Predicting trajectory of adolescent substance use severity. Drug and Alcohol Dependence, 206, 107604 (pp. 1-7).
- Jing, Y., Hu, Z., Fan, P., Wang, L., Tarter, R., Kirisci, L., Yang, J., Lirong, W., Vanyukov, M., & Xie, X-Q (2020). Analyses of substance use and its outcome by machine learning I. Evaluation of risk for substance use disorder from childhood to young adulthood. Drug and Alcohol Dependence, 206, 107605 (pp. 1-6).
- Cochran, G., Smid, M., Krans, E., Bryan, M, Gordon, A., Lundahl, B., Silipigni, J, Haaland, B., & Tarter, R. (in press). A pilot multisite study of patient navigation for pregnant women with opioid use disorder. Contemporary Clinical Trials.
- Tarter, R., Kirisci, L., Cochran, G., Seybert, A., Reynolds, M., & Vanyukov, M. (2020). Forecasting opioid use disorder at 25 years of age in 16-year old adolescents. Pediatrics, 225, 207-213e1.

Significant Grants

- Mechanisms of Change for an Effective Alcohol Text Message Intervention
Co-I: **Levent Kirisci**
Funding source: NIAAA
- Impact of Pharmacist-led Motivational Interviewing Program on Initiation and Completion of Hepatitis B Vaccination Series in Patients with Diabetes Mellitus”
Co-I: **Levent Kirisci**
Funding source: National Association of Chain Drug Stores
- University of Pittsburgh PA Studies MAT Training Program
PI: Maureen Reynolds
Funding source: CSAT/SAMHSA
- Optimizing Pregnancy and Treatment Intervention for Moms 2.0 (OPTI-Mom 2.0)
Co-I: Ralph Tarter
Funding Source: Center for Disease Control

Pharmacy Innovation Program

Faculty

Ameer Ali

Ravi Patel

Randall Smith

Representative Publications

- Digital health in practice will require the current and future landscape to practice with digital tools
 - Aungst, T. D., **Patel, R.** (2020). Integrating Digital Health into the Curriculum—Considerations on the Current Landscape and Future Developments. *Journal of Medical Education and Curricular Development*, 7, 2382120519901275.
- Augmented reality has applications for education and practice across multiple settings
 - Babichenko, D., **Patel, R.**, Grieve, V., Healy, P., Canton, S., Littleton, E.B., Donnellan, N. and Andrews, E. (2020) SterileAR: Exploration of Augmented Reality and Computer Vision Approaches for Real-Time Feedback in Sterile Compounding Training. In *2020 6th International Conference of the Immersive Learning Research Network (iLRN)* (pp. 62-69). IEEE.
- User-centered design can improve between aspiring researchers and potential mentors
 - Rahdari, B., Brusilovsky, P., Babichenko, D., Littleton, E.B., **Patel, R.**, Fawcett, J. and Blum, Z. (2020) Grapevine: A Profile-Based Exploratory Search and Recommendation System for Finding Research Advisors. In *Proceedings of the 2020 ASIS&T Virtual Annual Meeting (AM2020)*. Association for Computing Machinery, New York, NY, USA, 0. InPress.

Significant Invited Presentations

- Patel, R. “Digital Pills, A Pharmacist Perspective”. IEEE-USP Smart Pills: Decoding the Science and Technology to Ensure Quality, Rockville MD (2019)
- Patel, R. “Designing the Digital Future of Health Care” Products of Pittsburgh Podcast, University of Pittsburgh Clinical and Translational Science Institute (2020)

Significant grants

- University of Pittsburgh, Principal Investigator (2020)
Open Education Funding Award, Office of the Provost \$5,000
Oceans of Data Science, Distributory Pharmacy Application 2019-2020
- University of Pittsburgh Co-Investigator (2019)
Katz Center for Healthcare Management Seed Funding Grant \$8,000
Developing and Examining a Rich View of Experiences with ICT 2019-2020
Interventions for Expectant Mothers: Home Health Applications
and Exposure to Information on Maternal Health and Anti-Vaccination
Content

Innovations

- PittChallenge
 - Hosted the 3rd Annual Pitt Challenge Hackathon. This year featured the most participants and support, including: over 500 registrants, 119 participants from 15 universities and 9 states, 31 final project submissions, 13 sponsors, and 30 mentors and judges from high-profile companies in the United States.
- Data Science
 - Python for Data Management and Analytics continues to drive online education by introducing learners to concepts in data. The online course included more than 30+ students across disciplines and a new series of data case studies
- Innovation Curriculum Expansion
 - Two new courses added, “Intrapreneurship:Reinventing the Incumbent” “Side Project: Building Value”. These courses offers students the foundations required to successfully understand, create, and execute entrepreneurial ideas in pharmacy. They complement the current course series “Pharmacy Innovation 1, 2”. This curriculum had a reach of 65 students across our School and involved speakers and alumni from previous years

Strengthen Communities





Strengthen Communities

From the Plan for PittPharmacy:

The School of Pharmacy will be a leader in standardizing the elements of practice so that pharmacists enhance the care of patients in the community, in institutions, and during the transitions of care.

We will impact the lives of the people in the communities in which we live and work through pharmacists who are health care providers promoting health and wellness, optimizing use of medications, and stemming the misuse, abuse, and diversion of medications.

PATIENT CARE BY THE NUMBERS FOR FY20

In FY20, faculty:

- **31** [faculty] provided direct patient care and pharmacotherapy decisions for over **45,000 patients**.
- Trained **33** residents and **6** fellows at our Oakland and Shadyside based programs.
- Led *PreCISE-Rx*, the most significant precision medicine implementation program led by PittPharmacy and implemented at UPMC; to-date, the service has provided standard-of-care genotyping and clinical consultations to **over 3,000 patients**. Wrote clinical decision support alerts involving **14 genes** and **>100 medications** to advance pharmacogenomic implementation at UPMC.
- Launched the new Primary Care Precision Medicine Clinic to provide new pharmacogenomic services in a novel multidisciplinary clinic.
- The UPMC Presbyterian Campus Antimicrobial Stewardship Program received renewal of the IDSA Center of excellence for Antimicrobial Stewardship as well as implemented a novel service allowing rapid diagnostic testing results to optimize antibiotic therapy more efficiently.
- Developed a post-discharge telephone follow-up program for all patients discharged from UPMC PUH new to insulin.
- Pharmacokinetic urinary biomarker utilized to evaluate renal stress and development of an approach to Nephrotoxin Stewardship to prevent acute kidney injury. This will be the first of its kind in the field.
- First evaluation of frequency of encounters with primary care physicians and community pharmacies.
- Received funding from the Pennsylvania Department of Health for integrative and preventive disease care in the Grace Lamsam Pharmacy Program for the Underserved
- First Implementation Science and PharmacoAnalytics Fellowship as a partnership between PittPharmacy, UPMC, and Pfizer to advance care in patients with atrial fibrillation.
- PittPharmacy faculty member serves as UPMC PUH/SHY Medication Safety Officer.
- Administered over **3,500 influenza vaccinations** in partnership with Falk Pharmacy, University of Pittsburgh Benefits office, and UPMC Employee Health.
- Implemented an evidence-based, postoperative pain management protocol that resulted in **50% fewer opioid doses** prescribed at discharge.
- Faculty pharmacy practice provided over **250 patient transition of encounters** this year in transitions-of-care (TCM) and chronic care management (CCM).

- Deprescribed potentially inappropriate or unnecessary medications for **100** residents of Seneca Place Senior Community through the DE-PHARM (Discussion to Ensure the Patient-centered, Health-focused, prognosis-Appropriate, and Rational Medication regimen) initiative.
- Provided individualized patient care and medication education to **500 patients** receiving solid organ transplants and maintained pharmacotherapy services for **over 1,000 active thoracic transplant recipients**.
- **COVID-19**
 - The Poison Center managed nearly **80,000 calls** from the general public, health care providers, and law enforcement officials in addition to **over 2,000 calls for COVID** questions from the public and **over 1,600 calls for screening** 911 medical calls to provide EMS crews with inform on patients' COVID risk. The COVID work is in collaboration with the Allegheny County Health Department (ACHD).
 - Faculty collaborated with medical practices that are part of the UPMC Heart Vascular Institute VI to review **10,434 patients** on warfarin for opportunities to reduce the need for laboratory visits during the pandemic.
 - During the COVID-19 pandemic, student pharmacists provided direct patient care, including making diabetes management recommendations to prescribers and delivery of virtual diabetes education to hospitalized patients at UPMC Presbyterian.
 - Rapid deployment of telemedicine in thoracic transplant clinics during COVID-19 pandemic to conduct evaluations and consultative pharmacy services.
 - While creating a new clinical pharmacy practice at UPMC Horizon, faculty collaborated with health system to facilitate appropriate use of remdesivir during pandemic.

The Grace Lamsam Pharmacy Program for the Underserved

Faculty

Sharon Connor
 Lauren Jonkman
 Karen Pater
 Catherine Rebitch

Staff

Joni Carroll

Residents

Jennifer Ko

Patient Care:

- Continued to build the work with funding in collaboration with the Program for Healthcare to Underserved Populations from the State Department of Health to improve care for urban isolated patients with chronic disease with a focus on HTN, DM, COPD and Asthma by addressing the social determinants of health patients face that serve as barriers to optimal disease management.

- Engaged patients with chronic disease in self-management through innovative technology while direct patient care continued through the COVID-19 pandemic. The use of mHealth technology was especially impactful when patients were unable to be seen in person.
- Graduated **12 students** with an Area of Concentration in Global Health who will go on to advocate for the elimination of health disparities and positively impact the care of patients in resource-limited settings.

Representative Publications:

- Kennedy AJ, Bakalov V, Reyes-Uribe L, Kensler C, **Connor SE**, Benson M, Bui T, Radomski TR. Free Clinic Patients' Perceptions and Barriers to Applying for Health Insurance After Implementation of the Affordable Care Act. *J Community Health* 2019;45:492-500.
- **Ko J, Connor SE, Jonkman LJ**, Abraham O. Student Pharmacists' Perspectives of Service-Learning Experiences in Free Clinics. *Am J Pharm Ed.* 2019; 83 (9) Article 7379.
- Contributed three chapters to a new public health casebook - Covvey JR, Arya V, DiPietro Mager N, Gilman N, Herring M, Lukas S, Ochs L, Waddington L, eds. *Public health in pharmacy practice: a casebook*. 1st ed. Genesco, NY: Open SUNY Textbooks; 2020. Available at: <https://courses.lumenlearning.com/suny-public-health-in-pharmacy-practice/>.
 - **Connor SE**. Smoking Cessation Smoke in the Mirrors: The Continuing Problem.
 - Chim C, **Connor S**, Law M, Lukas S, Thigpen J. More Than Just Diet and Exercise: The Impact of Social Determinants on Well Being.
 - Lukas S, **Connor S**, Giles A, Lasjinsky J. The Cough Heard Round the World: Working with Tuberculosis.

Significant Invited Presentations:

- Global to Local: Connecting Global Health to Local Practice. **Connor S, Jonkman L**, Steeb D, Miller M, Schellhase, Kiser S. American Association of Colleges of Pharmacy Annual Meeting. Chicago, IL. July 15, 2019.
- Why do medications cost so much? **Connor S, Jonkman L**. University of Pittsburgh School of Medicine, Pittsburgh, PA. September 6, 2019.
- Improving Access to Care in Medically Underserved Communities. **Connor S**. American College of Clinical Pharmacy Annual Meeting. New York NY. October 29, 2019.

Significant Grants

- Integrated and Preventive Disease Care for Patients with Chronic Disease RFA 67-64 Community Based Health Care Program. Pennsylvania Department of Health (**Connor, Jonkman Co-Investigators**).

PharmacoAnalytics and Implementation Science

Faculty

James Coons
 Inmaculada Hernandez
 Sandra Kane-Gill
 Amy Seybert
 Kangho Suh

Graduate Students/Fellows

Matthew Gray

Terri Newman

Alvaro San Juan Rodriguez

Patient Care

- Received funding in collaboration with Pfizer to conduct a large-scale analysis of anticoagulation practices and clinical outcomes among patients with non-valvular atrial fibrillation at UPMC. This population health project will help to translate best practices to improve the quality of care for patients by identifying gaps in evidence-based care.

Representative Publications

- **Andreaggi C**, Novak E, Mirabile M, Sampathkumar S, **Gray MP**, He W, **Kane-Gill SL**. Safety Concerns Reported by Consumers, Manufacturers and Healthcare Professionals: A Detailed Evaluation of Opioid Related Adverse Drug Events in the FDA Database. *Pharmacoepidemiol Drug Saf* 2020; epub ahead of print.
 - The area of concentration- pharmacoanalytics (ARCO-PA) students from 2018-19 led the publication of their research project evaluating the adverse drug events associated with opioid use using 15 years of data.
- Camacho J, Zanoletti Mannello M, Landis-Lewis Z, **Kane-Gill SL**, Boyce R. A conceptual framework to study the implementation of clinical decision support systems (BEAR): Literature review and concept mapping. *J Med Internet Res* 2020 22:e18388.
 - *We have developed an integrated framework (BEAR – Behavior and Acceptance fRamework) that bridges the gap between behavioral change and technology acceptance aspects of the implementation of CDS, widening the view established by current models. The BEAR framework was developed using an iterative process to map constructs from four contributing frameworks (TDF - Theoretical Domains Framework, CFIR - Consolidated Framework for Implementation Research, HOT-fit - Human, Organization and Technology-fit, and UTAUT - Unified Theory of Acceptance and Use of Technology).*
- **Hernandez I, San-Juan-Rodriguez A**, Good CB, Gellad WF. Changes in List Prices, Net Prices, and Discounts for Branded Drugs in the US, 2007-2018. *JAMA* 2020;323(9):854-862
 - This study was the first to answer a research question of high policy relevance—to what extent do rebates offset increases in list prices of prescription drugs? Published in *JAMA*, this study demonstrated that rebates offset 60% of increases in drug prices, yet net prices still increase 3 times faster than inflation.
 - Accompanying editorials: Frazier KC. Affording Medicines for Today’s Patients and Sustaining Innovation for Tomorrow. *JAMA*. 2020;323(9):831-833; Deb C, Curfman G. Relentless Prescription Drug Price Increases. *JAMA*. 2020;323(9):826-828.
 - This study was featured in US News, STAT News, Al Jazeera, AARP, AJMC, FDA News, Fast Company, BioPharma Dive, Medscape (article and video), Medical Research, Medpage Today, Health Leaders Media, HealthDay, Consumer Affairs, Healthcare Finance, ZME Science, the Methods Man Blog, Fierce Pharma, Becker’s Hospital Review, Axios, Physician’s Briefing, News Medical, Pink Sheet, Courthouse News.

- **Berenbrok LA, Gabriel N, Coley KC, Hernandez I.** Evaluation of Frequency of Encounters with Primary Care Physicians Versus Community Pharmacies Among Medicare Beneficiaries. *JAMA Netw Open.* 2020;3(7):e20913.
 - This study was the first to leverage data from a nationally representative sample of Medicare beneficiaries to compare the frequency of patient encounters with primary care providers and pharmacists. The study demonstrated that Medicare beneficiaries interact twice as often with pharmacists as with primary care providers.
- **Suh K, Basu A, Carlson JJ, Branch KR.** Exploring medication adherence with P2Y12 inhibitors using conditional and unconditional quantile regression approaches. *Am J Cardiovasc Drugs.* 2020; doi: 10.1007/s40256-020-00405-1. Online ahead of print.
- Coleman KJ, Fischer H, Arterburn DE, Barthold D, Barton LJ, Basu A, Courcoulas A, Crawford CL, Fedorka P, Kim B, Mun E, Murali S, Reynolds K, **Suh K, Wei R, Yoon TK, Zane R.** Effectiveness of gastric bypass vs gastric sleeve for cardiovascular disease (ENGAGE CVD): A comparative effectiveness study of gastric bypass and gastric sleeve for cardiovascular disease risk. *JMIR Research Protocols.* 2020;9(4):e14936.
- Bounthavong M, **Suh K, Christopher MLD, Veenstra DL, Basu A, Devine EB.** Providers' perceptions on opioid overdose education and naloxone prescribing behavior after implementation of a national academic detailing program: A qualitative assessment. *Research in Social and Administrative Pharmacy.* [Published online ahead of print, 2019 Oct 31] S1551-7411(19)30065-8. doi:10.1016/j.sapharm.2019.10.015.

Significant Invited Presentations

- Clinical Decision Support Embedded in a Surveillance System to Facilitate Quality Improvement and Research. Premier's Annual Breakthrough Conference and Exhibition Nashville, TN (moved to virtual) **Kane-Gill.**
- Biosimilar Uptake and Impact on Pricing: The Empirical Evidence. Invited Presentation at FDA / FTC Workshop on a Competitive Marketplace for Biosimilars. Silver Spring, MD, March 9, 2020. **Hernandez.**

Significant Grants

- Implementation Science, Non-Valvular Atrial Fibrillation Collaborative Project. Pfizer, Inc. (**Coons**, Principal Investigator).
- National Institute of Allergy and Infectious Diseases (NIAID) Loan Repayment Program (9/1/2020-9/1/2022) Long-term Outcomes Associated with Penicillin Allergies and Economic Evaluation of Literature-Supported Interventions for Removing Erroneous Allergies Graduate Student: **Matthew Gray** Mentor: **Sandra Kane-Gill.**
- Average Manufacturer Price for 5i Drugs: Impact of Pharmaceutical Benefit Manager Concessions. Founding Agency: West Health Policy Center. Principal Investigator: **Hernandez.**
- Patient and System-Level Determinants of Oral Anticoagulation Use in Atrial Fibrillation (1K01HL142847-01). Founding Agency: NHLBI. Principal Investigator: **Hernandez.**

Patient and Medication Safety

Faculty

Sandra Kane-Gill

Margaret Verrico

Fellows

Emily Schartner

Patient Care

- Was part of a modified Delphi process of an international group of experts including physicians, a nurse practitioner, and pharmacists that provided a framework for current and future quality improvement projects in the area of acute kidney injury. This document provides best practices in the prevention, identification, and care of the patient with acute kidney injury. *Clin J Am Soc Nephrol* 2019; 14:941-53.
- Contributed to a collaborative document by ASCN, CHEST, CDC and SCCM to describe appropriate antibiotic stewardship for the intensive care unit. *Ann Am Thorac Soc* 2020;17:531-40.
- Participated as a Panelist discussing Approaches to the Effective Presentation of Comprehensive Drug Interaction Information in Labeling for the FDA.
- Served as UPMC Presbyterian Shadyside Medication Safety Officer with daily review of medication event reports and adverse drug reaction reports, intervening in active medication problems, responding to drug information questions, educating staff at Health System and local meetings, within local newsletter publications and providing consults to pharmacists from Children's Hospital of Pittsburgh, UPMC Hamot, UPMC Magee and UPMC Pinnacle regarding medication and adverse drug event review.
- Precepted 2 APPE and 2 IPPE students, precepted 5 Health System Pharmacy Administration Lead (HSPAL) Residents and Fellows, precepted 1 HSPAL Fellow in a Direct Area of Interest in Medication Safety, precepted 8 HSPAL Residents/Fellows and 3 PGY1 residents assigned to longitudinal Medication Safety commitments. Provided many educational offerings, such as Medication Safety Orientation by Zoom to 40 IPPE students during pandemic restriction; co-precepted one 4-week APPE student with HSPAL fellows; precepted 25 Pitt and 15 Duquesne APPE students.
- Supports the UPMC PUH SHY in upholding medication safety regulatory requirements and standards of the Department of Health (DOH), the Centers for Medicaid and Medicare Services (CMS), the Joint Commission (TJC) and other organizations that publish recommendations, guidelines and safety standards, communicate new external medication safety recommendations and determine how they may apply to the UPMC HS and UPMC PUH SHY, support safety actions related to product recalls, support external reporting to the FDA, CDC, VAERS, ISMP, and pharmaceutical manufacturers, as well as analyze new medication safety issues, regulations and recommendations and determine the need for internal gap analysis, further communication and/or action.

Representative Publications

- Schartner E, Verrico MM, L'Altrelli A. Institutional approach to protection of patients with possible heparin-induced thrombocytopenia: process changes over time. Vizion Annual Accreditation Update Meeting. Newport, RI. December 3, 2019. Abstract/Poster.
 - Represents results of a long-term safety project ensuring that patients with significant positive heparin antibodies have appropriate clinical team follow-up and allergy entry when deemed appropriate.

- Levito M, Coons J, **Verrico M, Kane-Gill S**, et al. A system-wide approach for navigating the dilemma of oral Factor Xa inhibitor interference with unfractionated heparin anti-Factor Xa concentrations. Accepted for publication: *Annals of Pharmacotherapy* (AOP-20-0399.R1).
 - Team effort resulting in recommendations for safe practices for the use of heparin following the use of direct oral anticoagulants agents.

Pittsburgh Poison Center (PPC)

Faculty

Amanda S. Korenoski

Patient Care

- The Poison Center, led by Dr. Korenoski, managed nearly 80,000 calls from the general public, health care providers, and law enforcement officials. Over 90% of cases were able to be managed from home, preventing unnecessary emergency room visits. Very positive satisfaction scores have been collected and analyzed from callers.
- Dr. Korenoski is a clinical pharmacist on the in-patient toxicology team at UPMC Presbyterian Shadyside. The team oversees consults at six local UPMC facilities and is one of the busiest services in the country. It is a very active teaching experience, with many medical and pharmacy students and residents rotating through.
- In March 2020, as the Allegheny County Health Department (ACHD) reported the first COVID-19 cases in the County, there was an immediate need for a call center to answer the public's questions. The PPC, under the direction of Dr. Korenoski, quickly established the Greater Pittsburgh Coronavirus Help Line. Through July 31st, pharmacy students and poison center specialists have answered over 2,000 calls on this line.
- In March 2020, local emergency management organizations contacted the PPC for assistance in keeping first-responders safe and cared for during the pandemic. The PPC is now screening most medical calls to 911 within the County to provide EMS crews with additional information on the patient's risk of having COVID-19. Between March and July, over 1600 cases have been put through this screening process. In addition, the PPC is helping connect symptomatic first-responders (fire, police, EMS) with high priority testing sites. The PPC has evaluated over 400 calls from first-responders to review their symptoms and aid in getting them tested in a timely fashion so that they can either return to work or take appropriate precautions.
- Dr. Korenoski is the pharmacy representative for the regional Alternate Care Site (ACS), which would be a field hospital established if the local hospitals were stressed with the influx of COVID-19 patients.

Innovations

- Dr. Korenoski led the development of an innovative strategy for teaching PharmD students about Population Health. Simulated poison exposure data were provided to students, who were instructed to identify a need within that population. Students worked in small groups to analyze the public health problem and create an intervention to address the needs of the community. During the second portion of this required course, the students use management principles to create a project plan to present to standardized "stakeholders" (e.g. public health officials, community leaders, organizational leadership) for support in making the proposed intervention.

- Significant partnerships have been made and strengthened with community groups directly and indirectly related to health care facilities. These include hospitals in 44 counties in Southwestern and Central PA, the FBI Pittsburgh Division’s Heroin Outreach Prevention Education (HOPE) Initiative, Merck Adult Out-patient Clinic for those with intellectual disabilities, Safe Kids Allegheny County, the PA Pharmacists Association, and others.
- Partnerships with local, county, and state public health organizations have paved the way for unique poison center utilization, including: regional response to the COVID-19 pandemic, real-time surveillance of exposures statewide, warm handoff programs for those suffering from substance use disorders, emergency preparedness activities, and antimicrobial stewardship telephonic services.
- Dr. Korenoski has continued to develop IPPE, APPE, and pharmacy resident rotations, which have been absent from the Poison Center/toxicology service for many years. Learners now participate in a variety of unique learning opportunities, collaborating with other health care professionals involved in both the Poison Center and the toxicology service. Dr. Korenoski also established a virtual APPE elective on Population Health, held virtually amidst the pandemic.

