Department of Medicinal Chemistry
2015 Annual Report

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Minneapolis, MN
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Greetings!

The year 2015 included many accomplishments in the Department of Medicinal Chemistry.

Philip Portoghese was awarded the 2015 Takeru Higuchi Research Prize from the American Pharmacists Association Academy of Pharmaceutical Research and Science, was recognized at the APhA Annual Meeting in San Diego, and was named one of the top 25 pharmacy professors by Medical Technology Schools. I was elected a Member-at-Large of the Section on Pharmaceutical Sciences by the American Association for the Advancement of Science. David Ferguson was named Professor of the Semester 2015 by the PharmD Twin Cities class of 2019. Elizabeth Ambrose tied with Michael Swanoski for the Professor of the Semester Award by the PharmD class of 2017 (Twin Cities and Duluth).

Financial support is vital to the function and continued success of our institution. The Department of Medicinal Chemistry and the ITDD received more than $6.5 million in research support from external agencies in calendar year 2015.

This year, we had 52 students in our graduate program and our faculty advised several students from other departments and the Mayo Clinic. We welcomed ten new students to the graduate program this fall and five students graduated. Departing students Ran Dai and Li-Kai Liu from the Finzel lab, Elbek Kurvanov from the Ambrose lab, Yang Li from the Fecik lab, and Margaret Olson from the Harki lab have moved on to pursue the next step in their research careers. The department also employs 60 postdoctoral and research associates.

This was another successful year for our students. Elbek Kurbanov from the Ambrose lab was invited to present his research at the Graduate School’s 2015 Doctoral Research Showcase. Elbek Kubanov from the Ambrose lab and Adam Zarth from the Hecht lab received Doctoral Dissertation Fellowships (DDF) from the Graduate School. Kimberly Maize from the Finzel lab and Joseph Buonomo from the Aldrich lab were Bighley Graduate Fellowship Award winners. Kimberly Maize was also one of 10 recipients nationally to receive the Eli Lilly/WCC Travel Award. The American Foundation for Pharmaceutical Education (AFPE) Board of Directors selected Sara Coulup from my lab to receive an AFPE Pre-Doctoral Award in Pharmaceutical Science. Stephanie Breunig, an undergraduate in the Harki lab, was awarded a stipend and travel funds from the Undergraduate Research Opportunities Program for her project. Wagner lab member Aniekan Okon won a best poster award at the “Translation Machinery and Health: Protein Synthesis and Beyond” Gordon Research Conference. Cliff Csizmar from the Wagner lab has been awarded the Dr. Warren J. Warwick and Henrietta Holm Warwick Fellowship for 2015–16. John Widen from the Harki lab received a travel grant from the Division of Medicinal Chemistry to attend the 2015 National American Chemical Society Meeting. Finally, student worker Laura Burnes received a SELP award at the annual Student Employee Recognition Event, which recognizes exceptional student employees.

I hope you share our pride in the Department’s accomplishments of 2015 and wish you all the best for the coming year.

Gunda Georg, Department Head
Mission Statement

The mission of the Department of Medicinal Chemistry is to educate and train scientists of the highest caliber, to provide future pharmacy practitioners with the basis for understanding the relationships between molecular structure and drug action, and to achieve and perpetuate excellence in medicinal chemistry through chemical and biological research for the improvement of human health.

Department of Medicinal Chemistry Head Gunda Georg is serving on the new campus-wide Grand Challenges Research Strategies group. The group has been charged with gathering perspectives from across campus on interdisciplinary areas of research and scholarship where the University has, or is poised to have, exceptional strength and a competitive advantage. In consultation with faculty, staff, students, and relevant external experts, they will then suggest which of these areas might best align with the Grand Challenge criteria outlined by the Strategic Planning Workgroup.

University News

After more than 20 years as Dean of the College of Pharmacy, Dean Marilyn Speedie announced her retirement. The announcement was made February 2015. Speedie will stay on as Dean while the recruiting process continues and will step down when a new leader is chosen.

Dean Speedie commented on her decision, “While the decision to step down wasn’t easy, I believe the timing is right for a leadership transition. Within the next few months we will have launched the last year of our new curriculum, and we recently successfully completed accreditation requirements set forth by ACPE. The college overall is in a strong position for a change in leadership.”

Dr. Sunil David joined the Department of Medicinal Chemistry in August. Dr. David is known for his work in adjuvant vaccine development, infectious disease, immunology, and inflammatory disease processes. Researchers from his group at the University of Kansas joined him in his new lab in the Cancer & Cardiovascular Research Building.
Teaching & Service

Medicinal Chemistry faculty members taught numerous professional and graduate courses in 2015 and were recognized throughout the year for high-quality teaching and dedication to students. Faculty also contributed to numerous committees, representing service to the Department, the University, the College of Pharmacy, national and professional organizations, and government agencies.

Professor Barry Finzel has been nominated to serve a three-year term as a USenate representative for the College of Pharmacy; he joins Elizabeth Ambrose who is also serving through 2016.

Additionally, numerous faculty served as reviewers for professional journals and as grant reviewers for governmental panels.

