

Indispensable News

MinneCeutics

PHARMACEUTICS FACULTY

William F. Elmquist
 Carolyn A. Fairbanks
 Karunya K. Kandimalla
 Hongbo Pang
 Jayanth Panyam
 Henning Schroeder
 Ronald A. Siegel
 Changquan Calvin Sun
 Raj G. Suryanarayanan
 Timothy S. Wiedmann

AFFILIATE FACULTY

Aktham Aburub, *Eli Lilly & Co.*
 Walid M. Awni, *AbbVie*
 Richard C. Brundage, *Experimental & Clinical Pharmacology, University of Minnesota*
 Lester R. Drewes, *Biochemistry & Molecular Biology, University of Minnesota-Duluth*
 Virginia Ghafoor, *University of Minnesota Medical Center*
 Michael D. Karol, *Synta Pharmaceuticals*
 Purna Kashyap, *Mayo Clinic College of Medicine*
 David A. Largaespada, *Genetics, Cell Biology & Development, University of Minnesota*
 Z. Jane Li, *Pharmaron*
 Mukesh Pandey, *Radiology, Mayo Clinic College of Medicine*
 Swayam Prabha, *Experimental & Clinical Pharmacology, University of Minnesota*
 Theresa M. Reineke, *Chemistry, University of Minnesota*
 Jann N. Sarkaria, *Radiation Oncology, Mayo Clinic*
 Ronald J. Sawchuk, *emeritus*
 Evgeniy Y. Shalaev, *Allergan*
 Chun Wang, *Biomedical Engineering, University of Minnesota*
 Zheng Yang, *Bristol-Myers Squibb*
 Joseph A. Zasadzinski, *Chemical Engineering & Materials Science, University of Minnesota*
 Cheryl L. Zimmerman, *emeritus*

From the Department Head

Greetings Dear Friends!

Once again, the summer sun fades as autumn's chill draws near, but what a summer it was! Our department saw a flurry of activity this June with the 4th David Grant Symposium and the 50th Annual Pharmaceutics Graduate Student Research Meeting (PGSRM-2018) held only one week apart on the University of Minnesota Twin Cities campus. While both events were highly successful, we are especially proud of our students' accomplishments, made all the stronger by your contributions, in their planning and execution of PGSRM-2018. We applaud their efforts as this year's host and wish the best to the University of Wisconsin-Madison with next year's event.

If you weren't able to join us for the David Grant Symposium or PGSRM-2018, I invite you to catch up at this year's Minnesota Alumni Breakfast which will be held at 7:00 AM on November 5th at the Marriott Marquis Washington, DC. Dr. Swati Nagar, a former student of Dr. Cheryl Zimmerman, will be our featured keynote speaker.

June also brought many new faces to our labs as we launched our first summer undergraduate research program. This year's participants were eight undergraduate students from the University of Minnesota and surrounding schools. Given the positive feedback we received, we are eager to offer the program again next year to more bright, young researchers with a burgeoning interest in pharmaceutics. Additionally, the recent expansion of our self-funded MS program attracted seven new MS students this fall. Joining them are eight new PhD students, resulting in the largest Pharmaceutics graduate class matriculation in recent past. Read more about our new students on page 6.

As our department membership has grown, we have committed to updating and evolving our spaces. Recently, we made several student-friendly upgrades including reorganizing the space in the lunchroom, installing personal lockers, and creating an additional meeting/presentation space. Feel free to drop by and check out these transformations!

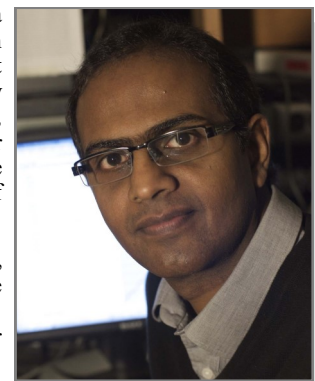
In July, we congratulated Dr. Carolyn Fairbanks on her promotion to the Associate Dean for Research position, where she will have the opportunity to "develop research priorities, respond to new research opportunities, and support research career development" for the University of Minnesota College of Pharmacy. Dean Lynda Welage welcomed Dr. Fairbanks into the role and shared in our confidence that she will help advance the college's research mission.

Given her new appointment and responsibilities, Dr. Fairbanks decided to step down as the Department of Pharmaceutics Associate Department Head and Dr. Changquan Calvin Sun agreed to step into the position. Dr. Sun will continue as the Director of Graduate Studies and so Dr. Karunya Kandimalla was appointed Associate Director of Graduate Studies to assist with the workload, be more proactive with student issues, and expand student services.

Finally, Dr. Hongbo Pang joined our department this January and spent the summer building his lab. We look forward to his contributions and seeing where his research will take us in the next few years. If you're in the area, feel free to introduce yourself and welcome him to the University of Minnesota community.

As always, I welcome your feedback on any department activity and hope to see you at various professional meetings soon. If you plan to be in the Twin Cities, please stop by for a visit!

Until then,
Jayanth Panyam, PhD
 Professor and Department Head



Alumni News

Amardeep Bhalla, PhD [2007], recently joined Regeneron Pharmaceuticals as a director in formulation development. Part of his responsibilities includes leading a team looking at sustained/depot delivery.

Paroma Chakravarty, PhD [2010], presented a seminar to the Department of Pharmaceutics in fall 2018 titled *Understanding 'Disorder' in the Drug Development Pipeline: An Industry Perspective*. She is currently a scientist in the Materials Characterization Group at Genentech, Inc. in San Francisco, California and works closely with both process chemists and formulators on solid form screening, crystallization, drug substance, and drug product characterization.

Michelle Fung, PhD [2017], is currently a senior scientist at Merck.

Ameya Kirtane, PhD [2015], received the 2018 STAT Wunderkind Award. He is one of 30 healthcare scientists/clinicians selected from across North America who are at the cusp of launching their independent scientific careers.

Sampada Koranne-Telang, PhD [2018], was selected Speaker of the Class and gave a keynote speech at the 2018 College of Pharmacy Hooding Ceremony. She is currently a senior pharmaceutical materials scientist at Merck.

Mak Jawadekar, PhD [1982], hosted Lamborghini company chairman, Tonino Lamborghini, in India and helped him with creating business partnerships in Mumbai and Pune, India. He will also serve on the Lamborghini advisory board. Mr. Lamborghini visited India, along with his son, Ferruccio, and daughter, Ginevra.

Mak also accompanied the Lamborghinis as they met with the Prime Minister of India, Narendra Modi, and the Chairman of Virgin Atlantic Airlines, Sir Richard Branson.

In February 2018, he received an honorary doctorate degree, along with Mr. Lamborghini and Mr. Greg Reid, from DY Patil University in Mumbai.

Robert G. Thorne, PhD [2002], presented a seminar to the Department of Pharmaceutics in fall 2018 titled *Drug Delivery to the Brain: Physiologic Considerations and the State-of-the-Art for Bypassing the CNS Barriers with Biologics*. He is currently an assistant professor in the Pharmaceutical Sciences division at the University of Wisconsin-Madison.

Yuanyuan Xie, PhD [2008], is currently working in Shanghai as a director in pharmaceutical product development at Prinbury Biopharm Co, Ltd.

Zheng Yang, PhD [1997], presented a special seminar to the Department of Pharmaceutics titled *Application of PK/PD Principles and Model-Based Approaches to Facilitate Knowledge Integration and Translational Research* and gave several lectures in our Advanced Pharmaceutics course in May 2018. He is currently a senior director of drug research and development at Bristol-Myers Squibb and an adjunct faculty member in the Department of Pharmaceutics.

Send your alumni news and pictures to
[pceuts@umn.edu!](mailto:pceuts@umn.edu)



Left to Right: Raj Suryanarayanan and Paroma Chakravarty



Left to Right: Mak Jawadekar, Tonino Lamborghini, and Ginevra Lamborghini



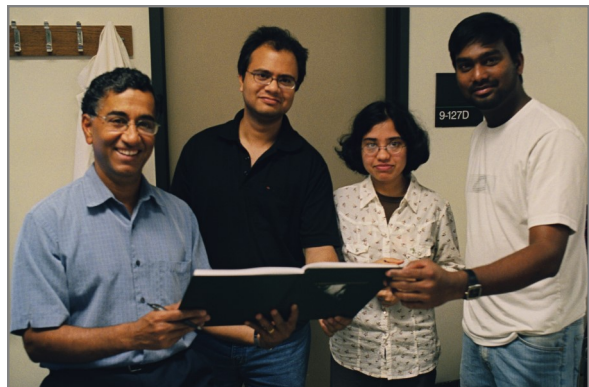
Sampada Koranne-Telang



Left to Right: Clarissa Burt, Ginevra Lamborghini, Tonino Lamborghini, Mak Jawadekar, Greg Reid, and Ferruccio Lamborghini

Alumni News (cont.)