UPMC Clinical Pharmacogenomic Services

Faculty

Lucas A. Berenbrok
James C. Coons
Philip E. Empey
James Stevenson

Clinical Fellow

Ryley Uber

Staff

Linda Prebehalla

Patient Care

- Led *PreCISE-Rx*, the most significant precision medicine implementation project at Pitt/UPMC. To-date, our service has provided standard of care genotyping and clinical consultations to >3000 patients. **Empey PE. Coons JC. Stevenson JM. Uber R.**
- Developed and launched the new Primary Care Precision Medicine Clinic to provide new pharmacogenomic services in a novel multidisciplinary clinic model. To date, 10 patients have been genotyped to optimize medication use with pharmacogenomic data. **Berenbrok LA. Empey PE.**
- Won the *M. Kellie Jordan Travel Award* for the AACP Annual Meeting. **Uber R.**

Significant leadership/service

- Invited member of the Getting the Medications Right (GTM-Rx), **Empey PE**
- Active participants in the Clinical Pharmacogenetics Implementation Consortium (CPIC). **Berenbrok LA. Coons JC. Empey PE. Stevenson JM. Keito Hoshitsuki**

Representative Publications

- **Berenbrok LA, Hart KM, McGrath SH, Coley KC, Somma McGivney MA, Empey PE.** Community pharmacists' educational needs for implementing clinical pharmacogenomic services. *J Am Pharm Assoc* (2003). Jul-Aug 2019;59(4):539-544.
 - *Identified pharmacogenomics educational needs of community pharmacists.*
- **Crisamore KC, Nolin TD, Coons JC, Empey PE.** Engaging and Empowering Stakeholders to Advance Pharmacogenomics. *Clin Pharmacol Ther.* 2019 Aug;106(2):305-308.
 - *Advances a new stakeholder engagement model to accelerate clinical pharmacogenomics.*
- **Limdi NA, Cavallari LH, Lee CR, Hillegass WB, Holmes AM, Skaar TC, Pisu M, Dillon C, Beitelshes AL, Empey PE, Duarte JD, Diaby V, Gong Y, Johnson JA, Graves J, Garbett S, Zhou Z, Peterson JF.** Cost-effectiveness of CYP2C19-guided Antiplatelet Therapy in Patients With Acute Coronary Syndrome and Percutaneous Coronary Intervention Informed by Real-World Data. *Pharmacogenomics J.* 2020 Feb 11.
 - *Demonstrates the cost-effectiveness genotyped guided therapy following cardiac stenting.*

Significant Invited Presentations

- “Pharmacogenomics decision making: Science to Practice.” American College of Clinical Pharmacology, Chicago, IL. September 2019. **Empey PE**
- “Advancing PGx: From the cath lab to preemptive population-scale testing.” University of Cincinnati, Cincinnati, OH, March 2020. **Empey PE**

Innovations

- Wrote clinical decision support alerts involving 14 genes and >100 medications to advance pharmacogenomic implementation at UPMC. **Uber R. Empey PE. Coons JC. Stevenson JM.**

INSTITUTIONAL PROGRAMS

UPMC Ambulatory Clinics and Pharmacies

Faculty

James Coons
Deanne L. Hall
Karen S. Pater
Amy L. Seybert

Residents

Precious Dadzie
Kayla Davis
Jennifer Ko
Marilyn Schoenle

Patient Care:

- COVID-19 Related
 - Ambulatory Care APPEAL
 - Remotely hosted APPEs, with two faculty leads (**Hall/Pater**) coordinating with amb care preceptors to provide remote patient care experiences where onsite

learning was limited by COVID 19 restrictions. The activities involved patient care case discussions, targeted topic discussions, journal club presentations, team-based learning, discussion board review, and drug information questions. Over the course of 2 five-week rotation experiences, there were more than 15 sites with 22 unique preceptors involved in this experience that allowed 31 students to complete their APPE rotation. **(Hall/Pater Coordinators)**

- DOAC-Warfarin Conversion Review
 - Coordinated with physician leadership for all UPMC HVI practices in an effort to reduce patients need for laboratory visits on warfarin. 10434 patients total on warfarin were reviewed. 3551 had UPMC Healthplan. Pharmacist reviewed patient to ensure that patient was a reasonable candidate for conversion and provided dosing recommendations for Xarelto and Eliquis, which was then sent back to the specific HVI offices for review by the physician. We had attempted to partner with Pfizer in order to reduce copay costs for at least 1 year, but they were unable to offer any additional discounts. As such, many patients medically qualified for DOAC treatment, but were unable or unwilling to convert due to cost concerns. This barrier was seen anecdotally, but now was able to be documented for DOAC use and was shared with the UPMC Health Plan. **(Hall/Junker)**.
- Cost savings and Revenue Initiatives
 - Determinations of anticoagulation reimbursement at non-hospital-based outpatient physician office. July 2019. Over the course of 1 year, it is estimated that anticoagulation management within the Heart and Vascular Institute brings in a revenue of ~\$114,000 based on 7616 anticoagulation episodes completed. **(Hall/Junker/Hovis)**.
- Improving Health of Patients and Innovative Health Care Delivery
 - Anticoagulation management with the Heart and Vascular Institute over a one-year period showed pharmacist facilitating ~200 interruptions to warfarin therapy for procedures, ~100 transitions of care on hospital discharge and adjustment of monitoring of anticoagulation for 380 drug interactions. **(Hall/Junker/Modany)**.
 - Falk Pharmacy Influenza Vaccination Program continues to collaborate with the University of Pittsburgh Benefits Office and UPMC Employee Health to provide over 3500 influenza vaccinations to the University and UPMC Presbyterian employees. **(Coordinator: Hall)**.
 - HYPERTENSION QI 2019 - Pharmacist Managed HTN
 - Baseline needs assessment found 51% of patients with documented HTN were arriving to clinic appointments with uncontrolled HTN (BP >140/90). In many instances these patients were making multiple trips to the clinic over a 4-month time frame due to acute issues, it was determined that chronic care needs (such as HTN) could not be adequately addressed. Preliminary 6 month data after implementation of the project in Nov 2019 revealed the following results revealed a significant improvement in BP in both systolic and diastolic readings from baseline in 2-6 month follow-up visits with 86% of patients included in the preliminary data set achieving a BP < 140/90 mmHg with 50% of those individuals ultimately meeting goal BP < 130/80, per 2017 ACC/AHA guidelines. This preliminary data stresses the importance of appropriate patient education regarding BP, importance of appropriate selection of antihypertensive

agents, and proper dose escalation of selected therapies in timely manner to obtain goals. **(Dadzie/Pater)**.

- Hyperlipidemia evaluation in primary care. A total of 187 patients were included for evaluation from GIMO and Shea. The first phase of this study revealed that 47.5% (89 patients) were not at an LDL goal of <70 mg/dl. The majority of pharmacist recommendations involved modification of statin therapy (55%). Additional recommendations included addition of ezetimibe (23.5%), obtaining an updated lipid panel (12.4%), and referral to cardiology for initiation of a proprotein convertase subtilisin/kexin type 9 (PCSK9) inhibitor (4.5%), more than one recommendation (3.5%), and no intervention (1.1%). The PCPs are being provided recommendations to optimize ASCVD prevention strategies. **(Davies/Hall)**.
- Community outreach
 - Quarterly DM Staff Training conducted by Karen Pater, PharmD, CDCES, BCACP at the Bradley Center, a residential treatment facility located in Pittsburgh, PA. **(Pater)**.

Representative Publications:

- **Coons JC**, Pogue K, Kolodziej AR, Hirsch GA, George MP. Pulmonary arterial hypertension: an update. *Curr Cardiol Rep* 2019;21:141. PMID: 31758342.
- Kido K, **Coons JC**. Efficacy and safety of pulmonary arterial hypertension medications in patients with pulmonary hypertension secondary to left heart disease: a systematic review. *Pharmacotherapy* 2019; 39(9):929-45. PMID: 31349390.
- Sutt AR**, Pagliaro AM**, Wilson E, Renner H**, **Hall DL**, Berenbrok LA, McGivney MS, Coley KC. Facilitating pandemic influenza vaccination implementation in grocery store chain community pharmacies. *J Am Pharm Assoc* 2019 Nov - Dec;59(6):848-85.1

Significant Invited Presentations:

- “Clinical Pipeline Updates in Cardiology” Presented as part of session, “Clinical Pipeline Updates.” ASHP Summer Meetings and Exhibition 2020. Planned for Seattle, WA, June 7, 2020. *Virtual presentation due to COVID-19*. **(Coons)**.
- “Updates from the 6th World Symposium on Pulmonary Hypertension.” Presenter as part of symposium, “Updates in Pulmonary Hypertension Management Across the Continuum of Care.” American College of Clinical Pharmacy (ACCP) Annual Meeting. Pulmonary Practice and Research Network Focus Session. Presented to pharmacy audience, New York, NY, October 29, 2019. **(Coons)**.
- “State of the Art Case Based Lecture: WHO Should Get What? A WHO PAH Group-Based Approach to Treatment.” Presenter as part of Session: “Clearing the Air on Pulmonary Arterial Hypertension: Pharmacology Session I.” American College of Cardiology 68th Annual Scientific Sessions and Expo. Presented to multidisciplinary audience, New Orleans, LA, March 17, 2019. **(Coons)**.
- Intersections of Innovation: Enhancing Standardized Patients and Interprofessional Education with EHRGo. VirtualPharmEd2020. AACP Annual Meeting. July 2020. **(Pater)**.

UPMC Critical Care Pharmacy

Faculty

Neal J. Benedict	Thomas Nolin
James C. Coons	Sam Poloyac
Philip E. Empey	Amy Seybert
Bonnie A. Falcione	Pamela Smithburger
Sandy Kane-Gill	

Residents

Bailey Colvin
Abby Meyers

Patient Care

- Elected Treasurer for the Society of Critical Care Medicine (**Kane-Gill SL**) and AACP Pharmacogenomics (**Empey PE**) and Assessment (**Benedict NJ**) Special Interest Group Chairs.
- Fellow of the American College of Cardiology. (**Coons JC**).
- Lead the Society of Critical Care Medicine’s “Choosing Wisely: The Next Five” Committee (**Smithburger PL**).

Representative Publications

- **Coons JC**, Albert L, Bejjani A, Iasella CJ. Effectiveness and safety of direct oral anticoagulants versus warfarin in obese patients with acute venous thromboembolism. *Pharmacotherapy* 2020;40:204-210.
 - *Largest research report of its kind using clinical data to evaluate outcomes between direct oral anticoagulants and warfarin among obese patients with acute venous thromboembolism.*
- Ostermann M, Bellomo R, Burdmann EA, Doi K, Endre ZH, Goldstein SL, **Kane-Gill SL**, Liu K, Prowle JR, Shaw AD, Srisawat N, Cheung M, Jadoul M, Winkelmayere WC, Kellum JA for the conference participants. Controversies in acute kidney injury: conclusions from a kidney disease improving global outcomes (KDIGO) conference. *Kidney Int* 2020;98:294-309.
 - *As part of an international group of experts, Kane-Gill contributed to the KDIGO Clinical Controversies highlighting limitations in the current guidelines and opportunities for future research.*
- Hagos FT, Horvat CM, Au AK, Conley YP, Li L, **Poloyac SM**, Kochanek PM, Clark RSB, **Empey PE**. Factors Contributing to Fentanyl Pharmacokinetic Variability Among Diagnostically Diverse Critically Ill Children. *Clin Pharmacokinet*. 2019 Dec;58(12):1567-1576. doi: 10.1007/s40262-019-00773-1.
- Malinowski A, **Benedict N**, Levent, K, Meng-Ni H, and **Kane-Gill S**. Patient Reported Outcomes Associated with Sedation and Agitation Intensity in the Critically Ill *American Journal of Critical Care* 2020;29(2):140-4.

Significant Invited Presentations

- Updates from the 6th World Symposium on Pulmonary Hypertension. Updates in Pulmonary Hypertension Management Across the Continuum of Care. *American College of Clinical*

Pharmacy Annual Meeting. Pulmonary Practice and Research Network Focus Session. New York, NY, October 2019. **Coons JC**.

- Antipsychotic Rationale for Role in Delirium. Society of Critical Care Medicine Annual Congress and Twitter Featured Session, Orlando FL 2020. **Smithburger PL**.
- **Kane-Gill** presents at the American Society of Health System Pharmacists; 9th AKI Symposium, University of Pittsburgh and 49th SCCM Critical Care Congress, Orlando, FL on the topic of Early Warning Biomarkers for Acute Kidney Injury. In addition to a discussion of nephrotoxin stewardship at National Kidney Foundation 2020 Spring Clinical Meeting, New Orleans, LA.
- Pharmacotherapy Scholars program: intensive longitudinal training to enhance post-graduate readiness. AACP Annual Meeting; Chicago, IL. **Benedict NJ**.

Significant Grants

- NIH/NIDDK R01 (DK116957-01A1); “Population Health Management to Optimize Care in CKD (PANOPTIC-CKD)” 2018 – 2023. **Nolin TD**(Co-I).
- R21/R33 NS107785 NINDS: Innovation Grants to Nurture Initial Translational Efforts (IGNITE). Period of Support: 07/15/2018 – 07/14/2021. *20-HETE Formation Inhibitors in Cardiac Arrest*. **Poloyac SM** [Principal Investigator (MPI)].
- NIH/NICHD R01 (R01HD099284-02) “Pharmacokinetics of sedatives – Understanding a modifiable risk factor for pediatric delirium” 09/1/2019-07/30/2024. **Empey PE** [Principal Investigator (MPI)].

Innovations

- **Kane-Gill SL**, Ostermann M, Shi J, Joyce EL, Kellum JA. Evaluating renal stress using pharmacokinetic urinary biomarker data in critically ill patients receiving vancomycin and/or piperacillin-tazobactam: A secondary analysis of the multicenter sapphire study. *Drug Saf* 2019; 42:1149 Dr. **Kane-Gill** discusses the clinical controversy of vancomycin and piperacillin-tazobactam contributions to AKI with biomarker data which has not previously been described.
- McDermott, LA; **Poloyac SM**; Koes, D. “20-HETE formation inhibitors” Provisional Patent Application. Appl No. 62/803,398.

UPMC Inpatient Diabetes Management/Transition of Care Program

Faculty

Amy Donihi

Patient Care

- Appointed as the pharmacist representative on the Endocrine Society Writing Committee for updated the Clinical Practice Guidelines for Management of Hyperglycemia in Hospitalized Patients in Non-Critical Care Setting.
- Collaborated with UPMC Rx Express to develop a post-discharge telephone follow-up program for all patients discharged from UPMC Presbyterian new to insulin.
- Chaired the system wide interdisciplinary UPMC Inpatient Diabetes Patient Safety Committee.

Representative Publications

- Karšlioglu French E, **Donihi AC**, Korytkowski MT. Diabetic ketoacidosis and hyperosmolar hyperglycemic syndrome: review of acute decompensated diabetes in adult patients. *BMJ*. 2019; 365: 11114.

Innovations

- Developed a remote IPPE and APPE experience for pharmacy students during the COVID-19 pandemic that allowed them to provide direct patient care, including making diabetes management recommendations to prescribers and delivering virtual diabetes education to hospitalized patients at UPMC Presbyterian.

UPMC Geriatrics (Benedum and Shadyside Senior Care Institute) Program

Faculty

Christine M. Ruby-Scelsi

Patient Care:

- The Benedum and Senior Care Institute clinics are models for academic interprofessional geriatric specialty practice. Pharmacists practice in conjunction with geriatric medicine and psychiatry physicians, nurses, advanced practice nurses, and social workers to provide comprehensive patient-centered care.
- Pharmacists practice in face-to-face scheduled office encounters for acute and chronic conditions, and telephone medicine managing recent ED and hospital discharges for medication reconciliation and care coordination; establishing the role for pharmacists in transitions-of-care (TCM) and chronic care management (CCM) within the Geriatrics Clinics, providing at least 250+ patient transition of care encounters last year. **Ruby CM and Suhrie EM.**
- Elected to serve as Chair of the American Association of Colleges of Pharmacy Geriatric Special Interest Group. **Ruby CM.**
- Appointed to serve on the Medication Safety and Transitions of Care Workgroup and the Pharmacy Education and Research Committee for the American Society of Consultant Pharmacists. **Ruby CM.**

Representative Publications:

- Hart K, Gennari A, and **Ruby CM.** A geriatric pharmacist's clinical and educational activities during weekly interprofessional team meetings. *The Senior Care Pharmacist* Volume 35, Number 3, March 2020, pp. 136-144(9). <https://doi.org/10.4140/TCP.n.2020.136>.
- **Pruskowski J, Ruby C, Berenbrok L, Seybert A, Handler S.** Medication Related 30-day Rehospitalizations in Palliative Care Patients. *Journal of the American College of Clinical Pharmacy (in press)*.
- Tyger T and **Ruby CM.** Transitions of care: A student perspective on the value of current successes and growth opportunities in the PharmD curriculum. *The Senior Care Pharmacist (in press)*.
- Zika A and **Ruby CM.** Older adults and acute kidney injury (AKI): A student perspective on medication changes during hospital admission and transitions of care follow-up. *The Senior Care Pharmacist (in press)*.

Significant Invited Presentations:

- **Pruskowski J, Ruby CM, Berenbrok LA, Seybert A, Handler S.** Characterizing Medication Related Rehospitalizations in Palliative Care Patients: An Exploratory Study. Presented at the American College of Clinical Pharmacists Annual Meeting; New York, NY; October 26, 2019.
- Mansour D, Tyger T, Kistler E, Herbster A, Nguyen J, **Ruby CM.** Implementation of the University of Pittsburgh American Society of Consultant Pharmacist (ASCP) Student Chapter Fidget Blanket Project. Presented at the American Society of Consultant Pharmacists Annual Meeting; Grapevine, TX; November 8, 2019.
- Tyger T, **Ruby CM.** Impact of Pharmacy-Driven Transition of Care Calls on Discovery and Correction of Drug Therapy Problems and Discrepancies for Geriatric Patients Post-Discharge. Presented at the American Society of Consultant Pharmacists Annual Meeting; Grapevine, TX; November 8, 2019.
- Mansour D, **Ruby CM, Pruskowski P.** Antibiotic-Related 30-Day Rehospitalizations in Palliative Care Patients. Presented at the American Society of Consultant Pharmacists Annual Meeting; Grapevine, TX; November 8, 2019.
- Ickes J, Rudzik K, Blake V, Wasylson E, **Ruby CM, Pruskowski J.** The Relationship Between Medication Changes During Index Admissions and the Incidence of 30-Day Readmissions in a Palliative Patient Care Population. Presented at the ASHP MidYear Clinical Meeting, Las Vegas, NV; December 9, 2019.
- Gambler K, **Ruby CM, Pruskowski J.** Do falls bring palliative care patients back to the hospital? A retrospective analysis. Presented at the ASHP MidYear Clinical Meeting, Las Vegas, NV; December 9, 2019.
- Hawn M, **Ruby CM, Pruskowski J.** Initial discharge disposition in relationship to medication-related readmissions in palliative care patients. Presented at the ASHP MidYear Clinical Meeting, Las Vegas, NV; December 9, 2019.

Innovations:

- Implemented the Geriatric and Palliative Care Area of Concentration to personalize the learning of student pharmacists interested in caring for geriatric and palliative care patients. The first cohort of 7 students graduated in April 2020. Role: **Ruby, CM (Co-Director).**
- Re-established the PGY2 Geriatric Pharmacy Residency program in collaboration with RxPartners. **Ruby CM.**

UPMC Infectious Diseases and Antibiotic Management Program (AMP)

Faculty

Brian A. Potoski
Bonnie A. Falcione

Patient Care

- Worked collaboratively with stakeholders in the Infectious Diseases division and the Antibiotic Management Program across UPMC Presbyterian and Shadyside campuses to significantly update, expand content, and finalize the Antimicrobial Guide to Chemotherapy for publication. This guide, the 10th edition since 2005, provides current recommendations and pathways for the

treatment of infectious diseases to healthcare faculty, staff, and trainees across UPMC hospital campuses. This guide ensures the optimal treatment of patients with infections and provides expert recommendations to maximize outcomes while minimizing collateral damage associated with antimicrobial therapy, such as antibiotic resistance and superinfections, such as *C. difficile* disease. The book has been distributed widely across UPMC campuses and is posted on this UPMC Infonet Website with additional links within the medication administration record software. The book is presently being printed with an expected delivery of 3,000 books by the middle of October 2020.

- Collaborative efforts across stewardship team members to enhance patient care through QI projects such as beta-lactam allergy/graded challenge protocols and revised recommendations for necrotizing soft-tissue infections.
- Crafted dedicated scheduling for daily antimicrobial stewardship services to ensure continuity of care across service provided focused on caring for patients.

Representative Publications

- Peri AM, Doi Y, **Potoski BA**, et al. Antimicrobial Treatment Challenges in the Era of Carbapenem Resistance. *Diagn Microbiol Infect Dis*. 2019 Aug;94(4):413-425.

Innovations

- In 2020, The UPMC Presbyterian Campus Antimicrobial Stewardship Program received renewal of its status as a Center of Excellence for Antimicrobial Stewardship as initially awarded by the Infectious Diseases Society of America (IDSA) in 2018. This prestigious designation identifies institutions and their stewardship programs that promote excellence in antimicrobial use and combating antimicrobial resistance.
- Partnering with the Clinical Microbiology at UPMC Presbyterian campus, incorporated a diagnostic stewardship phone as part of daily service. This novel service allows rapid diagnostic results to be called to a stewardship team member via this phone in real-time allowing for immediate action by the stewardship team for conveying results to the primary medical team and making expert recommendations in antimicrobial therapy. This yields a significant decrease in time to optimal antibiotic therapy for patients with bloodstream infections. Data collection of this new and novel service continue, and a more detailed assessment of impact to patient care and outcomes will be evaluated.

UPMC Palliative and Supportive Institute

Faculty

Jennifer Pruskowski

Patient Care:

- Provided clinical pharmacy support to: 10 hospital-based clinical palliative care teams, 8 outpatient clinics and home-based palliative care teams, and supported 4 palliative care CRNPs within UPMC Senior Communities.
- Developed and disseminated a Clinical Checklist for COVID-19 Actively Dying Patients to UPMC providers.

- Deprescribed 100 Seneca Place Senior Community residents of potentially inappropriate or unnecessary medications through the DE-PHARM (Discussion to Ensure the Patient-centered, Health-focused, prognosis-Appropriate, and Rational Medication regimen).
- Developed and conducted the DE-PHARMing Proton Pump Inhibitors Academic Detailing project initiative within Cranberry, Canterbury and Heritage Place Senior Community.
- Cared for over 30 patients within the Palliative Care Pharmacotherapy Clinic for oncology-palliative care patients within Hillman Cancer Center.
- Counseled more than 40 patients on intranasal naloxone prior to discharge from UPMC Shadyside Hospital.
- Mentored 15 Geriatric and Palliative Care Area of Concentration pharmacy learners to personalize the learning of those interested in caring for geriatric and palliative care patients.

Representative Publications

- **Pruskowski JA**, Springer S, Thorpe CT, Klein-Fedyshin M, Handler SM. Does Deprescribing Improve Quality of Life? A Systematic Review of the Literature. *Drugs Aging*. 2019 Dec;36:1097-1110.
- **Pruskowski J, Patel R**, Brazeau G. The Need for Palliative Care in Pharmacy Education. *Am J Pharm Educ*. 2019 Jun;83:7410.
- **Pruskowski J**, Childers J, Moore PA, **Zemaitis MA**, Bauer RE, Deverts DJ, Elnicki DM, Levine SC, Kaufman R, Dziabiak MP, Spallek H, Weiner DK, Horvath Z. Managing Acute Pain and Opioid Risks Following Wisdom Teeth Extraction: An Illustrative Case. *MedEdPORTAL*. 2019 Nov 22;15:10855.

UPMC Pharmacy Solid Organ Transplantation

Faculty

Edward Horn
 Carlo Iasella
 Heather J. Johnson
 Kristine S. Schonder
 Raman Venkataramanan

Patient Care

- Provided individualized patient care and medication education to 500 new patients receiving solid organ transplants.
- Maintained an active practice of caring for over 1,000 active thoracic transplant recipients.
- Increased medication educational efforts in heart transplant and mechanical circulatory support patients.
- Revised driveline infection protocol in mechanical circulatory support patients.
- Development of a multidisciplinary care protocol for LVAD patients with gastrointestinal bleeding.

Representative Publications

- Thanukrishnan H, Corcoran TE, **Iasella CJ**, Moore CA, Nero JA, Morrell MR, McDyer JF, Hussain S, Nguyen MH, **Venkataramanan R**, Ensor CR. Aerosolization of Second-generation

Triazoles: In Vitro Evaluation and Application in Therapy of Invasive Airway Aspergillosis. Transplantation. 2019 Dec;103(12):2608-2613. doi: 10.1097/TP.0000000000002697. PMID: 31343565.

- This manuscript reports that the physicochemical characteristics of aerosol particles of both second-generation triazoles, voriconazole and posaconazole, were optimal for aerosolized delivery. Pulmonary deposition for nebulized voriconazole was predicted, and the inhaled voriconazole in addition to systemic antifungals was successfully used in therapy of a patient with IA.
- **Iasella CJ**, Winters SA, Kois A, Cho J, Hannan SJ, Koshy R, Moore CA, Ensor CR, Lendermon EA, Morrell MR, Pilewski JM, Sanchez PG, Kass DJ, Alder JK, Nouraie SM, McDyer JF. Idiopathic pulmonary fibrosis lung transplant recipients are at increased risk for EBV-associated posttransplant lymphoproliferative disorder and worse survival. *Am J Transplant*. 2020 May;20(5):1439-1446. doi: 10.1111/ajt.15756. Epub 2020 Jan 22. PMID: 31874120.
 - This manuscript is one of the largest retrospective analyses of post-transplant lymphoproliferative disorder in lung transplant. It is the first report identifying IPF as a risk factor for PTLD after lung transplantation and may guide future efforts to personalize pharmacologic mitigation strategies in this population.
- Kilic A, Hickey GW, Mathier M, Sultan I, Gleason TG, **Horn E**, Keebler ME. Outcomes of adult heart transplant recipients using hepatitis C-positive donors. *J Am Heart Assoc* 2020; 9(2):e014495.
 - This paper is an evaluation utilizing the UNOS database to determine if outcomes are different in transplant recipients that receive organs from hepatitis C donors are different from those without. Overall survival between groups was not different (90.2% vs 91.1%; p=0.86). Rejection was also not different between groups. This data lends to the overall body of literature that shows that utilizing organs from hepatitis C positive donors can increase the donor pool safely with respect to survival and rejection outcomes.

Significant Invited Presentations

- **Iasella CJ**, Snyder MA, Popescu I, Wei J, Hoji A, Zhang Y, Xu W, Iouchmanov V, Brown M, Lendermon E, Johnson B, Kilaru S, Morrell M, Pilewski J, Greenland J, Chen K, McDyer JF. Transcriptome Analysis of Airway Brushes in Lung Transplant Recipients with and without Chronic Lung Allograft Dysfunction. Presentation/Abstract. International Society of Heart and Lung Transplantation Annual Meeting. Online Meeting (Due to COVID-19), April 2020.
- **Iasella CJ**, Winters SA, Kois A, Cho J, Hannan SJ, Koshy R, Moore CA, Ensor CR, Lendermon EA, Morrell MR, Pilewski JP, Sanchez PG, Kass DJ, Alder JK, Nouraie SM, McDyer JF. Idiopathic Pulmonary Fibrosis Lung Transplant Recipients are at Increased Risk for EBV-associated Post-Transplant Lymphoproliferative Disorder and Worse Survival. Presentation/Abstract. International Society of Heart and Lung Transplantation Annual Meeting. Online Meeting (Due to COVID-19), April 2020.
- **Fredrick S, Iasella CJ**, Moore CA, Mangiola M, Xu Q, Ensor CR, Riciutti D, LaFratte C, Sanchez P, Morrell MR, McDyer JF, Zeevi A. Outcomes of a pre-transplant desensitization protocol with carfilzomib, plasmapheresis, and IVIg for broadly sensitized lung transplant candidates: A case series. Presentation/Abstract. American Transplant Congress. Online Meeting (Due to COVID-19), May 2020.
- Sriwattanakomen R, Xu Q, Zeevi A, Demehin M, Shullo MA, Keebler ME, Mangiola M, Hickey GW, **Horn ET**. Carfilzomib for Heart Transplant Desensitization. Presentation/Abstract.

International Society of Heart and Lung Transplantation Annual Meeting. Online Meeting (Due to COVID-19), April 2020.

Significant Grants

- R01 HD096796. Pharmacologically-based Strategies for Buprenorphine Treatment During Pregnancy. National Institutes of Health 2018-2023 PI: **Venkataramanan R.**
- PBPK and Population Pharmacokinetic Analysis of Treprostonil. United Therapeutics 2018-2020 PI: **Venkataramanan R.**
- Microbiome and Host Responses of CLAD in CF Patients. Cystic Fibrosis Foundation 2019-2020 Co-Investigators: McDyer J, **Iasella CJ.**
- Proteasome inhibitor carfilzomib for antibody-mediated rejection diagnosis in lung transplantation. Onyx/Amgen 2016-2020. Co-investigators: McDyer J, **Iasella CJ.**

Innovations

Rapid deployment of telemedicine in thoracic transplant clinics during COVID-19 pandemic to conduct evaluations and consultative pharmacy services.