Graduate Courses

- Introduction to Drug Design (MEDC 5245)
- Principles of Medicinal Chemistry I (MEDC 8001)
- Principles of Medicinal Chemistry II (MEDC 8002)
- Recitation in Mechanistic Organic Chemistry (MEDC 8050)
- Medicinal Chemistry Seminar (MEDC 8100)
- Design of Chemotherapeutic Agents (MEDC 8500)
- Bioassay & Data Analysis (MEDC 8435)
- Molecular Targets of Drug Design (MEDC 8753)
- Medicinal Chemistry Laboratory Techniques (MEDC 8800)
- Research in Medicinal Chemistry (MEDC 8900)

Professional Courses

- Drugs of Abuse (PHAR 4248 and 6248)
- Honors Course: Medicinal Chemistry Seminar (PHAR 6150)
- Introduction to Pharmacy Research (PHAR 6206)
- Integrated Biochemical Sciences (PHAR 6702)
- Pharmaceutical Care Skills Lab I (PHAR 6710)
- Applied Pharmaceutical Care (PHAR 6716)
- Pharmaceutical Care Skills Lab II (PHAR 6720)
- Principles of Medicinal Chemistry (PHAR 6722)
- Immune System & Infectious Disease (PHAR 6724)
- Principles of Pharmacology (PHAR 6726)
- Medicinal Chemistry & Pharmacology of Cardiovascular Drugs (PHAR 6732)
- Cellular Metabolism & Nutrition (PHAR 6734)
- Colloquium I: Scholarly Presentation Skills (PHAR 6742)
- Integrated Endocrinology (PHAR 6752)
- Diabetes & Metabolic Syndrome (PHAR 6754)
- Medicinal Chemistry and Neuropharmacology (PHAR 6762)
- Biotechnology Derived Drugs (PHAR 6768)
- Infectious Disease (PHAR 6768)
- Oncology (PHAR 6784)
The Institute for Therapeutics Discovery and Development (ITDD) continued its research projects in the areas of drug discovery and development, and provided services to the scientific community of the University of Minnesota, the State of Minnesota, and beyond. The Institute has continued its effort toward developing non-hormonal male and female contraception. The highly innovative and collaborative program led by Dr. Gunda I. Georg, the Institute Director, has had continuous multi-million dollar funding from the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) for over a decade. The ITDD neuroscience program, with a primary focus on finding a cure for Alzheimer’s disease, is led by Dr. Michael A. Walters, Director of the Lead and Probe Discovery Core. Dr. Peter I. Dosa has continued his efforts in moving the anti-glaucoma lead candidate into preclinical development. The program is a collaboration with the Mayo Clinic and is currently supported by the Minnesota Partnership for Biotechnology and Medical Genomics with a multi-year grant. Dr. Walters, in collaboration with the Mayo Clinic and support from the same program, began a similar two-year project in 2015 to develop agents to treat aortic valve calcification. Dr. Jon Hawkinson, Director of the High-Throughput Screening and Assay Development Core, was awarded a shared instrumentation grant by the National Institutes of Health (NIH) to purchase a cutting-edge Biacore S200 surface plasmon resonance (SPR) instrument. The new equipment will significantly enhance the screening capability of the ITDD.

The Therapeutics Process Development Core led by Dr. Vadim J. Gurvich, the ITDD’s Associate Director, has participated in several drug development programs funded by the NIH, U.S. Department of the Army, private industry, and internal University sources. The programs are focused on various therapeutic areas such as asthma, atrial fibrillation, prostate cancer, bladder cancer, and others. Most recently, Dr. Gurvich was awarded a SBIR grant in collaboration with Blue Therapeutics, a Boston-based start-up pursuing commercialization of novel non-addictive analgesic agents originally developed in the Department of Medicinal Chemistry. Additionally, the ITDD has forged collaborations with several pharmaceutical companies, including two locally (effort led by Drs. Jon Hawkinson and Henry Wong), providing its services and expertise in various areas of drug discovery and development.
Gunda Georg has been elected a Member-at-Large of the Section on Pharmaceutical Sciences by the American Association for the Advancement of Science. Her four-year term began February 2015.

The American Pharmacists Association Academy of Pharmaceutical Research and Science honored Distinguished Professor Philip Portoghese with the 2015 Takeru Higuchi Research Prize. This award recognizes the highest accomplishments in pharmaceutical sciences, and is international in scope and stature. Dr. Portoghese was recognized at the APhA Annual Meeting in San Diego in March. He was also named one of the top 25 pharmacy professors by Medical Technology Schools.

David Ferguson was named Professor of the Semester 2015 by the PharmD Twin Cities class of 2019. Elizabeth Ambrose tied with Michael Swanoski for the Professor of the Semester Award by the PharmD class of 2017 (Twin Cities and Duluth).

The Grand Forks Herald article “Grand Forks Police Investigating ‘Drug New to North Dakota’” included quotes from David Ferguson about the illegal use of powdered fentanyl.

In the Health Talk feature “Promising Research for a New Antibiotic” Courtney Aldrich explains the importance of a new antibiotic study recently published in Nature.