A Blast from the Past!



From the Director of Graduate Studies

Dear Friends and Colleagues,

The essence of life is change; a principle of which the weather in Minnesota is a constant reminder. Particularly this fall, when the southeastern US hurricanes brought about seemingly endless days of gray, gloomy rain to Minnesota and we felt like we would never see the bright, blue sky ever again. Yet it has reappeared, hailing the autumnal transformation of the leaves from their lush green to golden yellows, vibrant oranges, and fiery reds, not to mention our championed maroon and gold.

Thus it is vital that, in these evolving and turbulent times, we remain anchored to our principles with the belief that the light of our efforts will be seen. Last year, for example, our faculty remained committed to training and mentoring graduate students to become the best pharmaceutical scientists in the world. Their high standards, coupled with student tenacity and determination, paved the way for securing multiple American Association of Pharmaceutical Scientists (AAPS) and International Pharmaceutical Excipients Council (IPEC) awards for research excellence.

Recognizing that our teaching team needed to expand, we hired with the intent to enhance our ability to train students in the areas of protein engineering and targeted drug delivery. Thus, we were excited to welcome Dr. Hongbo Pang to our faculty team as an assistant professor this past January 2018. We are confident that his creative presence will help us achieve our goals.

Our talented staff has also remained committed to efficiently and compassionately addressing student needs. Their recent efforts in organizing our interview day, which is a critical first point of contact with our future students, have proven highly successful as evidenced by the admission of seven PhD and eight MS students this year. With our department's enrollment elevated to a historically high number of current students, Dr. Karunya Kandimalla has stepped in as Associate Director of Graduate Studies to help manage the growth of our graduate program and bring personalized guidance to our students.

At the university and collegiate levels, there is now a greater commitment to increasing the diversity and number of domestic students in our graduate program. In response, last summer we launched a research program designed to engage undergraduate students early in their degree programs. The program shows promise as, at its conclusion, several interns expressed their interest in applying to our graduate program in the near future.

All of these layers of commitment prove that our success is neither automatic nor accidental. Rather, our current trajectory was formed by the dedication of our students, staff, and faculty as well as the continued achievement and support of our alumni. To sustain this journey, now more than ever, we need support in the form of fellowships, mentored summer internships, and industrial and academic visitors who bring vital working knowledge to our department. Only if we continue to work together can we continue to nourish the University of Minnesota Department of Pharmaceutics network that helped us all become who we are today and keep it thriving for those to come.

In addition to this annual newsletter, you can learn more about the great strides being taken by our department's faculty, students, and staff toward innovative research and academic excellence via our department's LinkedIn, Facebook, and Twitter pages. We invite you to follow us and comment on our updates as we are eager to hear from you. Otherwise, we hope you will join us at the Minnesota Alumni Breakfast on November 5th from 7:00 to 8:00 AM in the University of DC Room at the Marriott Marquis Washington, DC.

In closing, we hope that when looking at the changing leaves you can remember your alma mater with sentimental pride.

Sincerely,

Changquan Calvin Sun, PhD

Professor and Director of Graduate Studies

Karunya Kandimalla, PhD

Associate Professor and Associate Director of Graduate Studies



Graduate Student News



Degrees Earned in 2017-2018

Hyunjoon Kim, PhD

Thesis: *TLR7/8 Agonist Encapsulating Polymeric Nanoparticles for Cancer Immunotherapy*

Advisor: Dr. Jayanth Panyam

Minjee Kim, PhD

Thesis: *Delivery and Efficacy of Targeted Therapeutics and Imaging Agents for Brain Tumors*

Advisor: Dr. William Elmquist

Sampada Koranne, PhD

Thesis: *Physical Stability of Pharmaceutical Salts and Cocrystals in Drug Product Environment*

Advisor: Dr. Raj Suryanarayanan

Yafan Su, MS

Thesis: *Effects of Freezing and Freeze-Drying on Protein Conjugated Nanoparticles*

Advisor: Dr. Jayanth Panyam

2018-2019 Graduate Fellowship Recipients

The *David J.W. Grant and Marilyn J. Grant Fellowship in Physical Pharmacy* is awarded to students whose research is focused in physical pharmacy. This year it was awarded to **Kunlin Wang** (advisor: Dr. Changquan Calvin Sun).

The *Edward G. Rippie Fellowship in Pharmaceutics* is awarded to students with a consistent and outstanding academic record. This year it was awarded to **Kunlin Wang** (advisor: Dr. Changquan Calvin Sun).

The *Ronald J. Sawchuk Fellowship in Pharmacokinetics* is awarded to a graduate student whose research is focused in pharmacokinetics. This year it was awarded to **Minjee Kim** (advisor: Dr. William Elmquist).

The *Rory P. Remmel and Cheryl L. Zimmerman Fellowship in Drug Metabolism and Pharmacokinetics* is awarded to students that have chosen a thesis advisor whose research encompasses drug metabolism or pharmacokinetics. This year it was awarded to **Surabhi Talele** (advisor: Dr. William Elmquist).

The *University of Minnesota Graduate School Doctoral Dissertation Fellowship* is awarded to top graduate students as they are preparing to defend their PhD theses. This year it was awarded to **Gautham Gampa** (advisor: Dr. William Elmquist).

The *Theodore H. Rowell Graduate Fellowship* is awarded to graduate students who have completed at least two years of study in a pharmaceutical sciences program with preference given to students interested in nutrition or drug delivery systems. This year it was awarded to **Krutika Harish Jain** (advisor: Dr. Ronald Siegel).

The *Lyle D. Bighley and Sharon Bighley Graduate Fellowship* was established to support graduate students working in the biomedical health sciences and recognizes excellence in students conducting research in laboratories with an emphasis on collaborative and interdisciplinary work. This year it was awarded to **Krutika Harish Jain** (advisor: Dr. Ronald Siegel) and **Kelsey Pflipsen** (advisor: Dr. Carolyn Fairbanks).

The *Pharmaceutical Research and Manufacturers of America Foundation (PhRMA) Pre-Doctoral Fellowship in Pharmaceutics* is awarded to students who have completed most of their pre-thesis requirements and be engaged in thesis research as PhD candidates by the time the award is activated. This year it was awarded to **Davin Rautiola** (advisor: Dr. Ronald Siegel).

The *3M Science and Technology Fellowship* is awarded to a promising student with interests in drug development. This year it was awarded to **Sneha Rathi** (advisor: Dr. Jayanth Panyam).

Graduate Student News (cont.)

Welcome New Students!

Fangyi Dong

MS advisor: Dr. Jayanth Panyam

- Bachelor of Science in Kinesiology, University of Massachusetts Amherst
- Bachelor of Science in Nutrition, University of Massachusetts Amherst

Mokshada Kumar

MS advisor: Dr. Swayam Prabha

- Bachelor of Pharmacy, Mumbai University

Rahul Lalge

PhD advisor: Dr. Raj Suryanarayanan

- Master of Science in Pharmaceutical Sciences, University of Mississippi
- Bachelor of Technology in Pharmaceutical Sciences and Technology, Institute of Chemical Technology, Mumbai

Jinghan Li

MS advisor: Dr. Raj Suryanarayanan

- Bachelor of Science in Pharmaceutics, Shenyang Pharmaceutical University

Yuexuan Li

PhD advisor: Dr. Hongbo Pang

- Bachelor of Science in Pharmaceutical Science, Fudan University

Zhengxuan Liang

MS advisor: Dr. Changquan Calvin Sun

- Bachelor of Science in Basic Pharmacy, Shenyang Pharmaceutical University

Anqi Lu

MS advisor: Dr. Jayanth Panyam

- Bachelor of Science in Pharmaceutical Analysis, Shenyang Pharmaceutical University

Sneha Rathi

PhD advisors: Dr. Jayanth Panyam & Dr. Swayam Prabha

- Master of Science in Pharmaceutics, National Institute of Pharmaceutical Education and Research (NIPER) Hyderabad
- Bachelor of Pharmacy, Institute of Chemical Technology, Mumbai

Vrishali Salian

MS advisor: Dr. Karunya Kandimalla

- Bachelor of Pharmacy, Principal KM Kundnani College of Pharmacy

Manan Shah

MS advisor: Dr. Jayanth Panyam

- Bachelor of Technology in Pharmaceutical Sciences and Technology, Institute of Chemical Technology, Mumbai

Zekun Shao

PhD advisor: Dr. Jayanth Panyam

- Bachelor of Science in Biopharmacy, Huazhong University of Science and Technology

