

# BuffaloPharmacy

MAGAZINE

VOLUME 3 | 2020



Positioning  
**Pharmacists**  
to improve health  
care transitions  
p6



CREATING A CULTURE OF  
**PATIENT SAFETY** p8

UB STUDENTS LEAD THE WAY  
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# Message From The Dean

Our 2020 Buffalo Pharmacy Magazine highlights many impressive accomplishments, meaningful stories and engaging moments of our faculty, staff, students and alumni. Their leadership and innovation are helping to reshape health care and are the reason for our success, allowing us to provide an exemplary education for all SPPS students.

For more than 130 years, we have been leaders in pharmacy education. Recently, we launched an MS in Pharmacometrics and Personalized Pharmacotherapy, one of only a few in the country, which will provide students with the skills to optimize drug therapy, allowing for the provision of precision medicine and individualized therapies. We have also added micro-credentialed programs that give pharmacy and pharmaceutical sciences students the opportunity to add enhanced competencies in data analysis, clinical and translational research, and application of enhanced patient care principles and leadership.

Our PharmD students and faculty were recognized nationally for a comprehensive approach to reducing hospital readmissions through their Transitions of Care (TOC) program. These collaborative concepts are integrated into our curriculum, allowing students to take what they learn in the classroom and apply it while on rotation. Treating patients holistically has always been a

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**For more than 130 years,  
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pharmacy education.**  
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hallmark of pharmacy care. I encourage you to read more about these novel TOC approaches in our feature article.

On a sad note, we recently lost a member of our staff, Julie Kopfer, administrative assistant in the Department of Pharmacy Practice.

In a small school like ours, it is always a shock when a valued colleague passes away unexpectedly. Her enthusiasm, positive outlook and contributions to our continuing education programs and department support will be remembered fondly.

I hope you enjoy the stories and articles in the pages that follow. I am immensely proud of our collective accomplishments and look forward to supporting our future achievements in education, research and service.

Warm Regards,



James M. O'Donnell, PhD  
Professor and Dean



# In This Issue

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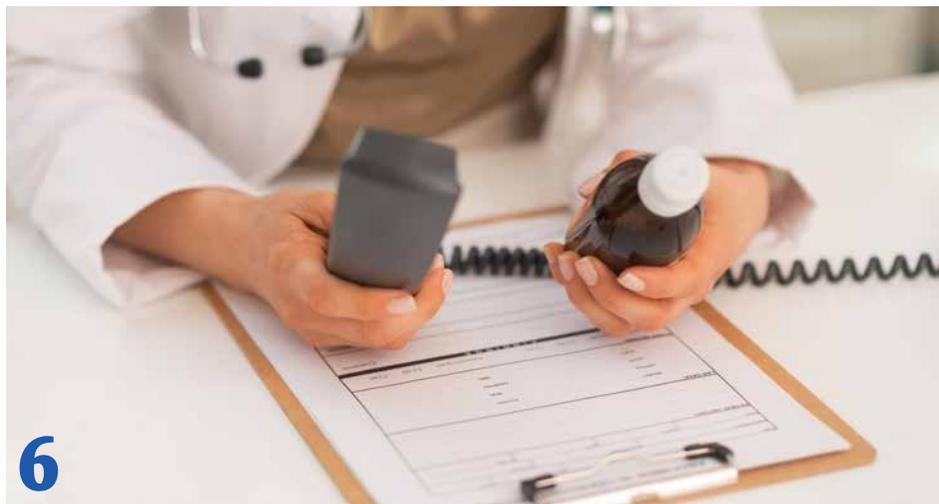
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# Pharmacy Summer Institute: Engaging Tomorrow's Students



BY KARA SWEET

The early July days of summer were anything but lazy for the 48 students who attended our 2019 Pharmacy Summer Institute.

Now in its fourth year, the program for high school and college students offers a broad scope of learning experiences, including a variety of hands-on activities and visits to local clinical practices and research labs. Also presented are lectures by UB faculty and Buffalo-area alumni on topics ranging from vaccinations to the future of the profession.

The program is continuously evolving based on student evaluations, says Jennifer Rosenberg, associate dean of admissions and advisement. "The timing, content and type of sessions have been adjusted annually to provide the best possible experience," she says.

The ins and outs of pharmacy practice are showcased through innovative sessions, such as patient counseling, compounding of medications, a highly unique interprofessional education forum and other clinically focused health care activities.

To further prepare students for health care careers, educational opportunities at the pharmacy school are also highlighted, and recommendations are offered on

preparatory high school courses focused on undergraduate pharmacy coursework.

**15%**  
percentage of Pharmacy Summer Institute attendees now enrolled as PharmD students

Student feedback has been overwhelmingly positive. "It was great spending almost a week at University at Buffalo this summer," said Natalia, a 2019 attendee. "The staff and the students I met were truly amazing. I believe that UB is a perfect fit for me."

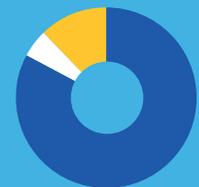


View photos from our 2019 Pharmacy Summer Institute.

## CLASS OF 2023 BY THE NUMBERS

Middle 50th\*  
Percentile of PCAT  
Composite Score:  
**60%-89%**

Middle 50th\*  
Percentile Science  
& Math GPA:  
**3.1-3.7**



In-State: **83%**  
Out-of-State: **5%**  
Foreign Citizen: **12%**



Females: **67%**  
Males: **33%**

INTERVIEWED: **259**

ENROLLED: **132**

AVERAGE AGE: **21**

**11**

Number of U.S. States/Canadian Provinces/International Countries Represented

2 YEARS OF LESS  
OF COLLEGE:

**47%**

3 YEARS OR  
HIGHER:

**11%**

BACHELOR'S OR HIGHER:

**42%**

\*The middle 50th percentile reflects those between the 25th and 75th percentiles.



Watch the Class of 2023 receive their white coats.

# Pieper Offers Words of Wisdom to 2019 Graduates

BY KARA SWEET

**John Pieper (PharmD '79)**, president of the St. Louis College of Pharmacy, was our 2019 Commencement keynote speaker. He discussed the profound impact the school and university had on him and his career.

“My years here at the [school] were transformative in developing me as a person, a clinician, a clinical scientist and an academician. The faculty here instilled in me the ability and the confidence to take risks, the ability and confidence to know that I can accomplish whatever I set my heart on.”

Pieper stressed the importance of mentorship and encouraged each graduate to incorporate creativity and originality into every aspect of their career.

“The exploration of who you are, to dream who you might become, and then to develop a path to achieve your dream is the whole purpose of your education here at UB.”

Pieper has more than 80 peer-reviewed research publications and approximately 100 published research abstracts in cardiovascular pharmacotherapy, pharmacokinetics and drug metabolism. He is a fellow of the American College of Clinical Pharmacy and the International Pharmaceutical Federation.



John Pieper (PharmD '79), President, St. Louis College of Pharmacy



Muhammad Malik (PharmD '19), Nadia Mansouri (PharmD '19), Farah Al Qaraghuli (BS '16 & MS '19)

“My years here at the [school] were transformative in developing me as a person, a clinician, a clinical scientist and an academician.”

John Pieper



Watch our 2019 Commencement ceremony.

## 2019 COMMENCEMENT STATS

**131** Doctor of Pharmacy degrees conferred

**5** Doctor of Pharmacy/  
Master of Business Administration

**1** Doctor of Pharmacy/  
Juris Doctor

**4** Doctor of Pharmacy/  
MS in Pharmaceutical Sciences

**14** Bachelor of Science in  
Pharmaceutical Sciences  
degrees conferred

**10** Master of Science in  
Pharmaceutical Sciences  
degrees conferred

**12** Doctor of Philosophy in  
Pharmaceutical Sciences  
degrees conferred

# 2019 Awards Ceremony: Celebrating Service and Leadership

BY KARA SWEET

## **Willis G. Gregory Memorial Alumni Award: Lee Vermeulen (BS '90)**

Lee Vermeulen was recognized with the school's most prestigious alumni award for his exemplary career accomplishments and leadership.

Vermeulen is chief of enterprise academic service lines for UK HealthCare, the University of Kentucky health system where he is responsible for development and oversight of enterprise-wide academic service lines delivering integrated care across multiple units, disciplines and demographics in a value-based, patient-centered model.

He is also a professor of medicine and pharmacy at UK and an active researcher with more than 80 peer-reviewed publications emphasizing the cost and value of emerging health care trends.

## **Orville C. Baxter Memorial Professional Practice Alumni Award: Christopher Rubino (PharmD '96)**

Christopher Rubino was honored for his leading innovative pharmacy practice as executive vice president of pharmacometrics for the Institute for Clinical Pharmacodynamics, a company that uses PK-PD to integrate preclinical and clinical data through modeling and simulation.

He has served as a resource for pharmaceutical firms during the submission

of adult- and pediatric-related filings to the FDA and the European Medicines Agency across several therapeutic areas. Rubino has authored more than 50 peer-reviewed publications, assisted in refereeing numerous industry journals and serves as a UB SPPS adjunct associate research professor.

## **Teacher of the Year Award: Tammie Lee Demler (BS '92 & PharmD '02)**

Tammie Lee Demler is an adjunct associate professor in the Department of Pharmacy Practice. Student supporters raved about her teaching style:

*"I love her enthusiasm for teaching and her passion for helping students."*

*"She makes class very entertaining but informative. One of the best professors I have had at UB."*

*"Dr. Demler teaches us information that is utilized in the real world, not just what the textbook says."*

## **Staff Member of the Year Award: Pamela Coniglio**

Pamela Coniglio is the Introductory Pharmacy Practice Experiences (IPPE) coordinator in the Office of Experiential Education. Her colleagues and students praised her hard work and dedication:

*"She's the greatest! Always goes out of her way to help when asked and knows the answers to everything."*

*"Pam is friendly and hardworking. UB is very lucky to have Pam."*

*"She has been a great resource for all of my IPPE questions, and an incredible help with professional organizations!"*

## **Daniel H. Murray Memorial Professional Development Award: Emily Hart (PharmD '19)**

Emily Hart received the Daniel H. Murray Memorial Professional Development Award for her innovative research and extraordinary scholarly work on proton pump inhibitors and their impact on kidney health, all while maintaining a high level of academic success.