Journal of Medicinal Chemistry
The American Chemical Society (ACS) Journal of Medicinal Chemistry is the most-cited journal in medicinal chemistry and ranked as the top primary research journal in impact in its category. Gunda Georg is co-Editor-in-Chief with Shaomeng Wang at the University of Michigan Comprehensive Cancer Center. Carrie Haskell-Luevano also serves as Executive Editor.

Medicinal Chemistry Faculty Editors
The University of Minnesota now boasts five Editors-in-Chief of ACS journals, the most in the country.

Courtney Aldrich is the Editor-in-Chief of the new ACS journal, Infectious Diseases, which began accepting papers in the fall for the first issue in January 2015. Rick Wagner is the Executive Editor of Molecular Pharmaceutics, and Stephen Hecht serves as Editor-in-Chief of Chemical Research in Toxicology.

Faculty Recognition: Awards & Promotions
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Faculty Recognition: In the News
The Grand Forks Herald article “Grand Forks Police Investigating ‘Drug New to North Dakota’” included quotes from David Ferguson about the illegal use of powdered fentanyl.

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Faculty Recognition: In the News (Continued)

The U.S. News & World Report feature “The Future of Male Birth Control” includes a profile of Gamendazole, the male birth control pill being developed by Gunda Georg with Joseph Tash from the University of Kansas.

Stephen Hecht was quoted in the story “Wisconsin Lawmakers Work to Catch Up with the E-cigarette Boom” on Wisconsin Public Radio and in the Superior Telegram.

Michael A. Walters, his Mayo Ph.D. student Jayme Dahlin, and their collaborators including Jessica Strasser and Subhashree Francis (both from the Walters lab) had a featured article in the Journal of Medicinal Chemistry, “PAINS in the Assay: Chemical Mechanisms of Assay Interference and Promiscuous Enzymatic Inhibition Observed During a Sulphydryl-Scavenging HTS.”

“Chemistry: Chemical Con Artists Foil Drug Discovery,” a commentary co-authored by Michael Walters, ITDD Lead and Probe Discovery Core Director, was published in Nature on September 24th. The article warns that research naivety about promiscuous, assay-duping molecules is polluting the literature and wasting resources.

Research Activities

Department of Medicinal Chemistry graduate faculty produced 91 publications in more than 54 journals and presented at numerous conferences through oral and poster presentations in 2015.

The University of Minnesota has been selected by the National Institutes of Health as one of three Research Evaluation and Commercialization Hub (REACH) sites nationally to establish a university-wide strategic framework promoting commercialization and technology transfer in the life sciences and biomedical technology. Supported by a $3 million NIH grant with another $3 million in matching U of M funds, the university’s MN-REACH program will provide commercial expertise and resources needed for the development and commercialization of diagnostics, therapeutics, preventive medicine, and medical devices. The program will establish new industry partnerships, strengthen existing partnerships, and provide entrepreneurial, commercial-style education for innovators to accelerate the pace at which innovations reach the marketplace.

The team for this project includes ITDD Director Vadim Gurvich, who will co-lead the pharmaceutical side of the program. Charles Muscoplat, College of Food, Agricultural and Natural Resources Science, will lead MN-REACH, while Allison Hubel, BioCoR Director will direct the medical device aspects. Additionally, Kevin Peterson from the Department of Community Health and the Center for Excellence in Primary Care will provide medical advice and oversight.
Seminars

Dr. Bryan Roth, University of North Carolina at Chapel Hill, presented the second Portoghese lecture, “Genome Wide Approaches to GPCR Chemical Biology.” Dr. Craig Lindsley, Vanderbilt University, gave the third Portoghese lecture, “Allosteric Modulation Targeting mGlu1 and PLD: New Insights and Therapeutic Potential.”

Hecht lab member Adam Zarth presented the Abul-Hajj-Hanna Exceptional Graduate Student Seminar, “Analyses of the Metabolism and Detoxification or DNA Damage of the Human Carcinogens Benzene and N’-Nitrosonornicotine.”

There were four Distinguished Lectureships given this year. Dr. Frank Raushel from Texas A&M University presented “Evolution of Enzymes for Catalytic Hydrolysis of Organophosphate Nerve Agents.” Dr. Kim Janda from The Scripps Research Institute gave the distinguished lecture “Merging of Chemistry and Biology: In Search of Molecules with Translational Function.” Dr. Joel Barrish, Vice President of Discovery Chemistry at Bristol-Myers Squibb, presented “Innovation in Kinase Inhibitor Drug Discovery: Evolution of a Drug Target Class.” Finally, Dr. Barbara Timmermann from the University of Kansas gave the distinguished lecture “Discovery and Investigation of Therapeutically Important Plant Natural Products.”

Other seminars in 2015 by the Department of Medicinal Chemistry, the Chemical Biology Initiative (CBI), and the Institute for Therapeutics Discovery & Development (ITDD) are listed below.

