



From the Chair

Welcome to another edition of the Department of Chemistry & Biochemistry Newsletter.

This has been an eventful year in which budget-related events in Madison made headlines for many weeks. The Department continues to do more with less, and the strain is evident, but the enthusiasm of students, staff, and faculty remains strong in spite of it.

This enthusiasm was evident at this year's Chemistry & Biochemistry Department Student Awards Day, which took place in April in the beautiful Zelazo Center on campus. The event started with the Sosnovsky Distinguished Lecture given by Dr. Peng Huang from the MD Anderson Medical Center (University of Texas). This was followed by a lively poster session, where spirited scientific discussions abounded. We greatly appreciated that Dr. Steven Anderson (UW-Whitewater), Dr. Yijun Tang (UW-Oshkosh), and Dr. Raja Annamalai (UW-Platteville) accepted our invitation to judge the graduate student research posters (with the assistance of Dr. Huang), while the undergraduate research posters were evaluated by our graduate students. The poster awards as well as all other awards presented on that day were made possible by generous donations from alumni and benefactors, for which we are very grateful!

Continuing the theme of enthusiasm, this year's Awards Day was organized by our Graduate Student Council (assisted by our office staff). The Council was established last summer as a voice for graduate students and takes up issues of interest and importance to graduate students. Moreover, we are pleased that our students are becoming more involved in outreach activities. For example, a Student Chapter of Society for Applied Spectroscopy was formed, and their networking and outreach activities were recognized by the national office of the Society. Moreover, the Chapter won the UWM Student Parliament Award for the best outreach activity of a student organization. Our students were also active in planning the 3rd Annual Poster Symposium and Mixer of the Younger Chemists Committee of the American Chemical Society Milwaukee Section. Thanks to all for a job well done!

We also instituted a mentoring program for new teaching assistants. We had a terrific group of graduate students who volunteered as mentors; the mentors conducted a part of the departmental training workshop for new teaching assistants. Subsequently, mentor-mentee pairs were formed, with mentors providing guidance and advice to their mentee over the course of the semester. The program has been very successful and we will continue it for the new student cohort arriving in the fall.

Although there are grave uncertainties about future budgets, the state of our programs is healthy. Currently, there are 80 graduate students and 15 postdoctoral research associates in the Department, and the number of undergraduates majoring in our degree programs is increasing.

Research funding remains strong, in spite of significant cuts to the budgets of major funding agencies. We are particularly pleased that all of our assistant professors have obtained funding from federal agencies for their research – no small feat given the strong competition for grant funding. Their accomplishments are being recognized: we just learned that Assistant Professor Xiaohua Peng won a UWM Foundation/Graduate School Research Award and Assistant Professor Kristen Murphy received this year's UWM Faculty Undergraduate Teaching Award. And, speaking of excellence, it was just announced that Dr. Anja Blecking, who has been serving the Department as Lecturer for the past five years, won the UWM Academic Staff Teaching Award. Congratulations to all three!

We also congratulate two department faculty members who gained promotions: Professor Carolyn Aita was promoted to Distinguished Professor; she also continues to be a Wisconsin Distinguished Professor, which is a separate recognition of excellence. Associate Professor Graham Moran was promoted to Full Professor in recognition of his contributions to his field.



Dr. Peter Geissinger, Chair

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Chairs' Letter continued from page 1

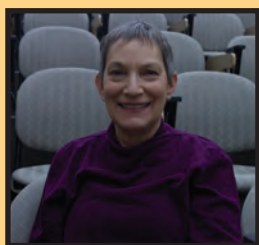
In other news, we are pleased to report that the Milwaukee Institute for Drug Discovery (MIDD) has now been officially established. I would like to encourage you to visit their website at drugdiscovery.uwm.edu. And, while on the topic of web pages, please check out the new departmental website, which was launched a few weeks ago. It can be found at chemistry.uwm.edu. Some areas of the site are still in development, but we would like to hear your comments and suggestions. An Alumni profile on the website is being developed. Let us know what you think and send us your profile to be added to our site.