UPMC Family Medicine Horizon and Shenango Programs

Faculty

Alexis Gaggini

Patient Care:

- Established role of pharmacist at Horizon on family medicine inpatient rounding team. Work collaboratively with attending and resident physicians to optimize pharmacotherapy. The family medicine team has an average daily census of 9 patients.
- Worked with health system and department to facilitate appropriate use of remdesivir. Responsibilities include screening for appropriate use, submitting patients to lottery, providing patient/caregiver education, securing inventory for remdesivir course.
- Established remote ambulatory care services for Shenango Valley Family Medicine outpatient clinic working collaboratively with family medicine physician and pharmacy students to enhance patient medication therapy management.
- Establish Shenango Valley Family Medicine as a learning site for APPEAL ambulatory care rotation.
- Provide patient education for diabetes blood glucose self-monitoring and administration of diabetes medications.

UPMC Oncology Magee Womens Hospital

Faculty

Leslie L. Gingo

Patient Care

- Streamlined multidisciplinary communication to optimize discharge medication delivery and education to reduce pharmacotherapy-related readmission risk.
- Implemented an evidence-based, postoperative pain management protocol that resulted in 50% fewer opioid doses prescribed at discharge. This change has reduced the need for insurance prior authorizations for these prescriptions and minimizes the risk for misuse and/or diversion.
- Developed an electrolyte replacement guide to optimize and standardize electrolyte repletion ordering for hypokalemia, hypomagnesemia, hypocalcemia, and hypophosphatemia in the perioperative setting.

UPMC St. Margaret Family Medicine

Faculty

Roberta Farrah

Residents

Rachael Cardinal

Annie Williams

Kevin Wissman

Patient Care:

- The family medicine residency program consists of three community-based family health centers that are models for academic interprofessional primary care practice. Pharmacists practice alongside family medicine and psychiatry physicians, nurses, social workers, behavioral health specialists, nutritionists, and patient case managers to provide comprehensive patient-centered care.
- All three family health centers have received Level 3 Patient Centered Medical Home (PCMH) status by the National Committee for Quality Assurance (NCQA). The family health centers see a patient volume of up to 2,500 visits per month, as a mix of pediatric and adolescent, adult, and geriatric medicine.
- Pharmacists practice in face-to-face scheduled office encounters for acute and chronic conditions, tele medicine outreach of recent ER and inpatient admissions for medication reconciliation and care coordination, group visits, home visits, population health management, and drug policy development and review. Provided leadership and management of team-based medication-assisted treatment (MAT) for alcohol and opioid abuse, treatment of hepatitis C in primary care, and transitional care management (TCM).
- Primary care pharmacists provide clinical patient care, leadership, and partnership with UPMC Enterprise and UPMC Rx Express™.

Representative Publications:

- **Wissman K, Hogan L.** We Need to Be Smarter Than Our Smartphones. *American Journal of Pharmaceutical Education.* 2019;83(1):131. doi:10.5688/ajpe7054.
- **Wissman K, Wilson E, Sakely H.** Bictegravir/Emtricitabine/Tenofovir Alafenamide (Biktarvy). *Materia Medica. Allegheny County Medical Society.*

- **Wissman K**, Ferdock A, Skef S. Does Dexamethasone Improve Outcomes in Adults with Bacterial Meningitis? REF #EMS3409 *Family Physicians Inquiries Network*.
- **Cardinal R**. Quality Improvement Projects. *Pennsylvania Pharmacist*. Pennsylvania Pharmacists Association. March/April 2020;101(2):36-37.
- **Cardinal RM**, Ferdock A, Sakely H. Semaglutide (Ozempic®). *Materia Medica*. Allegheny County Medical Society. February 2020.
- Brown A, **Williams A**, Lineman J. In patients with COPD, does spinal manipulative therapy (SMT) improve lung function compared to no spinal manipulative treatment? *Family Physicians Inquiries Network*. Accepted for Publication.
- Chatellier K, **Williams A**, Koenig M. Xenleta® (Lefamulin). *Allegheny Cty Med Soc*. 2020: 110(5):156-157.
- **Williams A**, Bobrynski E., Koenig M. Bupropion and Selective Serotonin Reuptake Inhibitors Equal in the Reduction of Anxiety in Adults with Depression. *Family Physicians Inquiries Network*. 2019; 30(13).

Significant Invited Presentations:

- Wissman K, **Farrah R**, McGuire P, Mercuri J, Koenig M. Incorporating Motivational Interviewing to Foster Change in Patients' Health Behaviors with an Interprofessional Team. [Poster] American College of Clinical Pharmacy Virtual Poster Symposium. May 26, 2020.
- Wissman K, Hogan L, Jaffe G, Panjwani S, Schmitz N. The Mindset Concept: How a "Growth Mindset" transforms teaching and learning. [Roundtable Discussion] Society of Teachers of Family Medicine Annual Conference. Salt Lake City, UT. May 1, 2020.
- Hogan L, Wissman K, Skef S. Interviewing for Residency: Family Medicine Candid(ates') Approaches to Health Equity. [Roundtable Discussion] Society of Teachers of Family Medicine Conference on Medical Student Education. Portland, OR. January 30th, 2020.
- Cardinal RM, Baumgartner M, Cassidy E, D'Amico F, Heath R. Variations of Pain Medication Use for Acute Extremity Pain. 53rd STFM Annual Spring Conference. Salt Lake City, UT. May 2020.
- Cardinal RM, D'Addezio A, Dakers K, D'Amico F, Yee A, and Castelli G. Safety and Efficacy of Direct Oral Anticoagulants in Extreme Body Weights – CPE (Poster #75). ACCP Annual Conference. Manhattan, NY. October 2019.
- Raghavan A and Cardinal RM. Deprescribing: Imitating the Art. Seminar at 53rd STFM Annual Spring Conference. Salt Lake City, UT. May 2020.
- Klatt, Patricia. Anne Williams. Bringing home the gold in ACGME accreditation: How incorporating pharmacists as core faculty can help your program. STFM Annual Conference. Salt Lake City, Utah, May 2020.
- Stephanie Ballard, Scott Brown, Anne Williams, Lindsay Niakashi. Ready to RIME n Roll. STFM Annual Conference. Salt Lake City, Utah, May 2020.

Selected Grants

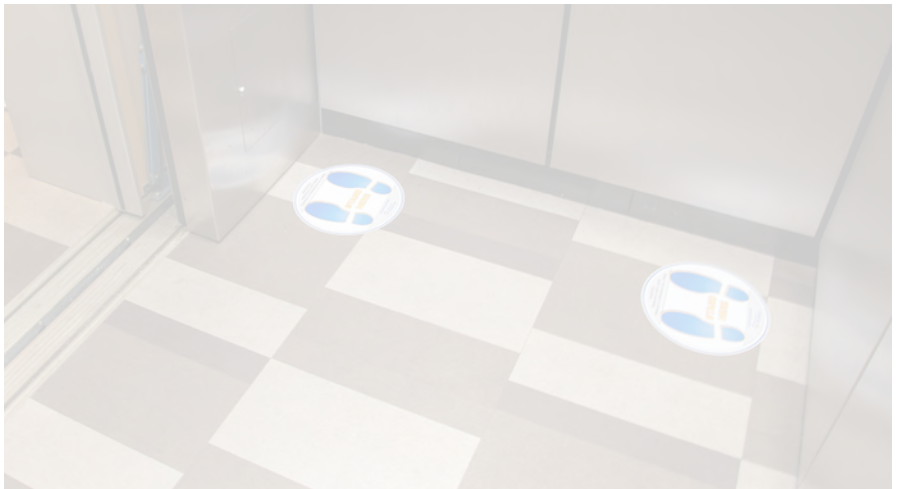
- Williams, A. Embedding Sustainable Clinical Pharmacy Services with Family Medicine Practices. American Society of Health System Pharmacist Foundation, Pharmacy Resident Practice-Based Research Grant. \$5,000 with second year extension.

Innovations

- Pharmacist-as-educators in precepting UPMC St. Margaret Family Medicine physician residents (36) on required and elective rotations, UPMC St. Margaret PGY1 pharmacy residents (5), and the University's Community Pharmacy Practice residents (3), and medical/pharmacy IPPE and APPE student learners.
- Pharmacy residents as two-year fellows within UPMC St. Margaret Faculty Development Fellowship. The five curriculum domains include clinical care, research and scholarship, teaching and learning, administration and management, and professional development and leadership.

Build Foundational Strength





Build Foundational Strength

Achieving the vision of the School of Pharmacy requires a financial and space resource base that supports faculty, staff, and students in their endeavors. Because the people of the School of Pharmacy are one of its greatest resources, information about faculty, staff, and alumni appears in this section.

We will partner with our stakeholders and communities to develop the resources to advance our mission.

RESOURCES BY THE NUMBERS FOR FY20

- **\$33.4 million:** The total School of Pharmacy expenditures in FY20 from all sources.
- **\$27.9 million:** The market value of the School's endowment at the end of FY20.
- **\$2,049,500:** Gifts in FY20
- The School of Pharmacy has an allocation of and/or leases **70,810 SF** of space in **seven (7) locations** in Oakland and the East End.
- **\$466 per SF:** Efficiency measured as expenditures divided by total number of square feet occupied.
- In FY20, the School of Pharmacy had **72 full-time faculty members; 12** were recipients of **16** awards for their accomplishments.

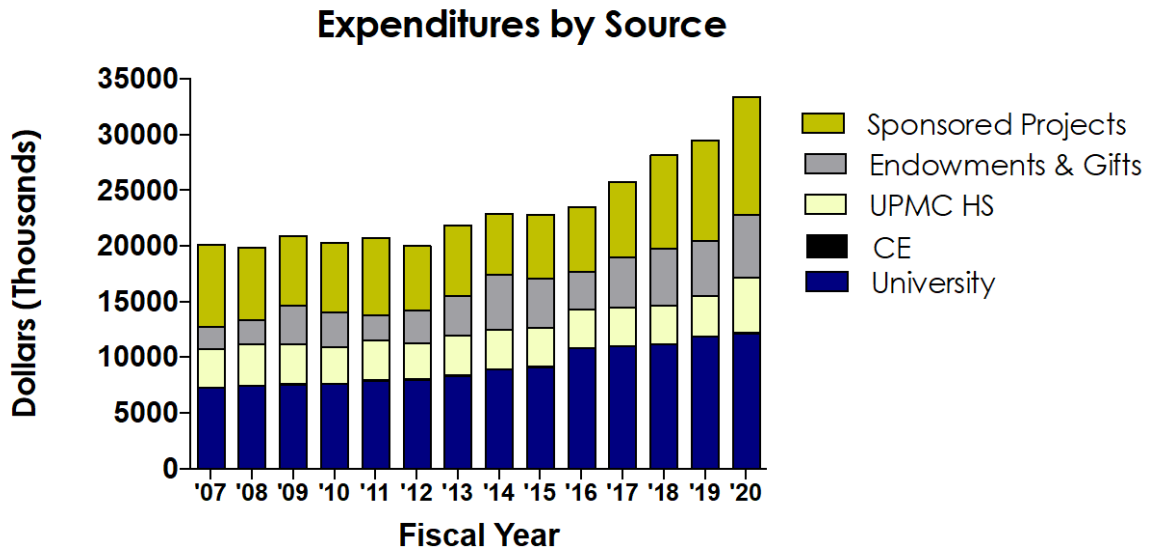
Of our **72** faculty members,

- **16 (22%)** have been elected to fellowship in one or more organizations.
- **24 (33%)** are board certified.
- **32 (44%)** are board certified, fellows, or both.
- **121:** The number of staff members. Thirty-one (**31**) are administrative and **90** are research
- Number of living alumni: **5,425**
- The School of Pharmacy's alumni ranked:
 - **Second** in the University in overall alumni engagement for FY20.
 - **Second** in overall participation out of all 20 schools and campuses for the University of Pittsburgh's second annual Day of Giving and first in the power hour, which unlocked \$16,000 in bonus funds for the school. Four hundred and thirty-three donors contributed over \$70,729.27.
- **10.69: percentage** of the alumni engaged with PittPharmacy and/or Pitt in some way.

FINANCIAL RESOURCES

Budget

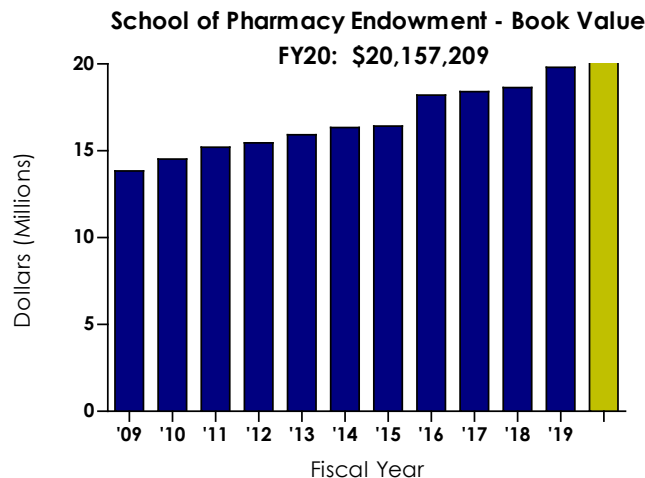
Sources of funding for the School of Pharmacy include allocation from the University of Pittsburgh, UPMC, continuing education and auxiliary accounts, gifts and endowments, and sponsored project awards. The graph below represents financial expenditures for fiscal years '07 through '20.



The School of Pharmacy’s expenditures in FY20 totaled \$33,396,035. Sponsored projects accounted for 32% of the expenses in FY20. Together, the University (37%), sponsored project awards (32%), and UPMC (14%) accounted for over 80% of the School’s funding in FY20.

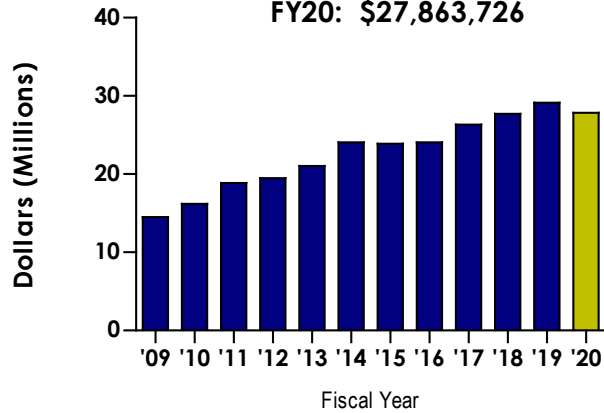
Institutional Advancement

The value of the School of Pharmacy is recognized in many ways, including philanthropic support.



School of Pharmacy Endowment - Market Value

FY20: \$27,863,726

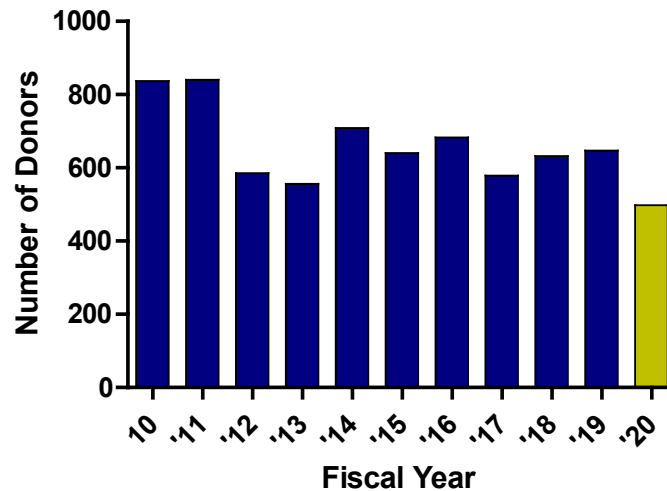


In FY20, the School of Pharmacy received charitable gifts, pledges, and grants totaling \$2,049,500 from a total of 498 individuals, foundations, corporations, and other organizations.

FY20 Giving to the School of Pharmacy by Source

	Alumni	Foundations	Corporations	Organizations	Friends
Amount	\$492,261	\$296,670	\$891,455	\$290,871	\$78,244
Percentage	24%	14%	43%	14%	4%

Annual Donors-FY20

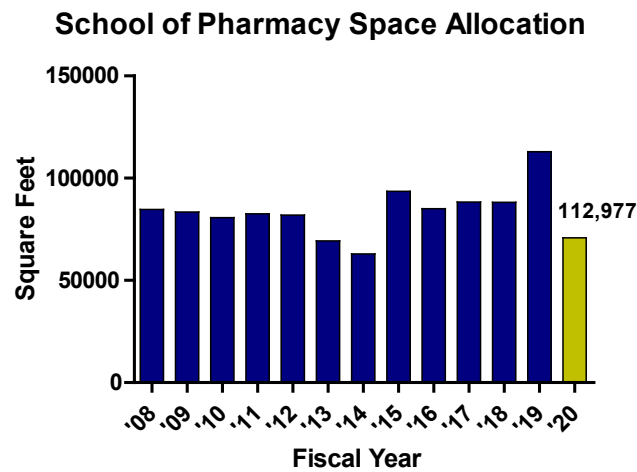


PHYSICAL FACILITIES

At the close of FY20, the School of Pharmacy occupied a total 70,810 SF including:

- 57,625 SF in Salk Hall* (10,299 SF is occupied, 47,326 SF is under renovation and unoccupied)
- 22,852 SF in Salk Pavilion*
- 2,283 SF Commons*
- 619 SF in BST III*
- 279 SF in 3609 Forbes Avenue*
- 20,000 SF (Leased) at The Offices @ Baum
- 14,478 (Leased) at the PTC Building

*University of Pittsburgh space



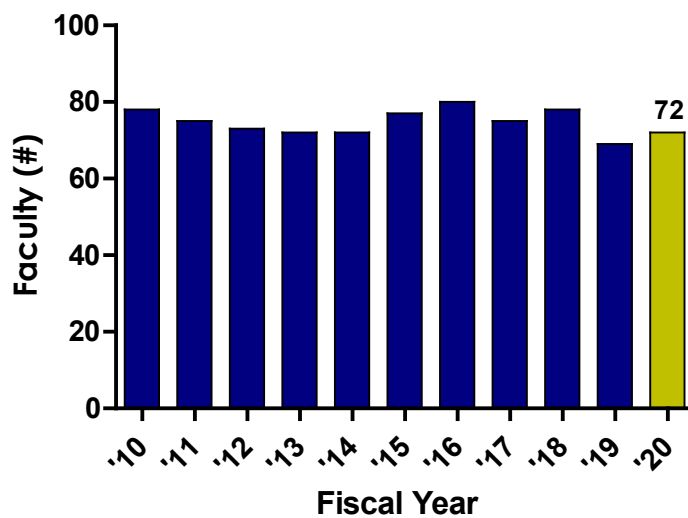
THE RESOURCE OF PEOPLE

We formally recognize that the people of the School are its most valuable resource, and therefore include people in the Resource Section.

Faculty

Seventy-two full-time and fourteen part-time faculty members comprise the School of Pharmacy, all of whom hold faculty appointments in either the Department of Pharmaceutical Sciences or the Department of Pharmacy and Therapeutics. The changes in number of faculty in the past decade are shown in the graph.

Full-Time Faculty Members



In the Department of Pharmaceutical Sciences, the following faculty were promoted and/or appointed:

- Da Yang, MD, PhD to associate professor with tenure
- Sravan Kumar Patel, MS, PhD to assistant professor
- Jingjing Sun, PhD to research instructor
- Imam Hussain Shaik, PhD to research instructor
- Faculty who left the University of Pittsburgh (fall 2020)
 - Sam Poloyac, PharmD, PhD, was appointed Dean of the University of Texas' (Austin) College of Pharmacy.

In the Department of Pharmacy and Therapeutics, the following faculty were promoted:

- Victoria Luna Brennan Grieve, PharmD promoted to assistant professor
- Kerry M. Empey, PharmD, PhD to associate professor with tenure
- Philip Empey, PharmD, PhD to associate professor with tenure
- New faculty members were hired into the department:
 - Poonam Alaigh, MD, MS, Research Professor
 - Alexis Gaggini, PharmD, Assistant Professor
 - Catherine Rebitch, PharmD, Associate Professor
 - John Riley, MBA, Assistant Professor
 - Kangho Suh, PharmD, PhD, Assistant Professor
 - Ying Xue, MS, PhD, Assistant Professor

Full-Time Faculty Rank by Department of Primary Appointment*

Faculty Rank	Pharmaceutical Sciences	Pharmacy and Therapeutics	Total for School of Pharmacy
Professor	11	7	18
Associate Professor	6	18	24
Assistant Professor	8	17	25
Instructor	2	0	2

Research Assistant Professor	2	0	2
Research Associate Professor	1	0	1
All Faculty	30	42	72

*Part-time Faculty (numbers not in table) include:
 Department of Pharmaceutical Sciences: 6
 Department of Pharmacy and Therapeutics: 8

In FY20, School of Pharmacy faculty members earned a total of 16 major awards.

FY20: Faculty Awards, Honors, and Recognitions

Faculty Member	Award	Organization
Lucas Berenbrok	Certificate of Outstanding Contribution in Reviewing	Journal of the American Pharmacists Association
	Rising Star Award	University of Pittsburgh School of Pharmacy
James Coons	Fellowship	American College of Cardiology
Christian Fernandez	Early Career Award	The American Society for Pharmacology and Experimental Therapeutics (ASPET) Translational and Clinical Pharmacology (TCP)
Inmaculada Hernandez	Fellowship	American Heart Association
	Seema S. Sonnad Emerging Leader in Managed Care Research Award	American Journal of Managed Care
Sandy Kane-Gill	Safety Award	UPMC Quality and Safety Fair
	Excellence in Innovation Award	Pennsylvania Pharmacists Association
Xiaochao Ma	Research Awards Committee, the Liver Foundation of the American Association for the Study of Liver Diseases (AASLD)	American Association for the Study of Liver Diseases (AASLD)
Jan Pringle	Excellence in Patient Care Award	National Association of Chain Drug Stores Foundation
Lisa Rohan	Outstanding Scholarly Contribution Award by the student members of the Alpha Omicron Chapter	Rho Chi Society
	Nominated for Provost's Award for Excellence in Doctoral Mentoring	University of Pittsburgh
Pam Smithburger	Safety Award	UPMC Quality and Safety Fair
Raman Venkataramanan	Nominated for Distinguished Scientists Award	American Association of Pharmaceutical Scientists (AAPS)
Junmei Wang	Graduate Faculty Member of the Year	School of Pharmacy University of Pittsburgh
Da Yang	AACR Team Science Award (TCGA program RNA-team leader)	American Association of Cancer

Fellowships in Organizations and Board Certification

Election to fellowship and board certification are two characteristics of faculty members who have distinguished themselves. Of the 72 faculty members, 16 (22%) have been elected to fellowship in one or more organizations, and 24 (33%) are board certified. The names, letters indicating the fellowship, and department of affiliation are shown in the table. The organization of the fellowship is indicated at the first use of the initials in the table.

FY20: Faculty Elected to Fellowship in Professional or Scientific Organizations

Name	Fellowship		Department
Kim Coley	ACCP	American College of Clinical Pharmacy	Pharmacy and Therapeutics
James Coons	ACCP	American College of Clinical Pharmacy	Pharmacy and Therapeutics
	ACC	American College of Cardiology	
Amy Donihi	ACCP	American College of Clinical Pharmacy	Pharmacy and Therapeutics
Inmaculada Hernandez	ACC	American College of Cardiology	Pharmacy and Therapeutics
	AHA	American Heart Association	
Sandra Kane-Gill	ACCM	American College of Critical Care Medicine	Pharmacy and Therapeutics
	ACCP	American College of Clinical Pharmacy	
Patricia Kroboth	ACCP	American College of Clinical Pharmacy	Pharmaceutical Sciences
	AAPS	American Association of Pharmaceutical Scientists	
	AAAS	American Association for Advancement of Science	
Melissa Somma McGivney	APhA	American Pharmacists Association	Pharmacy and Therapeutics
	ACCP	American College of Clinical Pharmacy	
	ACC	ACC Academic Leaders Network	
Susan Meyer	NAP	National Academies of Practice	Pharmacy and Therapeutics
Thomas Nolin	ACP	American College of Clinical Pharmacology	Pharmacy and Therapeutics
	ACCP	American College of Clinical Pharmacy	
	ASN	American Society of Nephrology	
Samuel Poloyac	AACP	American Association of Colleges of Pharmacy – Academic Leadership Fellow	Pharmaceutical Sciences
	ACCM	American College of Critical Care Medicine	
Christine Ruby-Scelsi	ASCP	American Society of Consultant Pharmacists	Pharmacy and Therapeutics

Name	Fellowship		Department
Amy Seybert	ASHP	American Society of Health System Pharmacists	Pharmacy and Therapeutics
	ACCP	American College of Clinical Pharmacy	
Susan Skledar	ASHP	American Society of Health System Pharmacists	Pharmacy and Therapeutics
Randall Smith	AAPS	American Association of Pharmaceutical Scientists	Pharmaceutical Sciences
Pam Smithburger	ACCP	American College of Clinical Pharmacy	Pharmacy and Therapeutics
	ACCM	American College of Critical Care Medicine	
Raman Venkataramanan	AAPS	American Association of Pharmaceutical Scientists	Pharmaceutical Sciences
	ACCP	American College of Clinical Pharmacology	

FY20: Faculty Board Certifications

Name	Fellowship		Department
Kim Coley	ACCP	American College of Clinical Pharmacy	Pharmacy and Therapeutics
James Coons	ACCP	American College of Clinical Pharmacy	Pharmacy and Therapeutics
	ACC	American College of Cardiology	
Amy Donihi	ACCP	American College of Clinical Pharmacy	Pharmacy and Therapeutics
Inmaculada Hernandez	ACC	American College of Cardiology	Pharmacy and Therapeutics
	AHA	American Heart Association	
Sandra Kane-Gill	ACCM	American College of Critical Care Medicine	Pharmacy and Therapeutics
	ACCP	American College of Clinical Pharmacy	
Patricia Kroboth	ACCP	American College of Clinical Pharmacy	Pharmaceutical Sciences
	AAPS	American Association of Pharmaceutical Scientists	
	AAAS	American Association for Advancement of Science	

Name	Fellowship		Department
Melissa Somma McGivney	APhA	American Pharmacists Association	Pharmacy and Therapeutics
	ACCP	American College of Clinical Pharmacy	
	ACC	ACC Academic Leaders Network	
Susan Meyer	NAP	National Academies of Practice	Pharmacy and Therapeutics
Thomas Nolin	ACP	American College of Clinical Pharmacology	Pharmacy and Therapeutics
	ACCP	American College of Clinical Pharmacy	
	ASN	American Society of Nephrology	
Samuel Poloyac	AACP	American Association of Colleges of Pharmacy – Academic Leadership Fellow	Pharmaceutical Sciences
	ACCM	American College of Critical Care Medicine	
Christine Ruby-Scelsi	ASCP	American Society of Consultant Pharmacists	Pharmacy and Therapeutics
Amy Seybert	ASHP	American Society of Health System Pharmacists	Pharmacy and Therapeutics
	ACCP	American College of Clinical Pharmacy	
Susan Skledar	ASHP	American Society of Health System Pharmacists	Pharmacy and Therapeutics
Randall Smith	AAPS	American Association of Pharmaceutical Scientists	Pharmaceutical Sciences
Pam Smithburger	ACCP	American College of Clinical Pharmacy	Pharmacy and Therapeutics
	ACCM	American College of Critical Care Medicine	
Raman Venkataramanan	AAPS	American Association of Pharmaceutical Scientists	Pharmaceutical Sciences
	ACCP	American College of Clinical Pharmacology	

Alumni and Alumni Engagement

The School of Pharmacy ranked second in the University in overall alumni engagement for FY20, with 580 (10.7 percent) of 5,425 alumni who engaged with PittPharmacy or Pitt in some way. Engaged alumni are those who donated, volunteered, or attended activities in FY20. Additionally, PittPharmacy ranked second in overall participation out of all 20 schools and campuses for the University of Pittsburgh's third annual Pitt Day of Giving; first in the power hour. Those rankings unlocked \$16,000 in bonus funds in addition to the gifts from 433 donors who contributed \$70,729.27.