- Dr. Allen Reitz, Institute for Hepatitis and Virus Research (IHVR), Pennsylvania Drug Discovery Institute at the University of Pennsylvania, “Chemical & Structural Biology of Epstein-Barr Nuclear Antigen EBNA12 & Derivatives of Myricanol that Autophagic Tau Clearance,” March 3.
Seminars (continued)

- Dr. William Chain, University of Hawaii at Manoa, “Chemistry and Biology of Englerin A,” April 14.
- Dr. David Chenoweth, University of Pennsylvania, “Chemical Approaches to Probing, Manipulating, and Imaging Biological Systems,” May 5.
- Dr. James Wollack, St. Catherine University, “Site-specific Enzymatic Modification of CAAX Containing Proteins with Bioorthogonal Tags Capable of Strain Promoted Cycloaddition,” June 23.
- Dr. Nadja Cech, University of North Carolina at Greensboro, “Mass Spectrometry Based Metabolomics to Identify Active Compounds In Natural Product Mixtures,” September 29.
- Dr. Jonathan Vennerstrom, University of Nebraska Medical Center, “Discovery of Antimalarial Ozonides OZ277 and OZ439,” December 8.
- Dr. Jerod Skyberg, College of Veterinary Medicine, University of Missouri, “Medicinal Chemistry Immunity of Brucellosis and Tularemia,” December 15.

Student Recognition

Fifty-two students enrolled in the graduate program this year. Five students graduated, and ten students joined the department: Malcolm Cole, Amanda Degner, Anand Divakaran, Corey Geehan, Ellie Hofer, Dmitri Konorev, William McCue, Connor McDermott, Kathryn Schlasner, and John Schultz.

As usual, our students were recognized and rewarded for the caliber of their work.
**Student Recognition (continued)**

**Elbek Kurbanov** of the Ambrose lab was invited to present his research on Computational, Synthetic, Biochemical, and X-ray Crystallographic Methods for Anthrax Toxin Lethal Factor (LF) Inhibitor Design at the Graduate School’s 2015 Doctoral Research Showcase. **Elbek Kurbanov** also received a 2014–15 Doctoral Dissertation Fellowship (DDF) from the Graduate School for this research.

**Adam Zarth** of the Hecht lab was awarded a 2015–16 Doctoral Dissertation Fellowship from the Graduate School. The DDF allows the University’s most accomplished Ph.D. candidates to devote full-time effort to an outstanding research project by providing time to finalize and write a dissertation during the fellowship year. **Adam** was also the second recipient of the Department’s Abul-Hajj–Hanna Exceptional Graduate Student Award in Medicinal Chemistry. The award honors individual excellence among graduate students based on quantity and quality of research accomplishments, original research proposal for the oral exam, quality of seminars, grade-point average since entering the program, and service and citizenship in departmental affairs. The award includes a cash prize.

**Kimberly Maize** of the Finzel lab and **Joseph Buonomo** of the Aldrich lab were two of four Bighley Graduate Fellowship Award Winners for 2015–16.

**Kimberly Maize** was one of 10 recipients nationally of the Eli Lilly/WCC Travel Award.

The American Foundation for Pharmaceutical Education (AFPE) Board of Directors selected **Sara Coulup**, a graduate student in the Georg lab, to receive a $10,000 AFPE Pre-Doctoral Award in Pharmaceutical Science.

**Stephanie Breunig**, an undergraduate chemistry major of the Harki lab has received an Undergraduate Research Opportunities Program (UROP) award for her project “The Synthesis of APOBEC3G Reversible Covalent Inhibitors.” She will continue working in the Harki lab this summer with her second Department of Chemistry Heisig/Gleysteen summer research fellowship. The fellowship includes a summer stipend and travel to a scientific conference to present research results.

Wagner lab member **Aniekan Okon** won a best poster award at the “Translation Machinery and Health: Protein Synthesis and Beyond” Gordon Research Conference.

**Cliff Csizmar**, a member of the Wagner lab, has been awarded the Dr. Warren J. Warwick and Henrietta Holm Warwick Fellowship for 2015–16. This fellowship includes a stipend and research grant totaling $30,000.

Graduate student **John Widen**, a member of the Harki lab, received a $1,000 travel grant from the Division of Medicinal Chemistry (MEDI) to attend the 2015 National American Chemical Society Meeting in Boston in August where he presented a poster of his research.

Student worker **Laura Burnes** received a SELPie award on May 7th at the annual Student Employee Recognition Event. The Student Employee Leadership Program (SELP) recognizes student employees who go above and beyond expectations in their work at the university.
Student Recognition (Continued)

CBITG Symposium 2015
More than 100 graduate students, postdocs, and faculty members from more than ten departments attended the annual National Institutes of Health Chemistry-Biology Interface Training Grant (CBITG) Symposium in May. The symposium was planned and hosted by current CBITG trainees, including Department of Medicinal Chemistry students Sara Coulup (Georg lab) and Carter Eiden (Aldrich lab). A variety of speakers from fields that bridge chemistry and biology research presented a range of topics. Kim Maize (Finzel lab) presented “Ligand-Induced Structural Changes in Anthrax Lethal Factor.” In addition, the symposium featured a poster session where the department was well-represented by graduate students Joe Buonomo and Carter Eiden (Aldrich lab); Denise Casemore (Xing lab); Sara Coulup, David Huang, and Andrea Wisniewski (Georg lab); Arnie Groehler (Tretyakova lab); Elbek Kurbanov (Ambrose lab); Cody Lensing (Haskell-Luevano lab); Aniekam Okon (Wagner lab); and Margaret Olson and John Widen (Harki lab).