Finally, the design of the Kenwood Interdisciplinary Research Complex is moving forward rapidly. At this point, occupancy of this new laboratory building, which will be located south of Lapham Hall, is projected for early 2015. While this building will mainly house the Department of Physics, there are provisions for shared user facilities for mass spectrometry, nuclear magnetic resonance, and electron microscopy.

As always, we would like to encourage you to stay in touch with the Department. We love hearing from you!

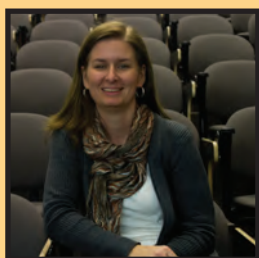


Faculty and Staff Accolades



Carolyn Aita was promoted to Distinguished Professor. She is also a Wisconsin Distinguished Professor – a separate noteworthy accomplishment.

Dr. Anja Blecking, Lecturer, received a 2012 UWM Academic Staff Teaching Award and also the Department's Outstanding Academic Service Award.



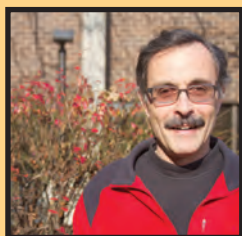
Assistant Professor Kristen Murphy received a 2012 UWM Faculty Undergraduate Teaching Award.

Graham Moran was promoted to Full Professor.



Associate Professor

Andy Pacheco received the Department's Faculty of the Year Award.



Comings and Goings

We welcome Adjunct Professor **Carol J. Hirschmugl** (Physics) to the Chemistry Department. Dr. Hirschmugl led a team of Synchrotron Radiation Center (SRC) Researchers at UW-Madison to a new imaging technique that offers high-resolution pictures of the molecular composition of tissues with unprecedented speed and quality. This technique is made possible by a new facility called the "Infrared Environmental Imaging (IRENI)," which employs multiple beams of synchrotron light to illuminate a state-of-the-art camera instead of just one beam. The technique could have broad applications not only in medicine, but also in pharmaceutical drug analysis, art conservation, forensics, biofuel production, and advanced materials, such as graphene. An article about the new facility appears in the March 21st online edition of *Nature Methods*.



Michelle Koranda, is our latest addition to the Laboratory Prep Technician group for the general and physical chemistry laboratories. She is replacing Keith Krumnow who retired last June after 30 years of service. She has a B.S. degree in chemistry from our very own University of Wisconsin-Milwaukee. Most recently, she worked at Hydrite Chemical Co. in Milwaukee as a Quality Control Chemist. Michelle is excited to be back at UWM and hopes to use her experience in private industry to benefit the department.



Scale Literacy For Chemistry Students

by Assistant Professor Kristen Murphy

“...greater emphasis needs to be placed on teaching and learning about scale in general, and small scale below the limits of visibility in particular”

Jones, M.G., Tretter, T., Taylor, A., and Oppewal, T. (2008)
International Journal of Science Education, 30, p. 428

A colleague is studying small molecules, and you may think about what they found, how they synthesized the molecule or with what it was interacting. However, a student in general chemistry may think, “Aren’t all molecules ‘small?’” We develop a very refined sense of scale, particularly spatial scale through the development of our own expertise. How we developed this, though, may not follow a defined path, like the development of other fundamental themes in science.

The American Association for the Advancement of Science (AAAS) has identified four common themes for science literacy: systems, models, constancy and change, and scale. These themes pervade any science course, and scientifically literate students would be expected to be successful in these courses. Just recently, the National Research Council has released the framework for K-12 science education that includes seven crosscutting concepts with “Scale, Proportion, and Quantity” as one.