In FY20, alumni demonstrated their commitment to the University and the School in many ways, including participation in events sponsored by the School and/or the Alumni Society.

- Pharmacy alumni celebrated Homecoming 2019 with a tailgate-style homecoming party held at the Wyndham University Inn attended by 109 alumni, faculty, staff, students, and friends.
- PittPharmacy hosted a Pharmacy Innovation Experience Research (PIER) Program reception in Miami, Florida on August 8, 2019 with forty individuals in attendance.
- The Twenty-Seventh Annual Career Roundtables on October 23, 2019 in the O'Hara Student Center Ballroom. Forty-four alumni participated in this student event. Alumni from 18 practice areas met with the P1 students and answered questions about their individual practice areas giving the students a better perspective of the many opportunities a degree in pharmacy can offer.
- The In the House Tonight RxTravaganza was held on November 2, 2019 in the Cathedral of Learning Commons. We hosted a cocktail reception, followed by dinner and our alumni awards. We honored Rising Stars: Luke Berenbrok '13, '17, Darem Dughri '06, Yardlee Kauffman '10, '12, and Jasmine Talameh Luzum '08, '13 and Distinguished Alumni: Scott Drab '89, Pamela Garzone '81, '87, Laura Hungiville '84, and Carla White '89. Then we danced the night away. One hundred and seventy-six individuals were in attendance.
- The Joseph A. Gatto Top Golf Event was held on September 8, 2019 with 34 individuals attending. This event was located at Pittsburgh TopGolf in Bridgeville, PA. The event lasted three hours and a buffet lunch, free club rental, and reserved bays were included. During the event we hosted a silent auction. The silent auction items included: James Connor and Jim Covert autographed photos, a Let's Go Bucs Basket (Pirates basket), Texas Roadhouse Legendary Raffle Basket, Sweets basket, Restaurant Gift Card Basket, The Gatto Family basket, PittPharmacy Basket, The Italian Basket, Pitt Men's Basketball Tickets, Pitt Football Tickets, and Penzeys Spice Set. All proceeds from the silent auction went to The Joseph A. Gatto Student Scholarship fund.
- The Third Annual Student Industry Symposium the weekend of February 15, 2019 at the Hilton Garden Inn. This event welcomed 13 alumni from all corners of the country to discuss the inner-workings of the pharmaceutical industry with graduate and PharmD students. The event began with a welcome reception on Friday, February 15th and culminated in a day-long meeting on Saturday, February 16th, where leading industry professionals gave informative, TED-style talks, participated in roundtable discussions, and interacted with students.
- PittPharmacy Zoo Day was held on Saturday, June 2, 2019 where alumni and friends made their way to the Pittsburgh Zoo and PPG Aquarium for a day of family fun.

During FY20, PittPharmacy had a bigger reach on social media platforms.

Pitt Pharmacy Social Media Followers						
2016 to 2020						
Social Media Outlet	Creation Date	Members/ Followers as of 6/5/16	Members/ Followers as of 5/27/17	Members/ Followers as of 5/21/18	Members/ Followers as of 5/18/20	Increase FY18 to FY20
Facebook	Feb, 2010	1,498	1,948	2,080	2,693	29.47%
Twitter	May 2009	722	1,319	1,513	1,930	27.56%
LinkedIn Group	Sep 2012	360	474	476	485	1.89%
Instagram	Jan 2016	N/A	N/A	N/A	1,406	N/A*

COVID-19 Social Media Campaign 2020 (March-June)						
Social Media Outlet	Number of Posts	Clicks (Photos, links, videos)	Followers	Engagement	Awareness, Mentions, Shares	Impressions/ Interactions
Facebook	80	6,182	2,496	9,707	525	336,206
Twitter	65	N/A	1,930	293	132	175
LinkedIn Group	60	N/A	23	N/A	N/A	N/A
Instagram	69	N/A	1,409	5,700	28	12,607

Pitt Pharmacy FY20						
Social Media Outlet	New Followers	Total number of Engagement	Number of Posts	Number of Impressions/Interactions	Awareness, Mentions, Shares	Clicks (Photos, links, videos)
Facebook	231	17,408	253	656,144	846	15,375
Twitter	217	900	181	440	466	N/A
LinkedIn Group	N/A	N/A	N/A	N/A	N/A	N/A
Instagram	471	14,556	196	31,028	97	N/A

ENHANCING OUR RESOURCE BASE THROUGH EFFICIENCY AND EFFECTIVENESS

Fostering philanthropic support, assuring the efficient utilization of space, acquiring space for new and/or growing programs, managing fiscal resources, and providing the faculty and students with the best teaching technologies are critical to our future success. All are core elements that drive our efficiency and effectiveness goals.

Staff

In FY20:

- Ninety-eight staff members served in:
 - administrative roles (31)
 - research roles (90)
- The PittPharmacy staff is extraordinary and has a remarkable commitment to excellence and innovation, to supporting research and scholarship, and to service in local and national organizations.
- Several administrative staff members serve as leaders on committees and councils external to the School of Pharmacy, including within the University.
- Members of the PERU research staff received the Best Professional Abstract Award at the American Public Health Association annual meeting and expo.
- Eight PittPharmacy staff members received service awards from the School of Pharmacy for their tenure and commitment to the School.

Information Technology

In FY20, the Information Technology staff:

- Handled 2,555 Technology Help Tickets – an increase of 64% over FY19*
 - Web Help Desk assistance: 2
 - Building and room access: 34
 - Classroom and speaker support: 100
 - Communications, graphics, and photography: 99
 - Database issues: 444
 - Email and calendar: 64
 - Equipment reservation: 20
 - Hardware: 192
 - iPad: 5
 - Network/connectivity: 236
 - New hardware request: 29
 - Other: 4
 - Software: 190
 - Website: 531
 - Uncategorized: 396

*FY20 differed from previous years in several ways that likely contributed to the increase in help tickets; during FY20, PittPharmacy had a first-ever remote work mandate due to COVID-19; PERU significantly increased its staffing; PERU moved to a new office location; migration to the Windows 10 platform; and the department file-server migration to enterprise storage.

Specifically between March 15 to July 1, 2020—the onset of COVID-19 pandemic—the IT team experienced a 126 percent increase in support requests compared to the previous year. The largest number of tickets concerned remote access to the department file server, and questions related to the Zoom platform, Microsoft Teams, and the VPN application (PulseSecure). Most support requests were able to be handled remotely using a variety of tools and communication platforms. Pitt IT consultants worked with Pharmacy leadership to plan and communicate remote work information, disseminate documentation, and provide laptops to Pharmacy staff and faculty who did not have the hardware for remote work.

Remote work also required that:

- The mobile hardware replacement project be accelerated.
- VPN roles for PulseSecure were expanded to accommodate more simultaneous users;
- Firewall rules were added to allow remote users the ability to connect to the same network resources they had access to in the office.
- Contactless break/fix repair work be developed and deployed nearly exclusively; hands-on support was limited to laptop/hardware deployment for remote workers

Communications

The School of Pharmacy advanced its use of electronic communication for sharing awards, accomplishments and events with constituents. As indicated earlier in this section, PittPharmacy has a presence on Twitter, Facebook, YouTube, and LinkedIn. The Web site is the primary mechanism by which stakeholders access information about the School of Pharmacy

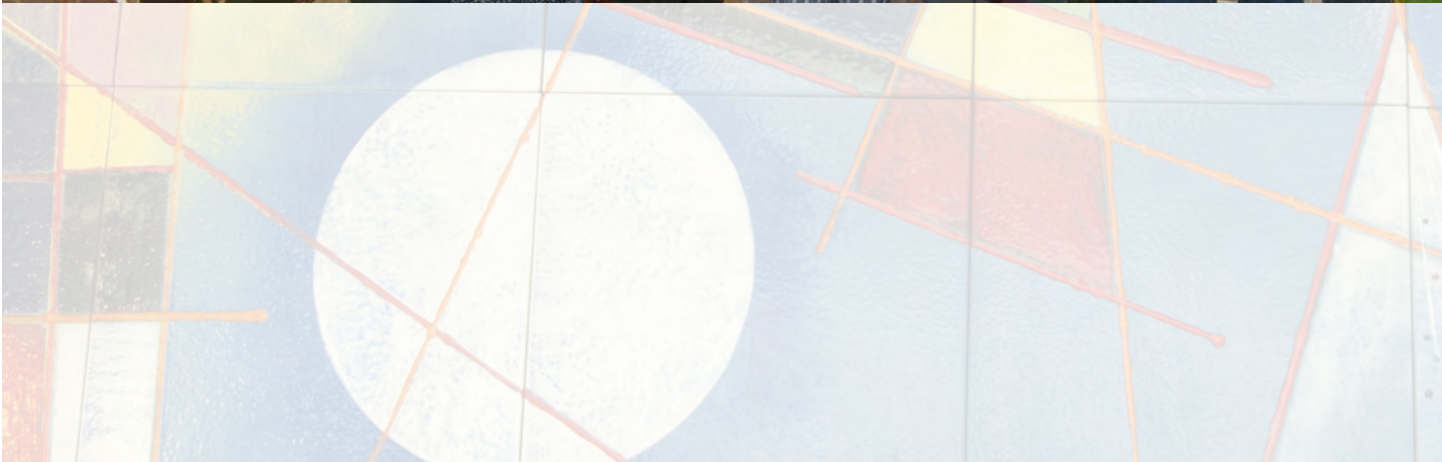
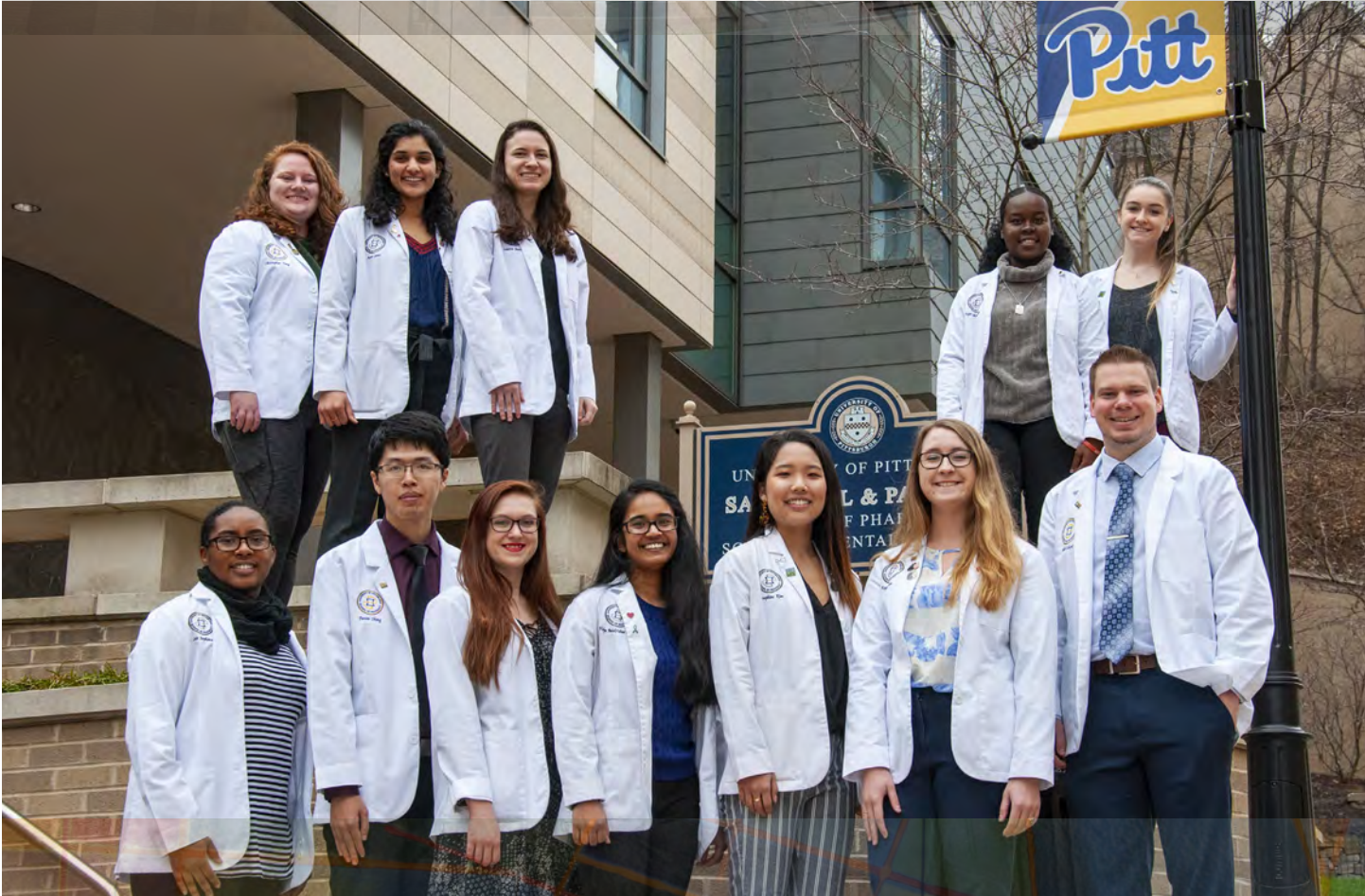
In FY20, the PittPharmacy Communications Team:

- Responded to the pandemic by increasing digital communications and decreasing the production and distribution of print materials. Print copies were reduced to four major projects:
 - PittPharmacy Magazine, which was distributed digitally then reproduced and distributed in print during the summer.
 - Yearbook 2020—a first time production as a result of the virtual graduation
 - Residents’ Research Booklet
 - Making Medicines Work Booklet.
- The 6,321 stakeholders of PittPharmacy continued to receive updated information about the School through electronic media, particularly regarding the roles of faculty, staff, students and alumni in spite of the pandemic.
- Pre-pandemic communications included:
 - RxTravaganza (2019 invitations) one of the most attended events of the year.
 - Day of Giving postcards and promotions yielding a second place standing within the University.
 - Print materials for PharmD recruitment, MPBA program recruitment and for alumni events including Homecoming, Top Golf, and ACT Pharmacy Collaborative.

- ePittPharmacy is the current news medium on the PittPharmacy website for the School. Updates on faculty, student, and school awards, accomplishments, grants, and events are publicized weekly on the website in addition to COVID_19 research and community involvement.
- In FY20, the number of ePittPharmacy eBlasts to alumni and friends containing School of Pharmacy news and events increased to eight.
- During FY20, the Communications Team coordinated the following virtual events:
 - RxPlore Box Contents and Stickers
 - PIER (recruitment) flyers and communications
 - Alumni Society Step It Up Campaign
 - Electronic Badges for Graduate Students and High School Students
 - Graduation 2020 for the Class of 2020
- Internal email lists were used as the primary source of communication to faculty, staff, and current students. Client-specific email blasts were sent during the year regarding CLIP workshops, MPBA recruitment, PharmD recruitment. Our external use email list comprises 4,614 active recipients.

Embrace the World





Embrace the World

In 2012, the University of Pittsburgh articulated its vision for “Living Globally,” which stated that:

“By 2020, the University of Pittsburgh will be a community of faculty, students, and staff “Living Globally.” The Living Globally commitment will influence all aspects of our research, teaching, and service missions and will serve to enhance the University’s reputation as a leader in global education. We will:

- Pursue research and scholarship that increase global understanding.
- Develop our students into global citizens and leaders.
- Improve people’s lives by studying and solving the world’s most critical problems.

Later, in February 2014, the University of Pittsburgh Board of Trustees formally adopted the “Statement of Aspiration and Strategic Priorities.” Abstracted from the document is the statement that “Our overarching goal to be among the best in all that we do. . . . In the pursuit of that perpetual goal, the University’s work in the years ahead will be centered on efforts to: . . . Extend Our Global Reach.”

The faculty and staff of the School of Pharmacy adopted Pitt’s global philosophy and chose to express this vision as “Embrace the World.” Our goals are to provide diverse learning opportunities for PittPharmacy students and to advance research and patient care through meaningful collaborations with international partners whose strengths and interests complement our own.

EMBRACE THE WORLD BY THE NUMBERS FOR FY20

During FY20:

- The School of Pharmacy engaged in partnerships with **20** international organizations on **5** continents, including Africa, Asia, Australia, North America, and Europe. The agreements include:
 - **12** Memoranda of Understanding for inter-institutional exchange of faculty and students
 - **8** Affiliation Agreements for the purposes of student and resident rotations
 - **30** international visiting scholars studied at the School of Pharmacy.
- **23** P4 PharmD students participated in rotations in **9** different countries.
- **2 residents** also completed international rotations.

Due to COVID-19, a number of students were unable to complete international rotations.

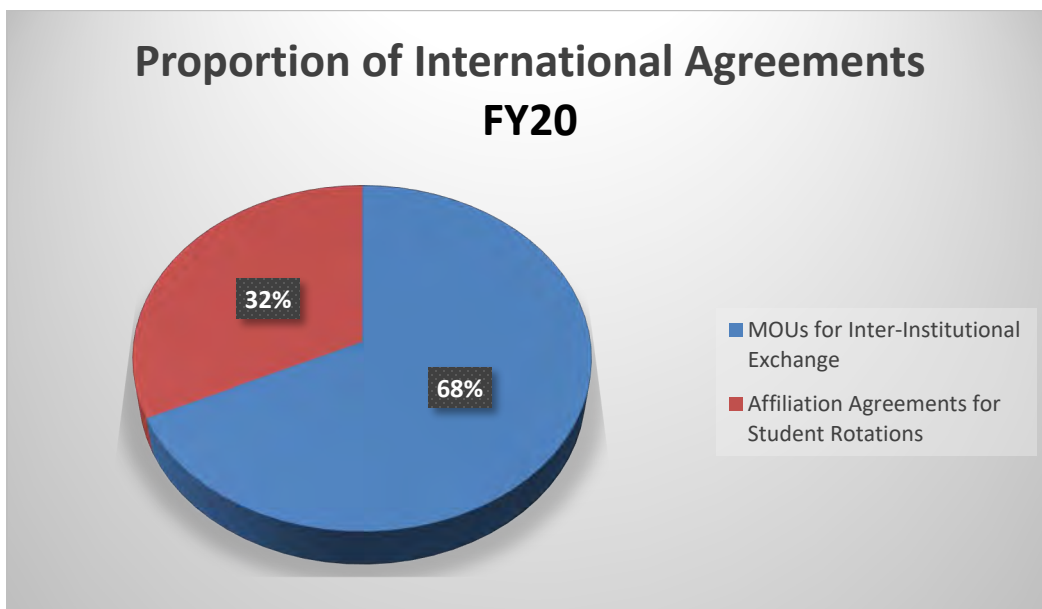
GLOBAL AND INTERNATIONAL PARTNERSHIPS

Partnerships

As part of the relationship-building process, the School of Pharmacy signs agreements with institutions to declare our intentions to explore possibilities for collaboration and to formalize our partnership. These agreements include:

- Memoranda of Understanding (MOU), which are broad-based expressions of interest in exploring opportunities for student and faculty exchange, research collaboration, and program development.
- Affiliation Agreements that provide structured expectations of both entities for international rotations for PharmD students and residents.
- Research Agreements between specific faculty or students and international organizations for the purposes of research collaboration.

The graph below illustrates the proportion of each agreement type. The table provides a comprehensive list of organizations with which we have active signed agreements.



FY20: Agreements with International Organizations

Institution	Location
Australia	
Sir Charles Hospital (Nedlands)*	Nedlands, Australia
Canada	
Memorial University of Newfoundland	Newfoundland, Canada
China	
Shanghai Changhai Hospital	Shanghai, China
Fudan University	Shanghai, China

Institution	Location
Peking University People's Hospital	Beijing, China
Second Military Medical University	Shanghai, China
Sun Yat-Sen University	Guangzhou, China
State Key Laboratory of Phytochemistry and Plant Resources	Kunming, China
West China School of Pharmacy of Sichuan University	Sichuan Sheng, China
West China Hospital of Sichuan University	Chengdu City, China
Botanical University of Yunnan	Yunnan Province, China
England	
King's College	London, England
Honduras	
Hombro a Hombro Pittsburgh-San Jose*	San Jose de Negrito, Yoro District, Honduras
Ireland	
Haven Pharmacy Farmers*	Dublin, Ireland
Italy	
Universita degli Studi di Palermo/ UPMC ISMETT, (translated as Mediterranean Institute for Transplantation and High Specialization Therapies)*	Palermo, Italy
Korea	
Seoul National University, College of Pharmacy*	Republic of Korea
Malawi	
Baobab Health Trust/Dai yang Luke Hospital*	Malawi
Namibia	
Windhoek Central Hospital – University of Namibia*	Windhoek, Namibia
Philippines	
Philippine General Hospital	Manila, Philippines
Switzerland	
Vivaleas SA Campus Biotech*	Geneva, Switzerland

*Affiliation Agreement (all others are MOUs)

Summer Visiting Research Program

Initiated in summer 2014 and led by PittPharmacy Professor Wen Xie, the School of Pharmacy designed a summer research program in partnership with the Sun Yat-Sen University School of Pharmaceutical Science in Guangzhou, China. The admissions committee, composed of faculty from both universities, annually selects competitive third year bachelor's students from Sun Yat-Sen University to participate as summer research interns at the University of Pittsburgh. In the early years, students were chaperoned by faculty advisors from Sun Yat-Sen University.

In the years since its inception, the number of students has increased:

FY14:	6 Sun Yat-Sen students
FY15	5 Sun Yat-Sen students
FY16:	7: 5 Sun Yat-Sen students + 2 University of Puerto Rico students
FY17:	10: 8 Sun Yat-Sen students + 2 University of Puerto Rico students
FY18:	7 Sun Yat-Sen students
FY19:	8 Sun Yat-Sen students

The COVID-19 pandemic precluded international travel and offering the internship in FY20. We plan to resume the program when it is safe to do so.

The goal of the program is to attract academically qualified and scientifically prepared MS and PhD students from top tier schools of pharmacy. The summer internship offers potential students an opportunity to learn more about the PittPharmacy graduate program, the faculty, the University of Pittsburgh, and living in Pittsburgh. In addition, it provides students with a sense of their readiness to live in another country. Importantly, the internship provides faculty with the opportunity to evaluate participants and the match of their research interests to individual laboratories.

Post internship, students must apply to the graduate program using the regular application process and must meet all requirements for graduate study at the University of Pittsburgh. Students have the option of choosing the two-year thesis-based master's program, the one-year non-thesis master's program, or the PhD program. Students admitted to the MS programs must be self-supported.

Success of the Program:

Evidence of the program's success is student application and acceptance into the program. Examples include:

- FY14 student Xinran Cai enrolled in the one-year non-thesis master's program for fall 2015 (Wen Xie, advisor) and was subsequently admitted to the PhD program for fall 2016; work continued with Dr. Xie.
- FY15 student (Xin Tong) enrolled in the two-year thesis master's program for fall 2016 and works under the supervision of Dr. Lisa Rohan. The student was subsequently admitted to the PhD program for fall 2018 and continued research with Dr. Rohan.
- FY16: Zhangyi Luo enrolled in the two-year thesis master's program for fall 2017 and works under the supervision of Dr. Song Li. The same student was admitted to our PhD program in fall 2019 and continued research with Dr. Song Li.
- FY17: Ziqian Zhang enrolled in the two-year thesis master's program for fall 2018 and works under the supervision of Dr. Song Li. One SYU student (Zhongfang Zhang) enrolled in the two-year thesis master's program for fall 2019 and works under the supervision of Dr. Song Li.

PharmD Student International Learning and Experiences

Interest in international pharmacy experiences remains strong among our PharmD students. Students seek a wide range of opportunities and their goals are diverse, including passion for serving communities, inquisitiveness to learn about health care in other nations through both research, practice, and teaching strategies, and an adventurous spirit to become well-rounded and engaged global citizens.

In FY20, a total of 23 PharmD students were the direct beneficiaries of the growing number of international partnerships.

- 23 PharmD students completed P4 APPE rotations across 9 countries.

A number of students were directly impacted by the global pandemic, which has limited international travel. At least six P4 students had international APPEs cancelled due to the pandemic. In addition, seven students were scheduled to participate in the Namibia spring-break experience, which was cancelled in March 2020 due to COVID-19.

University of Namibia: A Global Health Experience

The COVID19 pandemic has drastically changed global travel. For what would have been the fifth consecutive year, seven students (three P1s, one P2, and three P3s) as well as one pharmacy resident were scheduled to travel to Namibia for a training experience to extend the relationship with the University of Namibia. Before leaving, students participated in a rigorous preparatory course designed to ensure that students were well aware of the key principles in global health, determinants of health, historical context for care in Namibia, and tuberculosis. Unfortunately, the pandemic came to a head just days before students were meant to travel. The three P3 students transitioned their work to a comparative evaluation of tuberculosis treatment between the US and Namibia. This experience will continue to be offered twice annually for PharmD students at Pitt once international travel is safe. This precaution is to protect students and also vulnerable populations in Namibia.

Global Health Area of Concentration

In FY20, a total of 35 students were enrolled in the Global Health Area of Concentration (GH-ARCO). Sharon Connor, PharmD and Lauren Jonkman, PharmD, MPH co-director the GH-ARCO.

Twelve graduates in the class of 2020 participated in at least two global health APPE rotations; each completed a mentored independent research project. ARCO students comprise 8 students in the class of 2021, 13 in the class of 2022, and 2 enrolled in the class of 2023.