MIKI Meeting 2015
Held annually since 1963, the MIKI “meeting-in-miniature” is the oldest and most successful regional meeting in medicinal chemistry. Rotating meetings are organized by medicinal chemistry graduate students at the Universities of Minnesota, Iowa, Kansas, and Illinois at Chicago.

The University of Kansas hosted the 53rd Annual MIKI meeting, which featured a keynote lecture by Bruce Roth, the Senior Vice President of Small Molecule Drug Discovery at Genentech. Graduate students Elbek Kurbanov (Ambrose lab), Jingjing Shen (Wagner lab), Adam Zarth (Hecht lab), and Bo Zhou (Xing lab) made presentations on behalf of the University of Minnesota.

Commencement
Ran Dai .................................................................Ph.D., January .................................................................Advisor: Finzel
“Fragment Based Inhibitor Design of Mycobacterium tuberculosis BioA”

Elbek Kurbanov ....................................................Ph.D., October .................................................................Advisor: Ambrose
“Synthetic, Biochemical, X-ray Crystallographic, Computational and High-Throughput Screening Approaches Toward Anthrax Toxin Lethal Factor Inhibition”

Yang Li .................................................................Ph.D., July .................................................................Advisor: Fecik
“Deciphering Cryptic Stereochemistry in Polyketide Biosynthesis and Functional Characterization of B-processing Domains in Pikromycin Synthase”

Li-Kai Liu ............................................................Ph.D., August .................................................................Advisor: Finzel
“Discovery of Small Molecular Inhibitors of Hyaluronan Binding at Cell Receptor CD44”

Margaret Olson ....................................................Ph.D., September .................................................................Advisor: Harki
“High-Throughput Screening and Chemical Synthesis for the Discovery of APOBEC3 DNA Cytosine Deaminase Inhibitors”
Faculty

Gunda I. Georg ...................... Department Head and Professor; Director, Institute for Therapeutics Discovery & Development (ITDD); Robert Vince Endowed Chair and McKnight Chair
Rodney L. Johnson .............. Associate Department Head and Distinguished Professor
David M. Ferguson ............... Director of Graduate Studies and Professor
Yusuf J. Abul-Hajj ............... Professor
Eyup Akgün ....................... Research Associate Professor
Courtney C. Aldrich .............. Associate Professor
Elizabeth A. Ambrose .......... Associate Professor
Rebecca A. Cuellar ............... Research Assistant Professor
Peter I. Dosa ...................... Research Assistant Professor; Director, ITDD Medicinal Chemistry Core
Earl W. Dunham ................. Associate Professor
Robert A. Fecik ................. Associate Professor
Barry C. Finzel ................. Professor
Vadim J. Gurvich ............... Research Associate Professor; Associate Director, ITDD; Director, ITDD Chemical Process Development Core
Patrick E. Hanna ............... Professor Emeritus
Daniel A. Harki ................. Assistant Professor
Carrie Haskell-Luevano ....... Professor; Philip S. Portoghese Endowed Chair in Chemical Neuroscience; Institute for Translational Neuroscience Scholar
Jon Hawkinson ................. Research Professor; Director, ITDD High-Throughput Screening and Assay Development Core
Sidath C. Kumarapperuma .. Research Assistant Professor
Herbert T. Nagasawa ........... Professor Emeritus
Philip S. Portoghese ............ Distinguished Professor
Rory P. Remmel ................. Distinguished Teaching Professor
W. Thomas Shier ............... Professor
Marilyn K. Speedie ............. Dean, College of Pharmacy; Professor
Natalia Y. Tretjakova ........... Professor
Robert Turesky ................. Professor
Carston R. (Rick) Wagner ...... Professor; Endowed Chair in Medicinal Chemistry
Michael A. Walters ............ Research Associate Professor; Director, ITDD Lead and Probe Discovery Core
Henry L. Wong ................. Research Associate Professor; Director, ITDD Pharmacology and Biomarkers Core
Chengguo (Chris) Xing ....... Professor

Adjunct Graduate Faculty

Mark D. Distefano .......... Distinguished McKnight Professor, Department of Chemistry
Stephen S. Hecht .......... Professor, Wallin Chair Cancer Prevention, Masonic Cancer Center
Thomas R. Hoye ............. Distinguished Teaching Professor, Department of Chemistry
Lisa A. Peterson .......... Professor, Division of Environmental Health Sciences
Valérie C. Pierre .......... Associate Professor, Department of Chemistry
William C. Pomerantz .... Assistant Professor, Department of Chemistry
Administrative Staff

Caitlin Boley..................... Executive Operations Student Services Specialist
Laura Burnes.................... Student Office Assistant
Mary Crosson .................... Associate Administrator
Caitlyn Dibble............... Executive Office and Administrative Specialist
Sandy Dewing................... Associate Administrator, Journal of Medicinal Chemistry
Jeanine Ferguson........... Assistant to Dr. Gunda Georg
Hadhexa Nanatharn........ Principal Office and Administrative Specialist
Apoorva Reddy ............... Student Office Assistant
Rachel Rud ..................... Executive Accounts Specialist
Leah Peck ...................... Executive Office and Administrative Specialist
Sarah Johnson Sexton ...... Executive Office and Administrative Specialist
Amy Xiong ..................... Student Office Assistant