View the complete award winner list: [pharmacy.buffalo.edu/awards](http://pharmacy.buffalo.edu/awards).

### PRECEPTOR AWARDS

#### **IPPE Outstanding Contribution Award**

Brian Sultana PharmD '16

#### **Professional Practice Elective Preceptor of the Year**

Kalpesh Desai BS, PharmD

#### **J. Fred Bennes Outpatient Care Preceptor of the Year**

Joseph Navarra RPh

#### **Inpatient Care Preceptor of the Year**

Angela Borton PharmD '13

#### **Pharmacy Practice Faculty Preceptor of the Year**

Fred Doloresco MS, PharmD



2019 school wide award winners

# The Final 'Fore'

BY KARA SWEET

Our 16th Student Scholarship Golf Tournament was held June 10 at Grand Island's River Oaks Golf Club. It was our final tournament.

Since 2004, support of our tournament has allowed more than 80 students to receive scholarships totaling more than \$80,000. The generosity of our golfers over the past 16 years will allow us to award annual scholarships to deserving students for many years to come through our golf scholarship endowment.

Our sincere thanks to all of our tournament participants. Your partnership and support have made a long-lasting impact on pharmacy students past, present and future. We will be implementing new and exciting ways we can continue to support student scholarships—stay tuned!



## 2019 Student Scholarship Recipients:

Mary Hejna '20, Dean James O'Donnell, Laurie Plewinski '21, Stephanie Lanza '20 Not pictured: Pauleena Pal '20, Zakiya Rhodie '21

## Tournament Winners:



[View more photos from our 2019 Golf Tournament.](#)

### First-Place Foursome (with a score of 62)

Zach Giroux, Brad Arthur, Don Arthur, Steve Giroux (BS '81)

### Second-Place Foursome (with a score of 64)

Shawn Bradley, Scott Jarmusz, David Knee, Andrew Reidy (PharmD '16)

**Closest to the Line, Hole 10** Chris Sauls

**Closest to the Pin, Hole 16** Kalpesh Desai

**Longest Drive, Hole 9** Adam Salyer (PharmD '19)

**Closest to a Hole in One, Hole 5** Alec Romanowski (PharmD '20)

## Tournament Sponsors:

**Grand Sponsor:** Rochester Drug Cooperative

**Bronze Sponsors:** Independent Health; J. Rutowski and Sons Inc.; Middleport Family Health Center; Dean Salyer (BS '85) and Brian Loucks (BS '86); Woodmark Pharmacy

UP CLOSE &  
PERSONAL  
WITH OUR FACULTY

## David Jacobs

PHARM.D '11, ASSISTANT PROFESSOR,  
PHARMACY PRACTICE



**Dr. Jacobs, what is your favorite place in the Pharmacy Building and why?**

The café. Always has a hot cup of coffee ready on those snow-filled days.

**What is your favorite topic to teach and why?**

Clinical research methods and biostatistics. I enjoy seeing students fully grasp these topics when they apply them to their own research. It's not just about the didactics but more importantly their application to a real-world problem.

**What are the "hot topics" in pharmacy now and why do they interest you?**

The integration of implementation and team science into clinical pharmacy practice. This field addresses the research-to-practice gap and accelerates implementation of evidence-based interventions and services in real-world settings. As pharmacists, we regularly implement introduce evidence-based programs, but we have yet to fully grasp implementation and team science. Numerous opportunities to apply evidence-based interventions exist across pharmacy practice such as novel care delivery models (e.g., transition of care programs, comprehensive medication management) or applying data analytics to improve patient care quality.

**What has been your proudest professional accomplishment?**

Seeing my students and trainees present and being recognized for their research at national conferences.

**If you were stranded on a desert island and could only bring one book, one movie and one record what would each be and why?**

**Book:** Anything by the author James Patterson (It's a nice easy read)

**Movie:** "The Other Guys" (It makes me laugh every time)

**Record:** "Diamonds" (compilation of greatest hits by Elton John, including one of my favorites, "Your Song")

H

Rx

# Positioning Pharmacists to Improve Health Care Transitions

BY GABE DIMAIO



Transitions of care (TOC) refers to the process of moving a patient from one health care setting to another. That movement could be to a different location, such as a hospital, long-term care facility or home, or it could be within an individual setting, such as different departments in a hospital, from an emergency room to a general medicine floor.

Seamless and effective continuity for the patient equals better health outcomes, fewer hospital readmissions and lower health care costs. As health care is becoming more value-based, there is an impetus for delivering cost-effective health care while improving patient outcomes. Other economic and patient health drivers are changing the landscape, too. The Centers for Medicare & Medicaid Services' Hospital Readmission Reduction Program applies penalties if hospitals have readmission rates above a national standard for patients with specific higher-risk diagnoses.

Many factors can undermine transitions of care, including ineffective communication between health care providers or between a health care provider and the patient. Medication discrepancies can also be a problem if vigilant attention is not paid to the type and amount of drugs a patient is taking.

Pharmacists are uniquely positioned to address transitions of care issues. University at Buffalo pharmacists are leading this charge regionally and nationally.

"Even though we all have electronic health records, they all don't talk to each other. Having someone who is looking at medication lists from all settings can really be beneficial in not only streamlining but also making sure actual or potential problems don't creep up and cause problems for the patient," says Erin Slazak (PharmD '04), clinical assistant

professor, pharmacy practice.

Collin Clark (PharmD '17), clinical assistant professor, family medicine and adjunct instructor, pharmacy practice, says he's seen firsthand what can go wrong when it is not done well.

"We see patients on two medications in the same class that really shouldn't be used together. We see doses that are inappropriate for patients or durations of therapy that are much longer than they should be based on the data that we have," Clark says.

This transitions of care process can happen in-person or on the telephone. Each method has its pros and cons, but both are time intensive. As health care resources are limited, attention is paid to the patients who would benefit most. Christopher Daly (PharmD/MBA '12), clinical assistant professor, pharmacy practice, says he doesn't think it needs to be applied to all patients, just those at higher risk. He suggests patients with two or more chronic diseases—or those on multiple or high-risk medications—should be considered.

Daly says the effectiveness of having a pharmacist involved in transitions of care has been well studied. He suggests the key will be recognition from health care systems and C-suite executives.

"I would hope at some point we will place more pharmacists in these types of positions,

and I hope the health care sector grows to recognize pharmacists can be impactful in this area. It would be very important to have more of those opportunities,” says Daly.

### Education of Pharmacy Students

TOC training has gradually been woven into the PharmD curriculum. Beginning in the P1 year, students address safe medication transitions using evidenced-based solutions. Those foundational concepts are built upon in the P2 and P3 years with training in medication reconciliations and evaluation of safe transitions at hospital discharge (including patient interviews) and culminate with reinforcing the important role pharmacists have post-discharge. This sequenced instruction results in a certificate in medication therapy management from the American Pharmacists Association (APhA).

High Street Prescription Center were an integral component of the pharmacy’s TOC initiatives and provided more than 1,200 telephone-based medication counseling and reconciliation calls to recently discharged patients.

UB PharmD students conducted over 1,200 telephone medication counseling interventions for Buffalo General Medical Center’s High Street Prescription Center.

### Transitions of Care from Another Angle

Transitions of care mainly centers on the inpatient side, with medication reconciliation and discharge counseling taking place as a patient leaves the hospital.

A team of researchers from the School of Pharmacy and Pharmaceutical Sciences is advocating for more research focused on the impact of transitions of care in outpatient primary care settings. They are trying to determine if these interventions can achieve better, more cost-effective results for high-risk patients.

“The real difficulty with transitions of care right now is we don’t have a good tool to appropriately identify who is truly at high risk, in the sense that they are going to benefit most from pharmacist intervention,” says Slazak.

Originally, two pilot studies were done at Slazak’s practice site at General Physician, P.C., to better assess high-risk patients. Now there is grant funding for a larger, more robust study at multiple primary care sites. Daly and Clark are part of that research team, along with David Jacobs (PharmD ’11 & PhD ’18), assistant professor, pharmacy practice.

Using a systematic approach and a stringent study design, Jacobs is developing the protocols and analyzing the data to determine the impact.

“That’s the goal with any of these health service interventions we put into play,” says Jacobs. “It’s not just that we put them there but that they are showing an overall impact in care or costs.”

As part of the expansion to a custom randomized trial, the team will also consider the patient’s feedback on the transition of care. If they can show TOC is effective in these practices, they would like to implement it on a larger scale and ascertain which specific type of interventions work best.

Jacobs says their team expects to report on preliminary data by 2021.



Courtney Cardinal (PharmD '17), Erin Slazak, Merin Panthapattu (PharmD '19) and Daniel Girgis (PharmD '19) at General Physician, P.C. in Amherst, N.Y.

The real test of TOC training occurs on experiential rotations. Not only do students get to conduct the interviews with actual patients, they also write up Subjective Objective Assessment Plan (SOAP) notes, ensuring that complex patient information is accurately recorded. After the PharmD student’s SOAP note is reviewed by a licensed pharmacist, these updates go into the patient’s medical chart along with clinical recommendations based on this new information.

As recently reported in the Journal of American Pharmacists Association, UB PharmD students on rotation at Buffalo General Medical Center’s

# Creating a Culture of Patient Safety

BY GABE DIMAIO

## Researching More Effective Care for Aging Adults

It wasn't until he was questioned by a mentor that Robert Wahler (PharmD '00) fully considered his decision to research ways of preventing falls in aging adults. After all, the mentor said, studying falls in this demographic was "not sexy." Later, while ruminating on the decision, Wahler realized that his motivation stemmed from his father's chronic conditions that caused multiple falls and broken bones.

Wahler, clinical associate professor in the Department of Pharmacy Practice, is a core member of the multidisciplinary Team Alice in the University at Buffalo's Center for Successful Aging (UBCSA) whose mission is to protect seniors from medication-related harm. Seed funding for UBCSA from the State University of New York, UB and SPPS, along with Wahler's specific research, underscore institutional commitments to this important clinical area.



