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!

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.

PHARMD 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.

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

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.
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

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<th>SilverScripts Spring FY20</th>
<th>P1/P2 Students</th>
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<tr>
<td>Comprehensive Medication Reviews</td>
<td>391</td>
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<tr>
<td>Targeted Medication Reviews</td>
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<tr>
<td>Blood Pressure Assessments</td>
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<tr>
<td>Referrals to Other Health Care Providers</td>
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<tr>
<td>Total Unique Encounters</td>
<td>391</td>
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<tr>
<td>Total Unique Senior Centers</td>
<td>13</td>
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**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

<table>
<thead>
<tr>
<th>Patient interactions</th>
<th>26,458</th>
</tr>
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<tbody>
<tr>
<td>Patients ≥ 65 years of age</td>
<td>9,761</td>
</tr>
<tr>
<td>Diverse population patients</td>
<td>7,150</td>
</tr>
<tr>
<td>Drug therapy problems identified</td>
<td>15,437</td>
</tr>
<tr>
<td>Drug therapy recommendations</td>
<td>11,642</td>
</tr>
<tr>
<td>Adverse drug events identified</td>
<td>1511</td>
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Disease states of focus (patients may have ≥ 1)

- Cardiovascular: 24,470
- Endocrine (ex. diabetes): 8805
- 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

- Acute Care: 24.4%
- Hospital: 23.5%
- Community: 24.0%
- Ambulatory: 12.5%
- Elective: 15.3%
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](image)

![PCAT Composite Score](image)

![SAT Scores of P1 Students As Freshmen: Early Assurance](image)
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

<table>
<thead>
<tr>
<th>Fall Term</th>
<th>Residency Status</th>
<th>Early Assurance</th>
<th>Application Pathway*</th>
<th>Students with 4-Year Degree (% of class)</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>PA (%)</td>
<td>Non-PA (%)</td>
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<td>2015</td>
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<th>Year</th>
<th>Degree %</th>
<th>Non-Degree %</th>
<th>Students (#)</th>
<th>Degree %</th>
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<td>27</td>
<td>62</td>
<td>44</td>
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*Total across Applications Pathway sums to the total students enrolled

P1 Students: Previous Degree

P1 Students: In State/Out of State

Scholarship Awards from PittPharmacy

$615.9
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

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<th>Category</th>
<th>Percent</th>
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<td>Other/Lost To Follow-Up</td>
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<td>Residency/Fellowship</td>
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<td>Graduate Ed</td>
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Comparison of NAPLEX Pass Rates: First-Time Candidates

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<th>National Pass Rate (%)</th>
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<tr>
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<td>88.5</td>
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* Includes all data available from NABP as of 9-30-2020
### Comparison Multistate Pharmacy Jurisprudence Examination® (MPJE®) Results:

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<th>Pitt Pass Rate (%)</th>
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<tr>
<td>2009</td>
<td>77/77</td>
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<td>92.1</td>
</tr>
</tbody>
</table>

* 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.


- 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 Feeney, 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 of 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
- pharmaceutics 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

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<th>Source</th>
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<th>FY15</th>
<th>FY16</th>
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ENGAGE in RESEARCH of IMPACT| 2019–2020  | 1
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 Zhuoya Wan
Xinan Cai Jingyuan Wang
Yuqiang Chen Xiaofei Wang
Keito Hoshitsuki Yifei Wang
Haozhe Huang Yue Wang
Sihan Li Gregory Young
Apurva Pardeshi Bei Zhang
Hung-Chun Tung Zigian Zhang

Visiting Scholars
Bo Liang Pengfei Ren
Jianhua Li Chaogang Wei
Jing Li Yue Xi

Significant Research Results
- Dr. Xie’s lab identified the long non-coding RNA ERINA (estrogen inducible IncRNA) as an estrogen responsive oncogenic IncRNA, 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 TNFa inhibitor immunotoxicity, suggesting that 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


**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

**Innovations**

- A novel therapy for Erythropoietic Protoporphyria (EPP) and X-Linked Protoporphyria (XLP) (PCT/US20/33746) (Ma’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
Kerry M. Empey
Philip E. Empey
Thomas D. Nolin

Samuel Poloyac, Director
Lisa Rohan
Raman Venkataramanan

Graduate Students
Jonathan Birabaharan
Morgan Casal
Karryn Crisamore
Josh Deppas
Yoko Franchetti

Graduate Students
Jessica Kosanovich
Madeline Kreider
Madeline Lipp
Lingjue Li
Chenxiao Tang

Kerry M. Empey
Philip E. Empey
Raman Venkataramanan

Graduate Students
Lisa Rohan
Raman Venkataramanan

Graduate Students
Fellows/Post-Docs
Jonathan Birabaharan
Morgan Casal
Karryn Crisamore
Josh Deppas
Yoko Franchetti

Fellows/Post-Docs
Jessica Kosanovich
Katharine Eichinger
Madeline Kreider
Melanie Weltman
Madeline Lipp
Firuz Feturi
Lingjue Li
Imam Shaik
Chenxiao Tang
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

  - Invited chapter of a leading textbook for medical education.
  - 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.
  - 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.
  - Describes important changes in metabolism of a commonly used drug during pregnancy.
Significant Invited Presentations


Significant Grants


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

- 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*

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**COMMUNITY LEADERSHIP AND INNOVATION IN PHARMACY (CLIP) CENTER**

**Faculty**
- Lucas Berenbrok
- Kim C. Coley
- Sharon Connor
- Scott Drab
- Philip Empey
- Victoria Grieve
- Deanne Hall

- Inmaculada Hernandez
- Lauren Jonkman
- Melissa S. McGivney, Director
- Karen Pater
- Catherine Rebitch
- Christine Ruby-Scelsi

**Staff**
- Brandon Antinopoulos
- Natalie Capozzolo
- Joni Carroll

- Renee Fry
- Stephanie McGrath
- Ravi Patel

**Fellows**
- Sophia Cothrel Herbert
- Ryley Uber

**Residents**
- Precious Dadzie
- Kayla Davis
- Carly Gabriel

- Kelsey Hake
- Jennifer Ko
- 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 vacations** 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:

Significant Invited Presentations:
- 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)

**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
Changrui Xing
Yuemin Bian
Yankang Jing
Ziheng Hu
Jacob Cuyler
Beihong Ji
Peihao Fan
Shuhan Liu
Yuchen Sun
Siyi Wang
Mingzhe Shen
Tianjian Liang
Xiguang Qi
Xiaojing Guo
Yuzhao Zhang
Jingchen Zhai
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 Aβ oligomerization
  • Rat model of AD - Computational systems pharmacology analysis & Experimental validation
  • Simulation study of Amyloid-β42 Aggregate Formation
  • All-atom molecular mechanics force fields – effects on amyloid peptide assembly

Representative Publications


**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), 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**.

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/Gi 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:**

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<td>Number of Patients Referrals to Treatment</td>
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</table>
Representative Publications:

  
  - 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.


Significant Invited Presentations:


**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
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

  - This landmark paper details the preeminent precision medicine program in the US.
  - Expert Q&A interview on the design of Pitt’s Pharmacogenomics Center of Excellence.
  - An evaluation of the successful efforts of NHGRI to expand genomics through network inclusion.
  - Demonstrates the effectiveness of our Test2Learn teaching model in diverse populations.
  o Disseminates strategies for the effective implementation of CYP2D6 pharmacogenomic testing.

Invited Significant National/International Presentations

- “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
- “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

- 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)**
Prithivirajan 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 pharmaceutics 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 Pharmaceutics 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


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. Patel presented an on-demand talk at CRS Annual Meeting, 2020, Virtual, entitled: “Reproducible Dissolution Methods for Microparticles Administered Locally in the Periodontal Pocket.”