A research team of Kristen Murphy, Peter Geissinger and Anja Blecking with graduate student, Karrie Gerlach, and undergraduate researchers have been studying the scale literacy of students in introductory chemistry since 2008. There may be an assumption that concepts of scale should have been “absorbed” by the time a student reaches college level, but our empirical evidence demonstrates that it has not. A high level of scale literacy of students is required when seeking careers in areas of technology, specifically in nanoscience and nanotechnology. Through our research, we have found that students in introductory chemistry courses on average were at a novice level for scale literacy, and that scale literacy is a better predictor for success in introductory chemistry than more traditional measures. It is evident that the measures currently made and curricula currently taught are missing a crucial component of science literacy.

The current direction of this project focuses on the effect of incorporating scale-themed instruction into all components of introductory chemistry courses and examining the subsequent performance of students as a measure of their understanding of general chemistry. The inclusion of scale into supplemental instruction already has been pilot tested using an online adaptive format. The full project will begin this fall with students in General Chemistry I with class-wide studies of systematically incorporating scale-themed instruction; it will run for two years. Concurrently, additional experiments will be conducted that will examine student problem-solving strategies while working scaling tasks. These experiments will be conducted using an eye-tracking system. This two-year project was recently funded by the National Science Foundation Division of Undergraduate Education in TUES-Type I Program.

UWM Hosts Glassblowers

by Neal Korfhage

Last March, the UWM glass shop in the Department of Chemistry and Biochemistry hosted the American Scientific Glassblowers Society (ASGS) annual Spring Midwest section meeting. Just like the



ACS organization for chemists, the ASGS is the professional, nonprofit, organization of scientific glassblowers and associated members who are interested in the art of scientific glassblowing. The objectives of the Society are the promotion, gathering, and dissemination of technical and scientific information concerning all aspects of scientific glassblowing.

The Society is broken up into different geographical regions of the country, and each section has their own meetings twice a year. The main purpose of the meetings is for regional scientific glassblowers to gather together and share their collective knowledge through demonstrations and the presentation of technical papers in the form of lectures. There are approximately 300 members in the lower 48 states. Once a year, an annual symposium is held that rotates location among different cities.

My involvement in the Society keeps my glassblowing skills current so that I can help the students and faculty with their scientific research needs. Without the support of the membership of the ASGS, it would be much harder for me to address the unique research needs of the department. Outside of hosting the occasional section meeting, my other ASGS responsibilities include serving as an instructor at the Allen B. Brown glassblowing seminar during the annual symposium. I’m part of team of four other scientific glassblowers which puts on this two-day long seminar which features hands-on practice of various glassblowing techniques using a table top mounted torch.

See www.asgs-glass.org for more information about ASGS.

Center for Student Involvement Recognizes SAS' Work With High Schools



Steve Kopitzke accepted the award on behalf of the Society for Applied Spectroscopy

Over the past year, the UWM student chapter of the Society for Applied Spectroscopy (SAS) has been involved in a project designed to expose high school students to spectroscopy through a forensic lab involving the absorption of automobile paint. Using a lab designed by SAS members, they were able to introduce spectroscopy as a way to study forensic science. The labs were performed in area high schools – something the students normally would not have an opportunity to ever see – and received high compliments from all involved. As a result of this project, on April 23rd, the Center for Student Involvement at UWM awarded SAS with the Student Organization Service Award. Only one other group was awarded this award on campus, and SAS was greatly honored to have been chosen for this award. SAS extends a special thank you to Lisa Kendhammer, Hannah Wagie, Heather Adams, Brad Moran, Natalia Stein, Sarah Garvey and Steve Kopitzke for all of their hard work developing and implementing this project. The group looks forward to continuing this project well into the future; visits to new high schools are already planned for this year.

Grad Student Takes Science Back to High School

Graduate Student Steven Kopitzke visited his alma mater, Wisconsin Lutheran High School (WLHS), bringing along some of his colleagues to show the chemistry students how to use a spectrometer. To demonstrate the application of science to real-life problems, Steve immersed the students in an analysis of paint chips; the information gathered subsequently was used to investigate a hypothetical crime scene. A story about Steven's visit was prominently featured in the WLHS alumni magazine.