Wahler's work aims to help seniors avoid the devastating impact of falls such as those his dad sustained. "Statistically, we still have a 50 percent mortality rate one year after a fall," he says. "That's kind of scary." He points to data from the Centers for Disease Control and Prevention reporting the rate of fatal falls in aging adults is four times as great as fatal opioid overdoses.

Wahler says safe use of medications is one of the better ways to prevent falls and keep seniors out of the hospital, but there are challenges. The goal is to balance the use of medication to prevent disease and maintain quality of life without causing harm.

In order to prevent errors and injury from medications, there is now an increased focus on the culture of patient

safety. All patient care team members need to be involved, from pharmacy technicians and pharmacists to provider groups and hospitals. Insurance providers are also an important part of the solution.

To ensure quality of life, Wahler is conducting research into contributing factors for fall-risk including weakness,

**The goal is to balance the use of medication to prevent disease and maintain quality of life without causing harm.**

balance instability and medications. Wahler hopes to develop better patient-driven and system-driven models to address overprescribing within this age group. By critically reviewing deprescribing of medications to reduce the number of fall-risk inducing drugs (FRIDs) and replacing them with an alternate regimen, or removing them entirely if practical, the fall-risk for senior patients is significantly reduced.

Wahler and his colleagues have received significant UB and SUNY funding for a number of key initiatives they are leading through their innovative research:

### Physician Office Sites

Placing a pharmacist in a family medicine practice site to reconcile the patient's medications and identify potentially harmful medications or combination of medications, and collaborate with the primary care team to deprescribe them.

### Direct Patient and Care Giver

Pharmacists engaging directly with the patient or caregiver to garner subjective information that might determine a higher risk of a fall and thus a higher treatment priority. These sessions can help reveal pertinent medical or social impact issues not previously reported.

### Electronic Medical Records

Creating software that can integrate into the electronic health record and automatically flag drugs that might cause falls and measure the potential of contributing to fall-risk. Having this information in the medical record would provide comprehensive medical information to the entire health care team.

# UB Students Lead the Way for Passage of Student Immunizer Bill

BY GABE DIMAIO

Thanks to students in UB's School of Pharmacy and Pharmaceutical Sciences, New York now joins other states that allow pharmacy interns to administer certain immunizations under the supervision of a certified pharmacist.

As of December 2018, pharmacy students who have received their intern permit and met specific training requirements can now administer flu immunizations in addition to those to prevent pneumococcal disease, meningococcal disease, shingles, tetanus, diphtheria and pertussis disease. The pharmacy intern may only give these vaccinations under the direct supervision of a licensed pharmacist with a certification to give immunizations.

There are several benefits to this. Giving interns this authorization will increase overall immunization rates and thus keep more people out of the hospital and, in the long term, reduce health care costs in New York.

But for the hard work and advocacy of UB students, this might not have happened. Students Kevin Lavery (PharmD/MBA '19) and Kelsey Gregoire (PharmD '18) realized that most of their contemporaries in the vast majority of other states were allowed to give vaccinations.

"This became growingly frustrating for us, as students who were striving to develop our skills as pharmacy interns prior to becoming a licensed professional," says Lavery. "There were many students who were leaving New York in their fourth professional year to complete experiential rotations in other states that allowed them to exercise these skills."

Indeed, in many other states, students with a certified intern permit can provide immunizations under the supervision of a licensed pharmacist. Why not in New York? Lavery and Gregoire wondered. They decided to take up the mantle and began researching the issues. As part of this effort, they contacted law professors and boards of pharmacy in other states to learn about current legislation and then drafted a resolution.

In 2016, they presented the proposal at the Annual Meeting of the Pharmacists Society for the State of New York, Inc. (PSSNY). This body agreed to advocate for the measure to the New York State Board of Pharmacy and for the state legislature to adopt the resulting legislation. Students also made the case directly to members of the State Assembly and State Senate. This led to the passage of legislation allowing qualified pharmacy students to give immunizations.



Kelsey Gregoire and Kevin Lavery, recipients of the 2019 Pharmacists Association of Western New York Community Service Award for their advocacy work on the student immunizer bill

"Finally, in late 2018, the state legislature realized this was good for public health. As they understood other health care students could vaccinate, so should well-trained pharmacy interns," says Karl Fiebelkorn (BS '78, MBA '88), senior associate dean for student, professional and community affairs. "That's how you learn."

Fiebelkorn touts the accomplishment of Lavery and Gregoire. He says they are like many UB pharmacy students, who for decades have received leadership training through the PharmD curriculum and involvement in organizations such as the Pharmacists Association of Western New York (PAWNY) and PSSNY.

"They were credited statewide ... it was put in the statewide journals that they were the impetus that started this," Fiebelkorn adds. "They received quite a bit of praise for that."

For his part, Lavery says that it's been extremely rewarding to directly impact the future of the pharmacy profession, especially where public health is sure to benefit.

"To have tangible experience on successful grassroots advocacy like this is extremely fulfilling," he says. "It's something I hope to share with my family many years down the road."

**"To have tangible experience on successful grassroots advocacy like this is extremely fulfilling."**

*Kevin Lavery, PharmD/MBA '19*

# Micro-Credentials: Flexible and Customizable Educational Experiences

BY GABE DIMAIO



Depending on your generation, you can liken micro-credentials to the merit badges that Boy Scouts get for mastering certain skills, the achievements Fitbit users earn for their steps, or the achievements gamers unlock for the havoc they wreak in Call of Duty.

A micro-credential is official recognition a student has mastered a proscribed series of classes and/or learning experiences. They are very specific and let students drill down into a niche area of interests. Narrower in scope than an academic minor or certificate program, a micro-credential offers students a unique opportunity to differentiate themselves, elevating them for future job opportunities. Without adding more time or cost in to degree completion a micro-credential helps students distinguish themselves from their peers academically and add to their professional *bona fides*.

Recognition of successful completion of a micro-credential program comes in the form of a digital badge, which is an icon a student can affix to digital transcripts, digital resumes, social media accounts, e-portfolios and email signature blocks. When a potential employer clicks on the badge, verifiable metadata easily provides information on the micro-credential including: institution, award date, student's work, rubrics and other course information.

In its commitment to serve students with these flexible education experiences, UB offers a growing menu of for-credit and non-credit micro-credentials. The for-credit microcredential programs differ from their non-credit

cousins in that they have been evaluated for their ability to be transferred or combined for use in a credit-bearing program. Students taking a for-credit program also receive a notation in their transcript. Depending on the program, learning experiences are taught in-person, online or a hybrid.

"I would recommend any student, no matter where they are in the program, take a look at micro-credentials," says Kory Zelen (PharmD, '20). "No matter what the concentration is, it's a way to help differentiate themselves from all the other graduates."

## Clinical Pharmacy Research

Zelen is in the Clinical Pharmacy Research micro-credential program, one of four offered by the school.

This micro-credential is an in-person, for-credit program taken by third or fourth year PharmD students with a minimum 3.0 GPA. The course of study centers on pharmacy clinical and translational research and, with the guidance of a mentor, students write a proposal, conduct and then defend their supporting research. Along with developing critical thinking and problem solving, the program offers students skills to conduct basic research.

"I thought taking classes alongside research was a nice compliment to each other," says Zelen. "You're learning



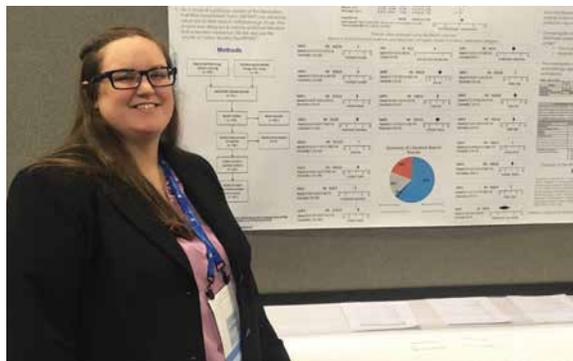
2019 Clinical Pharmacy Research graduates

things in the classroom that go beyond your normal curriculum. You're also getting your hands dirty doing bench research and getting a well-rounded experience."

Calvin Meaney (PharmD '11), clinical associate professor, pharmacy practice, says students learn study designs specific to clinical and translational pharmacology. In addition, they learn statistical and mathematical methods for characterizing pharmacokinetics and pharmacodynamics along with database development with emphasis on data collection and quality control.

"The allure for a lot of the students is they know they're interested in post-graduate training" says Meaney, who is program co-director program along with Brian Tsuji, professor, pharmacy practice. "This is a good mechanism to develop those skills and to show programs they are applying to that they've put in the extra work and effort as a pharmacy student."

## Pharmacy Scholarship, Education, Leadership (Scholars Program)



Scholars Program student Mary Hejna presenting at the 2018 American Society of Health-Systems Pharmacists Midyear Meeting

The Scholars micro-credential is a for-credit program open to PharmD students with a minimum 3.5 GPA and a history of involvement with professional organizations. Erin Slazak (PharmD '04), clinical assistant professor, pharmacy practice, is its director.

A micro-credential offers students a unique opportunity to differentiate themselves, elevating them for future job opportunities.

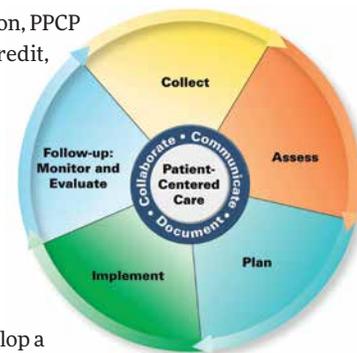
With the guidance of a mentor, the students working on this micro-credential will build the necessary skills to become a leader in pharmacy and pharmaceutical sciences. That includes experiences in clinical practice, teaching and scholarship. As part of the program, students submit their scholarly work for publication and present that work at a state or national pharmacy meeting.

the program, students submit their scholarly work for publication and present that work at a state or national pharmacy meeting.

"I am very interested in completing a residency," says Mary Hejna (PharmD '20). "The scholars program helps you to develop your skills to be a good residency candidate." After residency, Hejna hopes to ultimately become a clinical pharmacist and work with geriatric patients. She learned about micro-credentials while taking a class taught by Robert Wahler (PharmD '00), clinical associate professor, pharmacy practice and director of the Application of the Pharmacists' Patient Care Process micro-credential program.