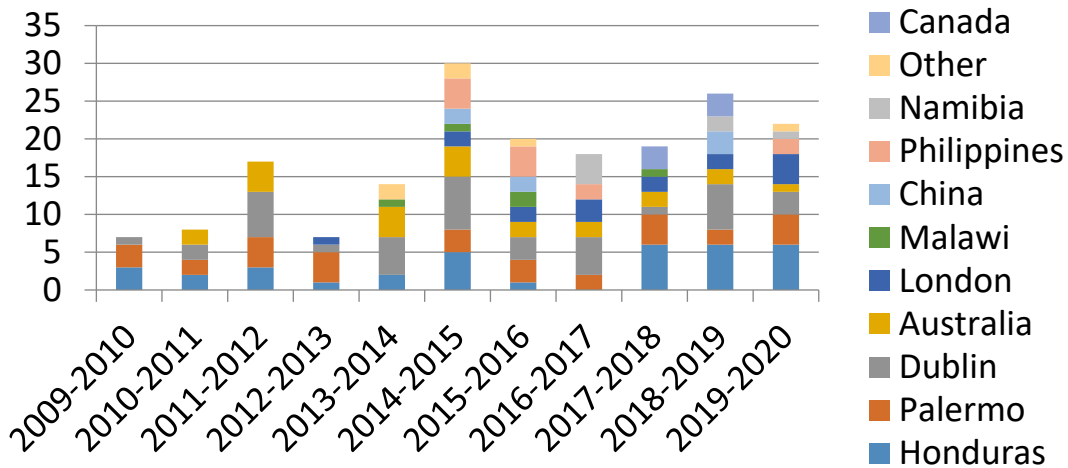
International Advanced Pharmacy Practice Experiences (APPEs)

In FY20, 29 P4 students chose international advanced pharmacy practice experiences (APPEs) across nine different countries.

- Travel advisories from the CDC and the Commonwealth of Pennsylvania have always guided decisions regarding choice of locations for student international experiences. The Experiential Learning Team closely monitors these advisories, as student safety is our utmost priority. The COVID-19 pandemic impacted our international program at the end of the Spring 2020 semester.
 - A total of **23** of the original 29 students were able to complete these experiences.
 - 2 of the 23 students completed the experiences remotely from the US, with the guidance of their international preceptors from Australia and Switzerland.

- Six students, scheduled to go abroad for a March 16, 2020 start in Ireland, Italy, and Australia, unfortunately had their APPEs cancelled. These students were carefully rescheduled into elective APPE rotations in their personalized interest areas.

Number of Students Completing P4 International APPEs



Global Health Residency and Rotations

The University of Pittsburgh School of Pharmacy is one of only two PGY2 residency programs in the country to offer pharmacist training to practice in the specialty area of global health. This program is now a track within the UPMC PGY2 Ambulatory Care Residency Program. The track coordinators of the PGY2 global health residency are Sharon Connor, PharmD and Lauren Jonkman, PharmD, MPH.

As part of the global health residency program, the resident practices in limited-resource settings in Pittsburgh and globally. This year, the resident was able to travel to Honduras in the fall and Namibia for 2 weeks in the spring (prior to evacuation due to the pandemic). In Pittsburgh, the resident conducted a qualitative program evaluation of the global health Area of Concentration and continued the work of addressing chronic disease management at the Birmingham Free Clinic supported by the Pennsylvania Department of Health Community Challenge Grant.

Four pharmacy residents from four programs, including the global health resident, completed global health rotations:

- Shoulder to Shoulder Pittsburgh-San José, San José del Negrito, Honduras (4 residents)
- University of Namibia School of Pharmacy, Windhoek, Namibia (1 resident)

International Visiting Scholars

In total, the School of Pharmacy hosted 30 international visiting scholars at differing levels of training during FY20. The visiting scholars are listed in the table on the next page.

FY20 Visiting Scholars

Name	Home Institution	Hosted By
Vaishali Aggarwal, PhD	Postgraduate Institute of Medical Education and Research, India	Dr. Shilpa Sant
Yiling Chen	Sun Yat-sen University	Dr. Raman Venkataramanan
Jin Cheng	Nanjing University of Chinese Medicine	Dr. Xiang-Qun Xie
Chen Du	Chinese PLA Medical School	Dr. Song Li
Mayuri Dutta	Guru Gobind Singh Indraprastha University (GGSIPU)	Dr. Shilpa Sant
Emily Edison	Memorial University, Canada	Dr. Lauren Jonkman
Betul Er	Yuditepe University	Dr. Christian Fernandez
Zihui Fang, MS	South China Agricultural University	Dr. Wen Xie
Ruizhi Ge	Sun Yat-sen University	Dr. Xiaochao Ma
Dongxiao Hao	Xi'an Jiaotong University	Dr. Junmei Wang
Jianhua Li	The First Affiliated Hospital of Zhengzhou University	Dr. Xiaochao Ma
Jing Li	Xuzhou Medical University	Dr. Wen Xie
Zefei Li	Sun Yat-sen University	Dr. LiRong Wang
Yangwuyue Liu, BS	Third Military Medical University	Dr. Song Li
Nan Luo	Sun Yat-sen University	Dr. Paul Johnston
Shweta Niak	University of Pittsburgh	Dr. Raman Venkataramanan
Emily Nolan	Memorial University, Canada	Dr. Lauren Jonkman
Guolian Ren	Shanxi Medical University	Dr. Song Li
Pengfei Ren	Nanfeng Hospital	Dr. Song Li
Yuchen Sun	Sun Yat-sen University	Dr. Junmei Wang
Chaogang Wei, MD	The Second Affiliated Hospital of Soochow University	Dr. Song Li
Hengbo Wu	Sun Yat-sen University	Dr. Peter Wipf
Mingjun Wu	Sun Yat-sen University	Dr. Song Li
Xuemei Wu, PhD	Fujian Medical University Union Hospital	Dr. Raman Venkataramanan
Yuhui Wu, MS	University of Pittsburgh	Dr. Junmei Wang
Yue Xi	Sun Yat-sen University	Dr. Wen Xie
Shunqing Xu	Yancheng Institute of Technology	Dr. Xian-Qun Xie
Chengyu Ye	China Pharmaceutical University	Dr. Wen Xie
Yueshan Zhao	Sun Yat-sen University	Dr. Da Yang
An Zhou	Anhui University of Chinese Medicine	Dr. Raman Venkataramanan

Promote Diversity and Inclusion



Promote Diversity and Inclusion

As stated in the Plan for PittPharmacy in 2017, PittPharmacy is committed to assuring that inclusion and diversity become part of the context in which we make every decision.

Specifically, PittPharmacy is committed to:

- Transforming the PittPharmacy climate
- Enriching student experiences through engagement (See educational initiatives)
- Attracting and retaining a diverse community – students and other trainees, faculty, and staff
- Expanding access from underrepresented communities through targeted programs and support
- Implementing training programs to avoid implicit bias in student admissions, and in searches for faculty and staff.

The Diversity and Inclusion Committee is a standing committee of the school. FY20 members include:

Christian Fernandez (Chair)	Zhiwei Fen
Lorin Grieve (Vice-Chair)	Marcia Borrelli
Sharon Connor	Sherri Peterson
Sharon Corey	Karen Wagner
Jim Stevenson	Tom Waters
Inmaculada Hernandez	Sam Poloyac
Maggie Folan	Shilpa Sant

The work of the Committee was integral to PittPharmacy’s accomplishments.

Transforming the PittPharmacy Climate

The year 2020 is now marked forever by the nationally televised murders of Black men and women at the hands of police, causing the acceleration of the Black Lives Matter movement nationally.

The dean and others reached out to Black Alumni to learn from them in new ways about the experiences they had while attending Pitt. While all indicated their appreciation for the education and experiences at PittPharmacy, we learned the need to do more and accelerate action and learning on the part of all to make a more equitable and just community, meant broadly.

In June, the dean appointed and led a taskforce to brainstorm ideas from which short and long-term goals and commitment from the school could be developed.

In addition, a statement of the PittPharmacy commitment to anti-racism was developed and appears still on the PittPharmacy home page.

Statement

We at PittPharmacy recognize the challenges of systemic racism, bias and structural inequality. We stand with Black, Indigenous and People of Color against racism. We take an anti-racist stance. We must reflect on our own beliefs, words, actions and interactions. We MUST do more. We WILL do more.

We are listening. We are learning. We are taking immediate steps. At the center of everything we do is assuring a safe, equitable and just community.

Student Recruiting Initiatives

PittPharmacy maintained and grew two major initiatives for the PharmD program. They are the PIER Program and the RxPlore Summer Camp.

The Pharmacy Innovation Experience and Research (PIER) Program

Purpose

The PIER Program focuses on the recruitment of minority students from the University of Pittsburgh community and from communities with high minority populations, such as the Miami, FL area, in order to engage high-achieving minority students in pharmacy and specifically to have them apply and enroll in PittPharmacy. The innovative program, which transformed to virtual in 2020, engages high school and undergraduate students of various demographics from Pittsburgh and at a distance by identifying partners that can host students throughout the five-week experience.

Program goals and objectives

Specific goals for PIER were developed based on literature, known factors that influence career choice of pharmacy, and the feedback of several college/high school student focus groups. PIER's objectives include:

- increasing awareness about the pharmacy profession.
- providing participants pharmacy mentors
- creating interest in PittPharmacy
- identifying barriers to recruiting minorities to the profession and to PittPharmacy. Pre- and post-program surveys are used to assess whether PIER achieved said objectives.

PIER Components

Based on our literature review, known influential factors, and the feedback from our focus groups, we designed four main components to achieve our goals and objectives:

- Experiential site visits (community and hospital pharmacies) to learn about the role of a pharmacist and pharmacy technicians in health care.
- Online didactic lectures introducing weekly experiential site visits, general pharmacy topics that increase pharmacy awareness, and information regarding PittPharmacy.
- Mentor debriefing sessions to discuss site visits and the role of pharmacists in health care
- A pharmacy-related research project designed by PittPharmacy faculty identifying minority health disparities in the local community

PIER Miami and PIER Pitt

PIER programs were implemented during summer 2017 in Miami, FL, spring 2018 in Pittsburgh, PA, and virtually in summer 2020. In FY20, Virtual PIER was created to allow high school and undergraduate

students across the country the opportunity to learn about the experiences at the University of Pittsburgh School of Pharmacy. Overall, there have been seven PIER sessions held since 2017: three in Miami, FL, three in Pittsburgh, PA, and one virtually. The success of the PIER program is monitored by:

- determining whether we successfully recruit minority students to PIER;
- determining whether we increased pharmacy awareness among participants;
- determining whether PIER participants applied to pharmacy programs; and
- determining whether PIER participants applied to the University of Pittsburgh

Summary of ongoing PIER program outcomes for FY20:

In FY 20, the **PIER-Pitt Program** hosted 24 participants. The demographics of the students in this undergraduate program included:

- Minorities: 4
 - Black: 2
 - Trinidadian: 1
 - Hispanic: 1
- White: 13
- Asian: 7

From this program, twelve students (half) enrolled in PittPharmacy.

PIER also hosted a student for a PharmD application interview. This student participated in the FY18 PIER Miami cohort as an undergraduate at the University of Miami. In FY19, she participated in the PIER Miami Program as a mentor, demonstrating the program's ability to maintain retention of participants over ongoing years.

In response to circumstances surrounding COVID-19, the team created the **Virtual PIER Program**. Faculty and staff worked with a team of student leaders to create a virtual experience that looks to accomplish the same goals of the PIER program and using a larger geographic scope.

- Virtual PIER partnered with the Hispanic Heritage Foundation to identify Virtual PIER participants.
- In FY20, Virtual PIER hosted 47 participants. Virtual PIER participants were 14-25 years of age, with varying education levels. The 47 participants identified as
 - were
 - LatinX: 19% (n=9)
 - Asian: 38% (n=18)
 - Black or African American: 15% (n=7)
 - Caucasian: 19% (n=9)
 - Other: 9% (n=4)

Virtual PIER FY20 included participants from Pennsylvania, Florida, New Jersey, California, Maryland, North Carolina, New York, Virginia, Texas, and Alabama.

Taken together, the PIER Program engaged 71 students in FY20 and is clearly achieving its objectives. It has increased the application pool of minority students to PittPharmacy.

RxPLORE Summer Camp for Recruiting PharmD Students

Summer 2019 was the inaugural year for RxPlore, which was created for rising high school juniors and seniors. RxPLORE is a professional summer camp that provides exposure to the critical role pharmacists play within healthcare. RxPLORE is designed by current PittPharmacy students in collaboration with dedicated faculty and staff.

In the inaugural 2019 summer, 27 high school students participated in the five-day residential camp. Students were from Pennsylvania, Delaware, and Maryland. Four students (15 percent) identified as minorities. Of the 22 seniors that participated summer 2019, **12 (60 percent) will matriculate as PITT Freshmen this 2020 fall term.**

In contrast, the virtual camp held in summer 2020 enrolled 69 high school students from 14 states. The 69 participants included:

- 18 minority students (26 percent);
- Students from Puerto Rico (1) the Marshall Islands (1) and 14 states.

The outcome of Virtual RxPlore 2020 will be determined next year.

School Culture and Climate

Based on the student, faculty and staff feedback, the Diversity and Inclusion Committee for FY20 focused on three aims identified by attendee feedback:

- providing underrepresented minority students with a voice,
- monitoring School climate, and
- improving diversity representation in the PharmD curriculum cases

Aim 1: Providing underrepresented minority students a voice.

- A Diversity Mixer event was organized through the Office of Health Sciences Diversity on October 17th, 2019 to give our students an opportunity to meet other underrepresented minorities across other Health Sciences programs
- At the time of the writing of this report, the Committee is developing/planning
 - Guidelines for improving the diversity among invited PittPharmacy seminar speakers,
 - Future Pharmacy Diversity seminars and/or town hall meetings,
 - Resource materials for faculty/staff recruitment to increase diversity of applicants,
 - An alumni mentoring program for minority students.

Aim 2: Monitoring School climate

Student focus group discussions have been conducted by the Diversity and Inclusion Committee to assess school climate among marginalized groups. Student groups that have been or are planned to be included in group discussions include:

- School of Pharmacy underrepresented minority PharmD students
- LGBTQ students
- School of Pharmacy Graduate students
- Students with disabilities

Aim 3: improving diversity representation in the PharmD curriculum cases

- Guidelines are under preparation to facilitate creating diverse patient cases in the curriculum
- Pharmacy courses are being assessed for misidentification of race as a risk factor for certain diseases

Education Appendix



Education Appendix

THE PHARMD PROGRAM

As a recognized national leader in pharmacy education, the School of Pharmacy offers world-class learning opportunities for students. The School of Pharmacy:

- contributes to the national dialogue about the scholarship of teaching, learning, and assessment through publications and presentations;
- provides students with a rich array of opportunities to personalize their education, including areas of concentration; elective courses; independent study; research engagement; experiential rotations; travel to state, regional, and national meetings; and international pharmacy travel;
- empowers students to become practitioners with the necessary skills and knowledge to be leaders in patient-centered care and key contributors on the health care team; and
- provides student pharmacists and graduate pharmacists with support and resources through a lifetime of professional development.

THE PHARMD PROGRAM

- A. Adopting the philosophy of “cost of PharmD education” vs. the credit-based tuition. Students are permitted to take courses above a standard credit limit and during the summer with no additional tuition.
- B. “Personalizing education.” See next major section.
- C. Accelerating learning through active engagement.
 1. Facilities enhance active engagement. The Novo Nordisk Learning Center, which opened in fall 2013, is a state-of-the-art classroom that facilitates active and small-group learning in a large group setting. A second technology-enhanced, flexible space teaching space was opened in FY17.
 2. Setting expectations and assessing performance. The FY15 implementation of a blended-simulation, readiness assessment sets student expectations and assesses student progress and readiness for Advanced Pharmacy Practice Experiences. P1 and P3 students plus PGY1 residents participate. Foundational knowledge, clinical decision making, patient communication skills, interprofessional communication skills, and attitudes of ownership for patient outcomes are all assessed in the performance-based assessment.

PittPharmacy’s readiness assessment received the national Excellence in Assessment Award in FY17 from the American Association of Colleges of Pharmacy. This assessment is now part of PittPharmacy's comprehensive assessment program. Data are used to inform student-specific education plans, as well as improvements to the curriculum to accelerate student development.
- D. Developing, implementing, and increasing the number of learning situations that engage students in simulated environments and with simulated patients and health care providers to accelerate the

development of clinical decision-making, patient education, and interprofessional communication skills.

1. Standardized patients
2. Standardized colleagues
3. Virtual patient simulation
4. Human patient simulators
5. Voice-oriented interprofessional communication
6. Educational games

Simulated patient experiences have tremendous value for learning because each of the above:

- Provides immediate feedback to the student on performance.
- Protects patients from medication errors or students practicing first-time communication skills.
- Provides a known safe environment for student learning.

1. Standardized Patients. Students gain skills in patient interviewing, clinical reasoning, and therapeutic decision making through a variety of simulated patient care experiences that are woven throughout the curriculum. Actors trained as standardized patients provide students opportunities to practice patient care in a safe environment and to receive detailed feedback from faculty focused on continued development and refinement of skills.

2. Standardized Colleagues. Faculty and residents trained as standardized physicians and other health professionals provide student opportunities to practice communication skills to effectively engage in collaborative team-based care delivery and navigate potentially difficult conversations. All P1 students also participate in the fall Interprofessional Forum to learn alongside first-year students in other health sciences programs on campus about the emerging importance of interprofessional collaborative care in the current era of health care reform.

3. Virtual Patient Simulation. PittPharmacy faculty members are nationally recognized for their development and use of computer-based, virtual patients to integrate case-based teaching of complex therapeutic concepts and clinical decision-making processes into the curriculum. Their award-winning work with a branched-outcome decision-making model is based on game theory. These cases have enhanced clinical decision making in the therapeutics component of the curriculum.

4. Human Patient Simulators. The Peter M. Winter Institute for Simulation, Education and Research (WISER) Center remains a valuable resource for use in pharmacy courses. Equipped with 16 full-sized simulators in a bank of simulated environments, control centers, and debriefing rooms, the WISER center is staffed with full-time technicians and serves students across the health sciences as well as practitioners across the UPMC system. In addition, the School has invested in a full-time director of simulation, two simulation mannequins, four arms to train in blood pressure monitoring, and a wound care foot that are housed in Salk Hall for students' use to improve their clinical skills.

5. Voice-Oriented Interprofessional Communication Evaluation System (VOICES). VOICES is a teaching strategy that incorporates telephone communication into the didactic and experiential learning curriculum. Using Google Voice (Google, Mountain View, CA), faculty have implemented learning activities to facilitate student development of skills needed for effective telephonic communication with patients and other health care professionals.

6. Educational Games. RxPedition is a semester-long course structured as a competitive game in which students learn the drug development process. Organized into 20 “companies,” students explore how drugs come to market and the drivers that influence drug discovery and development, participate in the design and evaluation of a simulated drug study according to FDA critically about the science, methods, and regulations that allow a product to reach the market with the expectation of safe and effective use by patients.

- E. Optimizing the use of required Introductory Pharmacy Practice Experiences (IPPEs) and Advanced Pharmacy Practice Experiences (APPEs), which require interactions with patients and other health care providers.

INDICATORS of EXCELLENCE

CURRICULAR IMPROVEMENT AND OVERSIGHT

The School has become nationally recognized for its assessment approaches and commitment to a culture of assessment. School faculty members received the Award for Excellence in Assessment from the American Association of Colleges of Pharmacy in 2012 and again in 2017. In addition, three projects were selected over two years (2013 and 2014) for presentation at the annual Assessment Institute, the nation’s oldest and largest event focused exclusively on outcomes assessment in higher education. The School’s Curriculum Assessment Committee is responsible for monitoring the effectiveness of the PharmD curriculum and the achievement of student learning outcomes.

Student Presentations at National and Regional Meetings

American Society of Health-System Pharmacists Midyear Clinical Meeting	
Primary Author	Poster Title
Dana Abraham (P3)	Association between opioids and time until death in a comfort measures only population
Hannah Akerberg (P4)	Evaluation of As Needed Psychotropic Medications in the Acute Management of Psychiatric, Neurodevelopmental, Disruptive, Impulse Control and Conduct
Emilee Baker (P3)	Anticoagulation with direct oral anticoagulants as an alternative to warfarin in seven patients with left ventricular assist devices
Jessica Cercone (P4)	Effect of early deep sedation on delirium in patients receiving extracorporeal membrane oxygenation (ECMO) support
Jarad Ickes (P4)	Understanding the relationship between medication changes and 30-day readmissions
Megan Karuzie (P4)	Development of a risk-based educational framework to meet patient expectations, expert opinions, and regulatory requirements for return of results
Emily Kistler (P4)	Does Baseline Renal or Hepatic Dysfunction Predict Medication-Related 30-Day Rehospitalizations in a Palliative Care Population?
Polina Langer (P4)	Effectiveness of direct oral anticoagulants (DOACs) or warfarin in lung transplant recipients
Diana Mansour (P4)	Safety of Direct Oral Anticoagulants and Warfarin Use in Atrial Fibrillation and Atrial Flutter

Kathy Monangai (P4)	Evaluation of a revised beta-lactam allergy assessment questionnaire on penicillin and cephalosporin utilization in patients with reported beta-lactam
Ami Patel (P3)	Timing and severity of bleeding events after genotype-guided antiplatelet therapy
Megha Patel (P4)	Comparative effectiveness of direct oral anticoagulants (DOACs) and warfarin use in atrial fibrillation and atrial flutter
Domenica Ricciuti (P4)	Safety of direct oral anticoagulants and warfarin use for atrial fibrillation and atrial flutter
Katelyn Rudzik (P4)	(1) Evaluation of the safety of direct oral anticoagulants and warfarin in lung transplant recipients (2) Understanding the relationship between medication
Roisin Sabol (P2)	Antibiotics Awareness Student Society Showcase Poster Presentation
Daniel Schrum (P4)	Beta-lactam allergy documentation and corresponding second-line, non-beta-lactam utilization rates...
Carson Shoemaker (P4)	Effectiveness of direct oral anticoagulants (DOACs) or warfarin in lung transplant recipients
Brittney Stottlemeyer (P3)	Antibiotics Awareness Student Society Showcase Poster Presentation
Vivian Tsai (P4)	Clindamycin for necrotizing soft tissue infection, it is time for an alternative
Nikitha Yagnala (P3)	Development of a risk based educational framework to meet patient expectations, expert opinions and regulatory requirements for return of results
Amanda Cremeans (P2) Melanie Umbaugh (P3) Dafonso Davage (P3)	RxPlore Professional Pharmacy Camp: A student pharmacist developed and implemented summer camp
Jennifer Dolphin (P3)	Anticoagulation with direct oral anticoagulants as an alternative to warfarin in seven patients with left ventricular assist devices
Emily Hughes (P3)	Assessing the need for pharmacist intervention of hypertension management at an outpatient family medicine clinic
Mohamed Kashkoush (P3)	Antibiotics Awareness Student Society Showcase Poster Presentation
Madeline Mitchell (P3)	Anticoagulation with direct oral anticoagulants as an alternative to warfarin in seven patients with left ventricular assist devices
Niti Patel (P3)	Antibiotics Awareness Student Society Showcase Poster Presentation
Rishi Arora (P4)	Comparative Safety of DOACs versus Warfarin in Atrial Fibrillation and Atrial Flutter at an Academic Medical Center
Lauren Brock (P4) Esther Hwang (P4)	Integration of real-world Patient Reported Outcome (PRO) experiences in schools of pharmacy curricula: implementation strategies at the University of Pittsburgh
Marissa Campagna (P4)	Effectiveness of direct oral anticoagulants (DOACs) and warfarin in lung transplant recipients
Jaehee Cho (P4)	Clinical Implications of Induction Immunosuppression Agents and EBV Mismatch on PTLD in Lung Transplant
Taylor Conrad (P4)	Comparative effectiveness of direct oral anticoagulants (DOACs) and warfarin use in atrial fibrillation and atrial flutter
Kara DeGrave (P4)	Evaluation of the Use and Monitoring of Sugammadex in Operating Rooms at a Northwestern Wisconsin Acute Care Hospital
Nicole Farah (P4)	Evaluation of duplicate pneumococcal immunization orders and administration opportunities within a hospital health system

Domenick Francis (P4)	Identifying candidate formulas for USP compounded preparation monographs (CPMs) from the ASHP list of drug shortages
Keely Gambler (P4)	Do falls bring palliative care patients back to the hospital? A retrospective analysis
Kiana Green (P4)	Evaluation of the safety of direct oral anticoagulants and warfarin in lung transplant recipients
Melanie Hawn (P4)	Initial discharge disposition in relationship to medication related 30 day readmissions in palliative care patients
Jessica Hu (P4) Jordan Kester (P4)	Comparative effectiveness of direct oral anticoagulants (DOACs) and warfarin use in atrial fibrillation and atrial flutter
Jenna Ingram (P4)	Assessing patient perspectives of unnecessary emergency department visits: a quality improvement initiative
Alyssa Lear (P4)	Appropriate continuation of home medications during transitions of care from the medical intensive care unit
Madison McConnell (P4)	The safety of warfarin vs DOACs in lung transplant patients
Mitchell Mirabile (P4) Emily Novak (P4) Shivani Sampathkumar (P4)	Evaluation of 15 years of adverse event reports reveals changes in most commonly reported opioid-related adverse drug reactions among an increase in adverse event reporting
Adam Patrick (P4)	Analysis of risk factors associated with 30-day all-cause mortality in patients with Staphylococcus aureus bacteremia at a community hospital: a case-control study
Allen Potter (P4)	Evaluation of Chemotherapy Induced Nausea and Vomiting (CINV) For Patients Receiving Post-Transplant Cyclophosphamide (PTCy) for Matched Related (MRD) and Unrelated Donor (MUD) Stem Cell Transplants with Ondansetron Plus Rolapitant Antiemetic Prophylaxis
Caylee Sams (P4)	Drug interactions in high acuity pediatric patients
Erin Wasylson (P4)	The Relationship Between Medication Changes During Index Admissions and the Incidence of 30-Day Readmissions in a Palliative Care Population
Abbey White (P3)	Assessing the need for pharmacist intervention of hypertension management at an outpatient family medicine clinic
American Pharmacists Association Annual Meeting	
Primary Author	Poster Title
Saxon Hartman (P3) Nick Pandelaras (P3) Emily Hughes (P3) Christian Rosikiewicz (P3)	Implementation of a baseline community pharmacy practice assessment tool for the Pennsylvania Flip the Pharmacy (FtP)
Hailey Mook (P3) Cindy Jiang (P3)	Patient opinions on participating in research through a community pharmacy practice-based research network
Abbey White (P3) Kristina Murray (P3)	A formative evaluation to improve implementation of a pharmacist-led call center adherence program at a regional grocery store chain pharmacy for employees with asthma or COPD
Arianna Sprando (P3)	Evaluation of Brief Messages to Inform a Meningococcal Group B Vaccine Multimedia Educational Campaign on a University Campus
Matt Kuhn (P3) Parker Stewart (P3) Alex Yawny (P3)	Using a performance dashboard to facilitate practice transformation in Pennsylvania community pharmacies