Congratulations to our Graduate Degree Recipients

Fall 2011 – M.S.

Dominique Brooks (Advisor: Jorg Woehl)

Scott Schlipp (Advisor: Joseph Aldstadt)

Yunxuan Yang (Advisor: David Petering)

Fall 2011 – PhD

Yi Hu (Advisor: Jorg Woehl)

Chitra Edwankar (Advisor: James Cook)

Terrill Clayton (Advisor: James Cook)

Spring 2012 – M.S.

Tahniyath Ara-Zaman

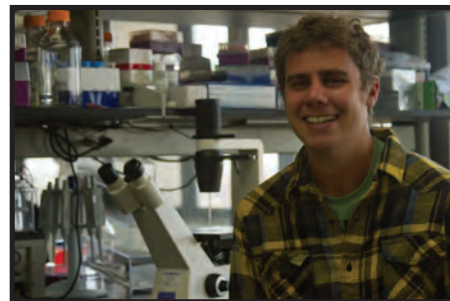
(Advisor: Alexander Arnold)

Congratulations to our Undergraduates Inducted Into Phi Beta Kappa

Phi Beta Kappa is the nation's oldest and most prestigious undergraduate honor society. It celebrates and advocates excellence in the liberal arts and sciences, admitting approximately the top 10% of America's leading college and university students. From the Department of Chemistry and Biochemistry, the 2012 inductees were: Sarah Bassiouni, Joseph D. Eschweiler, Sibel M Ibryamova, Daniel Monge, and Ryan Thill.

Graduate Student Matt Huisman Named "Most Helpful"

As part of the First-Year Student Success Awards, Matt Huisman (Advisor: Dr. Hossain) was named by first-year students as the UWM person who has helped them the most in their college success.



Special Insert – 2012 Student Awards Day

The Department of Chemistry and Biochemistry held its annual Student Awards Day on Friday, April 27, 2012. All areas of study were represented this year with 61 posters presented, including 15 at the undergraduate level.

Undergraduate posters were judged by graduate students this year, and the graduate students could not vote for posters in their respective field. The judges for the graduate poster competition were Dr. Peng Huang, University of Texas; Dr. Steven Anderson, University of Wisconsin-Whitewater; Dr. Yijun Tang, University of Wisconsin-Oshkosh; and Dr. V. Raja Annamalai, University of Wisconsin-Platteville.

The Sosnovsky Distinguished Lecture Series sponsored leading cancer expert Dr. Peng Huang, MD, PhD an Ashbel Smith Endowed Professor from the Department of Molecular Pathology – The University of Texas MD Anderson Cancer Center for a lecture on “Metabolic Alterations in Cancer: Mechanisms and Therapeutic Implications,” and “Novel Strategies to Target Metabolic Alterations in Cancer with Improved Therapeutic Selectivity.” Dr. Huang stated, “I am quite impressed by the research being done in your Chemistry Department.”

With each research group well represented in the competition, the toughest job was interviewing the students and choosing the winners. The Student Awards Day provides a wonderful opportunity to showcase the Department, recognizing our top students in academics as well as in research. Your alumni donations to the department help make Awards Day possible. Please contact Wendy Grober (wgrober@uwm.edu) if you are interested in serving as a judge or as a guest lecturer for an upcoming Awards Day.

Graduate Poster Awards

1st Place Keith Hall Award for Excellence in Graduate Research

Michael Garvey – “First-Principles Simulations of Scanning Tunneling Microscopy with Functionalized Tips” (Advisor: Wilfred Tysoe)

2nd Place Keulks Award for Graduate Research

Lisa M Mueller – “The Structure and Function of *Streptomyces bingechengensis* Acetoacetate Decarboxytase” (Advisor: Nicholar Silvaggi)

3rd Place McFarland Award

Robert W. Hoppe – “Synthesis and Binding Studies of Water Soluble Synthetic Molecular Receptors” (Advisor: Alan Schwabacher)