## Pharmacists' Patient Care Process (PPCP)

Under Wahler's direction, PPCP has evolved into a noncredit, hybrid course with instruction taken both online and in-person and is open to students in the Doctor of Pharmacy program and is a standardized, five-step process that helps pharmacists develop a medication management plan for patients, regardless of the setting. Aside from competency in PPCP, this micro-credential will help students develop skills in problem-solving, communications, collaboration and professionalism to ensure consistency in pharmacy led delivery of patient care.



## Pharmacometric Software Series

This graduate level micro-credential in the Department of Pharmaceutical Sciences is noncredit program and offers a series of pharmacometric software program workshops used in data analysis and computer modeling that are vital to the industry. Participants engage in PK/PD data analysis such as simulation, parameter estimation, noncompartmental analysis, study design and bioequivalence. In addition to acquiring practical knowledge, the program helps participants develop problem-solving skills. Wojciech Krzyzanski, associate professor, pharmaceutical sciences, is its director.

Micro-credentials are still relatively new, and these four programs in the School of Pharmacy and Pharmaceutical Sciences are the vanguard of what will be offered in the future. Their flexibility and customizability promise to change the way we educate ourselves.

More information about micro-credentials can be found at [buffalo.edu/micro-credentials](http://buffalo.edu/micro-credentials).

# The Healing Properties of Food BY KARA SWEET

“Let food be thy medicine and medicine be thy food.” —Hippocrates



## Red wine to fight depression

New research conducted by Ying Xu, PhD, research associate professor in the Department of Pharmaceutical Sciences, has revealed that resveratrol, a plant compound found in red wine, displays anti-stress effects by blocking the expression of an enzyme related to the control of stress in the brain.

The study’s findings were published in the July 2019 journal *Neuropharmacology*.

While research has identified resveratrol to have antidepressant effects, the compound’s relationship to phosphodiesterase 4 (PDE4), an enzyme influenced by the stress hormone

corticosterone by inhibiting the expression of PDE4.

The results of this research will lay the groundwork for the use of the compound in novel antidepressants. “Resveratrol may be an effective alternative to drugs for treating patients suffering from depression and anxiety disorders,” Xu says.

## Vegetables to fight fatigue in MS

A pilot study led by Murali Ramanathan, PhD, professor in the Department of Pharmaceutical Sciences, found that higher levels of HDL cholesterol—also known as

“good cholesterol”—may improve fatigue in multiple sclerosis patients.

Fatigue is a frequent and debilitating symptom for people with multiple sclerosis and has limited treatment options. The medications used to treat this fatigue often come with unwanted side effects.

The study, published in the June 2019 journal *PLOS ONE*, followed 18 multiple sclerosis patients over the course of a year who were placed on a diet high in fruits and vegetables. The dietary change was also accompanied by a home-based exercise program, neuromuscular electrical stimulation, meditation and massage. Participants reported a noticeable reduction in fatigue, which researchers attributed to an increase in HDL.

“Higher levels of HDL had the greatest impact on fatigue,” Ramanathan says. “Good cholesterol plays a critical role in stimulating glucose uptake and increasing respiration in cells to improve physical performance and muscle strength.”

The results provide the basis for a larger study that could examine the effects of metabolic changes on fatigue and help guide future fatigue treatment decisions.

# New Master’s Degree Targets Personalized Drug Therapy

BY KARA SWEET

The University at Buffalo School of Pharmacy and Pharmaceutical Sciences now offers an innovative new master’s degree program in pharmacometrics and personalized pharmacotherapy.

With the fast-paced advancements in personalized medicine, there is a growing need for highly skilled pharmacometricians to fulfill critical roles in drug discovery and development in pharmaceutical industries, regulatory agencies and academia. UB’s novel program is one of only a few in the country providing this evidence-based instruction in drug therapy optimization.

“This is a highly innovative program that draws on the strengths of the department and school,” says Dean James M. O’Donnell, PhD. “Advanced training in pharmacometric principles and approaches provides an excellent foundation for those in academia or industry interested in personalized pharmacotherapy.”

The curriculum combines conceptual training with hands-on computational training in the integration of health and biomedical data, allowing students to partner with internationally renowned faculty in high-level research and garner real-world job experience while still completing coursework.

Graduates of the program will have the skills necessary to deliver precision medicine and individualized therapies.

The fall 2019 inaugural class comprised 11 students, far surpassing initial enrollment expectations.

“With the additional faculty being hired through the Empire Innovation and Disciplinary Excellence awards and the growth of computational needs of the pharmaceutical industry, this program will likely expand further in the future,” says SUNY Distinguished Professor of Pharmaceutical Sciences and Program Director William Jusko (BS ’65 & PhD ’70).

# Novel Academic and Industrial Collaboration Brings New Hope to Alzheimer's Patients

BY KARA SWEET

**A** research collaboration between the University at Buffalo and the biotechnology company Tetra Therapeutics has led to the development of a new drug that may protect against the negative effects of Alzheimer's disease.

The study, published in *The Journal of Pharmacology and Experimental Therapeutics*, was led by Ying Xu, PhD, research associate professor in the Department of Pharmaceutical Sciences; and James M. O'Donnell, PhD, dean and professor, Department of Pharmaceutical Sciences. Mark E. Gurney, PhD, chairman and chief executive officer of Tetra Therapeutics, also collaborated on the research.

**The new drug...was found to be capable of activating multiple biological mechanisms that protect the brain."**

In Alzheimer's disease, a specific protein, amyloid beta, exists that is toxic to nerve cells, which results in memory loss, nerve damage and other biochemical impairments. The new drug, called BPN14770, was found to be capable of activating multiple biological mechanisms that protect the

brain from these disease effects.

"Developing effective drugs for memory deficits associated with Alzheimer's disease has been challenging," says O'Donnell. "BPN14770 works by a novel mechanism to increase cyclic adenosine monophosphate (cAMP) signaling in the brain."

Indeed, cAMP has numerous beneficial functions, including improved memory. By inhibiting the PDE4D gene, BPN14770 increases cAMP signaling in the brain, which ultimately protects against the toxic effects of amyloid beta.

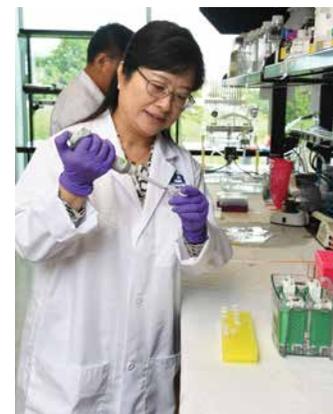
The benefits of BPN14770 could also translate to treatments for those with Fragile X syndrome, developmental disabilities and schizophrenia.

"Such observations imply that Alzheimer's pathology can be tolerated by the brain to some

extent due to compensatory mechanisms operating at the cellular and synaptic levels," says Xu.

The research was supported by the National Institutes of Health's Blueprint Neurotherapeutics Network through the National Institute of Neurological Disorders and Stroke, National Institute on Aging and National Institute of Mental Health.

Tetra Therapeutics is currently conducting Phase 2 studies of BPN14770 in patients with early Alzheimer's and adults with Fragile X syndrome. Results are expected in summer 2020.



Ying Xu, PhD, in her lab

# 2019 Grads Join Rutgers Fellowship Program

BY KARA SWEET

Jennifer Han (PharmD '19) and Anil Paul Melathe (PharmD '19) were accepted into the Ernest Mario School of Pharmacy's postdoctoral Rutgers Pharmaceutical Industry Fellowship (RPTF) Program.

The industry-based program is designed for individuals with a Doctorate of Pharmacy to further their experience in the pharmaceutical industry through work experience and clinical research partners.

Han is a clinical pharmacology/pharmacokinetic sciences fellow at the Novartis Institutes of BioMedical Research, where she supports all phases of drug development, from discovery to post-marketing.

"As an aspiring clinical pharmacologist, this program provides the training and support to gain expertise in clinical pharmacology and development," Han says.

Melathe is a U.S. Oncology Marketing postdoctoral fellow at Bayer Pharmaceuticals in Whippany, N.J. As a member of the brand team, he serves an ambassador for external facing products. He attributes his education at UB SPPS for preparing him for this role.

"UB School of Pharmacy and Pharmaceutical

Sciences gave me the opportunity to become clinically strong through a rigorous curriculum and to build a foundation for future success in a nontraditional pharmacist role," Melathe says.

The industry-based program is designed to further experience in the pharmaceutical industry through work experience and clinical research partners.



Jennifer Han (PharmD '19)



Anil Paul Melathe (PharmD '19)

# PharmD/MBA Students Named Western New York Prosperity Fellows

BY KARA SWEET

Four University at Buffalo PharmD/MBA students were named 2019-20 Western New York Prosperity Fellows.

The fellowships are made possible through support from the Prentice Family Foundation and assist students who are actively preparing for careers that further economic growth and

development in the region.

Each fellow is awarded scholarship and internship support for an academic year, based on financial need. Paid, credit-bearing internships assist fellows in acquiring both academic and practical experiences in their intended professions. Fellows are given the opportunity to intern in their chosen fields

of interest, in which they work alongside and are mentored by leaders in upper-level management.

"This fellowship is helping me in ways I couldn't imagine," says Kathryn Gentz (PharmD/MBA '22). "The ceiling for my career aspirations feels limitless now."