Sejla Jukic (P3)	Academia-CPESN Transformation (ACT) Pharmacy Collaborative: Evaluating Value and Impact of the National Day of Service
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* Denotes Non-Student Contributors

Pennsylvania Pharmacists Association Mid-Year Conference	
Primary Author	Poster Title
Abbey White (P3)	A formative evaluation of a pharmacists-led adherence intervention at a regional supermarket pharmacy call center for employees with obstructive lung disease
Arianna Sprando (P3)	Evaluation of Brief Messages to Steer a Meningococcal Group B Vaccine Multimedia Education Campaign on a University Campus
Emily Hughes (P3)	Implementation of a Baseline Community Pharmacy Practice Assessment Tool for the Pennsylvania Flip the Pharmacy Program
Roshini Pattabiraman (P3)	Medical Spanish Micro-credential: Encouraging Multilingual Pharmacists
Matthew Kuhn (P3)	Using a performance dashboard to facilitate practice transformation in Pennsylvania pharmacies
Nicholas Panderlaras (P3)	Creation of a Student Pharmacists Training Program to Reduce Opioid- Related Stigma
Sejla Jukic (P3)	Academia-CPESN Transformation (ACT) Pharmacy Collaborative: Evaluating Value and Impact of the National Student Day of Service
Hailey Mook (P3)	Patient Options on Participating in Research Through a Community Pharmacy Practice-Based Research Network
Whitney Puyang (P1)	Group Collaboration in Determining Methods of Communicating a Novel Financial Model of a New Community Pharmacy to the Residents of West View, PA
Kaitlyn Faiola (P3)	Using Evidence of Healthcare Cost Savings to Justify Community-Based Pharmacist-Provided Patient Care

Recognition and Awards: Individual Students

Student	Award
David Katz (P3)	Selected for the Pennsylvania Pharmacists Association Student CE Platform at the PPA Annual Conference- "Cannabis in the Pharmacy"
Melanie Umbaugh (P3) Vincent Knecht (P2)	Kappa Psi Foundation Scholarships – High Academic and Professional Achievement,
Ashley Yao (P3) Caroline Baldwin (P3) Brittney Stottlemyer (P3) Thomas Le (P3)	National Patient Care Project Award – American Pharmacists Association Academy of Student Pharmacists – For exemplary commitment to patient care, education and community outreach
Kathy Monangai (P4)	Elected as the National Vice President of the Student National Pharmaceutical Association

Brooke Kulusich (P2)	Carl F. Emswiler Summer Intern in Association Management through the American Pharmacist Association
Ravi Desai (P3)	Published in Journal of the American Medical Association- Varenicline and Nicotine Replacement Use Associated With the US Food and Drug Safety Communications
Mohamed Kashkoush (P3) Brittney Stottlemeyer (P3)	First Place Winners of the Pharmacy Quality Alliance Healthcare Quality Innovation Challenge
Ann Herbster (P2) Diana Mansour (P4) Tristan Tyger (P4)	American Society of Consultant Pharmacists Poster Presentation – Antibiotic – Related 30-Day Rehospitalizations in Palliative Care Patients
Shane Seager (P2) Danielle DiGiorgio (P2) Roisin Sabol (P2) Jeffrey Onyeador (P2) Angela Tsang (P2) Taylor Laffey (P2) Noah Delapaz (P2) Aarti Zaver (P2)	Panthers Forward Scholarship
Abigail Kois (P4)	IDWeek Presentation – “Appropriateness of Empiric Antibiotic Regimen for the Treatment of Enterbacteriaceae Bacteremia. Also awarded a grant from the IDSA Foundation as a mentee in the Foundation's mentor/mentee program
Nicole Farrah (P4) Blaine Laird (P2) Jaehee Cho (P2) Thai Nguyen (P2)	Kappa Psi - Excellence in Academia Award Kappa Psi – New Brother Scholarship Kappa Psi – Elected position of Parliamentarian Kappa Psi – Elected position of Webmaster
Holly Graber (P3) Emily Liu (P3)	Achieving Independence Competition – Pennsylvania Pharmacist Association
Alan Yee (P2) Vincent Knecht (P2) Yihan Li (P2)	American College of Clinical Pharmacy (ACCP) Clinical Research Finalist
Hailey Mook (P3) Grace Erdman (P3) Mara Cubellis (P3)	“Script Your Future” – Medication Adherence Team Challenge - American Pharmacist Association Winners – Team Leaders
Aarti Zaver (P2) Roshni Pattabiraman (P2)	American College of Clinical Pharmacy National Meeting Presentation
Nicole Hume (P3)	Appointed as the Vice Chair of the American College of Clinical Pharmacy (ACCP)
Kenneth Richardson (P2)	CVS Health Minority Scholarship
Haley Fribance (P3) Brooke Kulusich (P2)	American Pharmacist Association Awards Generation Rx Region 2 Award Operation Heart National Award OTC Medicine Safety Region 2 Award
Nicole Hume (P4)	ACCO 2021 - National Student Network Advisory Committee
Andrew Haddad (P4) Joseph Rizkalla (P4) Morgan Ostrowsky (P4)	American College of Clinical Pharmacy - Clinical Pharmacy Challenge Finalists (ACCP)

Student Awards at Graduation

Student Awardee	Award Title
Rishi Arora	Robert W. Taylor Award for Outstanding Performance in Patient Care Rotation
Kianna Green	Pennsylvania Pharmacists Association Outstanding Pharmacy Student Award
Taylor Conrad	John Herman Wurdack Award
Spencer Schlecht	The Dr. Gordon J. Vanscoy Business of Medicines Award
Rachel Douglass	University of Pittsburgh, School of Pharmacy Excellence in Self-Care Award
Caylee Sams	The Pennsylvania Society of Health-Systems Pharmacists Award – The Daniel J. Cobaugh Award
Victoria Blake	University of Pittsburgh, School of Pharmacy, Innovations in Community Practice Award
Marisa Postava	Merck Award
Kaitlyn Rudzik	Academy of Students of Pharmacy Senior Recognition Award
Kelly Jenniches	Mylan Pharmaceutical Excellence in Pharmacy Award
Alexandria Taylor	US Public Health Service–Excellence in Public Health Pharmacy Practice Award
Daniel Schrum	University of Pittsburgh School of Pharmacy Achievement and Leadership Award
Catherine Pfendner	Merck Award
Jessica Canonge	Robert W. Taylor Award for Outstanding Performance in Patient Care Rotation
Diana Mansour	Pennsylvania American Society of Consultant Pharmacists Award
Kathy Monangai	Merck Award

RESIDENCY PROGRAM: EDUCATING THE NEXT GENERATION OF PRACTITIONERS

Last Name	First Name	Pitt Residency Program	Year	PharmD School	Plans for FY20
Schoenle	Marilyn	Ambulatory Care Family Medicine Track UPMC Presbyterian	PGY2	Butler University	Ambulatory/Managed care Clinical Pharmacist, Devoted Health, Houston, TX
Ko	Jennifer	Ambulatory Care Global Health Track	PGY2	University at Buffalo	Assistant Professor, Marshal B. Ketchum University, Fullerton, CA

Last Name	First Name	Pitt Residency Program	Year	PharmD School	Plans for FY20
		UPMC Presbyterian			
Dadzie	Precious	Ambulatory Care Traditional Track UPMC Presbyterian	PGY2	Virginia Commonwealth University	Ambulatory Care Clinical Pharmacist, MedStar Union Memorial Hospital, Baltimore, MD
Davis	Kayla	Ambulatory Care Traditional Track UPMC Presbyterian	PGY2	Albany College of Pharmacy and Health Sciences	
Cardinal	Rachael	Ambulatory Care UPMC St. Margaret	PGY2	University at Buffalo	Inpatient Staffing Pharmacist, UPMC St. Margaret, Pittsburgh, PA
Williams	Anne	Ambulatory Care UPMC St. Margaret	PGY2	University of Maryland	Clinical Ambulatory Care Specialist, Frederick Health Hospital, Frederick, MD
Wissman	Kevin	Ambulatory Care UPMC St. Margaret	PGY2	University of Kansas	Clinical Assistant Professor, Kansas University, Wichita, KS
Colvin	Bailey	Cardiology UPMC Presbyterian	PGY2	University of the Sciences in Philadelphia	Clinical Pharmacy Specialist in Advanced Heart Failure, WVU Medicine, Morgantown, WV
Turco	Evan	Community Asti's Pharmacy	PGY1	West Virginia University	Lead Pharmacist-Patient Care Service Development, Moundsville Pharmacy, Moundsville, WV
Gabriel	Carly	Community Giant Eagle Pharmacy	PGY1	University of Pittsburgh	PGY2 Ambulatory Care Family Medicine Track, UPMC Presbyterian, Pittsburgh, PA
Hake	Kelsey	Community Rite Aid Pharmacy	PGY1	University of Pittsburgh	Community Pharmacy Practice Development and Research Fellow, University of Pittsburgh, Pittsburgh, PA
Chiappelli	Abby	Critical Care UPMC Presbyterian	PGY2	University of Pittsburgh	Unit Based Critical Care Pharmacist, UPMC Presbyterian, Pittsburgh, PA
Panjwani	Sehrish	Geriatrics UPMC St Margaret	PGY2	Texas Tech University Health Sciences Center	Population Health Pharmacist, Highmark, Pittsburgh, PA

Last Name	First Name	Pitt Residency Program	Year	PharmD School	Plans for FY20
Raghavan	Archana	Geriatrics UPMC St Margaret	PGY2	Virginia Commonwealth University	Clinical Pharmacy Specialist in Anticoagulation, Sacramento VA Medical Center, Sacramento, CA
Fawzy	John	Health System Pharmacy Administration and Leadership UPMC Presbyterian	PGY1-2	Long Island University - Arnold and Marie Schwartz College of Pharmacy	Post-Doctoral Fellow, Pharmacy Automation and Data Analytics, Omnicell, Pittsburgh, PA
Hylwa	Keith	Health System Pharmacy Administration and Leadership UPMC Presbyterian	PGY1-2	Albany College of Pharmacy and Health Sciences	Lead Pharmacist, Neurology, Trauma, and Cardiology Service Lines, UPMC Presbyterian, Pittsburgh, PA
Postlewaite	Madison	Health System Pharmacy Administration and Leadership UPMC Presbyterian	PGY1-2	West Virginia University	PGY2 Health System Pharmacy Administration and Leadership Residency, UPMC Presbyterian, Pittsburgh, PA
Ray	Lauren	Health System Pharmacy Administration and Leadership UPMC Presbyterian	PGY1-2	West Virginia University	PGY2 Health System Pharmacy Administration and Leadership Residency, UPMC Presbyterian, Pittsburgh, PA
Mingone	Carley	Managed Care CVS Caremark	PGY1	University of Pittsburgh	Clinical Pharmacist, Utilization Management, CVS Health, Pittsburgh, PA
Niehoff	Kevin	Managed Care CVS Caremark	PGY1	University of Iowa	Managed Care Pharmacist, Milliman, Chicago, IL
Akers	Taylor	Managed Care UPMC Health Plan	PGY1	Duquesne University	Clinical Pharmacy Specialist, UPMC Health Plan, Pittsburgh, PA
Casem	Kristian	Oncology UPMC Shadyside	PGY2	Rutgers Ernest Mario School of Pharmacy	Clinical Pharmacy Specialist, Medical/General Oncology, Emory University Hospital Midtown, Atlanta, GA

Last Name	First Name	Pitt Residency Program	Year	PharmD School	Plans for FY20
Gill	Meghan	Pharmacy UPMC Children's Hospital	PGY1	Virginal Commonwealth University	PGY2 Pediatric Pharmacy Residency, Virginal Commonwealth University Health System, Richmond, VA
Bacon	Molly	Pharmacy UPMC Hamot	PGY1	South Carolina College of Pharmacy	PGY2 Pain Management/Palliative Care Residency/Fellowship, Dana- Farber Cancer Institute and Harvard Medical School, Boston, MA
Jones	Richard	Pharmacy UPMC Hamot	PGY1	University of Pittsburgh	Pharmacist, UPMC Hamot, Erie, PA
Welch	Joseph	Pharmacy UPMC Hamot	PGY1	Lake Erie College of Osteopathic Medicine (LECOM)	Clinical Pharmacist, Antimicrobial Stewardship, UPMC Hamot, Erie, PA
Fay	Jennifer	Pharmacy UPMC Magee Womens Hospital	PGY1	Lake Erie College of Osteopathic Medicine (LECOM)	Pharmacist, UPMC Magee Womens Hospital, Pittsburgh, PA
Halza	Katherine	Pharmacy UPMC McKeesport	PGY1	University of Pittsburgh	PGY2 Ambulatory Care Traditional Track, UPMC Presbyterian, Pittsburgh, PA
Cain	Alexander	Pharmacy UPMC Mercy	PGY1	St. John Fisher	PGY2 Infectious Diseases Pharmacy Residency, Allegheny General Hospital, Pittsburgh, PA
Callejas	Liam	Pharmacy UPMC Mercy	PGY1	University of Pittsburgh	PGY2 Cardiology Pharmacy Residency, The Johns Hopkins Hospital, Baltimore, MD
Hand	Sydney	Pharmacy UPMC Mercy	PGY1	Duquesne University	Pharmacist, UPMC Passavant, Pittsburgh, PA
McAndrew	Ann	Pharmacy UPMC Mercy	PGY1	University of Pittsburgh	Pharmacist, UPMC Mercy, Pittsburgh, PA
Spencer	Emily	Pharmacy UPMC Mercy	PGY1	The Ohio State University	PGY2 Emergency Medicine Residency, University of Maryland Medical Center, Baltimore, MD
DiBridge	Julie	Pharmacy (Non- Traditional) UPMC Presbyterian	PGY1	University of Pittsburgh	PGY1 Pharmacy (Non-Traditional), UPMC Presbyterian, Pittsburgh, PA
Gregory	Jacob	Pharmacy UPMC Presbyterian	PGY1	West Virginia University	Pharmacist, UPMC Presbyterian, Pittsburgh, PA

Last Name	First Name	Pitt Residency Program	Year	PharmD School	Plans for FY20
Hutchins	Aaron	Pharmacy UPMC Presbyterian	PGY1	West Virginia University	PGY2 Solid Organ Transplant Residency, Nebraska Medicine, Omaha, NE
Levito	Marissa	Pharmacy UPMC Presbyterian	PGY1	Massachusetts College of Pharmacy and Health Science	PGY2 Cardiology Residency, UPMC Presbyterian, Pittsburgh, PA
Woodworth	Katharine	Pharmacy UPMC Presbyterian	PGY1	University of North Carolina	PGY2 Oncology Pharmacy Residency, UPMC Presbyterian Shadyside, Pittsburgh, PA
Courtney	Lindsay	Pharmacy UPMC Shadyside	PGY1	University of Colorado	PGY2 Ambulatory Care Family Medicine Residency, University of Colorado Skaggs School of Pharmacy, Aurora, Colorado
Zenilman	Dodi	Pharmacy UPMC Shadyside	PGY1	University of Maryland	PGY2 Ambulatory Care Residency, Veterans Affairs Maryland HealthCare System (VAMHCS), Baltimore, MD
Chatellier	Kristel	Pharmacy UPMC St. Margaret	PGY1	University of Pittsburgh	PGY2 Geriatrics Pharmacy Residency, UPMC St. Margaret, Pittsburgh, PA
DeMarco	Samantha	Pharmacy UPMC St. Margaret	PGY1	Virginia Commonwealth University	PGY2 Geriatrics Pharmacy Residency, UPMC St. Margaret, Pittsburgh, PA
Mehta	Amisha	Pharmacy UPMC St. Margaret	PGY1	Ernest Mario School of Pharmacy at Rutgers	PGY2 Ambulatory Care Pharmacy Residency, UPMC St. Margaret, Pittsburgh, PA
Schmitz	Nolan	Pharmacy UPMC St. Margaret	PGY1	University of Kansas	PGY2 Ambulatory Care Pharmacy Residency, UPMC St. Margaret, Pittsburgh, PA
Williams	Cassidy	Pharmacy UPMC St. Margaret	PGY1	Xavier University of Louisiana College of Pharmacy	PGY2 Ambulatory Care Pharmacy Residency, UPMC St. Margaret, Pittsburgh, PA
Sackett	Rena	Pharmacy UPMC Western Psychiatric Hospital	PGY1	Loma Linda University	Executive Fellowship in Association Leadership and Management, ASHP, Bethesda, MD
Temelie	Andreea	Pharmacy UPMC Western Psychiatric Hospital	PGY1	University of Minnesota	PGY2 Psychiatric Pharmacy Residency, UPMC Western Psychiatric Hospital, Pittsburgh, PA
Yabs	Melanie	Psychiatric Pharmacy UPMC Western Psychiatric Hospital	PGY2	The University of Texas at Austin	Clinical Psychiatric Pharmacist, UPMC Western Psychiatric Hospital, Pittsburgh, PA

Last Name	First Name	Pitt Residency Program	Year	PharmD School	Plans for FY20
Fredrick	Stacy	Solid Organ Transplant UPMC Presbyterian	PGY2	University at Buffalo	Clinical Pharmacy Specialist-Transplant, University of Rochester Medical Center, Rochester, NY

2020-2021 Residents

Program Type	Location	Resident	Education
PGY1 Community Pharmacy – University of Pittsburgh	Asti's Pharmacy	Erica Jackson	Lake Erie College of Osteopathic Medicine (LECOM)
	Giant Eagle	Erin Wasylson	University of Pittsburgh
	Rite Aid	Logan Kissell	Ohio Northern University
PGY1 Health System Pharmacy Administration and Leadership	UPMC Presbyterian	Garrett Day	University of Pittsburgh
		Joseph Simpson	Duquesne University
PGY1 Managed Care	CVS Caremark	Frank Nenninger	Washington State University
		Rachel Zegarac	Lake Erie College of Osteopathic Medicine (LECOM)
	UPMC Health Plan	Cameron Karnick	University of Pittsburgh
PGY1 Pharmacy	UPMC Chartwell Pennsylvania, LP	Kimberly Landsittel	University of Pittsburgh
	UPMC Children's Hospital	John Guggenberger	Creighton University
	UPMC Hamot	Abriana Holzworth	University of Toledo
		Rachael Jorgensen	St. John Fisher College
		Rachael Lobdell	West Virginia University
	UPMC Magee Womens Hospital	Samantha Poblete	D'Youville College
	UPMC McKeesport	Brooke Sabella	Duquesne University
	UPMC Mercy	Marissa Campagna	University of Pittsburgh
		Dana Cohan	St. John Fisher College
		Diana Mansour	University of Pittsburgh
		Madison McConnell	University of Pittsburgh
		Adam Patrick	University of Pittsburgh
	UPMC Presbyterian	Tia Bullard	St. John Fisher College
		Julie DiBridge	University of Pittsburgh
		Zoe Karavolis	Northeastern University Bouve College of Health Sciences
		Erin McMahan	Purdue University
		Katelyn Rudzik	University of Pittsburgh
	UPMC Shadyside	Jenna Christner	Duquesne University
		Megha Patel	University of Pittsburgh
	UPMC St. Margaret	William Beathard	Texas Tech Health Science Center
		Lauren Della Grotta	University of Rhode Island School of Pharmacy
Alicia Faggioli		University of Tennessee Health Science Center	

		Courtney Simpkins	University of Kentucky College of Pharmacy
		Alexandria Taylor	University of Pittsburgh
	UPMC Western Psychiatric Hospital	Dante Delerme	Duquesne University
		Tuyen Nguyen	University of Minnesota
PGY2 Ambulatory Care	UPMC Presbyterian	Carly Gabriel	University of Pittsburgh
		Katherine Halza	University of Pittsburgh
		Alison Manjerovic	University of Pittsburgh
		Santon Shagavah	East Tennessee State University-Bill Gatton College of Pharmacy
	UPMC St. Margaret	Amisha Mehta	Ernest Mario School of Pharmacy at Rutgers
		Nolan Schmitz	University of Kansas
		Cassidy Williams	Xavier University of Louisiana College of Pharmacy
PGY2 Cardiology	UPMC Presbyterian	Marissa Levito	Massachusetts College of Pharmacy and Health Science
PGY2 Critical Care	UPMC Presbyterian	Victoria Williams	The Ohio State University
PGY2 Geriatrics	UPMC Rx Partners	Cori Shope	University of Tennessee Health Science Center College of Pharmacy
	UPMC St. Margaret	Kristel Chatellier	University of Pittsburgh
		Samantha DeMarco	Virginia Commonwealth University School of Pharmacy
PGY2 Health System Pharmacy Administration and Leadership	UPMC Presbyterian	Madison Postlewaite	West Virginia University
		Lauren Ray	West Virginia University
PGY2 Oncology	UPMC Shadyside	Katharine Woodworth	University of North Carolina Eshelman School of Pharmacy
PGY2 Psychiatric	UPMC Western Psychiatric Hospital	Andreea Temelie	University of Minnesota
PGY2 Solid Organ Transplant	UPMC Presbyterian	Kristina Burroughs	University of South Florida College of Pharmacy

Pharmaceutical Sciences Graduate Students Enrolled in Fall 2019

Name	Advisor	Track	Enrollment	Degree
Alabdali, Rana	Gibbs, Robert	Pharmacology	19-Aug	PhD
Alvarez, Celeste	Wipf, Peter	Medicinal Chemistry	11-Aug	PhD
Bian, Yuemin	Xie, Xiang-Qun	Medicinal Chemistry	15-Aug	MS
Birabaharan, Jonathan	Poloyac, Samuel	Pharmaceutics	18-Aug	PhD
Cai, Xinran	Xie, Wen	Pharmacology	15-Aug	PhD
Casal, Morgan	Nolin, Tom	CPS*	19-Aug	PhD
Chaphekar, Nupur	Venkataramanan, Raman	Pharmaceutics	17-Aug	PhD
Chen, Yuang	Li, Song	Pharmaceutics	18-Aug	MS
Cheng, Haizi	Poloyac, Samuel	Medicinal Chemistry	13-Jan	PhD

Name	Advisor	Track	Enrollment	Degree
Chiang, Yun-Shan	Rohan, Lisa	Pharmaceutics	18-Aug	MS
Crisamore, Karryn	Empey, Phil	CPS*	17-Aug	PhD
Cuyler, Jacob	Xie, Sean; Jun, Jaden	MedChem	19-Aug	PhD
Deppas, Joshua	Beumer, Jan	CPS*	18-Aug	MS
Dodeja, Prerna	Venkataraman, Raman	Pharmaceutics	19-Aug	MS
Durairajan, Prithvirajan	Rohan, Lisa	Pharmaceutics	16-Aug	PhD
Fan, Peihao	Wang, LiRong	Medicinal Chemistry	17-Aug	MS
Feturi, Firuz	Venkataramanan, Raman	Pharmaceutics	11-Aug	PhD
Franchetti, Yoko	Nolin, Tom	CPS*	15-Aug	PhD
Gray, Matthew	Kane-Gill, Sandy	POPR [†]	18-Aug	PhD
Guo, Xiaojiang	Wang, LiRong	PSP [‡]	19-Aug	MS
Hoshitsuki, Keito	Fernandez, Christian	CPS*	19-Aug	PhD
Hou, Tianling	Xie, Sean	PSP [‡]	19-Aug	PhD
Huang, Haozhe	Li, Song	Pharmaceutics	18-Aug	PhD
Jhunjhunwala, Kunal	Rohan, Lisa	Pharmaceutics	13-Aug	PhD
Ji, Beihong	Wang, LiRong	Medicinal Chemistry	17-Aug	MS
Jing, Yankang	Xie, Xiang-Qun	Medicinal Chemistry	16-Aug	PhD
Kiesel, Brian	Beumer, Jan	Pharmaceutics	14-Aug	PhD
Kirshner, Ziv	Gibbs, Bob	Pharmacology	11-Aug	PhD
Kosanovich, Jessica	Empey, Kerry	CPS*	19-Aug	PhD
Kreider, Madeline	Nolin, Thomas	CPS*	19-Aug	PhD
Li, Huatien	Sant, Vinayak	Pharmaceutics	19-Aug	MS
Li, Sihan	Yang, Da	Pharmacology	17-Aug	MS
Li, Yujia	Hernandez, Inma	POPR [†]	19-Aug	MS
Liang, Tianjian	Feng, Zhiwei	PSP [‡]	19-Aug	MS
Lipp, Madeline	Empey, Kerry	CPS	19-Aug	PhD
Liu, Shuhan	Wang, Junmei	PSP [‡]	18-Aug	MS
Long, Keith	Hurn, Donna	Medicinal Chemistry	17-Aug	PhD
Luo, Zhangyi	Li, Song	Pharmaceutics	17-Aug	MS
Ma, Shifan	Xie, Xiang-Qun	Medicinal Chemistry	13-Aug	PhD
Nammas, Mohammed	Rohan, Lisa	Pharmaceutics	19-Aug	PhD
Pakalapati, Naren	Venkataramanan, Raman	Pharmaceutics	18-Aug	MS
Pardeshi, Apurva	Li, Song	Pharmaceutics	19-Aug	MA
Patel, Akhil	Sant, Shilpa	Pharmaceutics	13-Aug	PhD
Qi, Xiguang	Wang, Lirong	PSP [‡]	18-Aug	MS
Schleiden, Loren	Thorpe, Carolyn	POPR [†]	17-Aug	PhD
Shen, Mingzhe	Bertz, Richard	PSP [‡]	18-Aug	MS