Sichen Song

MS advisor: Dr. Ronald Siegel

- Bachelor of Science in Pharmacy, Shenyang Pharmaceutical University

Joel Updyke

PhD advisor: Dr. Ronald Siegel

- Bachelor of Bioproducts and Biosystems Engineering, University of Minnesota Twin Cities
- Bachelor of Science in Chemistry, University of Minnesota Twin Cities

Gerrit Vreeman

PhD advisor: Dr. Changquan Calvin Sun

- Bachelor of Science in Chemistry, University of Minnesota Twin Cities

Yihan Wang

PhD advisor: Dr. Hongbo Pang

- Master of Science in Pharmaceutical Sciences, Wayne State University
- Master of Science in Pharmaceutical Engineering of Chinese Pharmacy, Shanghai University of Traditional Chinese Medicine
- Bachelor of Science in Pharmaceutics, Shenyang Pharmaceutical University



Front Row (Left to Right): Manan Shah, Mokshada Kumar, Jinghan Li, Yuexuan Li, Sneha Rathi, Sichen Song, Joel Updyke

Back Row (Left to Right): Rahul Lalge, Yihan Wang, Vrishali Salian, Gerrit Vreeman, Zekun Shao, Zhengxuan Liang, Anqi Lu, Fangyi Dong

Graduate Student Activities

Kweku Konadu Amponsah-Efah has been selected to receive the 2018 International Pharmaceutical Excipients Council (IPEC) Foundation Graduate Student Scholarship Award. The award will be presented to him at the American Association of Pharmaceutical Scientists (AAPS) annual meeting in Washington, DC this November 2018, at which Kweku will also present two posters: *Characterizing the Nature of Drug-Polymer Complexes in Aqueous Solution Using Analytical Ultracentrifugation* and *Probing the Temperature-Dependence of Structural Relaxation Times Deep in the Glassy State of Amorphous Pharmaceuticals*.

Kweku was awarded a 2018 Robert L. Snyder Student Travel Grant which consisted of a waived registration fee for the 2018 Denver X-Ray Conference (DXC) and \$500 toward travel expenses.

Kweku also won the Judge's Choice award in the College of Pharmacy Three Minute Thesis Competition in September 2018. He will go on to compete in the University-level competition this November 2018.



Kweku gave the following presentations this past year:

- *Relationships Between Molecular Mobility and Physical Stability of Amorphous Pharmaceuticals*. Biomaterials and Pharmaceutical Materials Program Review Group, Industrial Partnership for Research in Interfacial and Materials Engineering (IPRIME) Annual Meeting, Minneapolis, Minnesota (May 2018).
- *The Influence of Drug Polymer Interactions on the Dissolution Performance of Amorphous Solid Dispersions*. Analysis and Pharmaceutical Quality (APQ) Town Hall Meeting, American Association of Pharmaceutical Scientists (AAPS) Annual Meeting, San Diego, California (November 2017).

Hongbo Chen won a 2018 PharmSci 360 Best Abstract Award for his research, *Simultaneous Improvement of Manufacturability and Dissolution Performance of Indomethacin by Spherical Co-Crystallization*.

Ben Clements received a 2017-2018 Outstanding Teaching Assistant Award for his exceptional work with students and faculty in the PharmD program.

Gautham Gampa served as the Fundraising Co-Chair on the PGSRM-2018 planning committee.

Gautham published three manuscripts and gave the following oral presentations this past year:

- *Delivery of Active Drug Concentrations to Brain Tumor Targets*. American Society for Pharmacology and Experimental Therapeutics (ASPET) Annual Meeting at Experimental Biology 2018, San Diego, California (April 2018).
- *Delivery of Novel Targeted Therapies for the Treatment of Brain Tumors*. University of Minnesota Brain Tumor Program (UMBTP) Data and Journal Club, Minneapolis, Minnesota (January 2018).
- *The Quest for a Brain Penetrant MEK Inhibitor: E6201*. 12th International Conference on Cerebral Vascular Biology (CVB) 2017, Melbourne, Australia (November 2017).

Gautham was awarded a UMBTP Travel Award and a CVB 2017 Travel Grant.

Gautham also represented the University of Minnesota Table Tennis team at the College Table Tennis National Championships held in Round Rock, Texas in April 2018.

Gautham married Divya in a beautiful ceremony that took place in Hyderabad, India in February 2018.



Graduate Student Activities (cont.)

Krutika Harish Jain served as Scientific and Publications Chair on the PGSRM-2018 planning committee.

Krutika was selected as a graduate student consultant in the Economic Development Fellows (EDF) Consulting Program. The purpose of this university program is to connect local companies with graduate and professional students and post-doctoral associates seeking business consulting opportunities.

Navpreet Kaur has started her research on the impact of lattice disorder on the solid-state stability of pharmaceutical cocrystals and salt hydrates. She presented posters of her research on cocrystal dissociation at the 4th David Grant Symposium in June 2018 and the Denver X-Ray Conference (DXC) in August 2018. She received a 2018



Robert L. Snyder Student Travel Grant which consisted of a waived registration fee for DXC 2018 and \$500 toward travel expenses.

Navpreet is serving on the College of Pharmacy's Graduate Education Policy Committee (GEPC) as a graduate student representative for the 2018-2019 academic year. The committee provides advice and counsel to the dean to promote graduate education, research, and scholarly activities in the college.

Navpreet's extracurricular activities include reading, painting, and hiking.

Vidhi Khanna served as Co-Chair on the PGSRM-2018 planning committee. She also gave the following presentations this past year:

- *Therapeutic Efficacy of Antibodies Targeting Domain 1 of HSPG2 Breast Cancer.* American Association for Cancer Research (AACR) Annual Meeting, Chicago, Illinois (April 2018).
- *HSPG2/Perlecan as a Novel Target in Metastatic Cancers.* 8th Annual Cancer Research Symposium, Masonic Cancer Center, University of Minnesota, Minneapolis, Minnesota (March 2018).

- *HSPG2/Perlecan as a Therapeutic Target in Metastatic Triple Negative Breast Cancer.* 2018 Globalization of Pharmaceutics Education Network (GPEN) Conference, Singapore (September 2018).

Hyunjoon Kim gave the following presentations this year:

- *Acid-Responsive, Immunostimulatory Nanoparticles for Cancer Immunotherapy.* American Association for Pharmaceutical Scientists (AAPS) Annual Meeting, San Diego, California (November 2017).
- *Nanoparticle-Based Whole Tumor Vaccine for Bladder Cancer Therapy.* Donald Gleason Conference on Prostate and Urologic Cancers, Minneapolis, Minnesota (November 2017).
- *Nanoparticle-Based Vaccine for Bladder Cancer.* Prostate and Urologic Cancers Translational Working Group Meeting, Minneapolis, Minnesota (February 2018).
- *Nanoparticle-Based Tumor Cell Lysate Vaccine for Cancer Immunotherapy.* American Association of Cancer Research (AACR) Annual Meeting, Chicago, Illinois (April 2018).
- *Immunostimulatory Nanoparticles for NK Cell-Mediated Cancer Immunotherapy.* Industrial Partnership for Research in Interfacial and Materials Engineering (IPRIME) Annual Meeting, Minneapolis, Minnesota (May 2018).
- *Polymeric Nanoparticles Encapsulating TLR7/8 Agonist for NK Cell-Mediated Cancer Immunotherapy.* Controlled Release Society (CRS) Annual Meeting and Exposition, New York City, New York (July 2018).



Graduate Student Activities (cont.)

Minjee Kim served as Hospitality Chair on the PGSRM-2018 planning committee.

Minjee has published six papers, two of which were first author papers. She also gave the following presentations this past year:

- *Let There Be Light: Factors that Influence Bio-Luminescent Imaging in the Brain*. 12th International Conference on Cerebral Vascular Biology, Monash University, Melbourne, Australia (December 2017).
- *Efficacy of Targeting MDM2-P53 in Glioblastoma: A Story of Tight Junctions and Transporters*. 12th International Conference on Cerebral Vascular Biology, Monash University, Melbourne, Australia (December 2017).
- *Let There Be Light: Factors that Influence Bio-Luminescent Imaging in the Brain*. Third American Association for Cancer Research-Society of Nuclear Medicine and Molecular Imaging (AACR-SNMMI) Joint Conference on State-of-the-Art Molecular Imaging in Cancer Biology and Therapy, San Diego, California (February 2018).
- *Efficacy of Targeting MDM2-P53 in Glioblastoma: A Story of Tight Junctions and Transporters*. Research Day, University of Minnesota College of Pharmacy, Minneapolis, Minnesota (February 2018).

Mokshada Kumar joined Dr. Prabha's lab as a first-year MS student. In July 2018, she received a scholarship from the JN Tata Endowment for the Higher Education of Indians for her graduate studies.