Kathryn Gentz (PharmD/MBA '22)  
Career Focus: Marketing and women's health



Peter Okoroza (BS '16 & PharmD/MBA '21)  
Career Focus: Collaborative practice between pharmacists and physicians



Neel Patel (PharmD/MBA '20)  
Career Focus: Drug manufacturing processes



Bryan Quinn (PharmD/MBA '20)  
Career Focus: Managed care pharmacy and the community setting



## 2019 UB Celebration of Student Academic Excellence Honorees

### Fulbright Program

Nabilia Ismail (PharmD '19)  
Finalist

### National Defense Science and Engineering Graduate Fellowship

Emily Bonacquisti, Pharmaceutical Sciences  
Nominee  
Natalie Smith, Pharmaceutical Sciences  
Nominee

### National Science Foundation Graduate Research Fellowship Program

Emily Bonacquisti, Pharmaceutical Sciences  
Honorable Mention

### UB Award for Excellence in Research, Scholarship and Creativity

Pharmaceutical Sciences  
Undergraduate Program  
Mairead Heavey (BS '19)  
Mokshada Kumar (PhD candidate)  
Shufang Liu (PhD candidate)  
Dominique Weeks (BS '19)

Pharmaceutical Sciences Graduate Program  
Amy Intini (BS '18 & MS '19)

# UB Students Prepare and Educate for Lifesaving Interventions

BY REBECCA BRIERLEY

Rho-Chi Honor Society students have always been thought of as leaders who offer tutoring and mentoring to students in academic need. However, to a dedicated group of Rho Chi students, academic support was not enough. Over the past two years, Rho Chi has participated in Erie County Department of Health's (ECDOH) Opioid Overdose Prevention "Train the Trainer" program. In this initiative, ECDOH representatives prepare students on how to recognize and respond to an opioid overdose incident—the students then take what they've learned to educate others, specifically other pharmacy and UB health sciences students.

During this two and a half-hour ECDOH training forum, students learn to recognize the signs and symptoms of opioid overdose, take appropriate actions to save someone from an opioid overdose and train in the proper administration of naloxone to reverse a possible overdose. At program completion, students receive a certificate attesting to their training in opioid overdose prevention, including the use of intranasal naloxone to prevent death from an opioid overdose.

As the opioid epidemic becomes more rampant throughout the country and in Western New York, Rho Chi believes that empowering UB pharmacy students as trainers of naloxone administration is part of their duty as future health care professionals. Melissa Fan, Rho Chi secretary, emphasizes the importance of their outreach. "With the availability of naloxone in the community pharmacy setting, pharmacists and pharmacy students are at the forefront of

tackling the opioid epidemic," she says. "It is our responsibility as health care providers to increase awareness of naloxone accessibility, identify signs of opioid overdose and administer naloxone when needed." She believes the next steps could include naloxone training as part of continuing education requirements for health care professionals.

Within the PharmD curriculum, students are presented with staggering statistics regarding opioid abuse, so the relationship between Rho Chi and the ECDOH is very important. By working closely with ECDOH, they will be able to conduct their own naloxone training

sessions in the community and at other UB health care professional schools. So far, Rho Chi has trained 90+ pharmacy students and a handful of UB physical therapy students. Future training sessions include School of Public Health and Health Professions students with a long-term goal of training all health sciences students and ensuring that

**90+**  
PharmD students  
trained in naloxone  
delivery by Rho Chi.

this important outreach program is known across campus.

Fan states, "Although this is only a small part of the battle against opioid overdose, every effort that we can make to educate our students and community on this epidemic is a significant step in the right direction."



Richard O'Brocta

# Making Connections in Experiential Education

BY KARA SWEET

**R**ichard O'Brocta, director of experiential education, loves making connections—with colleagues past and present, as well as with students and preceptors.

This passion for building relationships is what has driven his pharmacy career since he started as an intern at West Drug Store in his hometown of Dunkirk, N.Y. That led to four years serving as a pharmacist in the U.S. Air Force, where he gained valuable leadership skills.

While working at Olean General Hospital, first as a clinical pharmacist, then as director of pharmacy, O'Brocta got involved with teaching University at Buffalo medical students. This interprofessional work didn't go unnoticed—he was recruited to help launch the Lake Erie College of Osteopathic Medicine

(LECOM) School of Pharmacy in Erie, Pa.

At LECOM, he got more involved in pharmacy curriculum, in particular, the integration of experiential education. This provided him with a pathway to St. John Fisher College School of Pharmacy in Rochester, N.Y., then South University School of Pharmacy in Savannah, Ga. With each new role, he acquired more and more connections and became a resource for his fellow pharmacists.

“One consistent thing I've been able to do in my career is help others in my profession,” O'Brocta says. “I think that's very important in this field.”

O'Brocta was hired as the school's director of experiential education in 2019. Not surprisingly, his goal at UB is to enhance and expand relationships, creating an environment where students have the best learning experience possible.

“Assessment of data and getting input from everyone—preceptors, students, faculty—will foster continuous quality improvement and prepare our students for the future of pharmacy,” he says.

“This is a really dynamic school and I'm very happy to be a part of it.”



William Jusko

# A Lifetime of Scholarship in Pharmaceutical Sciences

BY KARA SWEET

**T**he year 2019 was one of leadership and productivity for SUNY Distinguished Professor and renowned pharmaceutical scientist William Jusko (BS '65 & PhD '70).

He was honored for his outstanding lifetime career achievements in pharmacometrics with the Lewis B. Sheiner Lecturer Award. This award is the highest recognition bestowed by the International Society of Pharmacometrics (ISoP).

Jusko studies the disposition and pharmacological effects of drugs and the optimization of dosing for immunosuppressive, anti-diabetic and cancer treatments. His work has led to significant advances in mathematical and computer modeling of the time-course of events following drug dosing.

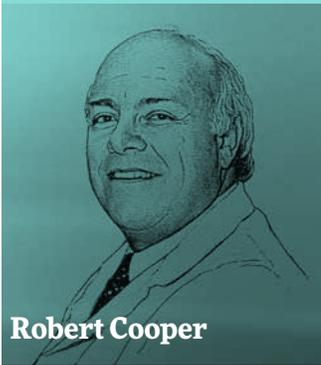
To further expand his research in drug effects on the body, Jusko received a \$2.9 million Maximizing Investigators' Research Award (MIRA) from the National Institute of General Medical Sciences, one of the National Institutes of Health. The MIRA program provides highly prolific researchers with a stable funding environment that allows for improved productivity to facilitate nimble, ambitious and creative research.

The five-year study will examine corticosteroid effects on genomic, metabolic, pharmacologic and physiologic responses in normal and arthritic animal models. “Our interdisciplinary collaboration offers the imagination and insight necessary to recognize new principles that emerge and underlie the complexities of how drugs, hormones and natural compounds work and

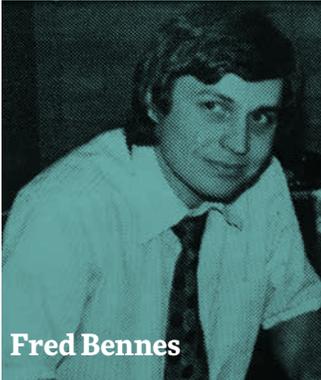
interact in the body,” Jusko says.

Jusko is also director of the UB Center of Excellence in Pharmacokinetics and Pharmacodynamics and is a fellow of the American College of Clinical Pharmacy, American Association of Pharmaceutical Scientists, American Association for the Advancement of Science and ISoP.

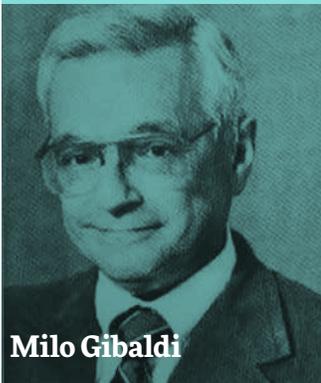
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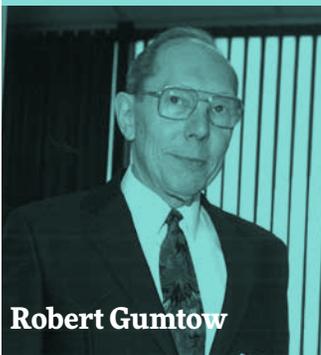
**Robert Cooper**



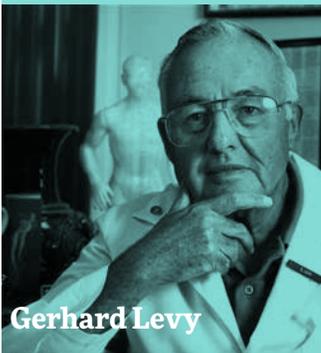
**Fred Bennes**



**Milo Gibaldi**



**Robert Gumtow**



**Gerhard Levy**

# Memorializing Past Faculty Leaders

BY REBECCA BRIERLEY

Strong faculty leadership is a tenet of our school. The knowledge and guidance of these past faculty leaders impacted thousands of UB SPPS students. In celebration of these individuals, you will find labs, classrooms and other school-wide areas dedicated to recognizing their significant contributions and continued impact on our students and the profession of pharmacy.

## New Memorials

### Robert Cooper

Robert Cooper, professor, pharmacy practice, was a member of the faculty from 1967-1995 and oversaw the professional practice lab and the Office of Student Affairs. In his honor, a portrait and memorial plaque was recently placed near the Professional Practice Laboratory. Because of his unique and empathetic teaching style, the 1975, 1983 and 1995 yearbooks were dedicated to him and the 1996 yearbook included a memorial page in his honor.

### Fred Bennes

Fred Bennes, clinical professor, pharmacy practice, was a member of the faculty from 1974-2010 and taught a variety of classes including pharmacotherapeutics and patient assessment. In his honor, a memorial photo collage was recently placed near the model pharmacy and patient assessment rooms. Bennes is remembered for his quick wit, voracious appetite for knowledge, and his love of teaching, family and friends.

**In addition to these recently placed memorials, we have memorial spaces throughout the school to pay tribute to the following scholarly and educational leaders:**

### Milo Gibaldi Computer Lab

Milo Gibaldi was a professor of pharmaceutics from 1966-1978. As a pioneering researcher, he was a leader in the areas of biopharmaceutics and pharmacokinetics, and in 1972 he established the first Clinical Pharmacokinetics Laboratory at Millard Fillmore Hospital. He was an elected member of the National Academy of Medicine, National Academy of Science.

### Robert Gumtow Library

Robert Gumtow began teaching at the school in 1962 and was an assistant professor of pharmacy from 1970-1994. He endured many physical challenges and these life obstacles taught him compassion and perseverance in his approach to teaching, mentorship, scholarship and health care.