Name	Advisor	Track	Enrollment	Degree
Silva Barbosa, Anne	Wen, Xie	Pharmacology	15-Aug	PhD
Tang, Chenxiao	Poloyac, Sam	CPS*	14-Aug	PhD
Tong, Xin	Rohan, Lisa	Pharmaceutics	16- Aug	MS
Tung, Hung-Chun	Xie, Wen	Pharmacology	16-Aug	PhD
Vasudevan, Aishwarya	Sant, Vinayak	Pharmaceutics	18-Aug	MS
Vaughn, Zoe	Hurn, Donna	Medicinal Chemistry	18-Aug	PhD
Wan, Zhuoya	Li, Song	Pharmaceutics	16-Aug	PhD
Wang, Jingyuan	Xie, Wen	Pharmacology	18-Aug	PhD
Wang, Siyi	Feng, Zhiwei	PSP‡	18-Aug	MS
Wang, Xiaofei	Yang, Da	Pharmacology	19-Aug	MS
Wang, Yifie	Yang, Da	Pharmacology	18-Aug	MS
Wang, Yue	Yang, Da	Pharmacology	16-Aug	PhD
Xie, Yang	Xie, Wen	Pharmacology	14-Aug	PhD
Xing, Changrui	Xie, Xiang-Qun	Medicinal Chemistry	14-Aug	PhD
Xu, Kexin	Hurn, Donna	Medicinal Chemistry	19-Aug	MS
Xu, Ruichao	Venkataramanan, Raman	Pharmaceutics	14-Aug	PhD
Xu, Yuanyuan	Xie, Xiang-Qun	PSP‡	18-Aug	MS
Yang, Lanting	Hernandez, Inma	POPR†	19-Aug	PhD
Young, Gregory	Xie, Wen	Pharmacology	19-Aug	PhD
Zhai, Jingchen	Wang, Junmei	PSP‡	19-Aug	MS
Zhang, Bei	Li, Song	Pharmaceutics	19-Aug	MS
Zhang, Yuzhao	Wang, Junmei;Jun, Jaden	PSP‡	19- Aug	MS
Zhang, Zhongfang	Rohan, Lisa	Pharmaceutics	19-Aug	MS
Zhang, Ziqian	Li, Song	Pharmaceutics	18-Aug	MS
Zheng, Ruohui	Rohan, Lisa	Pharmaceutics	17-Aug	PhD

*CPS – Clinical Pharmaceutical Scientist Program

†POPR - Pharmaceutical Outcomes and Policy Research Track

‡PSP – Pharmacometrics and Systems Pharmacology

Students Selected for the Pharmaceutical Sciences PhD and Research-based MS Graduate Program, Beginning in Fall 2020

Name	Track	Degree
Al Saad, Sarah	Pharmacology	MS
Bailey, Samantha	CPS*	PhD
Bhingarkar, Aboli	Pharmacology	MS
Brock, Matthew	PSP‡	PhD
Chen, Chih-Jung	PSP‡	MS
Chen, Nai-Chia	POPR†	MS
Chen, Yuang	Pharmaceutics	PhD
Deppas, Joshua	CPS*	PhD
Gu, Ruizhi	Pharmacology	MS
Hao, Yixuan	PSP‡	MS
Hill, Clare	MedChem	PhD
Jiang, Chen	PSP‡	MS
Qi, Xiguang	PSP‡	PhD
Sun, Yuchen	PSP‡	MS
Wang, Lin	Pharmaceutics	PhD
Wang, Yifei	Pharmacology	PhD
Yuan, Jiayi	PSP‡	MS
Zhang, He	Pharmacology	MS
Zhang, Ziqian	Pharmaceutics	PhD
Zhao, Yueshan	Pharmacology	MS

*Clinical Pharmaceutical Scientist Program and Pharmaceutics Track

†Pharmaceutical Outcomes and Policy Research Track

‡PSP – Pharmacometrics and Systems Pharmacology

Students Selected for the Non-Thesis MS Graduate Program in Pharmaceutical Sciences Beginning in Fall 2020

Ali, Zachary	Boro, Ryan
Cotter, Reiley	Desai, Ravi
Lynn, Andrew	Walko, Thomas
Wang, Fei	Wang, Tianqi

STUDENTS CONFERRED GRADUATE DEGREES IN 2019-2020

Master of Science Graduates

Thesis MS Graduates

Chen, Yuang, MS

Advisor: Song Li, MD, PhD

Graduation: April 2019 (Defense completed April 2019)

Thesis Title: Farnesylthiosalicylic Acid-derivatized PEI-based Nanocarrier for Improved Tumor Vaccination

Chiang, YunShan, MS

Advisor: Lisa Rohan, PhD

Graduation: April 2019 (Defense completed April 2019)

Thesis Title: Development of a Vaginal Film for Delivering a Sperm-Deactivating Non-Hormonal Contraceptive Candidate, Lupeol

Liu, Shuhan, MS

Advisor: Junmei Wang, PhD

Graduation: April 2019 (Defense completed March 2019)

Thesis Title: In Silico Simulation of DUSP-YIV906 Protein-Ligand Interactions and DUSP3-ERK Protein-Peptide Interactions

Qi, Xiguang, MS

Advisor: LiRong Wang, PhD

Graduation: April 2019 (Defense completed March 2019)

Thesis Title: The Performance of Gene Expression Signature-Guided Drug-Disease Association in Different Categories of Drugs and Diseases

Shen, Mingzhe, MS

Advisor: Richard Bertz, PhD

Co-Advisor: Zhiwei Feng, PhD

Graduation: April 2019 (Defense completed March 2019)

Thesis Title: Pain Chemogenomics Knowledgebase (PAIN-CKB) for Systems Pharmacology Target Mapping and PBPK Modeling Investigation of Opioid Drug-Drug Interactions

Vasudevan, Aishwarya, MS

Advisor: Vinayak Sant, PhD

Graduation: April 2019 (Defense completed April 2019)

Thesis Title: Development of Micropatterned, Mucoadhesive, Ocular Films for the Treatment of Diabetic Keratopathy

Wang, Siyi, MS

Advisor: Zhiwei Feng, PhD

Graduation: April 2019 (Defense completed March 2019)

Thesis Title: Characterizing the Binding Region of GPCRs Based on Molecular Simulation and Energy Decomposition

Wang, Yifei, MS

Advisor: Da Yang, MD, PhD

Graduation: April 2019 (Defense completed April 2019)

Thesis Title: MYC-binding lncRNA EPIC1 Promotes AKT-mTORC1 Signaling and Rapamycin Resistance in Breast and Ovarian Cancer

Zhang, Ziqian, MS

Advisor: Song Li, MD, PhD

Graduation: April 2019 (Defense completed April 2019)

Thesis Title: YAP/TAZ-Inhibitor-Based Drug Delivery System for Cancer Therapy

PhD Graduates**Celeste Alvarez, PhD**

Advisor: Peter Wipf, PhD

Graduation: December 2019 (Defense completed November 2019)

Thesis Title: Synthesis and Structure-Activity Relationship of Allosteric Inhibitors of The AAA ATPASE P97

Haizi Chen, PhD

Advisor: Huard, Johnny, PhD

Co-Advisor: Samuel Poloyac, PharmD, PhD

Graduation: August 2019 (Defense completed July 2019)

Thesis Title: The Role of Bone Morphogenetic Protein in Regulating Cell Cycle of Aged Muscle-Derived Stem Cells Osteogenic Potential In Vitro and Bone Regeneration In Vivo

Ashley Fancher, PhD

Advisor: Paul Johnston, PhD

Graduation: August 2019 (Defense completed April 2019)

Thesis Title: Disrupting Androgen Receptor Transactivation Domains to Identify Lead Compounds with Potential to be Optimized and Developed into Prostate Cancer Therapeutics

Firuz Feturi, PhD

Advisor: Raman Vankataramanan, PhD

Graduation: April 2020 (Defense completed July 2019)

Thesis Title: Site Specific Immunosuppression for Promoting Vascularized Composite Allograft and Reducing Systemic Immunosuppression Related Morbidity

Ziheng Hu, PhD

Advisor: Xiang-Qun (Sean) Xie, PhD, EMBA

Graduation: August 2019 (Defense completed July 2019)

Thesis Title: Achieving Personalized Medicine Using Machine Learning: Clinical Data Mining Studies on Coronary Heart Disease, Substance Use Disorder, and Alzheimer's Disease

Kunal Shriratan Jhunjhunwala, PhD

Advisor: Lisa Rohan, PhD

Graduation: December 2019 (Defense completed October 2019)

Thesis Title: Rectal Suppository as a Versatile Platform for Delivering Physicochemically Diverse Antiretrovirals for HIV Prevention

Ziv Zalman Kirshner, PhD

Advisor: Robert Gibbs, PhD

Graduation: December 2019 (Defense completed October 2019)

Thesis Title: Effects of Estradiol and Selective Estrogen Receptor Agonists on Biochemical Endpoints in the Brain: A Comparison between Transitional and Surgical Menopause Rat Models

Stanton Joseph Kochanek, PhD

Advisor: Paul Johnston, PhD

Graduation: August 2019 (Defense completed July 2019)

Thesis Title: Data-Driven Effect of Kidney Disease and Gut-Derived Uremic Toxins on Flavin Monooxygenases: Clinical and Translational Research Studies and HTS Strategies for Selection of Drug Combinations and 3D Models for Physiologically Relevant Drug Discovery

Joshua David Niznik, PharmD, PhD

Advisor: Carolyn Thorpe, MPH, PhD

Graduation: August 2019 (Defense completed May 2019)

Thesis Title: Deprescribing of Acetylcholinesterase Inhibitors in Older Adult Nursing Home Residents with Severe Dementia

Akhil Pravinkumar Patel, PhD

Advisor: Shilpa Sant, PhD

Graduation: December 2019 (Defense completed October 2019)

Thesis Title: Bioinspired Hydrogel Formulations for Bone Regeneration - Fabrication, Characterization, and In Vivo Efficacy Evaluation in Mice and Rabbits

Alexander John Prokopenko, PharmD, PhD

Advisor: Thomas Nolin, PharmD, PhD

Graduation: August 2019 (Defense completed July 2019)

Thesis Title: Effect of Kidney Disease and Gut-Derived Uremic Toxins on Flavin Monooxygenases: Clinical and Translational Research Studies

Amina Ibrahim Shehu, PhD

Advisor: Xiaochao Ma, PhD

Graduation: August 2019 (Defense completed July 2019)

Thesis Title: Pregnane X Receptor Activation Potentiates the Hepatotoxicity of Pharmacoenhancers

Harisudhan Thanukrishnan, PhD

Advisor: Raman Venkataramanan, PhD

Graduation: August 2019 (Defense completed June 2019)

Thesis Title: Pharmacological Approaches to Preserve Renal Grafts and to Optimize Immunosuppression in Renal Transplantation

Hongfei Zhang, PhD

Advisor: Raman Venkataramanan, PhD

Graduation: August 2019 (Defense completed April 2019)

Thesis Title: Optimization of Buprenorphine Dosing in Pregnant Women

AWARDS TO GRADUATE STUDENTS

Competitive Fellowships/Scholarships

- **Karryn Crisamore** was awarded the Herb and Nina Demuth Memorial Award in Pharmaceutics from the American Foundation for Pharmaceutical Education.
- **Beihong Ji** received NIH funding as a co-PI for her project “Quantitatively Predicting Drug-Drug Interactions between Oxycodone and Other Drugs by Pharmacokinetics Modeling and Simulations”.
- **Keito Hoshitsuki** was the recipient of a Clinical and Translational Science TL1 Postdoctoral Fellowship from the Institute for Clinical Research Education, University of Pittsburgh.
- **Brian Kiesel** was the recipient of a Clinical and Translational Science TL1 Postdoctoral Fellowship from the Institute for Clinical Research Education, University of Pittsburgh.
- **Keito Hoshitsuki** was the recipient of the Rho Chi/ American Foundation for Pharmaceutical Education First Year Graduate Fellowship.
- **Karryn Crisamore** was the recipient of a Clinical and Translational Science TL1 Postdoctoral Fellowship from the Institute for Clinical Research Education, University of Pittsburgh.
- **Matthew Gray** was the recipient of the NIH Loan Repayment Program.
- **Jonathan Birabaharan** was the recipient of a Clinical and Translational Science TL1 Postdoctoral Fellowship from the Institute for Clinical Research Education, University of Pittsburgh.
- **Brian Kiesel** was awarded a 2019 AFPE Pre-Doctoral Fellowship in Pharmaceutical Sciences for his proposal Comparative Pharmacology of ATR Inhibitors.
- **Ruohui Zheng** was the recipient of a T-32 NIH Training Grant was the recipient of a T-32 NIH Training Grant for Reproductive Science in Reproductive Development from Gonads to Fetuses from Magee-Women's Research Institute and Foundation.

Research or Presentation Awards

- **Matthew Gray** won the 2019 Student Research Award from the American Society of Health System Pharmacists for his publication entitled “Outcomes of Patients With Atrial Fibrillation Newly Recommended for Oral Anticoagulation Under the 2014 American Heart Association/American College of Cardiology/Heart Rhythm Society Guideline”.
- **Yoko Franchetti**, received an American Society of Nephrology Kidney (ASN) STARS Program award for her presentation Application of Individualized Physiologically-Based Pharmacokinetic Modeling of Rate Data (iPBPK-R) to Estimate the Effect of Hemodialysis on Nonrenal Clearance Pathways at the ASN 2019 National meeting.
- **Xin Tong** was awarded the 2020 Pitt Three Minute Thesis (3MT®) Competition PITT People’s Choice Award for his video presentation of his thesis: Protein-Loaded Polymeric Films Can Offer Protection for Women Against HIV Infection.
- **Yue Wang** received the STELLAR Abstract Award at the 213th Program in Quantitative Genomics Conference for her abstract titled Integrative Analyses Characterize the Landscape of LncRNA-Tumor Immune Interaction.

- **Zhuoya Wan** received the Selective Oral Presentation award at the 2019 American Chemical Society Fall National Meeting & Exposition for presentation entitled Dual Functional Immunostimulatory Polymeric Prodrug Carrier with Pendent Indoximod for Enhanced Cancer Immunochemotherapy.
- **Zhuoya Wan** was chosen for a Featured Media Interview: An interview with Zhuoya Wan in Cancer Immunotherapy, RxNet London, 2019

Other Awards

- **Matthew Gray** won the Randy and Reneé Juhl Pharmacy Graduate Scholar Award for excellent academic achievement for the 2019-2020 academic year.
- **Changrui Xing** won the Norman R. and Priscilla A. Farnsworth Student Research Award for the 2019-2020 Academic year.
- **Brian Kiesel** and **Zhuoya Wan** won the Pharmaceutical Sciences Graduate Student Excellent Award for the 2019-2020 academic year.
- **Keith Long** and **Madeline Kreider** received the Teaching Assistant of the Year Awards for the 2019-2020 Academic term.

Travel Awards

- **Yuemin Bian** received a Pharmaceutical Sciences Graduate Program Council travel award to attend the 2019 17th Annual Congress of International Drug Discovery, Science, and Technology in Nanjing, China, for his poster “Drug Discovery with Deep Convolutional Generative Adversarial Network (dcGAN) Models: Case Study Zhon Cannabinoid Receptors”
- **Akhil Patel** received a Pharmaceutical Sciences Graduate Program Council travel award to attend the 2019 Surfaces in Biomaterials Foundation Meeting in Park City, UT for his poster “Bottom-up Self-assembled Substitute Bone Graft Promotes Bone Regeneration in Mice and Rabbits”
- **Hung-Chun Tung** received a University of Pittsburgh Graduate and Professional Student Government Travel Grant to attend The Liver Meeting 2019 in Boston, MA for her poster "Aryl Hydrocarbon Receptor Signaling Prevents Activation of Hepatic Stellate Cells and Liver Fibrogenesis in Mice."
- **Hung-Chun Tung** received a Pharmaceutical Sciences Graduate Program Council Travel Award to attend The Liver Meeting 2019 in Boston, MA for her poster "Aryl Hydrocarbon Receptor Signaling Prevents Activation of Hepatic Stellate Cells and Liver Fibrogenesis in Mice."

Graduate Student Publications and Presentations

PUBLICATIONS

- **Kochanek SJ**, Close DA, Wang AX, Shun T, Empey PE, Eiseman JL, Johnston PA. Confirmation of selected synergistic cancer drug combinations identified in an HTS campaign and exploration of drug efflux transporter contributions to the mode of synergy. *SLAS Discov.* 2019 Jul;24(6):653-668.

- **Fan P**, Wang N, Wang L, Xie XQ. Autophagy and apoptosis specific knowledgebases-guided systems pharmacology drug research. *Curr Cancer Drug Targets*. 2019;19(9):716-728.
- An Y, Wang P, Xu P, **Tung HC**, **Xie Y**, Kirisci L, Xu M, Ren S, Tian X, Ma X, Xie W. An unexpected role of cholesterol sulfotransferase and its regulation in sensitizing mice to acetaminophen-induced liver injury. *Mol Pharmacol*. 2019 Jun;95(6):597-605.
- **Xie Y**, Xu M, Deng M, Li Z, Wang P, Ren S, Guo Y, Ma X, Fan J, Billiar TR, Xie W. Activation of pregnane X receptor sensitizes mice to hemorrhagic shock-induced liver injury. *Hepatology*. 2019 Sep;70(3):995-1010.
- Xu J, Sun J, Ho PY, **Luo Z**, Ma W, Zhao W, Rathod SB, Fernandez CA, Venkataramanan R, Xie W, Yu AM, Li S. Creatine based polymer for codelivery of bioengineered MicroRNA and chemodrugs against breast cancer lung metastasis. *Biomaterials*. 2019 Jul;210:25-40.
- Wang L, Ying J, **Fan P**, Weamer EA, DeMichele-Sweet MAA, Lopez OL, Kofler JK, Sweet RA. Effects of vitamin D use on outcomes of psychotic symptoms in Alzheimer Disease patients. *Am J Geriatr Psychiatry*. 2019 Sep;27(9):908-917.
- **Niznik JD**, Zhao X, He M, Aspinall SL, Hanlon JT, Nace D, Thorpe JM, Thorpe CT. Factors associated with deprescribing acetylcholinesterase inhibitors in older nursing home residents with severe dementia. *J Am Geriatr Soc*. 2019 Sep;67(9):1871-1879.
- **Yan J**, **Tung HC**, **Li S**, Niu Y, Garbacz WG, Lu P, Bi Y, Li Y, He J, Xu M, Ren S, Monga SP, Schwabe RF, Yang D, Xie W. Aryl Hydrocarbon receptor signaling prevents activation of hepatic stellate cells and liver fibrogenesis in mice. *Gastroenterology*. 2019 Sep;157(3):793-806.
- Feng Y, **Xie Y**, Xu M, Li L, Selcer KW, Oberly PJ, Poloyac SM, Wang H, Li C, Dong F, Yu C, Xie W. Hepatic steroid sulfatase critically determines estrogenic activities of conjugated equine estrogens in human cells in vitro and in mice. *J Biol Chem*. 2019 Aug 9;294(32):12112-12121.
- **Crisamore KR**, Nolin TD, Coons JC, Empey PE. Engaging and empowering stakeholders to advance pharmacogenomics. *Clin Pharmacol Ther*. 2019 Aug;106(2):305-308.
- Cheng J, **Wang S**, Lin W, **Wu N**, Wang Y, Chen M, Xie XQ, Feng Z. Computational systems pharmacology-target mapping for fentanyl-laced cocaine overdose. *ACS Chem Neurosci*. 2019 Aug 21;10(8):3486-3499.
- **Prokopienko AJ**, West RE 3rd, Stubbs JR, Nolin TD. Development and validation of a UHPLC-MS/MS method for measurement of a gut-derived uremic toxin panel in human serum: An application in patients with kidney disease. *J Pharm Biomed Anal*. 2019 Sep 10;174:618-624.
- Gao J, Wu MX, Dai D, Cai Z, **Wang Y**, Fang W, Wang Y, Yang YW. N-doped carbon dots covalently functionalized with pillar[5]arenes for Fe³⁺ sensing. *Beilstein J Org Chem*. 2019 Jun 7;15:1262-1267.
- **Wang Y**, Zhou Y, Yang Z, Cui J. A technological combination of lead-glaze and calcium-glaze recently found in China: Scientific comparative analysis of glazed ceramics from Shangyu, Zhejiang Province. *PLoS One*. 2019 Jul 11;14(7):e0219608.

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- **Long T**, Yao JK, *Li J*, **Kirshner ZZ**, Nelson D, Dougherty GG, Gibbs RB. Estradiol and selective estrogen receptor agonists differentially affect brain monoamines and amino acids levels in transitional and surgical menopausal rat models. *Mol Cell Endocrinol.* 2019 Oct 1;496:110533.
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- **Bian Y**, Wang J, Jun JJ, Xie XQ. Deep convolutional generative adversarial network (dcGAN) models for screening and design of small molecules targeting cannabinoid receptors. *Mol Pharm.* 2019 11 04;16(11):4451-4460.
- **Bian Y**, Jun J, **Cuyler J**, Xie Xi. Covalent allosteric modulation: An emerging strategy for GPCRs drug discovery. *Eur J Med Chem.* 2020 Aug 9;206. Epub ahead of print.
- **Casal MA**. Veverimer: A Promising Investigational Agent for Long-Term Treatment of Metabolic Acidosis in Chronic Kidney Disease Pharmacotherapy Updates, *Accesspharmacy* [Http://accesspharmacy.mhmedical.com](http://accesspharmacy.mhmedical.com). 10/9/2019;NA(NA).
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- **Fan P, Qi X**, Sweet RA, Wang L. Network Systems Pharmacology-Based Mechanism Study on the Beneficial Effects of Vitamin D against Psychosis in Alzheimer's Disease. *Sci Rep*. 2020 Apr 09;10(1):6136.
- **Franchetti Y**, Nolin TD. Simultaneous Assessment of Hepatic Transport and Metabolism Pathways with a Single Probe Using Individualized PBPK Modeling of ¹⁴CO₂ Production Rate Data. *J Pharmacol Exp Ther*. 2019 10;371(1):151-161"**PBPK Modeling of ¹⁴CO₂**
- **Gray MP**, San-Juan-Rodriguez A, Chen N, Good CB, Hernandez I. Impact of direct-to-consumer drug advertising during the Super Bowl on drug utilization. *Res Social Adm Pharm*. 2020 Aug;16(8):1136-1139.
- He X, **Liu S**, Lee TS, **Ji B**, Man VH, York DM, Wang J. Fast, Accurate, and Reliable Protocols for Routine Calculations of Protein-Ligand Binding Affinities in Drug Design Projects Using AMBER GPU-TI with ff14SB/GAFF. *ACS Omega*. 2020 Mar 10;5(9):4611-4619.
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- **Ji B, Liu S, Xue Y**, He X, Man VH, Xie XQ, Wang J. Prediction of Drug-Drug Interactions Between Opioids and Overdosed Benzodiazepines Using Physiologically Based Pharmacokinetic (PBPK) Modeling and Simulation. *Drugs R D*. 2019 Sep;19(3):297-305.
- **Jing Y, Hu Z, Fan P, Xue Y**, Wang L, Tarter RE, Kirisci L, Wang J, Vanyukov M, Xie XQ. Analysis of substance use and its outcomes by machine learning I. Childhood evaluation of liability to substance use disorder. *Drug Alcohol Depend*. 2020 Jan 01;206107605.
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- **Kosanovich JL**, Eichinger KM, **Lipp MA**, Yondola MA, Perkins TN, Empey KE. Formulation of the prefusion RSV F protein with a Th1/Th2-balanced adjuvant provides complete protection without Th2-skewed immunity in RSV-experienced young mice. *Vaccine*. 2020 Sep 22;38(41):6357-6362.
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- Liu S, He X, Man VH, **Ji B**, Liu J, Wang J. New application of in silico methods in identifying mechanisms of action and key components of anti-cancer herbal formulation YIV-906 (PHY906). *Phys Chem Chem Phys*. 2019 Nov 14;21(42):23501-23513
- **Luo Z, Xu J, Sun J, Huang H, Zhang Z**, Ma W, **Wan Z**, Liu Y, **Pardeshi A**, Li S. Co-delivery of 2-Deoxyglucose and a glutamine metabolism inhibitor V9302 via a prodrug micellar formulation for synergistic targeting of metabolism in cancer. *Acta Biomater*. 2020 Mar 15;105:239-252
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- Man VH, He X, **Ji B, Liu S**, Xie XQ, Wang J. Molecular Mechanism and Kinetics of Amyloid- β_{42} Aggregate Formation: A Simulation Study. *ACS Chem Neurosci*. 2019 11 20;10(11):4643-4658.
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- **Qi X, Shen M, Fan P, Guo X, Wang T**, Feng N, Zhang M, Sweet RA, Kirisci L, Wang L. The Performance of Gene Expression Signature-Guided Drug-Disease Association in Different Categories of Drugs and Diseases. *Molecules*. 2020 Jun 16;25(12):2776.
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- **Yang L**, Brooks MM, Glynn NW, Zhang Y, Saba S, Hernandez I. Real-World Direct Comparison of the Effectiveness and Safety of Apixaban, Dabigatran, Rivaroxaban, and Warfarin in Medicare Beneficiaries With Atrial Fibrillation. *Am J Cardiol*. 2020 Jul 1;126:29-36.
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PRESENTATIONS, POSTERS, AND PODIUM

- American College of Clinical Pharmacology 2020, Bethesda, MD. Mass Balance Studies of [14C]-Labeled Pozotinib. **Deppas, J**. June 3, 2020
- The American Society of Nephrology/ Kidney Week 2019, Washington, D.C. Application of Individualized Physiologically-Based Pharmacokinetic Modeling of Rate Data (iPBPK-R) to Estimate the Effect of Hemodialysis on Nonrenal Clearance Pathways. **Franchetti, Y**. November 8, 2019
- American Association of Pharmaceutical Scientists (AAPS) Regional Meeting 2018, Morgantown, WV. “Towards precision medicine: A pilot study to evaluate pharmacogenomics testing platforms”. **Crisamore K**. July 7, 2019.