Rahul Lalge joined the department as a first-year PhD student under the supervision of Dr. Sury. He successfully defended his MS thesis titled *Solubility and Bioavailability Enhancement of Poorly Absorbable Cefuroxime Axetil by Lipid-Based Gastro-Retentive Drug Delivery System Prepared Using Hot-Melt Extrusion Technology* at the University of Mississippi in May 2018.

Jinghan (Tony) Li is a first-year MS student in Dr. Sury's lab. Last year, during the last semester of his pharmaceutical undergraduate program at Shenyang Pharmaceutical University, he came to the University of Minnesota as a

student intern and worked on designing robust amorphous solid dispersion with the approach of supramolecular synthon in Dr. Sury's lab. He enjoys reading, watching movies, jogging, and traveling.

Kelsey Pflepsen served as Co-Chair on the PGSRM-2018 planning committee.

Kelsey presented her research, *Biodistribution of Intrathecally Delivered AAV5 Viral Vector Particles*, at the 2017 Society for Neuroscience Annual Conference in San Diego, California in November 2017.

Sneha Rathi joined the department as a first-year PhD student under the joint supervision of Dr. Panyam and Dr. Prabha. She successfully defended her MS thesis titled *Classification of Active Pharmaceutical Ingredients (APIs) and Nutraceuticals Based on their Nucleation and Crystal Growth Behavior* at NIPER-Hyderabad, India. Sneha enjoys arts and crafts, including henna and rangoli (designs made on the floor with colored sand), and exploring new places in her free time.

Davin Rautiola served as the Communications Chair on the PGSRM-2018 planning committee.

Davin won the People's Choice award in the College of Pharmacy Three Minute Thesis Competition in September 2018. He will go on to compete in the University-level competition this November 2018.



Drishti Sehgal served as Registrations Chair on the PGSRM-2018 planning committee.

Graduate Student Activities (cont.)

Jayesh Sonje received a 2018 Robert L. Snyder Student Travel Grant which consisted of a waived registration fee for the 2018 Denver X-Ray Conference held in August in Westminster, Colorado and \$500 toward travel expenses.

Jayesh presented a poster titled *Effect of Process Variables on Physical State of Mannitol in Tert-Butyl Alcohol – Water Frozen or Freeze-Dried Systems* at the International Society of Lyophilization-Freeze Drying (ISL-FD) Midwest Chapter Conference in Chicago, Illinois in April 2018; 50th Pharmaceutics Graduate Student Research Meeting (PGSRM-2018) in Minneapolis, Minnesota in June 2018; 4th David Grant Symposium in Minneapolis, Minnesota in June 2018; and the Denver X-Ray Conference (DXC) in Denver, Colorado in August 2018.

Surabhi Talele served as the Fundraising Co-Chair on the PGSRM-2018 planning committee.

Surabhi gave the following presentations this year:

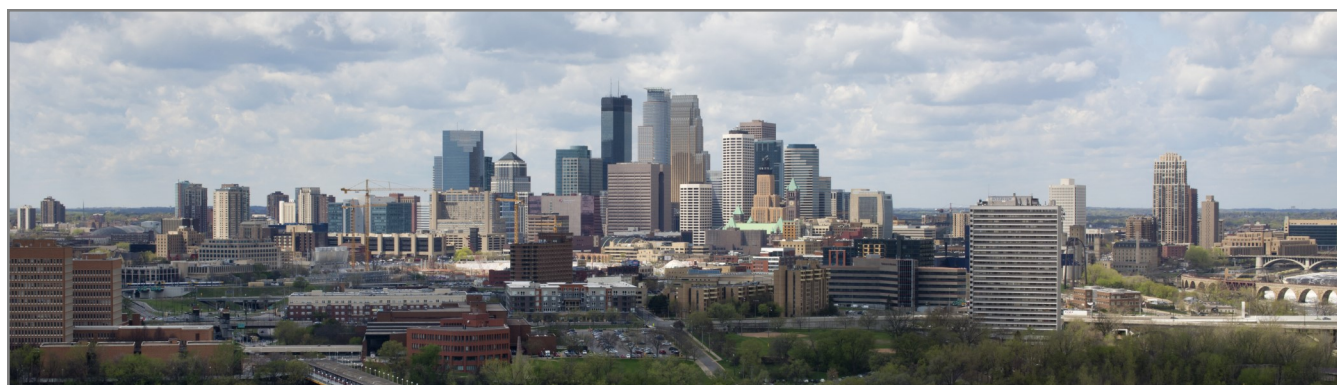
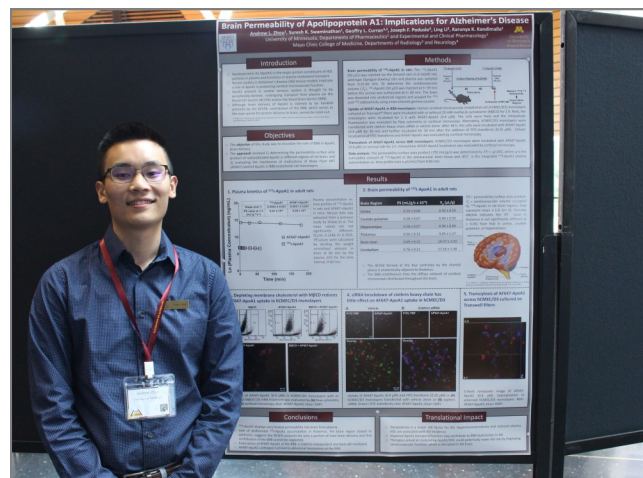
- *Improving MEK Inhibition in the Brain: A Key in Treating Brain Metastases*. 2018 Gordon Research Conference (GRC) on Barriers of the CNS, New London, New Hampshire (June 2018).
- *CNS Delivery of VX-970: A Selective ATR Inhibitor for Radiosensitization in GBM*. 2018 Globalization of Pharmaceutics Education Network (GPEN) Conference, Singapore (September 2018).

Surabhi received the Brain Tumor Program Travel Grant for 2018.

Kunlin Wang served as Logistics Chair on the PGSRM-2018 planning committee.

Kunlin received an American Crystallographic Association (ACA) Travel Award for her podium presentation of her research at the 2018 ACA Annual Meeting. She also presented her research, *Reversible Single Crystal-to-Single Crystal Phase Transition with Low-Temperature Induced Twinning of Diphenhydramine Citrate Salt*, at the 2018 Globalization of Pharmaceutics Education Network (GPEN) Conference in Singapore.

Andrew Zhou received best poster presentation awards at both the 50th Pharmaceutics Graduate Student Research Meeting (PGSRM-2018) in Minneapolis, Minnesota and the 2018 Globalization of Pharmaceutics Education Network (GPEN) Conference in Singapore.



Graduate Student Activities (cont.)

PGSRM-2018



The University of Minnesota Department of Pharmaceutics had the pleasure of hosting the 50th Annual Pharmaceutics Graduate Students Research Meeting (PGSRM-2018) in June this year. We were honored to host this wonderful event in keeping with its time-honored traditions!

PGSRM is a student-led, student-organized, and student-attended event held each year. This year's theme, *Bridging Therapeutics and Technology*, was inspired by the multidisciplinary nature of pharmaceutical sciences. As graduate students, we understand that we must learn to adapt and work as a multifunctional team as research progresses.

Our keynote speakers, Dr. Clay Siegall (Seattle Genetics) and Dr. Samir Mitragotri (Harvard University), provided industrial and academic perspectives regarding the field of pharmaceutical technology. Our other invited speakers covered current research and emerging technologies in pharmacokinetics/pharmacodynamics (Dr. Matthew Wright, Genentech), drug formulation (Dr. Lynne Taylor, Purdue University), and biopharmaceutics (Dr. Paul Lockman, University of West Virginia). In addition to invited speakers, we also held student poster and podia sessions to encourage thoughtful discussion among student attendees. We are happy to say that this year's PGSRM was a great success and we received numerous positive comments from attending students, invited speakers, industry representatives, and faculty.

We were very fortunate to have a tremendously hardworking planning committee, whom we cannot begin to thank enough! They worked tirelessly for two years leading up to the conference – in short, they were amazing! In addition, we would like to thank our faculty advisors, Dr. William Elmquist and Dr. Jayanth Panyam, who provided critical support and guidance. A big thank you also to Katie James, Amanda Hokanson, Jody Tracy, and the College of Pharmacy administrative staff who were a big asset throughout the planning process. We consider ourselves very fortunate to have been given this wonderful opportunity!

Sincerely,

Vidhi Khanna and Kelsey Pflipsen

PGSRM-2018 Planning Committee Co-Chairs

Graduate Student Organizations

2018 Fall Picnic Hosted by the 2017-2018 Pharmaceutics Graduate Student Representatives Hongbo Chen & Yafan Su

Students prepared tasty food for the entire Department of Pharmaceutics and their families and friends on the banks of the Mississippi River at the East River Flats Park. It was a gorgeous afternoon and everyone had a great time!