### Gerhard Levy Seminar Room

Gerhard Levy was a professor of pharmaceutics from 1958-2000 and is widely considered the “father of pharmaceutical sciences” for his groundbreaking work in pharmacokinetics, biopharmaceutics and pharmacodynamics. In 1978, he received the Høst Madsen Medal from the International Pharmaceutical Federation, and he was the first pharmacist named to the National Academy of Medicine (formerly the National Institute of Medicine, National Academy of Science) in 1980.

# Recognizing Excellence

These faculty and staff members were recognized for their leadership and pioneering approaches to education and research in 2019



**Joseph Balthasar (BS '91, PhD '96)**, professor, pharmaceutical sciences, was appointed as the University at Buffalo's executive director of research initiatives.



**Karl Fiebelkorn (BS '78)**, senior associate dean for student, professional and community affairs, received a 2019 State University of New York (SUNY) Chancellor's Award for Excellence in Faculty Service.



**Kristin Gniazdowski, EdM**, associate dean, resource management, received a 2019 State University of New York (SUNY) Chancellor's Award for Excellence in Professional Service.



**William Jusko (BS '65 & PhD '70)**, SUNY Distinguished Professor of Pharmaceutical Sciences, is the 2019 recipient of the Lewis B. Sheiner Lecturer Award from the International Society of Pharmacometrics. Jusko also received a \$2.9 million Maximizing Investigators' Research Award program from the National Institutes of Health. (See page 16 for additional information.)



**William Prescott (PharmD '02)**, clinical professor and chair, pharmacy practice, has been selected as a fellow in the 2019-2020 Mid-American Conference Academic Leadership Development Program.



**Sathy Balu-Iyer, PhD**, professor, pharmaceutical sciences, was appointed as the school's associate dean for research.



**Javier Blanco, PhD**, professor, pharmaceutical sciences, received a \$438,000 R21 grant from the National Cancer Institute to explore the prevention of drug-related toxicity in children with Down syndrome and acute myeloid leukemia.



**Jun Qu, PhD**, professor, pharmaceutical sciences, received a 2019 University at Buffalo Exceptional Scholar Award for Sustained Achievement.



**Jason Sprowl, PhD**, assistant professor, pharmaceutical sciences, received a 2019 New Investigator Award from the American Association of Colleges of Pharmacy.

## Remembering Julie Kopfer



In October, we lost a treasured colleague and dear friend, Julie Kopfer.

For nine years, Julie worked as a program coordinator in the Office of Continuing Education, helping

to drive the school's continuing education initiatives, and always exemplifying the highest levels of dedication and teamwork.

Marsha Nelson, director of the Office of Continuing Education, says Kopfer will be remembered for her generous spirit. "She was the first to volunteer when there was a need for any school event, and working with the students and the community was at her core."

Outside of work, Kopfer volunteered for the March of Dimes, Juvenile Diabetes Research Foundation and Kidney Foundation of Western New York. She also held leadership roles in the Buffalo Niagara chapter of the Public Relations Society of America.

"We will miss her bright spirit and kind heart," says William Prescott (PharmD '02), interim chair, Department of Pharmacy Practice.

# Reunion 2019: A Time to Reconnect

BY KARA SWEET

Celebrating their reunion in 2019 were the classes of 1959, 1969, 1974, 1979, 1984, 1989, 1994, 1999, 2004, 2009 and 2014.

Reunion Weekend activities included a continuing education program on diabetes, tours of the Pharmacy Building, a walking tour of downtown Buffalo mansions and a cocktail reception and dinner at the Embassy Suites. Thank you to all alumni who attended and special thanks to all those who assisted as class representatives.\*



1959

Standing: Paul Myka, Robert Tompkins, Joseph Voelkl, Paul Scavone,\* Leonard Rosokoff,\* Sanford Rosenberg,\* Gary Treger, Mark Rosenfeld\* Seated: JoAnn (Giambelluca) Skaros, Joan (Kurch) Hector, Carol Fenlon-Gress, Rosemary (Crimaldi) Madejski\*



1969

L-R: John Proctor, Leon Kuczumski, Louise (Gelbrecht) Cooper,\* Donald Banas, Patricia (Bell) Hewitt, Dennis Gawronski (Not pictured: Richard Dobiesz\*)



1979

Margaret (Buchanan) Johnson,\* Dale Cary, Tina (Li) Fiebelkorn,\* Randall Smith, Cindy (Kaplan) Bennes, Kenneth Nizialek, Daphen (Moy) Shum, Christine (Alberici) Nizialek, Andrea (Adam) Link, Lynn (Forster) Daly, Don Daly, Karl Donn\*



THE HISTORY BEHIND  
NOVEL ITEMS IN OUR  
SCHOOL'S APOTHECARY

## The Emperor of Elixir

BY KARA SWEET

Ray Vaughn Pierce was nicknamed "The Prince of Quacks" and "The Emperor of Elixir." A graduate of The Eclectic Medical College in Cincinnati, Ohio, he moved to Buffalo, N.Y., in 1867 and began to manufacture a wide array of herbal products, most of them geared toward "female conditions" such as weakness and nervousness, and nearly all of them containing opium and alcohol.

A master of marketing and advertising, Pierce ran ads in newspapers, on billboards and on the sides of barns. By the early 1900s, nearly one million of his products were sold,

all of them manufactured in Buffalo. His publication "The People's Common Sense Medical Advisor," considered somewhat of a predecessor to the Physicians' Desk Reference, sold more than two million copies. (It also served as a clever way to further promote his products!)

Pierce used his charisma and popularity to earn a seat in the New York Senate from 1878-1879. He was also an elected member of the 46th United States Congress from 1879-1880. He died in 1914 in Florida, and is buried in Forest Lawn Cemetery in Buffalo.

# Prior Paths to Pharmacy Remembered

BY: REBECCA BRIERLEY

In 2019, new honorary plaques were placed in the pharmacy school to pay tribute to our post-baccalaureate trailblazers

## Post-Baccalaureate PharmD

Before the initiation of the PharmD degree in the early 2000's, practicing pharmacists or newly graduated pharmacy students with an interest in enhanced clinical pharmacy sought out the University at Buffalo School of Pharmacy's nationally renowned post-baccalaureate PharmD program. This two-year rigorous program, which began in the early 1970s, provided trainees with enhanced clinical and research training.

The post-bac PharmD program had 230 graduates in total and many are currently some of the most noted national and international pharmacy leaders across industry, academia and health care. Among these leaders are many of our current faculty and adjunct professors including: Kathleen Tornatore '81, Gene Morse '83, Mark Sinnett '87, Charles Maponga '88, Terry Dunn '89, Curtis Haas '89, Denise Swiatek '96, Raymond Cha '99, Donald Mager '99, Robert Wahler '00 and Kimberly Zammit '00.

Kris Jordan, coordinator for Advanced Pharmacy Practice Experiences and former administrative assistant for the post-bac program remembers it fondly. "I began my career here in 1987 working with those students," she recalls. "It has been truly amazing to watch these individuals become the leaders that they are today. I am proud to have been a very small part of their lives for the two years that I worked with each of them".

**“It has been truly amazing to watch these individuals become the leaders that they are today.”**

## Non-Traditional PharmD

After the conclusion of the post-bac PharmD, another degree option was added to bridge the gap for BS pharmacists to receive enhanced clinical training. From 2002-2006, the Non-Traditional PharmD program was offered. This two - three year program was offered during the evening to accommodate the schedules of busy practicing pharmacists.

The Non-Traditional PharmD program had 13 graduates who are also pharmacy leaders across the country. Current faculty adjunct professors who are graduates of our Non-Traditional program include: Tammie Lee Demler-Dodson '02, Daniel Guarasci '04 and Jeff Lombardo '04. As preeminent pharmacotherapy specialists, they are helping to shape delivery of health care.



1984

Tom Smith, Rachel (Spire) Smith,\* John Krake



1994

Stephan Brand, Mojdeh Mozayani, Cynthia (Leidich) Lackie,\* Christine (Topolski) Kirchman, Jodi (Jones) Selbig, Brian Burns



View more photos from our 2019 Reunion Weekend.



By the early 1900s, nearly **one million** of his products were sold, all of them manufactured in Buffalo

# TOP 5 LIST

# TOP 5 Musical GENRES

## For Faculty and Staff

1. Pop
2. Alternative/indie
3. Classic rock
4. Country
5. Jazz

## For Students

1. Pop
2. Rap/hip-hop
3. Alternative/indie
4. Heavy metal
5. Punk

## Pharmacists on Ice



BY KARA SWEET

**F**or several years in the late 1970s and early 1980s, the UB School of Pharmacy and Pharmaceutical Sciences had an intramural hockey team.

The team was established in 1975, with weekly practices taking place Saturday mornings at Tonawanda Twin Rinks at 1 a.m., the only time the ice was open. Games were held Tuesday nights against other intramural teams at UB.

Don Daly (BS '79) joined the team in 1977 and was the team captain for the 1978-79 season. "We recruited players and got a pretty decent team going," he says.

By 1979, the team was good. So good that they beat their main rival, the UB dental school, and captured the UB Hockey Intramural Championship title.

"It was a big deal for a smaller professional school like pharmacy to win an intermural league in a large university like UB," says Andrew DiLuca (BS '81), a member of the iconic 1978-79 team and captain of the 1981 team. "The USA beat Russia and also won the gold medal in the Olympics [in 1980], so hockey was more popular than ever."

The momentum continued for several years.

"In the 1979-80 season, we had a few guys from Canada, so we were a much better team," recalls Howie Levine (BS '80), who still plays the sport today.

Daly stopped playing hockey after he graduated, but kept his jersey, stick and helmet for nostalgia's sake.

"It wasn't like the Sabres taking the ice, but we sure had fun."



1979 UB Pharmacy Hockey Team

# Local Independent Pharmacy: Main Street to Hollywood

BY: REBECCA BRIERLEY

The values that independent pharmacies bring to their communities are immeasurable: front-line health care provider, community leadership and, for one local pharmacy, the bright lights of Hollywood. This past summer, Akron Pharmacy in Akron, N.Y., owned by Chuck George (BS '72,) was featured in the filming of "A Quiet Place: Part II," an American horror film, hitting theaters in spring 2020.

**G**eorge established Akron Pharmacy in 2002; it includes a gift shop showcasing many local products and employs 14 people whom George refers to as part of his extended family.