Research Staff

Danielle Adank.................... Junior Scientist, Haskell-Luevano Lab
Narsihmulu Cheryala ........ Principal Scientist, Georg Lab
Ting-Lan Chiu.................... Research Associate, Ambrose Lab
Matthew Cuellar............... Principal Scientist, Walters Lab
Rawle Francis .................... Principal Scientist, Hawkinson Lab
Katie Freeman............... Assistant Scientist, Haskell-Luevano Lab
Joe Hexum ..................... Junior Scientist, Harki Lab
Kwon Ho Hong .................... Research Associate, Georg Lab
Sudhakar Jakkarak ............ Senior Principal Scientist, Georg Lab
Kristen John .................... Assistant Scientist, Hawkinson Lab
Sesha Krishnamachari ...... Senior Scientist, Turesky Lab
Peter Larson ..................... Senior Lab Technician, Ferguson Lab
Morgan Le Naour............... Research Associate, Walters Lab
Shuang Liang................... Scientist, Gurvich Lab
Pablo Leitzman ............... Senior Lab Technician, Xing Lab
Lev Lis .......................... Principal Scientist, Gurvich Lab
Mary Lunzer .................... Scientist, Portoghese Lab
Angela Perkins............... Research Associate, Harki Lab
Michael Powers .............. Scientist, Portoghese Lab
Sathya Schnell ............... Junior Scientist, Haskell-Luevano Lab
Stephen Schnell ............... Scientist, Portoghese Lab
Anamika Singh............... Research Associate, Haskell-Luevano Lab
Rondedrick Sinville.......... Principal Scientist, Hawkinson Lab
Jonathan Solberg .......... Assistant Scientist, Hawkinson Lab
Jessica Strasser .......... Assistant Scientist, Walters Lab
Shameem Sultana Syeda .... Principal Scientist, Georg Lab
Srinivasa Tala .............. Research Associate, Haskell-Luevano Lab
Defeng Tian ..................... Principal Scientist, Hawkinson Lab
Research Staff (Continued)

Kathryn Trautman .......... Research Professional, David Lab
Timothy Ward .................. Principal Scientist, Georg Lab
Stacey Wilber ................. Scientist, Haskell-Luevano Lab
Lihua Yao ...................... Assistant Scientist, Turesky Lab
Byeong Hwa (BH) Yun ....... Research Associate, Turesky Lab

Postdocs, Fellows, & Visiting Scholars

Mohamed Abou-Karam ...... Shier Lab
Tengfei Bian ................. Xing Lab
Jin Cai ....................... Visiting Professor, Georg Lab
Tingting Cai .................. Turesky Lab
Janardhan Banothu .......... David Lab
Mallesh Beesu ............... David Lab
Dibyendu Dana ............... Harki Lab
Surendra Dawadi .......... Aldrich Lab
Bassem Elsnerbini .......... Visiting University Fellow, Shier Lab
Mark Ericson ................. Haskell-Luevano Lab
Kate Guo ...................... Turesky Lab
Leila Hejazi ................... Turesky Lab
Yaisr Ihtesham ............... Shier Lab
Lakmal Kotelawala .......... Wanger Lab
Feng Liu ...................... Aldrich Lab
Yupeng Li ...................... David Lab
Zhenyuan Miao ............... Georg Lab
Sreekanth Narayananpillai ... Xing Lab
Kathryn Nelson .......... Walters Lab
Fatemah Oroojalian......... Shier Lab
Khyatiben (Kathy) Pathak ... Turesky Lab
Jean Santos ................... Georg Lab
Kristen Stoltz ............... Dosa Lab
Zinayyera Subhani .......... Shier Lab
Yi Wang ....................... Turesky Lab
Yoshi Watanabe .......... Portoghese Lab
Xi Zong ....................... Visiting Graduate Student, Georg Lab

Graduate Students

Evan Alexander ............. Advisor: Aldrich
Matthew Bockman ........... Advisor: Aldrich
Emily Boldry ............... Advisor: Tretyakova
Joseph Buonomo .......... Advisor: Aldrich
Erick Carlson ............... Advisor: Georg
Denise Casemore .......... Advisor: Xing
Malcolm Cole ............... Advisor: Aldrich
Sarah Coulup ............... Advisor: Georg
Clifford Csizmar .......... Advisor: Wagner
Anand Divakaran .......... Advisor: Pomerantz
Amanda Degner .......... Advisor: Tretyakova
Skye Doering ............... Advisor: Haskell-Luevano
Carter Eiden ............... Advisor: Aldrich
Jenna Eiden ............... Advisor: Tretyakova
William Fiers ............... Advisor: Fecik
Katlyn Fleming .......... Advisor: Haskell-Luevano
Corey Geethan ............ Advisor: Xing
Arnold Groehler IV ...... Advisor: Tretyakova
Graduate Students (Continued)