- 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**


**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 constituter 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**


**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

- Augmented reality has applications for education and practice across multiple settings

- User-centered design can improve between aspiring researchers and potential mentors

Significant Invited Presentations


Significant grants

- University of Pittsburgh, Principal Investigator
  - Open Education Funding Award, Office of the Provost $5,000
  - Oceans of Data Science, Distributary Pharmacy Application 2019-2020

- University of Pittsburgh Co-Investigator
  - 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
  o 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).
  o 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.
  o 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.
  o Rapid deployment of telemedicine in thoracic transplant clinics during COVID-19 pandemic to conduct evaluations and consultative pharmacy services.
  o 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:**
  - Connor SE. Smoking Cessation Smoke in the Mirrors: The Continuing Problem.

**Significant Invited Presentations:**

**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
  - The area of concentration-pharmacoeanalytics (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.
  - 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).
  - 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.
• **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.


**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.


**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.


**Patient and Medication Safety**

**Faculty**

Sandra Kane-Gill
Margaret Verrico

Fellows
Emily Schartner

Patient Care
- 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
  - 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.
  o 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

  - Identified pharmacogenomics educational needs of community pharmacists.
  - Advances a new stakeholder engagement model to accelerate clinical pharmacogenomics.
  - 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 annedtally, 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 medications and the need for improved care coordination.
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:**


**Significant Invited Presentations:**

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
  - 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.
  - 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.

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

- 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/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.

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

**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:**


• 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:


- 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.


- 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**

**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

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

- 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.

  - 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.

  - 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**


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

**Significant Grants**

**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**, Ferdock A, Skef S. Does Dexamethasone Improve Outcomes in Adults with Bacterial Meningitis? REF #EMS3409 *Family Physicians Inquiries Network*.


- 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.


**Significant Invited Presentations:**


- 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.
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**

<table>
<thead>
<tr>
<th>Source</th>
<th>Amount</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Alumni</td>
<td>$492,261</td>
<td>24%</td>
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<tr>
<td>Foundations</td>
<td>$296,670</td>
<td>14%</td>
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<tr>
<td>Corporations</td>
<td>$891,455</td>
<td>43%</td>
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<tr>
<td>Organizations</td>
<td>$290,871</td>
<td>14%</td>
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<tr>
<td>Friends</td>
<td>$78,244</td>
<td>4%</td>
</tr>
</tbody>
</table>

**Annual Donors-FY20**

[Graph showing annual donors for each fiscal year]
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.
In the Department of Pharmaceutical Sciences, the following faculty were promoted and/or appointed:
  o Da Yang, MD, PhD to associate professor with tenure
  o Sravan Kumar Patel, MS, PhD to assistant professor
  o Jingjing Sun, PhD to research instructor
  o Imam Hussain Shaik, PhD to research instructor

• Faculty who left the University of Pittsburgh (fall 2020)
  o 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:
  o Victoria Luna Brennan Grieve, PharmD promoted to assistant professor
  o Kerry M. Empey, PharmD, PhD to associate professor with tenure
  o Philip Empey, PharmD, PhD to associate professor with tenure

• New faculty members were hired into the department:
  o Poonam Alaigh, MD, MS, Research Professor
  o Alexis Gaggini, PharmD, Assistant Professor
  o Catherine Rebitch, PharmD, Associate Professor
  o John Riley, MBA, Assistant Professor
  o Kangho Suh, PharmD, PhD, Assistant Professor
  o Ying Xue, MS, PhD, Assistant Professor

### Full-Time Faculty Rank by Department of Primary Appointment*

<table>
<thead>
<tr>
<th>Faculty Rank</th>
<th>Pharmaceutical Sciences</th>
<th>Pharmacy and Therapeutics</th>
<th>Total for School of Pharmacy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professor</td>
<td>11</td>
<td>7</td>
<td>18</td>
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<tr>
<td>Associate Professor</td>
<td>6</td>
<td>18</td>
<td>24</td>
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<tr>
<td>Assistant Professor</td>
<td>8</td>
<td>17</td>
<td>25</td>
</tr>
<tr>
<td>Instructor</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
</tbody>
</table>

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*Faculty Rank

**Full-Time Faculty Members**

![Bar chart showing Full-Time Faculty Members from fiscal year 2010 to 2020 with a peak of 72 in 2020.](chart.png)
In FY20, School of Pharmacy faculty members earned a total of 16 major awards.

### FY20: Faculty Awards, Honors, and Recognitions

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

<table>
<thead>
<tr>
<th>Name</th>
<th>Fellowship</th>
<th>Department</th>
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<tr>
<td>Kim Coley</td>
<td>ACCP</td>
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<td>Patricia Kroboth</td>
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<td>AAAS</td>
<td>American Association for Advancement of Science</td>
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<td>Melissa Somma McGivney</td>
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<td>Susan Meyer</td>
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<td>Thomas Nolin</td>
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<td>Samuel Poloyac</td>
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<td>Name</td>
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<td>Amy Seybert</td>
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**FY20: Faculty Board Certifications**

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<td></td>
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<td>Pharmaceutical Sciences</td>
</tr>
<tr>
<td>Name</td>
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<td>Department</td>
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<tr>
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</tr>
<tr>
<td>Melissa Somma McGivney</td>
<td>APhA</td>
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<tr>
<td></td>
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<tr>
<td></td>
<td>ACC</td>
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<tr>
<td>Susan Meyer</td>
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</tr>
<tr>
<td>Thomas Nolin</td>
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</tr>
<tr>
<td></td>
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<tr>
<td></td>
<td>ASN</td>
<td>American Society of Nephrology</td>
</tr>
<tr>
<td>Samuel Poloyac</td>
<td>AACP</td>
<td>American Association of Colleges of Pharmacy – Academic Leadership Fellow</td>
</tr>
<tr>
<td></td>
<td>ACCM</td>
<td>American College of Critical Care Medicine</td>
</tr>
<tr>
<td>Christine Ruby-Scelsi</td>
<td>ASCP</td>
<td>American Society of Consultant Pharmacists</td>
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<td>Amy Seybert</td>
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<tr>
<td>Susan Skledar</td>
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<td>Randall Smith</td>
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<td>Raman Venkataramanan</td>
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</tr>
<tr>
<td></td>
<td>ACCP</td>
<td>American College of Clinical Pharmacology</td>
</tr>
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</table>
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

<table>
<thead>
<tr>
<th>Social Media Outlet</th>
<th>Creation Date</th>
<th>Members/ Followers as of 6/5/16</th>
<th>Members/ Followers as of 5/27/17</th>
<th>Members/ Followers as of 5/21/18</th>
<th>Members/ Followers as of 5/18/20</th>
<th>Increase FY18 to FY20</th>
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</thead>
<tbody>
<tr>
<td>Facebook</td>
<td>Feb, 2010</td>
<td>1,498</td>
<td>1,948</td>
<td>2,080</td>
<td>2,693</td>
<td>29.47%</td>
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<td>Twitter</td>
<td>May 2009</td>
<td>722</td>
<td>1,319</td>
<td>1,513</td>
<td>1,930</td>
<td>27.56%</td>
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<tr>
<td>LinkedIn Group</td>
<td>Sep 2012</td>
<td>360</td>
<td>474</td>
<td>476</td>
<td>485</td>
<td>1.89%</td>
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<tr>
<td>Instagram</td>
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<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>1,406</td>
<td>N/A*</td>
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COVID-19 Social Media Campaign 2020 (March-June)

<table>
<thead>
<tr>
<th>Social Media Outlet</th>
<th>Number of Posts</th>
<th>Clicks (Photos, links, videos)</th>
<th>Followers</th>
<th>Engagement</th>
<th>Awareness, Mentions, Shares</th>
<th>Impressions/Interactions</th>
</tr>
</thead>
<tbody>
<tr>
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<td>6,182</td>
<td>2,496</td>
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<td>525</td>
<td>336,206</td>
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<td>Twitter</td>
<td>65</td>
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<td>293</td>
<td>132</td>
<td>175</td>
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<td>LinkedIn Group</td>
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<td>Instagram</td>
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<td>N/A</td>
<td>1,409</td>
<td>5,700</td>
<td>28</td>
<td>12,607</td>
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</table>

Pitt Pharmacy FY20

<table>
<thead>
<tr>
<th>Social Media Outlet</th>
<th>New Followers</th>
<th>Total number of Engagement</th>
<th>Number of Posts</th>
<th>Number of Impressions/Interactions</th>
<th>Awareness, Mentions, Shares</th>
<th>Clicks (Photos, links, videos)</th>
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</thead>
<tbody>
<tr>
<td>Facebook</td>
<td>231</td>
<td>17,408</td>
<td>253</td>
<td>656,144</td>
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<td>Twitter</td>
<td>217</td>
<td>900</td>
<td>181</td>
<td>440</td>
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<tr>
<td>LinkedIn Group</td>
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<td>N/A</td>
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<tr>
<td>Instagram</td>
<td>471</td>
<td>14,556</td>
<td>196</td>
<td>31,028</td>
<td>97</td>
<td>N/A</td>
</tr>
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</table>
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.