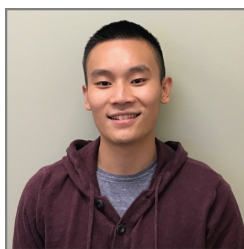


Graduate Student Organizations (cont.)

AAPS UMN Student Chapter Officers 2018-2019



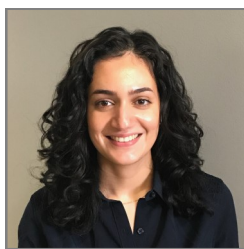
Surabhi Talele
Chair



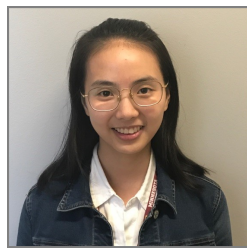
Andrew Zhou
Chair-Elect



Davin Rautiola
Treasurer



Vidhi Khanna
Secretary

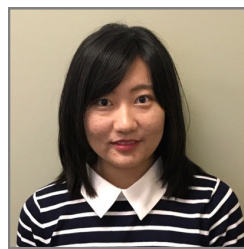


Lushan Wang
Student Outreach
Officer



Rahul Lalge
Web Coordinator &
Social Media
Advertising Officer

Pharmaceutics Graduate Student Representatives 2018-2019



Xueyao Hu



Zhongyang Shi

Council of Graduate Students (COGS) Pharmaceutics Representative 2018-2019



Navpreet Kaur

People

Amanda Hokanson, Pharmaceutics Executive Office and Administrative Specialist, was instrumental in the success of both PGSRM-2018 and the 4th David Grant Symposium this year, and was named a coordinator for the latter. She also redesigned the department's lunchroom space, converted a portion of the David Grant Library



into a conference room, and arranged for the installation of student lockers. In addition to serving on this year's College of Pharmacy Meritorious Service Award selection committee, her professional development included completing courses in project management and technical writing and the Office of Equity and Diversity (OED) Certificate Program.

In her free time, Amanda continues to support student exploration of Minnesota and Wisconsin by arranging various outings such as snow tubing, kayaking, a paint night, the Renaissance Festival, and a haunted hayride, among others. You can take a look at pictures from some of these trips on page 14.

Katie M. James, Pharmaceutics Office Supervisor and Graduate Program Coordinator, completed the University of Minnesota's Leading on All Levels development program. She also served on this year's College of Pharmacy Meritorious Service Award selection committee.



Katie attended the Midwest Association of Graduate Admission Professionals (MAGAP) Summer Seminar in Chicago, Illinois in June 2018 and the National Association of Graduate Admission Professionals (NAGAP) Summer Professional Development Institute in Las Vegas, Nevada in July 2018.

Katie started volunteering as a den leader in her son's Cub Scout pack this year. Cub Scouting is available to boys and girls from five to ten years of age and their families. It's also part of the worldwide scouting movement and aims to promote character development, good citizenship, and personal fitness as well as fun and adventure.

NS Krishna Kumar, a research specialist in Dr. Sury's lab, defended his thesis titled *Relaxation Studies on Conductive and Dielectric Dispersion of Certain Disordered Systems* during the public viva voce exam held at Pondicherry University, India in September 2018.

Krishna also married Nayana in a beautiful ceremony that took place in Thiruvananthapuram, Kerala, India in September 2018.



Wei Li joined the Dr. Sun's lab in August 2018. He is supported by a grant from the Anhui Institute for Food and Drug Control in China.

Manish Mishra joined Dr. Sun's lab as a post-doctoral fellow in August 2018. His research is in crystal engineering with a focus on elucidating crystal structure-mechanical property relationship.

Siddharthya Mujumdar, a Biomedical Engineering PhD graduate who was advised by Dr. Siegel, was promoted to head of formulation and process development at F. Hoffmann-La Roche in July 2018. His new section is responsible for the pharmaceutical development of all oral pediatric formulations.

Akash Nagapurkar, a former research intern, received a Minnesota Scholars of Distinction Award and a Minnesota Academy of Science Honorable Mention Award for his work in Dr. Siegel's lab.

Guoyu Pan, a former post-doctoral associate in Dr. Elmquist's lab, is currently working as a professor in the Shanghai Institute of Materia Medica, a branch of the Chinese Academy of Sciences.

People (cont.)

Ryoma Tanaka, a visiting scholar in Dr. Sury's lab, is a



PhD student from Musashino University in Tokyo, Japan. His research program is based on physical chemistry and molecular analysis. He is particularly interested in the design and in-situ measurement of molecular complexes, such as drug-drug, drug-polymer, and host-guest systems using

big-data analysis to improve physicochemical properties. Ryoma received a scholarship from the Japan Society for the Promotion of Science (JSPS) Overseas Program for Young Researchers.

Seema Thakral, a researcher in Dr. Sury's lab, gave the following presentations this year:

- *SAX Ganesha and its Diverse Applications*. Polymeric Materials Science and Engineering (PMSE) Student Chapter Meeting, University of Minnesota, Minneapolis, Minnesota (February 2018).
- *Strategies for the Development of Lyophilized Injection Formulation for Poorly Water Soluble Drugs: Case Studies*. International Society of Lyophilization-Freezing Drying (ISL-FD) Midwest Chapter Conference, Chicago, Illinois (April 2018).
- *Amorphous Solid Dispersions: Relevance of Drug-Polymer Miscibility to Physical Stability*. Industrial Partnership for Research in Interfacial and Materials Engineering (IPRIME) Annual Meeting, Minneapolis, Minnesota (May 2018).
- *Phase Transformation During Dehydration: Use of Non-Ambient XRD*. Denver X-Ray Conference, Westminster, Colorado (August 2018).

Seema and Dr. Raj Suryanarayanan received funding from the US Pharmacopoeia Convention for their project, *Revisiting the Stability and Storage Specifications of Oxytocin Injection: A Literature Review*.

Alpana Thorat, a post-doctoral associate in Dr. Sury's lab, and her husband, Manoj, welcomed a healthy and beautiful baby boy, Amay, in July 2018.



Jody Tracy, Program/Project Specialist, graduated with a Bachelor of Applied Sciences degree in Communications and



Massage Therapy from the University of Minnesota Crookston and completed her Hatha Yoga Teacher Training program at the University of Minnesota Twin Cities. She plans to continue her education in myofascial release. Jody

celebrated her ten year anniversary working at the University of Minnesota this year, with four of those years in the Department of Pharmaceutics. She also celebrated her 10th wedding anniversary with her husband, PJ, and, for the first time this year, biked over 500 miles.

Ayla Carolina Vea Barragan, a PhD graduate student at

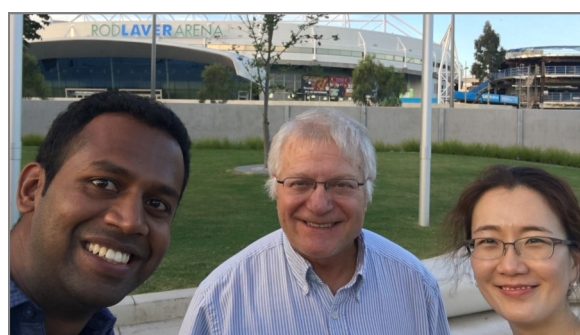


the Universidad Autónoma de Baja California (UABC), is currently visiting Dr. Siegel's lab. Ayla's faculty advisor at UABC is Dr. Jose Cornejo Bravo, one of Dr. Siegel's former students. (This makes her Dr. Siegel's academic

granddaughter!) Ayla's project involves studying the pH sensitivity of polyelectrolyte hydrogels.

People (cont.)

A Year in Pictures



People (cont.)

President Eric Kaler Decides to Step Down



In July 2018, the 16th President of the University of Minnesota, Dr. Eric Kaler, announced that he will step down from the presidency at the end of June 2019. President Kaler made the following statement on July 13, 2018:

Today I write to inform you of my decision to step down as President on July 1, 2019. My tenure already exceeds the national average. This is an incredibly demanding job, essentially seven days a week, evenings and nights included, and as proud and confident of my contributions and ability as I am, I also know that the University will benefit from a fresh perspective. Quite simply, it is time.

The University of Minnesota is a remarkable collection of people, ideas, and impact. It is also a center of deep emotional connection to our more than 580,000 living alumni and the more than 5 million people who call Minnesota home. Every day, we make a difference in the lives of tens of thousands of students, patients and their families, businesses, communities, and beyond.

For more than seven years, I have worked to be worthy of our history and to meet the ambitions of this incredible institution. I have been humbled and honored by the trust placed in me as President of the University of Minnesota. Following my departure in July 2019, I plan to work as President Emeritus for one year to continue the momentum on our \$4 billion Driven campaign. I look forward then to a sabbatical before assuming my faculty position in our spectacular Department of Chemical Engineering and Materials Science.