- American College of Clinical Pharmacology 2018, Washington, D.C. Model-based analysis to evaluate alteration of buprenorphine pharmacokinetics during pregnancy. **Zhang, H.** September 25, 2019.
- Simcyp Internship Presentation 2019, Princeton, NJ. A physiologically-based pharmacokinetic modeling approach to predict buprenorphine. **Zhang, H.** November 14, 2019.
- American Chemical Society 259th National Meeting & Exposition 2020, Philadelphia, PA. The Development of Novel Therapeutics to Treat Acute Kidney Injury. **Vaughan, Z.** March 22, 2020
- American Society of Human Genetics Annual Meeting 2019, Houston, TX. Comparison of Genetic Testing Approaches for Implementation of Preemptive Pharmacogenomics. **Crisamore, K.** October 15, 2019
- American Association for the Study of Liver Diseases 2019, Boston, MA. Aryl Hydrocarbon Receptor Signaling Prevents Activation of Hepatic Stellate Cells and Liver Fibrogenesis in Mice. **Tung, HC.** November 10, 2019
- American College of Clinical Pharmacy Annual Meeting 2020, Dallas, TX. A machine learning approach to predict clopidogrel bleeding outcomes among genotyped post-PCI patients. **Kreider, M.** October 24, 2020
- The 11th Annual University of Pittsburgh-Duquesne University-West Virginia University AAPS Student Chapters Research Symposium 2020. Pittsburgh, PA. Andrographolide ameliorates mice from alcoholic steatohepatitis by blocking pregnane X receptor (PXR) – fatty acid-binding protein 4 (FABP4) pathway **Young, G.** January 17, 2020
- American Chemical Society National Spring Meeting 2020. Generation of Druglike Molecules with Generative Adversarial Networks (GANs). **Ji, B.** Philadelphia, PA. April 15, 2020
- The 11th Annual University of Pittsburgh-Duquesne University-West Virginia University AAPS Student Chapters Research Symposium 2020. Pittsburgh, PA. Polymers Selection for Novel Solvent-Cast (SC) Formulations to Utilize Anti-HIV Protein Drugs. **Tong, X.** January 17, 2020
- Controlled Release Society Virtual Annual Meeting 2020. Overcoming Drug Efflux to Improve Tissue Uptake Using Nanoparticles in Film for Extended Protection against HIV Infection. **Tong, X.** June 29, 2020
- American Society for Clinical Pharmacology and Therapeutics Virtual Annual Meeting. 2020. Pharmacokinetic analysis of the HDAC inhibitor belinostat (Beleodaq) and metabolites in patients with hepatic dysfunction. **Kiesel, B.** July 30, 2020
- American Association for Cancer Research Virtual Meeting. Non-linear absorption pharmacokinetics (PK) of the ATR inhibitor AZD6738 in mice. **Kiesel, B.** May 21, 2020
- University of Pittsburgh School of Pharmacy Center for Pharmacogenetics Symposium: Twenty-Year Journey, From Pharmacogenetics to Molecular Medicine and Pharmaceutics. Pittsburgh, PA. Identify robust lncRNA biomarkers for chemo-resistance: from cell lines to cancer patients. **Wang, Y.** November 13, 2019

- 13th Program in Quantitative Genomics Conference, 2019. Quantitative Challenges in Cancer Immunology & Immunotherapy. Harvard University Medical School, Boston, MA. Integrative Analyses Characterize the Landscape of LncRNA-Tumor Immune Interaction. **Wang, Y.** November 5, 2019
- Computational Medicine Conference, Clinical and Translational Science Institute, University of Pittsburgh 2019. Pittsburgh, PA. Machine Learning for Evaluation of Substance Use Disorders on Childhood. **Jing, Y.** October 29, 2019
- The 11th Annual University of Pittsburgh-Duquesne University-West Virginia University AAPS Student Chapters Research Symposium 2020. Pittsburgh, PA. Analysis of substance use and its outcomes by machine learning. **Jing, Y.** January 17, 2020.
- American Chemical Society Fall National Meeting & Exposition, 2019. San Diego, CA. Dual Functional Immunostimulatory Polymeric Prodrug Carrier with Pendent Indoximod for Enhanced Cancer Immunochemotherapy. **Wan, Z.** August 8, 2019
- Cell Therapies and Immunotherapy Conference, Society for Biological Engineering, 2019. San Francisco, CA. AICHE Dual Functional Immunostimulatory Polymeric Prodrug Carrier with Pendent Indoximod for Enhanced Cancer Immunochemotherapy. **Wan, Z.** October 1, 2019
- American Institute of Chemical Engineers Annual Meeting, Biomaterials for Immunological Applications, 2019. Orlando, FL. Dual Functional Immunostimulatory Polymeric Prodrug Carrier with Pendent Indoximod for Enhanced Cancer Immunochemotherapy. **Wan, Z.** November 2, 2019
- The 11th Annual University of Pittsburgh-Duquesne University-West Virginia University AAPS Student Chapters Research Symposium 2020. Pittsburgh, PA. Triple drugs co-delivered by a small AraC-based carrier for leukemia immunochemotherapy. **Wan, Z.** January 17, 2020
- Control Release Society Virtual Annual Meeting, 2020. Rational Design of An AraC-Based Ultrasmall Prodrug Nanocarrier for Effective Leukemia Combination Therapy. **Wan, Z.** July 1, 2020

POSTDOCTORAL FELLOWS

School of Pharmacy Postdoctoral Associates FY20

Name	Degree	Degree/University	Field	Country
Al Antary, Doaa	PhD	The University of Arizona	Pharmaceutics	Jordan
Ardila Montoya, Diana Catalina	PhD	University of Pittsburgh	Bioengineering	United States
Feturi, Firuz	PhD	University of Pittsburgh	Pharmaceutical Sciences	Libya
Gundala, Venkata Naveen Kumar	PhD	Jawaharlal Nehru Technological University	Biotechnology	India
Guo, Weiwei	PhD	Fudan University	Genetics	China

Name	Degree	Degree/University	Field	Country
Joyasawal, Sipak	PhD	Vidyasagar University	Organic Chemistry	India
Lei, Saifei	PhD	University of the Chinese Academy of Sciences	Pharmacology	China
Mohammed, Shabber	PhD	IIIM-Academy of Scientific Innovative Research	Chemical Sciences	India
Rathod, Sanjay	PhD	National Institute of Virology	Biotechnology	India
Shaik, Imam	PhD	Texas Tech University	Pharmaceutical Sciences	India
Sun, Jingjing	PhD	Chinese Academy of Sciences	Polymer Chemistry and Physics	China
Vallicherla, Guru Raghavendra	PhD	CSIR-Central Drug Research Institute	Pharmacokinetics	India
Xu, Pengfei	PhD	Beijing Normal University	Developmental Biology	China
Xue, Ying	PhD	Fudan University	Pharmacology	China
Zhang, Yue	PhD	University of Minnesota	Pharmacology	China
Zhu, Junjie	PhD	Chinese Academy of Sciences	Medicinal Chemistry	China

Research Appendix



Research Appendix

FY20 PHS Funding

Investigator	Agency	Title	Direct \$	Indirect \$	Total
C. Fernandez	NIH	Improving the disposition of antileukemic asparaginase after drug-induced immunotoxicity	205,875	116,319	322,194
C. Fernandez	NIH	Asparaginase hepatotoxicity is lipolysis-dependent - Liver Research	25,000	14,125	39,125
D. Huryn	NIH	Discovery of Post-transcriptional utrophin upregulator small molecules for Duchenne Muscular Dystrophy therapeutics (Khurana / UPenn)	4,317	2,439	6,756
D. Swanson	NIH	Regenerative Medicine	6,760	3,819	10,579
D. Yang	NIH	Identification of Novel Human LncRNAs Controlling Human Cardiogenesis	10,942	6,082	17,024
D. Yang	NCI	The oncogenic role of EPIC1MYC axis in breast cancer	211,242	119,352	330,594
D. Yang	NIH	Identification of Novel Human LncRNAs Controlling Human Cardiogenesis	10,942	6,082	17,024
I. Hernandez	NHLBI	Patient and Ssystem-Level Determinants of Oral Anticoagulation Use in Atrial Fibrillatoin	147,871	11,633	159,504
J. Beumer	NIH	NCI ET-CTN with Phase I Emphasis at UPCI	36,119	20,407	56,526
J. Beumer	NIH	Cancer Center Support Grant	33,305	17,985	51,290

Investigator	Agency	Title	Direct \$	Indirect \$	Total
J. Beumer	NIH	University of Pittsburgh Microphysiology Systems Database Center	18,797	10,622	29,419
J. Beumer	NIH	Signature-Directed, Sequential Delivery of Radiation Mitigators	66,154	35,723	101,877
J. Beumer	NIH	Application of mucolytic therapy in Patient-Derived Models of Pseudomyxoma	4,136	2,337	6,473
J. Beumer	NIH	Formulation and Optimized Delivery of JP4-039	14,997	8,473	23,470
J. Beumer	NIH	PITT-CAL ETCTN PK Resource Laboratory	384,065	127,073	511,138
J. Beumer	NIH	CPPF Beumer: Cancer Center Support Grant	26,701	15,087	41,788
J. Beumer	NIH	TORFPG: Analytical Support and PK Sample Analysis for Preclinical Pharmacology Studies	16,577	9,366	25,943
J. Beumer	NIH	Phase I/II clinical trial of vorinostat for GVHD prevention in children, adolescents, and young adults	8,417	4,756	13,173
J. Beumer	NIH	PSMA - Targeting Small- Molecule Drug Conjugates	23,005	12,998	36,003
K. Empey	NIH	An adjuvant for an RSV prefusion F vaccine that safely protects infants via maternal vaccination (Yondola)	72,895	38,842	111,737
K. Empey	NIH	Polymicrobial interactions in the respiratory tract (Jennifer Bomberger)	18,978	10,723	29,701
L. McDermott	NIH	Improved Methods and applications for interactive online virtual screening optimization - Koes	32,085	18,128	50,213

Investigator	Agency	Title	Direct \$	Indirect \$	Total
L. Rohan	JOHNS	Development of Rectal Enema As Microbicide (DREAM)	130,240	73,586	203,826
L. Rohan	Louisville	Griffithsin-based Recta Microbicides for PREvention of Viral EVTry (Prevent)	6,418	3,466	9,884
L. Rohan	MAGEE	Studies to Assess Interactions between Dapivirine and Vaginally Applied Over-the-Counter Products (CRIMP)	521,892	161,067	682,959
L. Rohan	MAGEE	Long Acting Film Technology for Contraception and HIV Prevention (LATCH)	2,225,970	442,719	2,668,689
L. Wang	NIH	Synaptic Resilience to Psychosis in Alzheimer Disease (Sweet)	45,724	22,485	68,209
P. Empey	NIH	All of Us (Reis) - Supplement	24,353	13,759	38,112
P. Empey	NIH	Pharmacokinetics of sedatives - Understanding a modifiable risk factor for pediatric delirium (Michael Bell)	35,772	18,781	54,553
R. Venkataramanan	NIH	Optimization of Drug Dosing in Pregnant Women through Research and Education - OPRC Administrative Core - Caritis	44,441	28,706	73,147
R. Venkataramanan	NIH	Optimization of Drug Dosing in Pregnant Women through research and Education - Impact of Pregnancy on Buprenorphine Pharmacokinetics and Pharmacodynamics-Caritis	12,528	7,078	19,606

Investigator	Agency	Title	Direct \$	Indirect \$	Total
R. Venkataramanan	NIH	Optimization of Drug Dosing in Pregnant Women through research and Education - Basic/Translational Investigations on Buprenorphine- Caritis	123,073	69,536	192,609
R. Venkataramanan	NIH	Pharmacologically-based Strategies for Buprenorphine Treatment During Pregnancy (MWRIF - Caritis)	87,221	49,280	136,501
R. Venkataramanan	NIH	ETCTN PK Resource Laboratory at Pittsburgh (Jan Beumer)	6,354	3,590	9,944
S. Li	NIH	Novel Antimicrobial Agents to Overcome Antibiotic Resistant Pseudomonas and MRSA Respiratory Infection	12,316	6,958	19,274
S. Li	NIH	PROJ 1: Signature-Directed, Sequential Delivery of Radiation Mitigators	12,528	6,765	19,293
S. Li	NIH	Nanotherapeutics for Synergistic Targeting of Myc in Prostate Cancer	222,952	114,719	337,671
S. Li	NIH	Developing Nano Technology for HER2 Directed Therapy	79,777	43,877	123,654
S. Li	NIH	Immunostimulatory Nanocarrier for Breast Cancer Immunotherapy	281,783	159,207	440,990
S. Li	NIH	Determinants and Mechanisms of Efficacy of Peptide Antibiotics as Novel Sepsis Therapy (E&OH: Dr. Deslouches)	9,706	5,484	15,190
S. Poloyac	NIH	20-HETE Formation Inhibitors in Cardiac Arrest	250,000	119,304	369,304
S. Poloyac	NIH	CORE F: Signature-Directed, Sequential Delivery of	39,887	21,539	61,426

Investigator	Agency	Title	Direct \$	Indirect \$	Total
S. Poloyac	NIH	Melatonin Biosynthesis in Neuronal Mitochondria	2,453	1,386	3,839
S. Poloyac	NIH	Small Molecule Biomarker Core: TSQ Altis LC-MS/MS	429,410	-	429,410
S. Sant	NIH	Three-dimensional organoid models to study breast cancer progression	271,134	160,737	431,871
T. Nolin	NIH	PopulATIOn health management to OPTimize Care in CKD (PANOPTIC-CKD) (Abdel-Kader) (Jhamb)	72,843	41,156	113,999
T. Nolin	NIH	Mechanisms of Neutrophil Dysfunction in Antifungal Immunity (Biswas)	27,512	15,544	43,056
W. Xie	NIH	PXR-Mediated Xenobiotic Response in the Pathogenesis Hemorrhagic Shock	202,500	114,412	316,912
W. Xie	NIH	Role of the ADAR1-mediated RNA editing / RNA sensing axis in sterile inflammation	12,734	7,195	19,929
W. Xie	NIH	Xenobiotic Receptors in Mediating hte Enviromental Effects on Human Diseases and Morbidity	582,962	286,453	869,415
X. Ma	NIH	Pharmacoenhancers for antiretroviral therapy: safety and future development	226,547	128,000	354,547
Total			1,396,232	753,497	2,149,729

FY19 Federal Other Funding

Investigator	Agency	Title	Direct \$	Indirect \$	Total
D. Huryh	DOD	Optimizing Small Molecule Therapeutics for Diabetic Kidney Disease and Acute Kidney Injury - Hukriede	210,197	117,010	327,207
D. Huryh	Leidos	University of Pittsburgh Chemical Diversity Center	503,047	284,222	787,269
J. Pringle	SAMHSA	ARTEMIS: AHN Researching Treatment Effectiveness and Medical Integration Through SBIRT (Allegheny-Singer / Johnjulio)	159,849	90,314	250,163
J. Pringle	SAMHSA	Cambria SBIRT Champions Training	19,059	5,718	24,777
J. Pringle	CDC	CDC Overdose to Action (Gateway Health)	42,308	12,692	55,000
J. Pringle	DOJ	COAP: Comprehensive Opioid Abuse Program - PA Statewide / (US Dept of Justice -PCCD)	845,403	253,621	1,099,024
J. Pringle	DOJ	COAP: Comprehensive Opioid Abuse Program - Wyoming County, PA / (US Dept of Justice)	74,481	22,344	96,825
J. Pringle	DOJ	COAP: Comprehensive Opioid Abuse Program / (US Dept of Justice - YORK COUNTY)	134,714	40,414	175,128
J. Pringle	DOJ	COAP: Comprehensive Opioid Abuse Program / (US Dept of Justice -LACKAWANNA COUNTY) PI: Rosencrance	134,714	40,414	175,128
J. Pringle	HRSA	Collaboration of Rural Agencies for Reduction of Opioid Related Overdoses	31,949	18,051	50,000
J. Pringle	SAMSHA	Commonwealth Opioid Medical MAT Training Program (COMMIT)- Washington County, PA	417,675	96,203	513,878

Investigator	Agency	Title	Direct \$	Indirect \$	Total
J. Pringle	SAMHSA	DATA Waiver Training for Medical Students (Douaihy)	68,145	5,452	73,597
J. Pringle	PA	Enhancing the Access and Quality of Medication-Assisted Treatment (MAT) for Individuals with Opioid Use Disorder (OUD) in Rural Pennsylvania's Medicaid Primary Care Practices (Cole)	237,965	134,450	372,415
J. Pringle	SAMHSA	First Responder Collaboration with Treatment Services for Overdose Reduction (SCOPE)	178,297	100,738	279,035
J. Pringle	SAMHSA	Growing Evidence Based Prevention in Pennsylvania to Address Opioid Misuse (PSU - Welsh)	6,482	518	7,000
J. Pringle	PA	Pennsylvania Screening, Brief Intervention and Referral to Treatment (PA-SBIRT) (White)	276,665	82,999	359,664
J. Pringle	HRSA	Rural Communities Opioid Response - Implementation (1 GA1RH33551 01 00)	819,354	180,646	1,000,000
J. Pringle	SAMHSA	Strategies for Coordinating Overdose Prevention Efforts (SCOPE): Blair County PA	215,039	56,396	271,435
J. Pringle	SAMHSA	Strategies for Coordinating Overdose Reduction Efforts (SCOPE): PA	2,173,307	626,693	2,800,000
J. Pringle	VA	Suicide Prevention Accelerated Research Construct (SPARC) / Task N0121	1,365,148	634,850	1,999,998
J. Pringle	SAMHSA	Targeted capacity expansion: Medication assisted treatment - prescription drug and opioid addiction	9,112	5,148	14,260
J. Pringle	SAMHSA	Ursuline College Breen School of Nursing MAT Training Integration Program (URSULINE COLLEGE)	81,566	6,525	88,091

Investigator	Agency	Title	Direct \$	Indirect \$	Total
J. Pringle	VA	Veterans Crisis Line (VCL) National Care Coordination and Field operations Health care Initiative to reduce suicide risk among VCL Callers project	307,691	92,307	399,998
L. Rohan	MAGEE	Physiologically-based model of the female reproductive tract	333,812	48,213	382,025
M. Reynolds	SAMHSA	University of Pittsburgh PA Studies MAT Training Program (David Beck)	60,803	4,786	65,589
M. Somma	PAPHARM	State Public Health Actions to Prevent and Control Diabetes, Heart Disease, Obesity and Associated Risk Factors and Promote School Health	25,175	10,825	36,000
Total			5,683,200	1,758,161	7,441,361

FY19 Industry Funding

Investigator	Agency	Title	Direct \$	Indirect \$	Total
J. Beumer	AbbVie	PK Support of: An Early Phase 1 Study of ABT-888 in Combination with Carboplatin and Paclitaxel in Patients with Hepatic or Renal Dysfunction and Solid Tumors	367,349	58,711	426,060
J. Beumer	AbbVie	Phase 1 Study of Veliparib (ABT-888), a PARP Inhibitor, in Combination with Carboplatin and Paclitaxel in Advanced Solid Malignancies	3,096	1,904	5,000
J. Beumer	TriSalus	Pressure-enabled oxaliplatin PK	56,840	3,615	60,455
L. Berenbrok	Premier	The Impact of a Multimedia Educational Campaign on Meningococcal Group B Vaccination Rates in a University Student Population (PREMIER HEALTHCARE)	94,511	-	94,511
Total			367,349	58,711	426,060

FY19 Foundation/Association Funding

Investigator	Agency	Title	Direct \$	Indirect \$	Total
C. Gabriel	PPA	Informing the development of a transitions of care program	600	-	600
D. Yang	ACS	The regulation of cell cycle by long non-coding RNA in breast cancer (ACS)	487,542	97,508	585,050
E. Turco	PPA	Effective coaching strategies for the "Flip the Pharmacy" practice transformation initiative in Pennsylvania community pharmacies.	1,000	-	1,000
I. Hernandez	WHPC	Average Manufacturer Price for 5i Drugs: Impact of Pharmaceutical Benefit Manager Concessions	27,124	2,712	29,836
J. Beumer	SFA	Dissecting DNA damage and repair pathways in leiomyosarcomas: Improving therapy by understanding biology	2,812	312	3,124
J. Pringle	NACDS	Project Lifeline	520,091	78,014	598,105
J. Pringle	Vital	Community Coalition-Based Harm Reduction Activities / Sponsor: Vital Strategies	1,043,478	156,522	1,200,000
S. McGrath	CPF	Community Pharmacy Practice Transformation Flip the Pharmacy	58,547	-	58,547
Total			2,141,194	335,068	2,476,262

FY19 Other Funding

Investigator	Agency	Title	Direct \$	Indirect \$	Total
C. Iasella	UPENN	Microbiome and Host Responses of CLAD in CF patients (Jason Christie)	15,089	1,207	16,296
J. Beumer	Emory	W1212135: Phase 1 study of palbociclib in combination with cisplatin or carboplatin...	63,731	19,119	82,850
J. Beumer	Roswell	Palbociclib PK support for RPCI	2,396	1,354	3,750

Investigator	Agency	Title	Direct \$	Indirect \$	Total
J. Beumer	PA	Tobacco Phase 18 Formula Funds	829,643	86,664	916,307
J. Pringle	PA	Pennsylvania Opioid Overdose Reduction Technical Assistance Center	682,317	136,464	818,781
J. Pringle	PA	PA Centers of Excellence	614,467	73,736	688,203
J. Pringle	PA	DDAP Diversion SCOPE Lackawanna County	50,303	15,091	65,394
J. Pringle	PA	DDAP Diversion SCOPE Schuylkill County	76,289	22,887	99,176
J. Pringle	PA	RAMP Expansion (May-June 2020)	85,238	25,571	110,809
L. Rohan	PA	Prevent COVID	568,131	-	568,131
L. Wang	UPMC	ITTC - Discovering the Protein Signature of Synapse Loss and Cognitive Decline During Aging	6,554	-	6,554
T. Nolin	PA	Evidence-based Policy Research and Programming for the Commonwealth of PA (Everette James)	25,000	-	25,000
Total			18,613	2,792	21,405

RESEARCH RECOGNITION OF FACULTY

Faculty members received various forms of recognition for their accomplishments and their expertise during FY20.

30 faculty members served on scientific journal editorial boards.

13 faculty members served on NIH grant review committees.

Members of Editorial Boards

Faculty Member	Number	Editorial Board
Lucas A. Berenbrok, PharmD, MS, BCACP, CTTS	1	Journal of American Pharmacists Association
Jan H. Beumer, PharmD, PhD, DABT	2	Cancer Chemotherapy and Pharmacology Oncology Research

Faculty Member	Number	Editorial Board
Kim C. Coley, PharmD, FCCP	2	PPA Editorial Board Journal of the American College of Clinical Pharmacy
James Coons, PharmD, FCCP, BCCP	1	Cardiovascular Therapeutics
Sharon E. Connor, PharmD	1	Global Health Research for Research in Social and Administrative Pharmacy – Special Issue
Colleen Culley, PharmD, BCPS	1	Clin-Alert
Zhiwei Feng, PhD	1	Free Energy Calculation: Current Paradigms and Applications for Drug Discovery
Inmaculada Hernandez PharmD, PhD, FACC	1	BMI Cardiovascular Disorders
Donna M. Huryn, PhD	5	Organic Reactions ACS Med Chem Letters Burger's Medicinal Chemistry Cancer Volume Molecular Cancer Therapeutics Reaxys Advisory Board
Paul A. Johnston, PhD	1	Journal of Assays and Drug Development Technologies, Mary Ann Liebert, Inc. publishers
Sandra L. Kane-Gill, PharmD, MS, FCCP, FCCP	5	Journal of Hospital Administration Annals of Pharmacotherapy – Adverse Reactions and Medication Safety Panel Advances in Pharmacoepidemiology and Drug Safety Critical Care Medicine Hospital Pharmacy, Critical Care Column
Levent Kirisci PhD	3	International Journal of Person-Centered Medicine Bipolar Disorder: An International Journal of Psychiatry and Neurosciences Journal of Substance Abuse and Rehabilitation
Song Li, MD, PhD	5	Journal of Gene Medicine Biological Procedure Online American Journal of Cancer Therapy and Pharmacology Journal of Nano Medicine and Application Asian Journal of Pharmaceutical Sciences
Xiaochao Ma, PhD	2	Advances in Pharmacoepidemiology & Drug Safety Journal of Drug Metabolism & Toxicology
Lee A. McDermott, PhD, MBA	1	Journal of Drug Research and Development
Melissa A. Somma McGivney, PharmD, FCCP, FAPhA	2	Innovations in Pharmacy Journal of the American College of Clinical Pharmacy
Thomas D. Nolin, PharmD, PhD	3	American Journal of Kidney Diseases American Journal of Kidney Diseases; 'Research Letters' Clinical Journal of the American Society of Nephrology
Pravan Kumar Patel, MS PhD	1	Pharmaceutics – Special Issue
Lisa Cencia Rohan, PhD	2	Pharmaceutics Guest Editor, MDPI Pharmaceutics
Shilpa Sant, PhD	3	IEEE Transactions on NanoBioScience Nature Publishing Group, Scientific Reports Biomaterials, Frontiers in Molecular Biosciences, Bioengineering and Biotechnology and Materials
Vinayak Sant, PhD	1	Enliven: Biosimilars and Bioavailability
Amy L. Seybert, PharmD, FASHP, FCCP	3	JACCP International Scholarly Research Network Crit Care Pharmacy

Faculty Member	Number	Editorial Board
		Pharmacy
Susan J. Skledar, RPh, MPH, FASHP	1	ASHP Preceptor Competency Assessment Program
Ralph E. Tarter, PhD	5	Drug and Alcohol Dependence Experimental and Clinical Psychopharmacology Clinical Psychology Review Prevention Science International Journal of Person-Centered Medicine
Raman Venkataramanan, PhD	8	American Journal of Analytical Chemistry Therapeutic Drug Monitoring Open Pharmacology Journal Open Current Clinical Pharmacology Open Clinical and Experimental Pharmacology Open Transplantation Open-International Journal of Pharmacokinetics BOAJ Pharmaceutical Sciences
Junmei Wang, PhD	2	Current Computer-Aided Drug Design Bioenergetics
LiRong Wang, PhD	2	Journal of Pharmacy & Pharmaceutics Enliven Archive: Biosimilar and Bioavailability
Wen Xie, MD, PhD	10	Drug Metabolism World Journal of Gastroenterology Drug Metabolism Letters Drug Metabolism Reviews Molecular Endocrinology Drug Metabolism and Disposition Endocrinology Molecular Pharmacology Chinese Medical Journal Acta Pharmaceutica Sinica B (APSB)
Xiang-Qun (Sean) Xie, PhD, EMBA	2	American Association of Pharmaceutical Scientists (AAPS) Journal US FDA Advisory Committee, the United States, the Food and Drug Administration (FDA))
Da Yang, MD, PhD	2	Journal of Gene Medicine Molecular Carcinogenesis

Faculty Participation in NIH Review Committees and Panels

Faculty Member	Department	No. of Panels
Jan H. Beumer, PharmD, PhD, DABT	Pharmaceutical Sciences	1
Kerry Empey, PharmD, PhD	Pharmacy and Therapeutics	1
Philip E. Empey, PharmD, PhD	Pharmacy and Therapeutics	1
Donna M. Huryn, PhD	Pharmaceutical Sciences	1
Levent Kirisci, PhD	Pharmaceutical Sciences	1

Song Li, MD, PhD	Pharmaceutical Sciences	3
Xiaochao Ma, PhD	Pharmaceutical Sciences	1
Lee A. McDermott, PhD, MBA	Pharmaceutical Sciences	1
Samuel M. Poloyac, PharmD, PhD	Pharmaceutical Sciences	1
Lisa Cencia Rohan, PhD	Pharmaceutical Sciences	1
Shilpa Sant, PhD	Pharmaceutical Sciences	3
Wen Xie, MD, PhD	Pharmaceutical Sciences	1
Xiang-Qun (Sean) Xie, PhD, EMBA	Pharmaceutical Sciences	2

School of Pharmacy Publications in Peer-Reviewed Journals

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