**Proportion of International Agreements**

**FY20**

<table>
<thead>
<tr>
<th>MOUs for Inter-Institutional Exchange</th>
<th>Affiliation Agreements for Student Rotations</th>
</tr>
</thead>
<tbody>
<tr>
<td>68%</td>
<td>32%</td>
</tr>
</tbody>
</table>

**FY20: Agreements with International Organizations**

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

*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-direct 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**

<table>
<thead>
<tr>
<th>Year</th>
<th>Canada</th>
<th>Other</th>
<th>Namibia</th>
<th>Philippines</th>
<th>China</th>
<th>Malawi</th>
<th>London</th>
<th>Australia</th>
<th>Dublin</th>
<th>Palermo</th>
<th>Honduras</th>
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**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

<table>
<thead>
<tr>
<th>Name</th>
<th>Home Institution</th>
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<tbody>
<tr>
<td>Vaishali Aggarwal, PhD</td>
<td>Postgraduate Institute of Medical Education and Research, India</td>
<td>Dr. Shilpa Sant</td>
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<tr>
<td>Yiling Chen</td>
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<td>Dr. Raman Venkataramanan</td>
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<td>Chen Du</td>
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<td>Mayuri Dutta</td>
<td>Guru Gobind Singh Indiapurastha University (GGSIIPU)</td>
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<td>Betul Er</td>
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<td>An Zhou</td>
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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 session 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 surround 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

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<tr>
<th>American Society of Health-System Pharmacists Midyear Clinical Meeting</th>
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<tr>
<td><strong>Primary Author</strong></td>
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<tr>
<td>Dana Abraham (P3)</td>
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<tr>
<td>Hannah Akerberg (P4)</td>
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<tr>
<td>Emilee Baker (P3)</td>
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<tr>
<td>Jessica Cercone (P4)</td>
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<td>Jarad Ickes (P4)</td>
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<tr>
<td>Megan Karuzie (P4)</td>
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<td>Emily Kistler (P4)</td>
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<td>Polina Langer (P4)</td>
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<td>Diana Mansour (P4)</td>
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</table>
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 Stottlemyer (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)  RxPlore Professional Pharmacy Camp: A student pharmacist developed and implemented summer camp

Melanie Umbaugh (P3)  DaFonso Davage (P3)

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
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<td>Domenick Francis (P4)</td>
<td>Identifying candidate formulas for USP compounded preparation monographs (CPMs) from the ASHP list of drug shortages</td>
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<tr>
<td>Keely Gambler (P4)</td>
<td>Do falls bring palliative care patients back to the hospital? A retrospective analysis</td>
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<td>Kiana Green (P4)</td>
<td>Evaluation of the safety of direct oral anticoagulants and warfarin in lung transplant recipients</td>
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<td>Melanie Hawn (P4)</td>
<td>Initial discharge disposition in relationship to medication related 30 day readmissions in palliative care patients</td>
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<td>Jessica Hu (P4)</td>
<td>Comparative effectiveness of direct oral anticoagulants (DOACs) and warfarin use in atrial fibrillation and atrial flutter</td>
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<td>Jenna Ingram (P4)</td>
<td>Assessing patient perspectives of unnecessary emergency department visits: a quality improvement initiative</td>
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<td>Alyssa Lear (P4)</td>
<td>Appropriate continuation of home medications during transitions of care from the medical intensive care unit</td>
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<td>Madison McConnell (P4)</td>
<td>The safety of warfarin vs DOACs in lung transplant patients</td>
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<td>Mitchell Mirabile (P4)</td>
<td>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</td>
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<td>Emily Novak (P4)</td>
<td>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</td>
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<td>Shivani Sampathkumar (P4)</td>
<td>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</td>
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<td>Drug interactions in high acuity pediatric patients</td>
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<td>Erin Wasylnson (P4)</td>
<td>The Relationship Between Medication Changes During Index Admissions and the Incidence of 30-Day Readmissions in a Palliative Care Population</td>
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<tr>
<td>Abbey White (P3)</td>
<td>Assessing the need for pharmacist intervention of hypertension management at an outpatient family medicine clinic</td>
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**American Pharmacists Association Annual Meeting**

<table>
<thead>
<tr>
<th>Primary Author</th>
<th>Poster Title</th>
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</thead>
<tbody>
<tr>
<td>Saxon Hartman (P3)</td>
<td>Implementation of a baseline community pharmacy practice assessment tool for the Pennsylvania Flip the Pharmacy (FIP)</td>
</tr>
<tr>
<td>Nick Pandelaras (P3)</td>
<td>Patient opinions on participating in research through a community pharmacy practice-based research network</td>
</tr>
<tr>
<td>Emily Hughes (P3)</td>
<td>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</td>
</tr>
<tr>
<td>Christian Rosikiewicz (P3)</td>
<td>Evaluation of Brief Messages to Inform a Meningococcal Group B Vaccine Multimedia Educational Campaign on a University Campus</td>
</tr>
<tr>
<td>Hailey Mook (P3)</td>
<td>Using a performance dashboard to facilitate practice transformation in Pennsylvania community pharmacies</td>
</tr>
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</table>
Academia-CPESN Transformation (ACT) Pharmacy Collaborative: Evaluating Value and Impact of the National Day of Service