As your President, I am honored and privileged to lead an institution that directly affects the residents of the great State of Minnesota and people around the globe. Our healthcare breakthroughs are historic. Our science and technology, awe inspiring. Our commitment to the arts, breathtaking. And our core mission, teaching the next generation of leaders, absolutely incredible.

All students across our five system campuses receive our support so that they can achieve their own success, their own path to a brighter future. We are, and I am, incredibly proud of them, and of our faculty and staff who support them.

While higher education has been increasingly viewed with a critical eye, this institution remains a visible and important reminder of the success that the University provides for this state. During my presidency we held tuition increases systemwide to under the rate of inflation, all while cutting more than \$90 million in expenses. We spun off more than 10 new businesses a year from the University, growing jobs and economic success based on our research and business prowess. Our philanthropic support has set new record levels and our commitment to this state, indeed to every county and city, remains strong with our public service and engagement winning national recognition. From Greater Minnesota to the Twin Cities, we are and remain a visible and constant reminder of the value of higher education in research, in education, and in service.

My wife, Karen, and I both thank you for your kindness, your friendship, and most of all, your contributions to this University. I know that whatever my legacy will be, it will include the proud phrase “The University of Minnesota.”

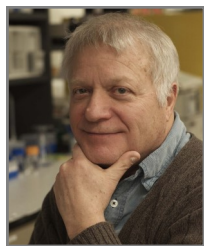


President Kaler and Pharmaceutics faculty members, 2013

Source: z.umn.edu/KalersAnnouncement

Faculty News & Activities

Professor William F. Elmquist



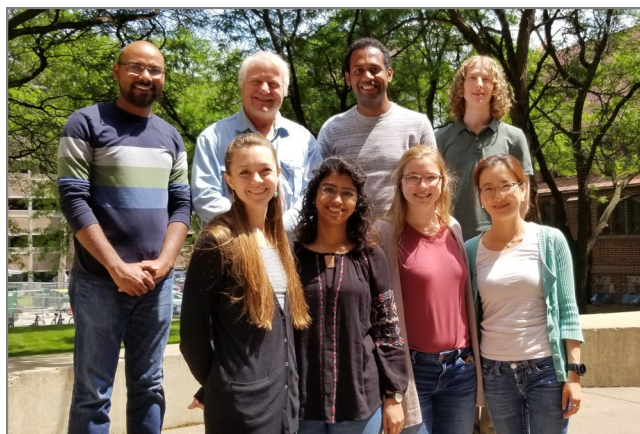
Dr. Elmquist served as the Vice Chair of the 2018 Barriers of the CNS Gordon Research Conference in New London, New Hampshire and attended the 2018 Globalization of Pharmaceutics Education Network (GPEN) Conference in Singapore. He is also heading the planning of the

2020 GPEN Conference which will be hosted by and held at the University of Minnesota Twin Cities.

Members of Dr. Elmquist's lab participated again this year in the Brain Tumor 5K Run. The team raised funds and awareness for brain tumor research.

Dr. Elmquist was invited to give the following presentations this past year:

- *Targeted CNS Delivery to Treat Brain Tumors: Many Challenges, Many Opportunities.* South Dakota State University, Brookings, South Dakota (October 2017).
- *Quantitative Systems Approach to Therapy for Brain Tumors.* University of Kentucky, Lexington, Kentucky (March 2018).
- *Brain Tumor Interactions: A Complex, Dynamic System Influencing Efficacy and Resistance.* Discovery and Development of Brain Penetrant Inhibitors for Cancer, Annual Blood-Brain Penetrant Inhibitors Symposium, Cambridge Healthtech Institute's 14th Annual Drug Discovery Chemistry, San Diego, California (April 2018).
- *Factors Influencing Drug Transport at the BBB: A Critical Determinant of Efficacy in Brain Tumors.* Cancer Research UK, Brain Tumour Conference 2018, London, England (May 2018).
- *Factors Influencing Drug Transport at the BBB: A Critical Determinant of Efficacy in Brain Tumors.* Rudbeck Laboratory Seminar Series, Uppsala University, Uppsala, Sweden (May 2018).
- *Factors Influencing Drug Transport at the BBB: A Critical Determinant of Efficacy in Brain Tumors.* Jarowski Symposium, Saint John's University College of Pharmacy, Queens, New York (June 2018).
- *Factors Influencing Drug Transport at the BBB: A Critical Determinant of Efficacy in Brain Disease.* Novel Approaches for Accessing the CNS: Nonclinical and Clinical Challenges, Drug Information Association (DIA) 2018, Boston, Massachusetts (June 2018).
- *Improving Treatment Efficacy in Primary and Metastatic Brain Tumors.* Saint Jude Children's Hospital, Memphis, Tennessee (October 2018).



Professor Carolyn A. Fairbanks



In 2017-2018, Dr. Fairbanks and her research team continued to contribute their expertise in intrathecal and epidural drug delivery for translational research collaborations with industry and other academic groups. Her research interests continue to focus on targeted delivery

of gene therapeutics to specific CNS neuronal subpopulations. This research is supported in part by the National Institute on Drug Abuse (NIDA) to investigate mechanisms of inhibition of opioid-induced tolerance. Her program also includes a strategy to develop gene therapeutics for the treatment of opioid addiction, an effort

Faculty News & Activities (cont.)

generously supported by another gift from the Noble Family to the College of Pharmacy. Additionally, Dr. Fairbanks is supported by Neurosensory and Rehabilitation Research Award from the Department of Defense for her study, *Controlling Neuropathic Pain by Novel Non-Opioid Pharmacological and Gene Therapeutic Approaches*. Collaborators include Dr. R Scott McIvor (Genetics, Cell Biology, and Development), Dr. Lucy Vulchanova (Neuroscience), Dr. Herb Nagasawa (Medicinal Chemistry), and Dr. Gunda Georg (Medicinal Chemistry). She also received an award from MN-REACH to continue development of new medications to treat opioid addiction.

One of Dr. Fairbanks's team members, Kelsey Pflapsen, a fourth-year Pharmaceutics pre-doctoral fellow, received a Bighley Graduate Fellowship for 2018-2019 recognizing strength in collaborative and interdisciplinary research. Another team member, Ben Clements, a second-year Pharmaceutics student, received an award from the Associate Dean of Graduate Education for his outstanding performance as a Teaching Assistant in 2017-2018.

Dr. Fairbanks continues to be featured in the University of Minnesota's *Driven to Discover* campaign for her contributions to addiction research and development of gene therapeutics and peripherally restricted analgesic medications. You can view a video of her story at z.umn.edu/FairbanksVideo.

Dr. Fairbanks continues to lead the University of Minnesota's Pain Consortium and cultivated a major gift from the Hubbard Foundation to support interdisciplinary research initiatives to improve our understanding of the mechanisms underlying chronic pain and to develop new non-opioid medications. This gift was matched by the Medical Discovery Team on Addiction, the Office of the Vice President for Research, and the Academic Health Center.

In June 2018, Dr. Fairbanks became the Associate Dean for Research for the College of Pharmacy. In her role, she will represent the college's research mission to the greater university as well as at the national and international levels. Her lab manager, Oanh Nguyen, will join the Office of the

Associate Dean for Research as Assistant to the Associate Dean. Dr. Fairbanks has recruited two new team members to the office: Dr. Cory Goracke-Postle as Research Director of Implementation and Strategic Partnerships and Dr. Rebecca Cuellar as Research Specialist. They will be working on facilitation of research compliance and stimulation of collaborative research grants and trainee fellowships among other research-related activities.

Professor Karunya Kandimalla



Dr. Kandimalla has been appointed as the Associate Director of Graduate Studies.

Dr. Kandimalla's lab members submitted several publications and presentations this year. Partnering with their Mayo Clinic collaborators, his lab continues to develop diagnostic probes for the early detection of brain insulin resistance in Alzheimer's disease patients. Moreover, they have been developing translational approaches to repositioning and repurposing diabetes drugs to treat Alzheimer's disease.

Vrishali Salian joined Dr. Kandimalla's lab as an MS student and Divaakar Siva Bala Sunderam joined as a Bioinformatics and Computational Biology PhD student this year.

Dr. Kandimalla contributed to the following presentations this year:

- Kandimalla K, Swaminathan SK, Sarma VV, Curran GL, Bruinsma TJ, Decklever TD, Thompson KJ, Tang X, Min PH-K, Kalari KR, Lowe VJ. *Cerebrovascular Pathologies Triggered by Metabolic Syndrome and Amyloid Beta Exposure in Alzheimer's Disease Brain*. 2018 Gordon Research Conference (GRC) on Barriers of the CNS, New London, New Hampshire (June 2018).
- Swaminathan SK, Min PH-K, Sarma VV, Ahlschwede KM, Bruinsma TJ, Curran GL, Decklever TD, Lowe VJ, Kandimalla K. *Amyloid Beta Affects on Insulin Permeability from Plasma to Brain Measured by I-125*

Faculty News & Activities (cont.)