Xianghong Guan ..................Advisor: Georg
Ellie Hofer ........................Advisor: Wagner
Trinh (Amy) Holt..................Advisor: Georg
David Huang ......................Advisor: Georg
Shaofei Ji (Chem) .................Advisor: Tretyakova
Jiewei Jiang .......................Advisor: Georg
Ozgun Kilic ........................Advisor: Wagner
Dmitri Konorev ....................Advisor: Turesky
Elbek Kurbanov ...................Advisor: Ambrose
Jillian Kyzer .......................Advisor: Georg
Cody Lensing ......................Advisor: Haskell-Luevano
Wei Li (Chem) ......................Advisor: Georg
Yang Li ............................Advisor: Feck
Jing Liu (Chem) ....................Advisor: Wagner
Kimberly Maize ....................Advisor: Finzel
William McCue .....................Advisor: Finzel
Connor McDermott .................Advisor: Ambrose
Aniekan Okon .....................Advisor: Wagner

Margaret Olson ....................Advisor: Harki
Kellan Passow .....................Advisor: Harki
Jacob Petersburg ..................Advisor: Wagner
Chris Richards (Pharmacol) ......Advisor: Tretyakova
Katherine Schlasner ...............Advisor: Haskell-Luevano
John Schultz .......................Advisor: Aldrich
Christopher Seiler .................Advisor: Tretyakova
Rachit Shah .......................Advisor: Wagner
Jingjing Shen ......................Advisor: Wagner
Alex Strom ........................Advisor: Wagner
Nicholas Struntz ..................Advisor: Harki
Harrison (Trent) West .............Advisor: Wagner
John Widen .........................Advisor: Harki
Andrea Wisniewski .................Advisor: Georg
Adam Zarth .........................Advisor: Hecht
Bo Zhou ............................Advisor: Xing

Undergraduate Research Assistants & Summer Scholars

Molly Andersen ....................Tretyakova Lab
Jordan Baur .........................Harki Lab
Alexandra Behrend .................Tretyakova Lab
Harrison Berg .......................Ferguson Lab
Stephanie Breunig ..................Harki Lab
Chris Brown .........................Aldrich Lab
Tenley Brown .......................Harki Lab
Maram Essaway .....................Aldrich Lab
Mitch Fuller .........................Aldrich Lab
Erick Gaasedelen ...................Aldrich Lab
Ryan Harding .......................Remmel Lab
Alex Hendricks .....................Wagner lab
Ryan Herzig .........................Georg Lab
Edward Higgins .....................Shier Lab
Abby Hoffman ......................Tretyakova Lab
Mitch Hooverman ..................Remmel Lab
Bo Hu (Pharm.D.) ....................Harki Lab
Tim Isdahl .........................Wagner Lab
Emma King .........................Aldrich Lab
Molly Koller .........................Haskell-Luevano Lab
Da Yeon Lee .........................Xing Lab
Jordan Paladinog .................Xing Lab
Joshua Schmidt .....................Tretyakova Lab
Mei Kuen Tang ......................Finzel Lab
Enoch You .........................Aldrich Lab
Andrew Zhou ......................Wagner Lab
Ways to Give

Private support of our activities is important to maintain the quality of our program and the continuation of the mission of the department. Even small contributions accumulate over time and can have a significant impact.

Opportunities for giving include:
- Abul-Hajj–Hanna Exceptional Graduate Student Award in Medicinal Chemistry
- Medicinal Chemistry Alumni Graduate Student Fellowship
- MIKI Meeting Fund
- Ole Gisvold Fellowship in Medicinal Chemistry
- Philip S. Portoghese Fellowship in Medicinal Chemistry
- Philip S. Portoghese Lectures in Medicinal Chemistry
- Remmel and Zimmerman Fellowship in Drug Metabolism and Pharmacokinetics
- Robert Vince Graduate Student Fellowships
- Taito O. Soine Lectures in Medicinal Chemistry
- Yusuf J. Abul-Hajj Fellowship in Medicinal Chemistry

Our Development Director Robert Busch will work with you and answer any questions that you might have. He can be reached by e-mail, busch110@umn.edu, or phone (1-866-437-0012).

Research Grants

Other ongoing projects and grants newly funded in 2015 are listed below with their primary investigator.