* Denotes Non-Student Contributors

### Pennsylvania Pharmacists Association Mid-Year Conference

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

<table>
<thead>
<tr>
<th>Student</th>
<th>Award</th>
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<tbody>
<tr>
<td>David Katz (P3)</td>
<td>Selected for the Pennsylvania Pharmacists Association Student CE Platform at the PPA Annual Conference- “Cannabis in the Pharmacy”</td>
</tr>
<tr>
<td>Melanie Umbaugh (P3)</td>
<td>Kappa Psi Foundation Scholarships – High Academic and Professional Achievement,</td>
</tr>
<tr>
<td>Vincent Knecht (P2)</td>
<td></td>
</tr>
<tr>
<td>Ashley Yao (P3)</td>
<td>National Patient Care Project Award – American Pharmacists Association Academy of Student Pharmacists – For exemplary commitment to patient care, education and community outreach</td>
</tr>
<tr>
<td>Caroline Baldwin (P3)</td>
<td></td>
</tr>
<tr>
<td>Brittnay Stofflemeyer (P3)</td>
<td></td>
</tr>
<tr>
<td>Thomas Le (P3)</td>
<td></td>
</tr>
<tr>
<td>Kathy Monangai (P4)</td>
<td>Elected as the National Vice President of the Student National Pharmaceutical Association</td>
</tr>
<tr>
<td>Name</td>
<td>Details</td>
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</tr>
<tr>
<td>Brooke Kulusich (P2)</td>
<td>Carl F. Emswiller Summer Intern in Association Management through the American Pharmacist Association</td>
</tr>
<tr>
<td>Ravi Desai (P3)</td>
<td>Published in Journal of the American Medical Association- Varenicline and Nicotine Replacement Use Associated With the US Food and Drug Safety Communications</td>
</tr>
<tr>
<td>Mohamed Kashkoush (P3)</td>
<td>First Place Winners of the Pharmacy Quality Alliance Healthcare Quality Innovation Challenge</td>
</tr>
<tr>
<td>Ravi Desai (P3)</td>
<td>American Society of Consultant Pharmacists Poster Presentation – Antibiotic – Related 30-Day Rehospitalizations in Palliative Care Patients</td>
</tr>
<tr>
<td>Abigail Kois (P4)</td>
<td>Panthers Forward Scholarship</td>
</tr>
<tr>
<td>Nicole Farrah (P4)</td>
<td>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</td>
</tr>
<tr>
<td>Holly Graber (P3)</td>
<td>Achieving Independence Competition – Pennsylvania Pharmacist Association</td>
</tr>
<tr>
<td>Alan Yee (P2)</td>
<td>American College of Clinical Pharmacy (ACCP) Clinical Research Finalist</td>
</tr>
<tr>
<td>Hailey Mook (P3)</td>
<td>“Script Your Future” – Medication Adherence Team Challenge - American Pharmacist Association Winners – Team Leaders</td>
</tr>
<tr>
<td>Aarti Zaver (P2)</td>
<td>American College of Clinical Pharmacy National Meeting Presentation</td>
</tr>
<tr>
<td>Kenneth Richardson (P2)</td>
<td>CVS Health Minority Scholarship</td>
</tr>
<tr>
<td>Haley Fribance (P3)</td>
<td>American Pharmacist Association Awards Generation Rx Region 2 Award Operation Heart National Award OTC Medicine Safety Region 2 Award</td>
</tr>
<tr>
<td>Nicole Hume (P4)</td>
<td>ACCO 2021 - National Student Network Advisory Committee</td>
</tr>
<tr>
<td>Andrew Haddad (P4)</td>
<td>American College of Clinical Pharmacy - Clinical Pharmacy Challenge Finalists (ACCP)</td>
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</table>
# Student Awards at Graduation