Insulin SPECT in APP/PS1 Mice. Alzheimer's Association International Conference (AAIC) 2018, Chicago, Illinois (July 2018).

- Swaminathan SK, Sarma VV, Curran GL, Bruinsma TJ, Decklever TD, Thompson KJ, Tang X, Gali CC, Min PH-K, Kalari KR, Lowe VJ, Kandimalla K. *Vascular Contributions to Alzheimer's Disease: A Systems Physiology Perspective.* Alzheimer's Association International Conference (AAIC) 2018, Chicago, Illinois (July 2018).
- Zhou A, Swaminathan SK, Curran GL, Poduslo JF, Li L, Kandimalla K. *Brain Permeability of Apolipoprotein A-I: Implications for Alzheimer's Disease.* 50th Pharmaceutics Graduate Student Research Meeting (PGSRM), University of Minnesota, Minneapolis, Minnesota (June 2018).
- Zhou A, Swaminathan SK, Curran GL, Poduslo JF, Li L, Kandimalla K. *Brain Permeability of Apolipoprotein A-I: Implications for Alzheimer's Disease.* 2018 Globalization of Pharmaceutics Education Network (GPEN) Conference, Singapore (September 2018).
- Bruinsma TJ, Swaminathan SK, Curran GL, Min PH-K, Decklever TD, Sarma VV, Ahlschwede KM, Lowe VJ, Kandimalla K. *Imaging Type-Three Diabetes in an Alzheimer's Disease Animal Model: A Preliminary Mouse Study.* Radiological Society of North America (RSNA) Annual Meeting 2018, Chicago, Illinois (November 2018).
- Swaminathan SK, Ahlschwede KM, Decklever TD, Curran GL, Kalari KR, Lowe VJ, Kandimalla K. *The Alzheimer's Disease Amyloid Beta Proteins Perturb Plasma-to-Brain Delivery of Insulin and Brain Insulin Signaling.* American Association of Pharmaceutical Sciences (AAPS) PharmSci 360 Annual Meeting, Washington, DC (November 2018).
- Zhou A, Swaminathan SK, Sarma VV, Ahlschwede KM, Curran GL, Decklever TD, Kalari KR, Lowe VJ, Kandimalla K. *Development of a Pharmacokinetic/Pharmacodynamic Model to Describe Insulin Trafficking/Signaling Perturbations in Alzheimer's*

Disease Transgenic Mice. American Association of Pharmaceutical Sciences (AAPS) PharmSci 360 Annual Meeting, Washington, DC (November 2018).

In January 2018, investigators of the Minnesota Partnership Grant (Kandimalla/Lowe) had a get-together at Dr. Kandimalla's home. Guests included researchers working on Alzheimer's disease, nuclear medicine, molecular imaging, computational genomics, and diabetes. The Partnership is a collaborative venture among the University of Minnesota, Mayo Clinic, and the state of Minnesota.



Professor Hongbo Pang



Dr. Pang joined the department as a tenure-track assistant professor in January 2018. He earned his BS degree in Biological Science from Peking University in Beijing, China and his PhD in Biochemistry from the University of Utah in Salt Lake City. Most recently he was a research

assistant professor at Sanford Burnham Prebys Medical Discovery Institute in La Jolla, California. His research focus is on how to transport the cargo to the site of interest in the human body with high specificity and efficiency. His research synergizes multiple disciplines from cell and cancer biology, peptide chemistry, nanomaterial to clinical imaging, and cancer therapies. His ultimate goals are to discover new delivery technologies, decode the underlying transport machinery, and develop novel diagnosis and treatment for cancer and other human diseases.

Dr. Pang welcomed two post-doctoral associates to his lab: Dr. Wenjie Chen and Dr. Tang Tang.

Faculty News & Activities (cont.)

Professor Jayanth Panyam



Dr. Panyam had a busy and productive year. He served on various federal and regional grant study sections.

Dr. Panyam was also invited to give the following presentations this past year:

- *Whole Cell Based Phage Display Identifies Perlecan as a Target in Metastatic Breast Cancer.* Pharmaceutical Sciences Seminar Series, Wayne State University College of Pharmacy, Detroit, Michigan (October 2017).
- *Therapeutic Modification of Tumor Microenvironment to Improve Drug Delivery.* China Pharmaceutical University-University of Minnesota Bilateral Symposium, China Pharmaceutical University, Nanjing, China (October 2017).
- *Identification of Perlecan as a Novel Target in Solid Tumors.* Pharmaceutical Sciences Seminar Series, University of South Florida College of Pharmacy, Tampa, Florida (March 2018).
- *Therapeutic Modification of Tumor Microenvironment to Improve Nano Drug Delivery.* Banaras Hindu University, Varanasi, India (June 2018).
- *Therapeutic Modification of Tumor Microenvironment to Improve Nano Drug Delivery.* Indian Institute of Technology, Gandhi Nagar, India (June 2018).
- *Therapeutic Modification of Tumor Microenvironment to Overcome Intratumoral Transport Barriers for Nanomedicine.* Nanomedicines: From Fundamentals to Applications, 256th American Chemical Society (ACS) National Meeting, Boston, Massachusetts (August 2018).

Dr. Panyam's research group also had a productive 2017-2018 academic year. The group members presented a number of podia and posters at various regional and national meetings.

Professor Ronald A. Siegel



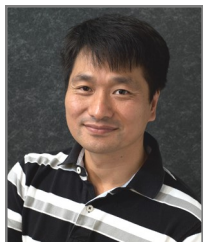
Dr. Siegel continues to direct the Biomaterials and Pharmaceutical Materials program for IPRIME (Industrial Partners for Research in Interfacial and Materials Engineering) and serve on the advisory board for the Medical Devices Center at the University of Minnesota.

Dr. Siegel was invited to give the following presentations this past year:

- *Sensing and Drug Delivery Using Hydrogels and MEMS.* 3M, Saint Paul, Minnesota (December 2017).
- *Progress Towards Intranasal Diazepam Delivery Using an Aqueous Prodrug/Enzyme Combination.* 14th Eilat Conference on New Antiepileptic Drugs and Devices, Madrid, Spain (May 2018).
- *Artificial Gut Simulator for Simultaneous Evaluation of Dissolution and Absorption of Supersaturating Drug Formulations.* ETH Zurich, Zurich; Roche, Basel; and Novartis, Basel, Switzerland (May 2018).
- *Elasticity, Plasticity, and Failure of Biodegradable Polymers: Prelude to Biodegradable Osmotic Delivery Pumps.* Industrial Partnership for Research in Interfacial and Materials Engineering (IPRIME) Annual Meeting, Minneapolis, Minnesota (May 2018).
- *Some Ideas in Drug Delivery Derived from Electrical Engineering.* Engineering in Medicine and Biology Conference, Honolulu, Hawaii (July 2018).
- *CRS in the (Go-Go) 90s: Onward and Upward.* Controlled Release Society Annual Meeting, New York, New York (July 2018).
- *Supersaturation in Enhanced Intranasal Delivery of Benzodiazepines for Treatment of Seizure Emergencies.* University of Washington, Seattle, Washington (September 2018).

Faculty News & Activities (cont.)

Professor Changquan Calvin Sun



Dr. Sun was appointed Associate Department Head in August 2018.

Dr. Sun was admitted as a fellow of the Royal Society of Chemistry (RSC) recognizing his efforts which have impacted a field in the chemical sciences. The RSC is the oldest chemistry society in the world with about 54,000 members worldwide.

The David Grant Symposium has become a key scientific event in the field of pharmaceutical materials sciences. Dr. Sun chaired the 4th David Grant Symposium, which was held at the University of Minnesota in June 2018. The 5th David Grant Symposium will be held in 2020.

Dr. Sun was named a 2018 Top Reviewer by the editorial team of the *Journal of Pharmaceutical Sciences* (JPharmSci) and by Publons in the Chemistry and the Pharmacology and Toxicology categories. He joined the editorial advisory board of *Crystals*, published by MDPI, in November 2017 and the editorial board of *Heliyon*, published by Elsevier, in September 2018.

Dr. Sun was appointed Vice Chair of the United States Pharmacopeia (USP) Physical Analysis Expert Committee in June 2018 for a one year term.

Dr. Sun also served as an external examiner on the PhD thesis committees of Nawin Pudasaini, a student at the University of Copenhagen in Denmark; Muhammad Ubaid, a student at COMSATS University Islamabad in Pakistan; and S Mobashar Ali Abid, a student at COMSATS University of Islamabad in Pakistan.