- Administration of the National Institute for Pharmaceutical Technology and Education .................................................. Vadim Gurvich
- Anthrax Toxin Lethal Factor Inhibition Study .......................................................... Elizabeth Ambrose
- Anti-cancer CSANs Development .......................................................... Carston Wagner
- Antitubercular Bir A Inhibitors .......................................................... Courtney Aldrich
- APOBEC3 Inhibitors .......................................................... Daniel Harki/Margaret Olson
- Beyond Parthenolide: Next Generation Molecules Targeting AML Cancer
  Stem Cells .......................................................................................... Daniel Harki
- Cell-cycle Regulatory Kinases as Targets for Male Contraceptive Drug Development .......................................................... Gunda Georg
- Cellular Effects of Small Molecule Antagonists of Hyaluronan Binding to CD44 .......................................................... Barry Finzel
- Chemical Biology Consortium .......................................................... Gunda Georg
- Chemical Probes of Endogenous Mutation: Small Molecule Computational and Experimental Optimization of Anthrax Toxin Lethal Factor (LF) Inhibitors .......................................................... Elizabeth Ambrose
- Chemoproteomics Profiling of Parthenolinde in Human Glioblastoma .......................................................... Daniel Harki
- Critical Interactions of APOBEC3s .......................................................... Daniel Harki
- Critical Path Manufacturing Sector Research Initiative .......................................................... Vadim Gurvich
- Defensins as Melanocortin Ligands .......................................................... Carrie Haskell-Luevano
- Design of Antibacterial Agents that Target Biotin Met .......................................................... Courtney Aldrich
- Design of Antituberculosis Agents .......................................................... Barry Finzel
- Design of Antituberculosis Agents that Target Sidephore B .......................................................... Courtney Aldrich
- Developing a Post-carcinogen Lung Cancer Chemopreventive .......................................................... Chris Xing
- Development of Photochemical DNA Decoys to Control NFkB Gene Expression .......................................................... Daniel Harki/Nicholas Struntz
- Development of Pironetin as an Ovarian Cancer Chemo-therapeutic Agent .......................................................... Gunda Georg/David Huang
- Dihydromethysticin (DHM) for Lung Cancer Chemoprevention .......................................................... Chris Xing
- Discovery of Small Molecule Inhibitors of Hyaluronan Binding .......................................................... Barry Finzel/Li-Kai Liu
- DNA-Protein Cross-links: Cellular Effects and Repair Mechanisms .......................................................... Natalia Tretyakova
- DNA Cross-linking by Diepoxybutane .......................................................... Natalia Tretyakova
• Drug Discovery and Synthesis of Contraceptive Agents............................. Gunda Georg
• Effect of MCC22, a New Mu Opioid Agonist & Hyperalgesia in Mice ........ Philip Portoghese
• Engineering Cell–Cell Interactions by Chemically Self-assembled CARS........ Carston Wagner
• Establishment, Colonization, Toxin Production and Development of Charcoal Rot Fungus Macrophomina Phaseolina on Soybean During the Disease Life Cycle: Basic Biology................................................................. W. Thomas Shier
• FadD32: High-Throughput Screening & Inhibitor Synthesis ....................... Courtney Aldrich
• Formulation Development and Propofol Hemisuccinate......................... Vadim Gurvich
• Human Histidine Triad Nucleotide Binding Proteins (hHINT)................... Barry Finzel/Kim Maize
• Inhibitors of Na,K-ATPase Alpha4 as Male Contraceptives...................... Gunda Georg
• iTC200 MicroCalorimetry Cell Control Unit ........................................... Courtney Aldrich
• Ligands that Target Opioid-chemokine and Opioid-mGlu5 Heteromers......... Philip Portoghese
• Maintenance and Operation of a Medicinal Chemistry Facility................ Gunda Georg
• Mechanisms of Anticancer Agents Selective against Drug Resistant Leukemia.. Chris Xing
• Mechanisms of Ethnic/Racial Differences in Lung Cancer....................... Natalia Tretyakova
• Mechanisms of Prostate Cancer Prevention by Korean Angelica............... Chris Xing
• Melanocortin Selective Ligands.............................................................. Carrie Haskell-Luevano
• Molecular Profiling of EPI-001: An Inhibitor of Androgen Receptor Signaling with a Disputed Mechanism of Action........................................... Daniel Harki
• Novel Therapeutic Agents for the Treatment of Glaucoma...................... Peter Dosa
• Preclinical Development of Myosolwins, a New Class of Medicine for Asthma Vadim Gurvich
• Production of Human MUC17 (CRD1-L-CRD2) Recombinant Protein in Rice Jon Hawkinson
• Role of DNA Deamination in Breast Cancer........................................... Daniel Harki
• SERCA Activators for a Breakthrough in Diabetes Therapy...................... Courtney Aldrich
• Targeting Childhood Brain Tumors with Parthenolide Analogues............... Daniel Harki
• Toward a Mechanism-based Approach to Treating Atrial Fib..................... Vadim Gurvich
• Design of Ligands to Inhibit Progression of Neurodegenerative Diseases.... Philip Portoghese
• Enzyme-catalyzed Mutation in Breast Cancer....................................... Daniel Harki
• Excretion of Antibiotic Metabolite in the Broiler Chick following Hatchery Antibiotic Administration ................................................................. Rory Remmel
• Highly Potent Chemopreventive Agent Blocking Tobacco Carcinogen 4-(methyl-nitrosamino)-(3-pyridyl)-1-butanone (NNK)-induced Lung Tumorigenesis & Mechanisms......................................................... Chris Xing
• Nano-engineered Mesenchymal Stem Cells as Targeted Therapeutic Carriers Natalia Tretyakova
• Nuclear Export of Androgen Receptor with Light-controllable DNA Decoys Daniel Harki
• Technology Platform for Development of Multi-component Preservation Solutions ... Peter Dosa
• Treatment of Tauopathies...................................................................... Michael Walters


64. Syeda SS, Jakkaraj S, Georg GI. Scalable Syntheses of the BET Bromodomain Inhibitor JQ1. *Tetrahedron*