Over the summer of 2019, actor and director John Krasinski and his crew arrived in the small town of Akron to begin shooting. Akron's Main Street was transformed into a pre-apocalyptic horror set, with storefronts transformed to crumbling facades and the gift shop at George's Akron Pharmacy changed into a local store.

George states, "It was a great experience; the whole crew was in and out of our space, and I had the chance to meet Krasinski, his wife Emily Blunt and other members of the cast. [It was a] great opportunity for the Village of Akron! How often does a small independent pharmacy have the chance to be part of a major Hollywood movie?"

"A Quiet Place: Part II" gave Akron Pharmacy visibility on the national stage, but George knows the real pride accrues from the local community he serves. In a conversation, he gave us insights from his 28 years in retail pharmacy, with 17 of those years spent at Akron.

## Reflections from a Community Pharmacist

### Endless Rewards

"I have the opportunity to really get to know the majority of the people in the community, which is really rewarding and helps build a sense of confidence in the community. The

interactions I have with my patients and customers are not 'transactional.' They know me and I know them. They talk to me about their lives, kids and grandkids. I feel like they are a part of my family."

### Community Pharmacy= Community Support

"A large part of owning a community pharmacy, especially in a small town, is your support and integration into all aspects of the community: working with the Chamber of Commerce, supporting local events and organizations such as Boy Scout Troops, charity golf tournaments and barbecue dinners. It's a great way to get to know the community you serve and allows the community to get to know you, too."

### Advice to PharmD Students Interested in Independent Pharmacy

"Look at your target market area. What does the community look like? Are there other pharmacies nearby? Are there other health care providers in the area you could partner with? Understand you will need to be active in the community you will practice in. Be a good community steward and be prepared to work really hard, especially in the beginning. Long hours and long weeks are common, but the rewards are endless.

Always keep in mind, you are responsible for keeping a community healthy who otherwise may not have access to needed medication or health care counseling—and sometimes they'll just want a friend to have a cup of coffee with."



Director and actor John Krasinski and Chuck George



Chuck George at his pharmacy

"I have the opportunity to really get to know the majority of the people in the community, which is really rewarding and helps build a sense of confidence in the community."

# Always Believed in Helping Others and Giving Back

Ronald Evens, BS '69, PharmD, thanks UB with support



BY S. A. UNGER

Ronald P. Evens, BS '69, PharmD, a nationally recognized leader in biotechnology development and marketing, has made a generous estate commitment to scholarships in the School of Pharmacy and Pharmaceutical Sciences. The Evens Family Scholarship, “established in order to increase financial aid available to worthy PharmD students,” will be distributed to awardees for each of their four years in pharmacy school.

Evens, who is semi-retired, has enjoyed a prolific career that began in academia and later dovetailed with exponential growth in the biotechnology industry, starting in the late 1980s.

For thirteen years, beginning in 1989, he was head of the Professional Services Department at Amgen. “When I began there, the biotechnology industry only had about 10 products on the market, compared to about 400 now,” says Evens, who played a role in the Amgen’s early expansion. His group supporting health care professionals grew from 4 to 144 staff over 10 years with a \$50 million budget.

-----  
**“[T]he majority of my wealth I am giving back to society, to my profession and to education so that others can get a really good start in a really good program, like I had at UB.”**  
 -----

Prior to joining Amgen, Evens was associate director of clinical research and medical services at Bristol-Myers, conducting analgesic research. Before that he served in leadership positions in academia at the University of Texas at Austin, the University of Texas Center for Health Sciences at San Antonio, and at the University of Tennessee, where he was an associate professor and acting chair of

the Department of Pharmacy Practice. Currently, he consults with Tufts University in biotechnology and publishes his work.

In addition to his support for education, Evens has made substantial commitments to the disadvantaged in Buffalo, environmental causes and to the profession of pharmacy by establishing a future research program at the American College of Clinical Pharmacists.

A native of Tonawanda, NY, Evens grew up in a loving, but poor family. “My parents worked very hard, but I can remember being on welfare a few times when I was a child,” he recalls. “When it came to my education, I was on my own financially, but my parents always encouraged me and fostered in me an appreciation for education as an avenue to success.”

Evens made the best of his years at UB and has vivid memories of the “very challenging academic environment,” which he found stimulating, the friends he made and the superb mentors he had, including Kenneth Letcher, Gerhard Levy, Michael Schwartz and Milo Gibaldi. “I went to UB because it was my local state school,” he says. “I didn’t know it was a top five school, as was the University of Kentucky, where I did my PharmD and clinical residency training.”

Evens says he can’t think back on his years at UB in the 1960s without recalling the unrest on campus. “It was an era of rebellion,” he says. “Once, we had a major riot on the other end of campus while we were going to class. It was a crazy time, but we were a pretty dedicated group of students who worked really hard and played hard.”

For Evens, the concept of giving back — “passing forward,” as he calls it—is simple: “I have always believed in helping others, supporting others, because I came out of poverty. Through a lot of luck and some hard work, I’ve had success, but now I want to give back. My children will get something significant, but the majority of my wealth I am giving back to society, to my profession and to education so that others can get a really good start in a really good program, like I had at UB.”

# SUPPORT



“I remember being so thankful because those little tablets allowed him to be with us.”

McKenna Butler

Dean James O'Donnell,  
McKenna Butler and Kim O'Donnell

## O'Donnell Family Scholarship Established

### Inaugural recipient McKenna Butler exemplifies the purpose

BY S. A. UNGER

When James “Jim” O'Donnell, PhD, professor and dean of the School of Pharmacy and Pharmaceutical Sciences, and his wife, Kim, established the O'Donnell Family Scholarship, they could not have envisioned a more deserving inaugural recipient than McKenna Butler, a third-year PharmD student.

The O'Donnell Scholarship—which is awarded annually and includes a bequest commitment to fund a permanent endowment—is intended to promote excellence in research by providing support to a deserving PharmD student interested in research.

Butler, a native of Sayville, N.Y., on the south shore of Long Island, is the youngest of five children in a tight-knit family. As a child, she watched her father battle prostate cancer, a diagnosis he received when she was only two years old. “He was always going to doctor’s appointments, trying new chemotherapies,” Butler recalls. “I was about 14 when he enrolled in a clinical trial for a new oral regimen, and I remember being so thankful because those little tablets allowed him to be with us. Ever since then I’ve been fascinated by the pharmacy field and knew I wanted to be a pharmacist.”

In the years ahead, Butler hopes to complete an oncology pharmacy residency and pursue a career as a clinical pharmacy specialist. Currently, she is

working on a research project involving myeloma patients at Roswell Park Comprehensive Cancer Institute.

Sadly, Butler’s receipt of the O'Donnell Family Scholarship coincided with her father’s death in April 2019, but the support has only inspired her to give back in a similar way someday.

“I am so thankful to have been selected to receive this scholarship at this time,” says Butler. “I was able to meet Dr. and Mrs. O'Donnell recently, and they are such delightful and generous people who have made a great impact on my life. I am honored to be the first recipient of their scholarship, and I aspire to one day be in the position to pay it forward and continue to help students.”

The O'Donnells were very pleased to meet McKenna, as well. “She understands from her own experience how research closely coupled to patient care can lead to advances in the pharmaceutical sciences,” says Jim O'Donnell. “It is very meaningful to Kim and me to help McKenna and other students pursue their research interests.”

Kim O'Donnell says that she and her husband also hope to ease the debt burden assumed by many students today and “to free up some time for them to really absorb the process of being in school and not have to worry so much about where the money will come from to pay for it.”

*The gifts described in these stories are part of Boldly Buffalo: The Campaign for UB. This university-wide campaign, launched publicly in April 2018, will raise \$650 million to deliver transformative changes for the public research university, Western New York and around the world. The School of Pharmacy and Pharmaceutical Sciences has reached 93% of its \$31 million goal. Learn more at [buffalo.edu/campaign](http://buffalo.edu/campaign) or contact our Office of Advancement at 716-645-3432.*

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# SCHOLARLY PURSUITS

## Publications

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INCLUDES EPUBS AHEAD OF PRINT\*

### PHARMACY PRACTICE

#### ALBANESE, NICOLE P

Ladziak N, Albanese NP. Effect of changing COPD triple-therapy inhaler combinations on COPD symptoms. *Am J Manag Care*. 2019 Apr;25(4):201-204.

Woodruff AE, Albanese NP, Prescott WA Jr. Comparing Pharmacotherapy Instruction to the 2009 and 2016 ACCP Toolkit Recommendations. *Am J Pharm Educ*. 2018 Dec;82(10):6771. doi: 10.5688/ajpe6771.

#### BEDNARCZYK, EDWARD

Russak EM, Bednarczyk EM. Impact of Deuterium Substitution on the Pharmacokinetics of Pharmaceuticals. *Ann Pharmacother*. 2019 Feb;53(2):211-216. doi: 10.1177/1060028018797110.

#### CHA, RAYMOND

Bergen PJ, Smith NM, Bedard TB, Bulman ZP, Cha R, Tsuji BT. Rational Combinations of Polymyxins with Other Antibiotics. *Adv Exp Med Biol*. 2019;1145:251-288. doi: 10.1007/978-3-030-16373-0\_16.

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#### CIERI-HUTCHERSON, NICOLE E.

Griffin BL, Stone RH, El-Ibiary SY, Westberg S, Shealy K, Forinash A, Yancey A, Vest K, Karaoui LR, Rafie S, Horlen C, Lodise N, Cieri-Hutcherson N, McBane S, Simonyan A. Guide for Drug Selection During Pregnancy and Lactation: What Pharmacists Need to Know for Current Practice. *Ann Pharmacother*. 2018 Aug;52(8):810-818. doi: 10.1177/1060028018764447.

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Victor K, Skelly M, Mulcahy K, Demler TL, Trigoboff E. A review and study of aspirin utilization for the primary prevention of cardiovascular events in a psychiatric population. *Int Clin Psychopharmacol*. 2018 Sep;33(5):274-281. doi:10.1097/YIC.0000000000000228.