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

## RESIDENCY PROGRAM: EDUCATING THE NEXT GENERATION OF PRACTITIONERS

<table>
<thead>
<tr>
<th>Last Name</th>
<th>First Name</th>
<th>Pitt Residency Program</th>
<th>Year</th>
<th>PharmD School</th>
<th>Plans for FY20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schoenle</td>
<td>Marilyn</td>
<td>Ambulatory Care Family Medicine Track UPMC Presbyterian</td>
<td>PGY2</td>
<td>Butler University</td>
<td>Ambulatory/Managed care Clinical Pharmacist, Devoted Health, Houston, TX</td>
</tr>
<tr>
<td>Ko</td>
<td>Jennifer</td>
<td>Ambulatory Care Global Health Track</td>
<td>PGY2</td>
<td>University at Buffalo</td>
<td>Assistant Professor, Marshal B. Ketchum University, Fullerton, CA</td>
</tr>
<tr>
<td>Last Name</td>
<td>First Name</td>
<td>Pitt Residency Program</td>
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<td>PharmD School</td>
<td>Plans for FY20</td>
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</tr>
<tr>
<td>Dadzie</td>
<td>Precious</td>
<td>Ambulatory Care Traditional Track UPMC Presbyterian</td>
<td>PGY2</td>
<td>Virginia Commonwealth University</td>
<td>Ambulatory Care Clinical Pharmacist, MedStar Union Memorial Hospital, Baltimore, MD</td>
</tr>
<tr>
<td>Davis</td>
<td>Kayla</td>
<td>Ambulatory Care Traditional Track UPMC Presbyterian</td>
<td>PGY2</td>
<td>Albany College of Pharmacy and Health Sciences</td>
<td></td>
</tr>
<tr>
<td>Cardinal</td>
<td>Rachael</td>
<td>Ambulatory Care UPMC St. Margaret</td>
<td>PGY2</td>
<td>University at Buffalo</td>
<td>Inpatient Staffing Pharmacist, UPMC St. Margaret, Pittsburgh, PA</td>
</tr>
<tr>
<td>Williams</td>
<td>Anne</td>
<td>Ambulatory Care UPMC St. Margaret</td>
<td>PGY2</td>
<td>University of Maryland</td>
<td>Clinical Ambulatory Care Specialist, Frederick Health Hospital, Frederick, MD</td>
</tr>
<tr>
<td>Wissman</td>
<td>Kevin</td>
<td>Ambulatory Care UPMC St. Margaret</td>
<td>PGY2</td>
<td>University of Kansas</td>
<td>Clinical Assistant Professor, Kansas University, Wichita, KS</td>
</tr>
<tr>
<td>Colvin</td>
<td>Bailey</td>
<td>Cardiology UPMC Presbyterian</td>
<td>PGY2</td>
<td>University of the Sciences in Philadelphia</td>
<td>Clinical Pharmacy Specialist in Advanced Heart Failure, WVU Medicine, Morgantown, WV</td>
</tr>
<tr>
<td>Turco</td>
<td>Evan</td>
<td>Community Asti’s Pharmacy</td>
<td>PGY1</td>
<td>West Virginia University</td>
<td>Lead Pharmacist-Patient Care Service Development, Moundsville Pharmacy, Moundsville, WV</td>
</tr>
<tr>
<td>Gabriel</td>
<td>Carly</td>
<td>Community Giant Eagle Pharmacy</td>
<td>PGY1</td>
<td>University of Pittsburgh</td>
<td>PGY2 Ambulatory Care Family Medicine Track, UPMC Presbyterian, Pittsburgh, PA</td>
</tr>
<tr>
<td>Hake</td>
<td>Kelsey</td>
<td>Community Rite Aid Pharmacy</td>
<td>PGY1</td>
<td>University of Pittsburgh</td>
<td>Community Pharmacy Practice Development and Research Fellow, University of Pittsburgh, Pittsburgh, PA</td>
</tr>
<tr>
<td>Chiappelli</td>
<td>Abby</td>
<td>Critical Care UPMC Presbyterian</td>
<td>PGY2</td>
<td>University of Pittsburgh</td>
<td>Unit Based Critical Care Pharmacist, UPMC Presbyterian, Pittsburgh, PA</td>
</tr>
<tr>
<td>Panjwani</td>
<td>Sehrish</td>
<td>Geriatrics UPMC St Margaret</td>
<td>PGY2</td>
<td>Texas Tech University Health Sciences Center</td>
<td>Population Health Pharmacist, Highmark, Pittsburgh, PA</td>
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<tr>
<td>Last Name</td>
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<td>Raghavan</td>
<td>Archana</td>
<td>Geriatrics UPMC St Margaret</td>
<td>PGY2</td>
<td>Virginia Commonwealth University</td>
<td>Clinical Pharmacy Specialist in Anticoagulation, Sacramento VA Medical Center, Sacramento, CA</td>
</tr>
<tr>
<td>Fawzy</td>
<td>John</td>
<td>Health System Pharmacy Administration and Leadership UPMC Presbyterian</td>
<td>PGY1-2</td>
<td>Long Island University - Arnold and Marie Schwartz College of Pharmacy</td>
<td>Post-Doctoral Fellow, Pharmacy Automation and Data Analytics, Omnicell, Pittsburgh, PA</td>
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<tr>
<td>Hylwa</td>
<td>Keith</td>
<td>Health System Pharmacy Administration and Leadership UPMC Presbyterian</td>
<td>PGY1-2</td>
<td>Albany College of Pharmacy and Health Sciences</td>
<td>Lead Pharmacist, Neurology, Trauma, and Cardiology Service Lines, UPMC Presbyterian, Pittsburgh, PA</td>
</tr>
<tr>
<td>Postlewaite</td>
<td>Madison</td>
<td>Health System Pharmacy Administration and Leadership UPMC Presbyterian</td>
<td>PGY1-2</td>
<td>West Virginia University</td>
<td>PGY2 Health System Pharmacy Administration and Leadership Residency, UPMC Presbyterian, Pittsburgh, PA</td>
</tr>
<tr>
<td>Ray</td>
<td>Lauren</td>
<td>Health System Pharmacy Administration and Leadership UPMC Presbyterian</td>
<td>PGY1-2</td>
<td>West Virginia University</td>
<td>PGY2 Health System Pharmacy Administration and Leadership Residency, UPMC Presbyterian, Pittsburgh, PA</td>
</tr>
<tr>
<td>Mingone</td>
<td>Carley</td>
<td>Managed Care CVS Caremark</td>
<td>PGY1</td>
<td>University of Pittsburgh</td>
<td>Clinical Pharmacist, Utilization Management, CVS Health, Pittsburgh, PA</td>
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<tr>
<td>Niehoff</td>
<td>Kevin</td>
<td>Managed Care CVS Caremark</td>
<td>PGY1</td>
<td>University of Iowa</td>
<td>Managed Care Pharmacist, Milliman, Chicago, IL</td>
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<tr>
<td>Akers</td>
<td>Taylor</td>
<td>Managed Care UPMC Health Plan</td>
<td>PGY1</td>
<td>Duquesne University</td>
<td>Clinical Pharmacy Specialist, UPMC Health Plan, Pittsburgh, PA</td>
</tr>
<tr>
<td>Casem</td>
<td>Kristian</td>
<td>Oncology UPMC Shadyside</td>
<td>PGY2</td>
<td>Rutgers Ernest Mario School of Pharmacy</td>
<td>Clinical Pharmacy Specialist, Medical/General Oncology, Emory University Hospital Midtown, Atlanta, GA</td>
</tr>
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<td>Last Name</td>
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<tr>
<td>Gill</td>
<td>Meghan</td>
<td>Pharmacy UPMC Children’s Hospital</td>
<td>PGY1</td>
<td>Virginia Commonwealth University</td>
<td>PGY2 Pediatric Pharmacy Residency, Virginia Commonwealth University Health System, Richmond, VA</td>
</tr>
<tr>
<td>Bacon</td>
<td>Molly</td>
<td>Pharmacy UPMC Hamot</td>
<td>PGY1</td>
<td>South Carolina College of Pharmacy</td>
<td>PGY2 Pain Management/Palliative Care Residency/Fellowship, Dana-Farber Cancer Institute and Harvard Medical School, Boston, MA</td>
</tr>
<tr>
<td>Jones</td>
<td>Richard</td>
<td>Pharmacy UPMC Hamot</td>
<td>PGY1</td>
<td>University of Pittsburgh</td>
<td>Pharmacist, UPMC Hamot, Erie, PA</td>
</tr>
<tr>
<td>Welch</td>
<td>Joseph</td>
<td>Pharmacy UPMC Hamot</td>
<td>PGY1</td>
<td>Lake Erie College of Osteopathic Medicine (LECOM)</td>
<td>Clinical Pharmacist, Antimicrobial Stewardship, UPMC Hamot, Erie, PA</td>
</tr>
<tr>
<td>Fay</td>
<td>Jennifer</td>
<td>Pharmacy UPMC Magee Womens Hospital</td>
<td>PGY1</td>
<td>Lake Erie College of Osteopathic Medicine (LECOM)</td>
<td>Pharmacist, UPMC Magee Womens Hospital, Pittsburgh, PA</td>
</tr>
<tr>
<td>Halza</td>
<td>Katherine</td>
<td>Pharmacy UPMC McKeesport</td>
<td>PGY1</td>
<td>University of Pittsburgh</td>
<td>PGY2 Ambulatory Care Traditional Track, UPMC Presbyterian, Pittsburgh, PA</td>
</tr>
<tr>
<td>Cain</td>
<td>Alexander</td>
<td>Pharmacy UPMC Mercy</td>
<td>PGY1</td>
<td>St. John Fisher</td>
<td>PGY2 Infectious Diseases Pharmacy Residency, Allegheny General Hospital, Pittsburgh, PA</td>
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<tr>
<td>Callejas</td>
<td>Liam</td>
<td>Pharmacy UPMC Mercy</td>
<td>PGY1</td>
<td>University of Pittsburgh</td>
<td>PGY2 Cardiology Pharmacy Residency, The Johns Hopkins Hospital, Baltimore, MD</td>
</tr>
<tr>
<td>Hand</td>
<td>Sydney</td>
<td>Pharmacy UPMC Mercy</td>
<td>PGY1</td>
<td>Duquesne University</td>
<td>Pharmacist, UPMC Passavant, Pittsburgh, PA</td>
</tr>
<tr>
<td>McAndrew</td>
<td>Ann</td>
<td>Pharmacy UPMC Mercy</td>
<td>PGY1</td>
<td>University of Pittsburgh</td>
<td>Pharmacist, UPMC Mercy, Pittsburgh, PA</td>
</tr>
<tr>
<td>Spencer</td>
<td>Emily</td>
<td>Pharmacy UPMC Mercy</td>
<td>PGY1</td>
<td>The Ohio State University</td>
<td>PGY2 Emergency Medicine Residency, University of Maryland Medical Center, Baltimore, MD</td>
</tr>
<tr>
<td>DiBridge</td>
<td>Julie</td>
<td>Pharmacy (Non-Traditional) UPMC Presbyterian</td>
<td>PGY1</td>
<td>University of Pittsburgh</td>
<td>PGY1 Pharmacy (Non-Traditional), UPMC Presbyterian, Pittsburgh, PA</td>
</tr>
<tr>
<td>Gregory</td>
<td>Jacob</td>
<td>Pharmacy UPMC Presbyterian</td>
<td>PGY1</td>
<td>West Virginia University</td>
<td>Pharmacist, UPMC Presbyterian, Pittsburgh, PA</td>
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<tr>
<td>Hutchins</td>
<td>Aaron</td>
<td>Pharmacy UPMC Presbyterian</td>
<td>PGY1</td>
<td>West Virginia University</td>
<td>PGY2 Solid Organ Transplant Residency, Nebraska Medicine, Omaha, NE</td>
</tr>
<tr>
<td>Levito</td>
<td>Marissa</td>
<td>Pharmacy UPMC Presbyterian</td>
<td>PGY1</td>
<td>Massachusetts College of Pharmacy and Health Science</td>
<td>PGY2 Cardiology Residency, UPMC Presbyterian, Pittsburgh, PA</td>
</tr>
<tr>
<td>Woodworth</td>
<td>Katharine</td>
<td>Pharmacy UPMC Presbyterian</td>
<td>PGY1</td>
<td>University of North Carolina</td>
<td>PGY2 Oncology Pharmacy Residency, UPMC Presbyterian Shadyside, Pittsburgh, PA</td>
</tr>
<tr>
<td>Courtney</td>
<td>Lindsay</td>
<td>Pharmacy UPMC Shadyside</td>
<td>PGY1</td>
<td>University of Colorado</td>
<td>PGY2 Ambulatory Care Family Medicine Residency, University of Colorado Skaggs School of Pharmacy, Aurora, Colorado</td>
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<tr>
<td>Zenilman</td>
<td>Dodi</td>
<td>Pharmacy UPMC Shadyside</td>
<td>PGY1</td>
<td>University of Maryland</td>
<td>PGY2 Ambulatory Care Residency, Veterans Affairs Maryland HealthCare System (VAMHCS), Baltimore, MD</td>
</tr>
<tr>
<td>Chatellier</td>
<td>Kristel</td>
<td>Pharmacy UPMC St. Margaret</td>
<td>PGY1</td>
<td>University of Pittsburgh</td>
<td>PGY2 Geriatrics Pharmacy Residency, UPMC St. Margaret, Pittsburgh, PA</td>
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<tr>
<td>DeMarco</td>
<td>Samantha</td>
<td>Pharmacy UPMC St. Margaret</td>
<td>PGY1</td>
<td>Virginia Commonwealth University</td>
<td>PGY2 Geriatrics Pharmacy Residency, UPMC St. Margaret, Pittsburgh, PA</td>
</tr>
<tr>
<td>Mehta</td>
<td>Amisha</td>
<td>Pharmacy UPMC St. Margaret</td>
<td>PGY1</td>
<td>Ernest Mario School of Pharmacy at Rutgers</td>
<td>PGY2 Ambulatory Care Pharmacy Residency, UPMC St. Margaret, Pittsburgh, PA</td>
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<tr>
<td>Schmitz</td>
<td>Nolan</td>
<td>Pharmacy UPMC St. Margaret</td>
<td>PGY1</td>
<td>University of Kansas</td>
<td>PGY2 Ambulatory Care Pharmacy Residency, UPMC St. Margaret, Pittsburgh, PA</td>
</tr>
<tr>
<td>Williams</td>
<td>Cassidy</td>
<td>Pharmacy UPMC St. Margaret</td>
<td>PGY1</td>
<td>Xavier University of Louisiana College of Pharmacy</td>
<td>PGY2 Ambulatory Care Pharmacy Residency, UPMC St. Margaret, Pittsburgh, PA</td>
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<tr>
<td>Sackett</td>
<td>Rena</td>
<td>Pharmacy UPMC Western Psychiatric Hospital</td>
<td>PGY1</td>
<td>Loma Linda University</td>
<td>Executive Fellowship in Association Leadership and Management, ASHP, Bethesda, MD</td>
</tr>
<tr>
<td>Temelie</td>
<td>Andreea</td>
<td>Pharmacy UPMC Western Psychiatric Hospital</td>
<td>PGY1</td>
<td>University of Minnesota</td>
<td>PGY2 Psychiatric Pharmacy Residency, UPMC Western Psychiatric Hospital, Pittsburgh, PA</td>
</tr>
<tr>
<td>Yabs</td>
<td>Melanie</td>
<td>Psychiatric Pharmacy UPMC Western Psychiatric Hospital</td>
<td>PGY2</td>
<td>The University of Texas at Austin</td>
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**2020-2021 Residents**