Over the last year, Dr. Sun served as a grant reviewer for the Fund for Scientific Research-FNSR, the Newton International Fellowships, the National Science Foundation (NSF) Division of Civil, Mechanical, and Manufacturing Innovation (CMMI), and the Fund for Scientific Research-FNSR, Belgium.

Dr. Sun was invited to give the following presentations this past year:

- *Expedited Development of Tablets Through Integrated Crystal and Particle Engineering*. Tianjin University of Traditional Medicines, Tianjin, China (May 2018).
- *Sweet Crystals*. Tianjin University, Tianjin, China (May 2018).
- *Integrated Crystal and Particle Engineering for Expedited Development of Tablets*. Jarowski Symposium, Saint John's University, Queens, New York (June 2018).
- *Enabling Continuous Direct Compression Through Particle Engineering*. Land O'Lakes Conference on Strategic and Technical Considerations for Implementing Continuous Manufacturing from Drug Substance Through Drug Products, Madison, Wisconsin (June 2018).
- *Relationships Among Crystal Structure, Mechanical Properties, and Tableting Performance*. 4th David Grant Symposium, University of Minnesota Twin Cities, Minneapolis, Minnesota (June 2018).
- *Impact of Water on Flow and Tableting Properties of Pharmaceutical Powders*. 1st North American Symposium on Dynamic Vapor Sorption Science, Philadelphia Historic District, Pennsylvania (September 2018).
- *Enabling Continuous Direct Compression of Low Dose Drugs Through Particle Engineering*. Ashland Pharmaceutical Technology Symposium of Continuous Processing, Wilmington, Pennsylvania (September 2018).
- *Integrated Crystal and Particle Engineering for Expedited Development of Tablets*. University of Texas at Austin College of Pharmacy, Austin, Texas (October 2018).

Faculty News & Activities (cont.)

- *Pharmaceutical Cocrystals*. Department of Chemistry and Biochemistry, University of Minnesota Duluth, Duluth, Minnesota (November 2018).
- *Integrated Crystal and Particle Engineering for Expedited Development of Tablets*. University of Wisconsin-Madison School of Pharmacy, Madison, Wisconsin (November 2018).

Professor Raj G. Suryanarayanan



In 2017-2018, Dr. Sury served on the University of Minnesota Salary Equity Review Committee (SERC), College of Pharmacy Admissions Committee, and Committee for Equity, Diversity, and Inclusion (CEDI).

Dr. Sury also served as a member of the Ebert Prize subcommittee of the Journal of Pharmaceutical Sciences editorial team. The Ebert Prize recognizes the most original and impactful research published in the journal.

Dr. Sury was a member of the Scientific Committee for the International Conference on Contemporary Pharmacy Challenges (ICCP) which was held in Wisla, Poland in September 2018. In addition, he served as Session Chairperson for the Physicochemical Stability Improvement and Crystallization Inhibition section at ICCPC.

Dr. Sury is the University of Minnesota Site Director for the Dane O. Kildsig Center for Pharmaceutical Processing Research (CPPR) and serves on the CPPR Industrial Advisory Board. CPPR is an industry-university National Science Foundation (NFS) funded consortium.

Dr. Sury was responsible for the Industrial Advisory Board meeting in Minneapolis, Minnesota in May 2017 and is scheduled to host the meeting again in October/November 2019.

Dr. Sury is currently an associate editor for Molecular Pharmaceutics and an editorial advisory board member for PharmSci, Pharmaceutical Development and Technology, and the Journal of Pharmaceutical Sciences. He is also a reviewer for Crystal Growth and Design, Pharmaceutical Research, and the International Journal of Pharmaceutics.

Dr. Sury was invited to give the following presentations this past year:

- *Analytical Techniques to Ensure Stable Amorphous Solid Dispersions*. American Association of Pharmaceutical Scientists (AAPS) Annual Meeting, San Diego, California (November 2017).
- *Monitoring Phase Transitions in Formulations*. Spring Pharmaceutical Synchrotron X-Ray Powder Diffraction (SPS-XRPD) Workshop, Purdue University, West Lafayette, Indiana (May 2018).
- *Phase Transformations During Freeze-Drying: Potential Implications on Drug Product Performance*. LyoLearn Webinars Series, SP Scientific (December 2017).
- *Characterization of Frozen and Freeze-Dried Systems by Complementary Analytical Techniques*. Bio-Techne, Minneapolis, Minnesota (February 2018). This presentation was jointly given with Dr. Alpna Thorat.
- *Applications of Powder X-Ray Diffractometry*. Keynote Lecture, 14th Biennial Conference on High-Resolution X-Ray Diffraction and Imaging, Bari, Italy (September 2018).
- *Physical Stability of Amorphous Solid Dispersions*. Plenary Lecture, 1st International Conference on Contemporary Pharmacy Challenges (ICCP): Amorphous Pharmaceutical and Biopharmaceuticals, Wisla, Poland (September 2018).
- *Processing-Induced Phase Transformations*. Short Course, 2018 Globalization of Pharmaceutics Education Network (GPEN) Conference, Singapore (September 2018).
- *Mike Pikal: A Scientific Giant*. Center for Pharmaceutical Processing Research (CPPR) Meeting, University of Connecticut, Storrs, Connecticut (May 2018).

Faculty News & Activities (cont.)

Professor Timothy S. Wiedmann



Dr. Wiedmann once again helped coordinate the internships of six Pharmacy undergraduate students from Shenyang Pharmaceutical University (SPU), located in Liaoning Province in Northeast China. The students spent the spring semester in five different laboratories and worked on projects which satisfied part of their Bachelor of Science degree requirements.

He also continues to participate in AeroCore, an internal/external research organization at the University of Minnesota that conducts inhalation research studies.

AeroCore is currently supporting the projects of Dr. Lisa Peterson, *Interactions Between Tobacco Smoke Constituents in Rodent Tumor Models*, and Dr. Stephen Hecht, *e-Cigarettes: Formaldehyde DNA Adducts, Oxidative Damage, and Potential Toxicity and Carcinogenesis*. A new proposal, initiated by Dr. Natalia Tretyakova, was also funded which will involve rodent exposure to cigarette smoke and measurement of the formation of DNA adducts. A funded project was recently completed by Dr. Amir Naqwi of Abbe Vision, Inc. in which the distribution of lung surfactant was determined following administration to newborn, surfactant deficient pigs using a novel aerosol generation device.

Finally, Dr. Wiedmann has started his phase retirement, which is planned to extend for an additional four years.



Recent Publications

Ahlschwede KM, Curran GL, Rosenberg JT, Grant SC, Sarkar G, Jenkins RB, Ramakrishnan S, Poduslo JF, **Kandimalla K**. (2018 Oct) Cationic Carrier Peptide Enhances Cerebrovascular Targeting of Nanoparticles in Alzheimer's Disease Brain. *Nanomedicine*. pii: S1549-9634(18)30529-X. doi: 10.1016/j.nano.2018.09.010.

Babiker HM, Byron SA, Hendricks WPD, **Elmquist WF**, **Gampa G**, Vondrak J, Aldrich J, Cuyugan L, Adkins J, De Luca V, Tibes R, Borad MJ, Marceau K, Myers TJ, Paradiso LJ, Liang WS, Korn RL, Cridebring D, Von Hoff DD, Carpten JD, Craig DW, Trent JM, Gordon MS. (2018 Sep) E6201, an Intravenous MEK1 Inhibitor, Achieves an Exceptional Response in BRAF V600E-Mutated Metastatic Malignant Melanoma with Brain Metastases. *Invest New Drugs*. doi: 10.1007/s10637-018-0668-8. [epub ahead of print]

Beilman G, Wolf A, **Suryanarayanan R**, **Thakral S**. (2018 Apr) Resuscitation Composition and Methods of Making and Using. United States Patent Application 20180104218.

Bērziņš K, **Suryanarayanan R**. (2017 Dec) Compression-Induced Crystallization in Sucrose-Polyvinylpyrrolidone Amorphous Solid Dispersions. *Cryst Growth Des*, 18(2):839-848. doi: 10.1021/acs.cgd.7b01305.

Bhattarai Y, Williams BB, Battaglioli EJ, Whitaker WR, Till L, Grover M, Linden DR, Akiba Y, **Kandimalla KK**, Zachos NC, Kaunitz JD, Sonnenburg JL, Fischbach MA, Farrugia G, **Kashyap PC**. (2018 Jun) Gut Microbiota-Produced Tryptamine Activates an Epithelial G-Protein-Coupled Receptor to Increase Colonic Secretion. *Cell Host Microbe*, 23(6):775-785.e5. doi: 10.1016/j.chom.2018.05.004.

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