# Publications *continued*

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Leppien E, Demler TL. Examining prescriber perceptions of statin therapy and the potential implications these perceptions may have on guideline adherence. *Int Clin Psychopharmacol*. 2018 Sep;33(5):290–296. doi: 10.1097/YIC.0000000000000224.

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#### REVIEW BOARDS:

**22 faculty**  
**85 journals**

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\*publication format: National Library of Medicine: Citing Medicine, 2nd edition. The NLM Style Guide for Authors, Editors, and Publishers

# Grants

JULY 1, 2018 - JUNE 30, 2019

## PHARMACY PRACTICE

### BEDNARCZYK, EDWARD

**Health Research Inc.**  
Buprenorphine Academic Detailing

**Health Research Inc.**  
Opioid Prescriber Training Program

### Island Peer Review Organization

Special Innovation Project 1 for Innovations that Advance Local Efforts for Better Care at Lower Costs

### State University of New York

Evidence Based Clinical Research Collaboration Program

### CHA, RAYMOND

**University of Rochester**  
University of Rochester Center for AIDS Research/ URF  
AWDC527703

### DUNN, TERRY

#### ASHP Research and Education Foundation

Evaluation of Health Outcomes Associated with a Pharmacist's Telephone Intervention in Transitions of Care in Underserved Populations

### JACOBS, DAVID

#### Cost share for UL1TR001412 funded by the National Center for Advancing Translational Sciences

A Pilot Study to Evaluate Objective Assessment Tools to Improve Medication Management in Chronic Obstructive Pulmonary Disease

#### UB Clinical Scholar Program in Implementation Science to Achieve Triple Aims funded by National Heart Lung and Blood Institute

Development and implementation of a chronic obstructive pulmonary disease care transition intervention integrating pharmacists onto the care team

### MA, QING

#### Merck Sharp and Dohme Corporation

Doravirine Cerebrospinal Fluid (CSF) Pharmacokinetics in HIV-Infected Individuals

### MEANEY, CALVIN

**American College of Clinical**

### Pharmacy

T Regulatory Cell Response to Erythropoiesis Stimulating Agents Post-Renal Transplantation

#### American Association of Colleges of Pharmacy

Personalized Erythropoiesis in Hemodialysis Patients: The Novel PREDHICT Tool

MORSE, EUGENE

#### University of California at Los Angeles

ACTG Precautionary and Prohibited Medications Database (TO1)

#### University of California at Los Angeles

Laboratory Center (LC), AIDS Clinical Trials Group (TO4)

#### Fogarty International Center

Global Infectious Diseases Research Training Program

#### University of Rochester

Center for Health + Technology

#### National Institute of Allergy & Infectious Disease

Clinical Pharmacology Quality Assurance

#### Fogarty International Center

HIV Research Training Program

#### University of Rochester

University of Rochester HIV/AIDS Clinical Trials Unit

#### University of Rochester

Chronic Exposure to cART Predispose Older HIV Infected Individuals to CNS Injury

### TORNATORE, KATHLEEN

#### National Institute on Aging

Age and Race Influences on Immunosuppression after Renal Transplant

### TSUJI, BRIAN

**Duke University**  
Antibacterial Resistance Leadership Group (ARLG)

#### National Institute of Allergy & Infectious Disease

Novel PK/PD Strategies for Polymyxin Combination against Gram-negative Superbugs

### WAHLER, ROBERT

#### IITG

Development of a Micro-Credential on the Newly Developed Pharmacist Patient Care Process for Use in Pharmacy and Health Profession Programs: Promoting Patient-Centered Care

## PHARMACEUTICAL SCIENCES

### BALTHASAR, JOSEPH

#### Center for Protein Therapeutics

Tumor selectivity of anti-carcinoembryonic antigen scFv, scFv-ABD, and monoclonal

#### Center for Protein Therapeutics

Dynamic contrast enhanced magnetic resonance imaging for the prediction of monoclonal

#### National Cancer Institute

Catch and Release Immunotoxins: CAR-bombs for Cancer

### BALU-IYER, SATHY

#### NYS Economic Development

UB Center for Advanced Technology in Big Data and Health Sciences

#### Center for Protein Therapeutics

Study viable approaches for oral delivery of colon-targeting macromolecules (e.g. targeting TNF for IBD), and understand the gut absorption mechanism following oral delivery

#### National Heart Lung and Blood Institute

HL-development and Pharmacology of novel lipidic rAHF and biotherapeutics

### BIES, ROBERT

#### Merck Sharp and Dohme Corporation

Visiting Scholar: Nikhil Pillai

#### U.S. Food and Drug Administration

Physiologically-based model of the female reproductive tract: vaginal and intrauterine delivery components- Support New Approaches to Improve Product Manufacturing and Quality

#### Magee-Womens Research Institute and Foundation

Film Antiretroviral Microbicide Evaluation

#### U.S. Army Medical Research Acquisition Activity

Understanding the Relative Contributions of and Critical Enzymes for the Three Pathways for Intracrine Metabolism of Testicular Androgens in Advanced Prostate Cancer

### BLANCO, JAVIER

#### Board of Trustees of the University of Alabama Birmingham

Understanding the Molecular

Underpinnings of Anthracycline-related Cardiomyopathy in Childhood Cancer Survivors

#### Eunice Kennedy Shriver National Institute of Child Health & Human Development

Epigenetic Regulation of FcRn Expression in Human Lung and its Role in the Disposition of Monoclonal Antibody Drugs

#### National Institute of General Medical Sciences

Contributions of CBRs and AKRs to the Pharmacodynamics of Anthracycline Drugs

### JUSKO, WILLIAM

#### National Institute of General Medical Sciences

Mechanistic Pharmacokinetics and Pharmacodynamics

#### National Institute of General Medical Sciences

Corticosteroid Pharmacokinetics and Pharmacodynamics

### KRZYZANSKI, WOJCIECH

#### Bristol Meyers Squibb

UB-BMS Training Program

#### La Jolla Pharmaceutical Corporation

Master Services Agreement: MRI Quantification of Iron Overload in Belgrade Rats

### MAGER, DONALD

#### Beckman Research Institute of the City of Hope

Optimizing GVHD Prevention with Systems Pharmacology Models

#### MedImmune

Tumor Kinetic and Survival/ Dropout Modeling of Durvalumab for Multiple Cancer Types

#### Boston Children's Hospital

Immunologic and Neurodevelopmental Consequences of Neonatal Anemia and Thrombocytopenia and their Treatments

#### F Hoffmann-La Roche Limited

Mechanistic Modeling in Hematology to systematically Explore Factors Contributing to Differences in anti-CD20 Therapy Outcomes and to Inform Optional anti-CD20 Combination Strategies

#### Center for Protein Therapeutics

PK/PD Modeling of Liposomal IL-12 Enhancement of Human Tumor-Specific T Cell Killing In A Novel

**MORRIS, MARILYN**

**National Institute on Drug Abuse**  
Gamma-Hydroxybutyrate: Toxicokinetics, Toxicodynamics and treatment Strategies

**Center for Protein Therapeutics**  
Visualizing the Renal Disposition of Proteins and Peptides using Two-Photon Microscopy

**Center for Protein Therapeutics**  
BCSFB transport of protein therapeutics: Influence of Type 2 Diabetes

**NYUGEN, JULIANE**

**NYS Department of Economic Development**  
Bio-nanotechnology applications at SUNY Buffalo

**National Institute of Biomedical Imaging and Bioengineering**  
RNA EXO-Codes: A novel way to reprogram pathological exosomes

**National Science Foundation**  
CAREER: Active-Loadable Poresomes for the Cytoplasmic Delivery of Membrane-Impermeable

**QU, JUN**

**AbbVie Incorporated**  
Comprehensive characterization of upregulated proteases in diseased vs normal tissues

**Wake Forest University Health Sciences**  
GMPS-GMPR axis melanoma progression and therapy

**University of Rochester**  
Modeling Mechanisms of Adjuvanted Influenza Vaccine induced IgG Repertoire Diversity and Heterosubtypic Immunity URF

**Center for Protein Therapeutics**  
Extensive investigation of ocular tissue disposition of antibody-drug conjugates and the ocular toxicity using novel LC-MS-based strategies

**Center for Protein Therapeutics**  
Sensitive, accurate investigation of biotherapeutics and biomarker/target levels in both fresh and FFPE tissues, and application in Inflammatory bowel diseases

**RAMANATHAN, MURALI**

**Otsuka Pharmaceutical Development and Commercialization Inc.**  
Adherence Modeling of Digital Medicine Data

**National Institute of**

**Neurological Disorders & Stroke**  
Cholesterol Biomarkers and Oxysterols in Multiple Sclerosis Progression

**SHAH, DHAVAL**

**National Institute of Allergy and Infectious Disease**  
Modulation of antigen pharmacokinetics with pH dependent antibody

**Oncolinx LLC**  
Fellowship Agreement: Ashwani Verma

**National Institute of General Medical Sciences**  
Translational Systems Pharmacokinetic Models of Novel Anticancer Biologics

**Center for Protein Therapeutics**  
Brain Pharmacokinetics of Different Size Antibody Fragments

**Center for Protein Therapeutics**  
Clinical Validation of Antibody PBPK Model Using 89Zr Labelled Imaging Studies

**SPROWL, JASON**

**American Association of Colleges of Pharmacy**  
Regulation of SGLT1 function by tyrosine kinase inhibitors

**STRAUBINGER, ROBERT**

**National Cancer Institute**  
Large-scale proteome-wide analysis with high accuracy/precision to guide pancreatic cancer therapy development

**Royal Society of Chemistry**  
Short term visit by UCD graduate student Cara Moloney

**Ipsen Bioscience Incorporated**  
Ipsen Es1e 2017-19

**Center for Protein Therapeutics**  
Multiparametric MRI-based physiological imaging to predict mAb penetration and efficacy in pancreatic cancer

**Merrimack Pharmaceuticals Incorporated**  
M398/M310 Testing Services

**National Cancer Institute**  
Tumor priming sequences combined with novel nanoparticle drug carriers for enhanced therapeutic efficacy in pancreatic cancer

**XU, YING**

**Tetra Discovery Partners**  
SBIR - Phosphodiesterase-4B (PDE4B) Inhibitors for Psychiatric Disease



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