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*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

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*Clinical Pharmaceutical Scientist Program and Pharmaceuticals 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

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<td>Boro, Ryan</td>
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<tr>
<td>Cotter, Reliey</td>
<td>Desai, Ravi</td>
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<tr>
<td>Lynn, Andrew</td>
<td>Walko, Thomas</td>
</tr>
<tr>
<td>Wang, Fei</td>
<td>Wang, Tianqi</td>
</tr>
</tbody>
</table>
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-Dri Effect of Kidney Disease and Gut-Derived Uremic Toxins on Flavin Monoxygenases: Clinical and Translational Research Studies  
ven 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 Prokopienko, 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 Monoxygenases: 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 PIT 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 Renée 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 (deGAN) 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**


• Lipp MA, Pasternak A, Ward K. The MTHFR C677T genetic variant associations with depression and depression treatment: what does it mean and what can you do with the results? Current Psychiatry. Accepted.


**Presentations, Posters, and Podium**


• 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 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


• 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


• 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 Pharmaceuticals. Pittsburgh, PA. Identify robust IncRNA 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


**Postdoctoral Fellows**

<table>
<thead>
<tr>
<th>Name</th>
<th>Degree</th>
<th>Degree/University</th>
<th>Field</th>
<th>Country</th>
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<tbody>
<tr>
<td>Al Antary, Doaa</td>
<td>PhD</td>
<td>The University of Arizona</td>
<td>Pharmaceutics</td>
<td>Jordan</td>
</tr>
<tr>
<td>Ardila Montoya, Diana Catalina</td>
<td>PhD</td>
<td>University of Pittsburgh</td>
<td>Bioengineering</td>
<td>United States</td>
</tr>
<tr>
<td>Feturi, Firuz</td>
<td>PhD</td>
<td>University of Pittsburgh</td>
<td>Pharmaceutical Sciences</td>
<td>Libya</td>
</tr>
<tr>
<td>Gundala, Venkata Naveen Kumar</td>
<td>PhD</td>
<td>Jawaharlal Nehru Technological University</td>
<td>Biotechnology</td>
<td>India</td>
</tr>
<tr>
<td>Guo, Weiwei</td>
<td>PhD</td>
<td>Fudan University</td>
<td>Genetics</td>
<td>China</td>
</tr>
<tr>
<td>Name</td>
<td>Degree</td>
<td>Degree/University</td>
<td>Field</td>
<td>Country</td>
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<tr>
<td>Joyasawal, Sipak</td>
<td>PhD</td>
<td>Vidyasagar University</td>
<td>Organic Chemistry</td>
<td>India</td>
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<tr>
<td>Lei, Saifei</td>
<td>PhD</td>
<td>University of the Chinese Academy of Sciences</td>
<td>Pharmacology</td>
<td>China</td>
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<tr>
<td>Mohammed, Shabber</td>
<td>PhD</td>
<td>IIIM-Academy of Scientific Innovative Research</td>
<td>Chemical Sciences</td>
<td>India</td>
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<tr>
<td>Rathod, Sanjay</td>
<td>PhD</td>
<td>National Institute of Virology</td>
<td>Biotechnology</td>
<td>India</td>
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<tr>
<td>Shaik, Imam</td>
<td>PhD</td>
<td>Texas Tech University</td>
<td>Pharmaceutical Sciences</td>
<td>India</td>
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<td>Sun, Jingjing</td>
<td>PhD</td>
<td>Chinese Academy of Sciences</td>
<td>Polymer Chemistry and Physics</td>
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<td>Vallicherla, Guru Raghavendra</td>
<td>PhD</td>
<td>CSIR-Central Drug Research Institute</td>
<td>Pharmacokinetics</td>
<td>India</td>
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<td>Xu, Pengfei</td>
<td>PhD</td>
<td>Beijing Normal University</td>
<td>Developmental Biology</td>
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<td>Xue, Ying</td>
<td>PhD</td>
<td>Fudan University</td>
<td>Pharmacology</td>
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<td>Zhang, Yue</td>
<td>PhD</td>
<td>University of Minnesota</td>
<td>Pharmacology</td>
<td>China</td>
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<tr>
<td>Zhu, Junjie</td>
<td>PhD</td>
<td>Chinese Academy of Sciences</td>
<td>Medicinal Chemistry</td>
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## Research Appendix

### FY20 PHS Funding

<table>
<thead>
<tr>
<th>Investigator</th>
<th>Agency</th>
<th>Title</th>
<th>Direct $</th>
<th>Indirect $</th>
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<tbody>
<tr>
<td>C. Fernandez</td>
<td>NIH</td>
<td>Improving the disposition of antileukemic asparaginase after drug-induced immunotoxicity</td>
<td>205,875</td>
<td>116,319</td>
<td>322,194</td>
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<td>C. Fernandez</td>
<td>NIH</td>
<td>Asparaginase hepatotoxicity is lipolysis-dependent - Liver Research</td>
<td>25,000</td>
<td>14,125</td>
<td>39,125</td>
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<td>D. Huryn</td>
<td>NIH</td>
<td>Discovery of Post-transcriptional utrophin upregulator small molecules for Duchenne Muscular Dystrophy therapeutics (Khurana / UPenn)</td>
<td>4,317</td>
<td>2,439</td>
<td>6,756</td>
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<tr>
<td>D. Swanson</td>
<td>NIH</td>
<td>Regenerative Medicine</td>
<td>6,760</td>
<td>3,819</td>
<td>10,579</td>
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<td>D. Yang</td>
<td>NIH</td>
<td>Identification of Novel Human LncRNAs Controlling Human Cardiogenesis</td>
<td>10,942</td>
<td>6,082</td>
<td>17,024</td>
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<td>D. Yang</td>
<td>NCI</td>
<td>The oncogenic role of EPIC1MYC axis in breast cancer</td>
<td>211,242</td>
<td>119,352</td>
<td>330,594</td>
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<tr>
<td>D. Yang</td>
<td>NIH</td>
<td>Identification of Novel Human LncRNAs Controlling Human Cardiogenesis</td>
<td>10,942</td>
<td>6,082</td>
<td>17,024</td>
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<td>I. Hernandez</td>
<td>NHLBI</td>
<td>Patient and System-Level Determinants of Oral Anticoagulation Use in Atrial Fibrillation</td>
<td>147,871</td>
<td>11,633</td>
<td>159,504</td>
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<tr>
<td>J. Beumer</td>
<td>NIH</td>
<td>NCI ET-CTN with Phase I Emphasis at UPCI</td>
<td>36,119</td>
<td>20,407</td>
<td>56,526</td>
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<td>J. Beumer</td>
<td>NIH</td>
<td>Cancer Center Support Grant</td>
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<td>51,290</td>
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<td>J. Beumer</td>
<td>NIH</td>
<td>University of Pittsburgh Microphysiology Systems Database Center</td>
<td>18,797</td>
<td>10,622</td>
<td>29,419</td>
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<td>J. Beumer</td>
<td>NIH</td>
<td>Signature-Directed, Sequential Delivery of Radiation Mitigators</td>
<td>66,154</td>
<td>35,723</td>
<td>101,877</td>
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<td>J. Beumer</td>
<td>NIH</td>
<td>Application of mucolytic therapy in Patient-Derived Models of Pseudomyxoma</td>
<td>4,136</td>
<td>2,337</td>
<td>6,473</td>
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<td>J. Beumer</td>
<td>NIH</td>
<td>Formulation and Optimized Delivery of JP4-039</td>
<td>14,997</td>
<td>8,473</td>
<td>23,470</td>
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<td>J. Beumer</td>
<td>NIH</td>
<td>PITT-CAL ECTTN PK Resource Laboratory</td>
<td>384,065</td>
<td>127,073</td>
<td>511,138</td>
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<td>J. Beumer</td>
<td>NIH</td>
<td>CPPF Beumer: Cancer Center Support Grant</td>
<td>26,701</td>
<td>15,087</td>
<td>41,788</td>
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<td>J. Beumer</td>
<td>NIH</td>
<td>TORFPG: Analytical Support and PK Sample Analysis for Preclinical Pharmacology Studies</td>
<td>16,577</td>
<td>9,366</td>
<td>25,943</td>
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<td>J. Beumer</td>
<td>NIH</td>
<td>Phase I/II clinical trial of vorinostat for GVHD prevention in children, adolescents, and young adults</td>
<td>8,417</td>
<td>4,756</td>
<td>13,173</td>
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<td>J. Beumer</td>
<td>NIH</td>
<td>PSMA - Targeting Small-Molecule Drug Conjugates</td>
<td>23,005</td>
<td>12,998</td>
<td>36,003</td>
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<td>K. Empey</td>
<td>NIH</td>
<td>An adjuvant for an RSV prefusion F vaccine that safely protects infants via maternal vaccination (Yondola)</td>
<td>72,895</td>
<td>38,842</td>
<td>111,737</td>
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<td>K. Empey</td>
<td>NIH</td>
<td>Polymicrobial interactions in the respiratory tract (Jennifer Bomberger)</td>
<td>18,978</td>
<td>10,723</td>
<td>29,701</td>
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<td>L. McDermott</td>
<td>NIH</td>
<td>Improved Methods and applications for interactive online virtual screening optimization - Koes</td>
<td>32,085</td>
<td>18,128</td>
<td>50,213</td>
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<td>L. Rohan</td>
<td>JOHNS</td>
<td>Development of Rectal Enema As Microbicide (DREAM)</td>
<td>130,240</td>
<td>73,586</td>
<td>203,826</td>
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<td>L. Rohan</td>
<td>Louisville</td>
<td>Griffithsin-based Recta Microbicides for PREvention of Viral EVTry (Prevent)</td>
<td>6,418</td>
<td>3,466</td>
<td>9,884</td>
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<td>L. Rohan</td>
<td>MAGEE</td>
<td>Studies to Assess Interactions between Dapivirine and Vaginally Applied Over-the-Counter Products (CRIMP)</td>
<td>521,892</td>
<td>161,067</td>
<td>682,959</td>
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<td>L. Rohan</td>
<td>MAGEE</td>
<td>Long Acting Film Technology for Contraception and HIV Prevention (LATCH)</td>
<td>2,225,970</td>
<td>442,719</td>
<td>2,668,689</td>
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<tr>
<td>L. Wang</td>
<td>NIH</td>
<td>Synaptic Resilience to Psychosis in Alzheimer Disease (Sweet)</td>
<td>45,724</td>
<td>22,485</td>
<td>68,209</td>
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<td>P. Empey</td>
<td>NIH</td>
<td>All of Us (Reis) - Supplement</td>
<td>24,353</td>
<td>13,759</td>
<td>38,112</td>
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<td>P. Empey</td>
<td>NIH</td>
<td>Pharmacokinetics of sedatives - Understanding a modifiable risk factor for pediatric delirium (Michael Bell)</td>
<td>35,772</td>
<td>18,781</td>
<td>54,553</td>
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<td>R. Venkataramanan</td>
<td>NIH</td>
<td>Optimization of Drug Dosing in Pregnant Women through Research and Education - OPRC Administrative Core - Caritis</td>
<td>44,441</td>
<td>28,706</td>
<td>73,147</td>
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<tr>
<td>R. Venkataramanan</td>
<td>NIH</td>
<td>Optimization of Drug Dosing in Pregnant Women through research and Education - Impact of Pregnancy on Buprenorphine Pharmacokinetics and Pharmacodynamics-Caritis</td>
<td>12,528</td>
<td>7,078</td>
<td>19,606</td>
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<tr>
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<td>R. Venkataramanan</td>
<td>NIH</td>
<td>Optimization of Drug Dosing in Pregnant Women through research and Education - Basic/Translational Investigations on Buprenorphine- Caritis</td>
<td>123,073</td>
<td>69,536</td>
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<td>R. Venkataramanan</td>
<td>NIH</td>
<td>Pharmacologically-based Strategies for Buprenorphine Treatment During Pregnancy (MWRIF - Caritis)</td>
<td>87,221</td>
<td>49,280</td>
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<td>R. Venkataramanan</td>
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<td>ETCTN PK Resource Laboratory at Pittsburgh (Jan Beumer)</td>
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<td>Novel Antimicrobial Agents to Overcome Antibiotic Resistant Pseudomonas and MRSA Respiratory Infection</td>
<td>12,316</td>
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<td>S. Li</td>
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<td>PROJ 1: Signature-Directed, Sequential Delivery of Radiation Mitigators</td>
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<td>S. Li</td>
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<td>Nanotherapeutics for Synergistic Targeting of Myc in Prostate Cancer</td>
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<td>114,719</td>
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<td>S. Li</td>
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<td>Developing Nano Technology for HER2 Directed Therapy</td>
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<td>S. Li</td>
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<td>Immunostimulatory Nanocarrier for Breast Cancer Immunoochemotherapy</td>
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<td>Determinants and Mechanisms of Efficacy of Peptide Antibiotics as Novel Sepsis Therapy (E&amp;OH: Dr. Deslouches)</td>
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<td>20-HETE Formation Inhibitors in Cardiac Arrest</td>
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<td>S. Sant</td>
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<td>Three-dimensional organoid models to study breast cancer progression</td>
<td>271,134</td>
<td>160,737</td>
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<td>T. Nolin</td>
<td>NIH</td>
<td>PopulAtion health management to OPTIImize Care in CKD (PANOPTIC-CKD)</td>
<td>72,843</td>
<td>41,156</td>
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<td>T. Nolin</td>
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<td>Mechanisms of Neutrophil Dysfunction in Antifungal Immunity (Biswa)</td>
<td>27,512</td>
<td>15,544</td>
<td>43,056</td>
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<td>W. Xie</td>
<td>NIH</td>
<td>PXR-Mediated Xenobiotic Response in the Pathogenesis Hemorrhagic Shock</td>
<td>202,500</td>
<td>114,412</td>
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<td>Role of the ADAR1-mediated RNA editing / RNA sensing axis in sterile inflammation</td>
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<td>D. Huryn</td>
<td>DOD</td>
<td>Optimizing Small Molecule Therapeutics for Diabetic Kidney Disease and Acute Kidney Injury - Hukriede</td>
<td>210,197</td>
<td>117,010</td>
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<td>D. Huryn</td>
<td>Leidos</td>
<td>University of Pittsburgh Chemical Diversity Center</td>
<td>503,047</td>
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<td>J. Pringle</td>
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<td>ARTEMIS: AHN Researching Treatment Effectiveness and Medical Integration Through SBIRT (Allegheny-Singer / Johnjulio)</td>
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<td>Cambria SBIRT Champions Training</td>
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<td>CDC Overdose to Action (Gateway Health)</td>
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<td>74,481</td>
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<td>J. Pringle</td>
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<td>Collaboration of Rural Agencies for Reduction of Opioid Related Overdoses</td>
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<td>J. Pringle</td>
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<td>J. Pringle</td>
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<td>J. Pringle</td>
<td>PA</td>
<td>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)</td>
<td>237,965</td>
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<td>First Responder Collaboration with Treatment Services for Overdose Reduction (SCOPE)</td>
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<td>Growing Evidence Based Prevention in Pennsylvania to Address Opioid Misuse (PSU - Welsh)</td>
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<td>J. Pringle</td>
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<td>Pennsylvania Screening, Brief Intervention and Referral to Treatment (PA-SBIRT) (White)</td>
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<td>Rural Communities Opioid Response - Implementation (1 GA1 RH33551 01 00)</td>
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<td>Strategies for Coordinating Overdose Prevention Efforts (SCOPE): Blair County PA</td>
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<td>56,396</td>
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<td>Suicide Prevention Accelerated Research Construct (SPARC) / Task N0121</td>
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<td>J. Pringle</td>
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<td>Targeted capacity expansion: Medication assisted treatment - prescription drug and opioid addiction</td>
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<td>J. Pringle</td>
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<td>Ursuline College Breen School of Nursing MAT Training Integration Program (URSULINE COLLEGE)</td>
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<td>J. Pringle</td>
<td>VA</td>
<td>Veterans Crisis Line (VCL) National Care Coordination and Field operations Health care Initiative to reduce suicide risk among VCL Callers project</td>
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<td>L. Rohan</td>
<td>MAGEE</td>
<td>Physiologically-based model of the female reproductive tract</td>
<td>333,812</td>
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<td>M. Reynolds</td>
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<td>University of Pittsburgh PA Studies MAT Training Program (David Beck)</td>
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<td>M. Somma</td>
<td>PAPHARM</td>
<td>State Public Health Actions to Prevent and Control Diabetes, Heart Disease, Obesity and Associated Risk Factors and Promote School Health</td>
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**FY19 Industry Funding**

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<td>J. Beumer</td>
<td>AbbVie</td>
<td>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</td>
<td>367,349</td>
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<td>AbbVie</td>
<td>Phase 1 Study of Veliparib (ABT-888), a PARP Inhibitor, in Combination with Carboplatin and Paclitaxel in Advanced Solid Malignancies</td>
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<td>Pressure-enabled oxaliplatin PK</td>
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<td>L. Berenbrok</td>
<td>Premier</td>
<td>The Impact of a Multimedia Educational Campaign on Meningococcal Group B Vaccination Rates in a University Student Population (PREMIER HEALTHCARE)</td>
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# FY19 Foundation/Association Funding

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<td>PPA</td>
<td>Informing the development of a transitions of care program</td>
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<td>D. Yang</td>
<td>ACS</td>
<td>The regulation of cell cycle by long non-coding RNA in breast cancer (ACS)</td>
<td>487,542</td>
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<td>E. Turco</td>
<td>PPA</td>
<td>Effective coaching strategies for the “Flip the Pharmacy” practice transformation initiative in Pennsylvania community pharmacies.</td>
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<td>I. Hernandez</td>
<td>WHPC</td>
<td>Average Manufacturer Price for Si Drugs: Impact of Pharmaceutical Benefit Manager Concessions</td>
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<td>SFA</td>
<td>Dissecting DNA damage and repair pathways in leiomyosarcomas: Improving therapy by understanding biology</td>
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<td>J. Pringle</td>
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<td>Community Coalition-Based Harm Reduction Activities / Sponsor: Vital Strategies</td>
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<td>S. McGrath</td>
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<td>Community Pharmacy Practice Transformation Flip the Pharmacy</td>
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# FY19 Other Funding

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<td>C. Iasella</td>
<td>UPENN</td>
<td>Microbiome and Host Responses of CLAD in CF patients (Jason Christie)</td>
<td>15,089</td>
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<td>J. Beumer</td>
<td>Emory</td>
<td>W1212135: Phase 1 study of palbociclib in combination with cisplatin or carboplatin...</td>
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<td>J. Beumer</td>
<td>Roswell</td>
<td>Palbociclib PK support for RPCI</td>
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<td>J. Beumer</td>
<td>PA</td>
<td>Tobacco Phase 18 Formula Funds</td>
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<td>J. Pringle</td>
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<td>J. Pringle</td>
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<td>DDAP Diversion SCOPE Lackawanna County</td>
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<td>J. Pringle</td>
<td>PA</td>
<td>DDAP Diversion SCOPE Schuylkill County</td>
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<td>J. Pringle</td>
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<td>RAMP Expansion (May-June 2020)</td>
<td>85,238</td>
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<td>L. Rohan</td>
<td>PA</td>
<td>Prevent COVID</td>
<td>568,131</td>
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<td>L. Wang</td>
<td>UPMC</td>
<td>ITTC - Discovering the Protein Signature of Synapse Loss and Cognitive Decline During Aging</td>
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<td>T. Nolin</td>
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<td>Evidence-based Policy Research and Programming for the Commonwealth of PA (Everette James)</td>
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<td>18,613</td>
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**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**

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<tr>
<th>Faculty Member</th>
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<tbody>
<tr>
<td>Lucas A. Berenbrok, PharmD, MS, BCACP, CTTS</td>
<td>1</td>
<td>Journal of American Pharmacists Association</td>
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<tr>
<td>Jan H. Beumer, PharmD, PhD, DABT</td>
<td>2</td>
<td>Cancer Chemotherapy and Pharmacology Oncology Research</td>
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<tr>
<td>Faculty Member</td>
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<tr>
<td>Kim C. Coley, PharmD, FCCP</td>
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**Faculty Participation in NIH Review Committees and Panels**

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School of Pharmacy Publications in Peer-Reviewed Journals


Bian YM, He XB, Jing YK, **Wang LR**, Wang JM, Xie XQ. Computational systems pharmacology analysis of cannabidiol: a combination of chemogenomics-knowledgebase network analysis and


Ge H, Bian Y, He X, Xie XQ, Wang J. Significantly different effects of tetrahydroberberrubine enantiomers on dopamine D1/D2 receptors revealed by experimental study and integrated in silico


Pilch NA(Weimert), Sell ML, McGhee W, Venkataramanan R. Important Considerations in Drug Therapy in Pediatric Transplant Patients. *Pediatric Transplantation Special Issue (In Press).*