4th Place Chemistry Alumni Award

Megan M. McCallum – “A Fluorescence-Based High Throughput Assay for the Identification of Promiscuous Inhibitors” (Advisor: Mark Dietz)

Undergraduate Poster Awards

1st Place McFarland Award

Diana Bartczak – “Using Phage Display to Identify Peptide Ligands that Bind to the Helicase Region of Hepatitis C Virus (HCV) NS3 Protein”

2nd Place Chemistry Alumni Award

Sarah Oehm – “A Streamlined Synthesis of Gramines”

3rd Place Chemistry Alumni Award

Margaret L. Guthrie – “Measurement of the Octanol-Water Partition Coefficients for Imidazolium-Based Ionic Liquids Using the Slow Stir Technique and a Novel HILIC-UV Method”

Other Graduate Student Awards

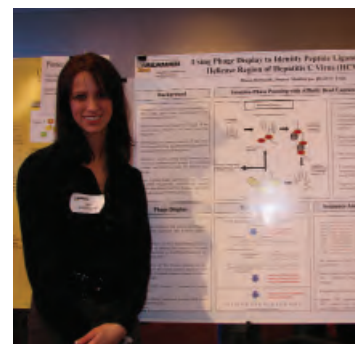
- Louise Arndt Fellowship Award – Steve Kopitzke
- Sosnovsky Award for Excellence in Graduate Research – Matthew Youngblut
- Frederick C. Hoppe Memorial Award – Sandra Simon and Megan Corby
- Moczynski Outstanding Teaching Assistant Award – James Wankowski

Other Undergraduate Student Awards

- Durward Layde Memorial Fellowship Award – Brian Spindler
- Outstanding Senior Award – Sarah Oehm
- Outstanding Performance in Analytical Chemistry – Sarah Oehm
- Outstanding Performance in Biochemistry – Michele Gliniecki
- Outstanding Performance in Inorganic – Brian Zielke
- Kovacic Award for Outstanding Performance in Organic Chemistry – Daniel Murphy
- Vanselow Award in Physical Chemistry – Brian Zielke
- Outstanding Performance in Introductory Chemistry – Daniel Love
- Chemistry Emeritus Award Outstanding Junior – Nicholas Darrow



Michael Garvey, left, and judge Dr. Peng Huang



Diana Bartczak

Special Insert – Scenes From Student Awards Day



Students Form New Graduate Student Council

by Hannah Monday Wagie, Graduate Student and Teaching Assistant

The Graduate Student Council is a new student service organization for the Department of Chemistry and Biochemistry, providing an organized means of communication between students and administration.

The impetus for the formation of the group began when Dr. Peter Geissinger, chair of the department, initiated a discussion in May, 2011, about the disconnect between students and faculty. I was asked to come up with ideas about how it should be structured, and, to ensure that everyone across all of the department's divisions, including international students, was included, I asked four other students to help me. Our mission reads as follows:

Statement of Intent

- 1. Be responsible for the student culture within the department:*
 - a. Provide for interaction between students in different divisions and with various backgrounds.*
 - b. Promote both academic and social interests that represent the current graduate student body.*
- 2. Provide opportunity for discourse between the graduate student body and the department, including administration and faculty:*
 - a. Meet regularly with the Graduate Committee to examine a structured agenda.*
 - b. Be a channel for students to submit grievances and suggestions in a constructive manner.*
- 3. Uphold the value of all degrees granted within the department:*
 - a. Enforce accountability for the course offerings within the department.*
 - b. Encourage faculty to actively show interest in students' work.*

One of our first accomplishments was to secure a standing invitation for first ten minutes of the Graduate Sub-committee every time they meet as a way to keep the lines of communication open. Thank you to Dr. Geissinger and Dr. Woehl, the head of the Graduate Sub-committee.

All graduate students in the Department of Chemistry & Biochemistry are eligible to be "members" of the organization. Alumni may also be members upon request.

In the past year, we have:

- planned a department picnic in August, 2011
- implemented activities for new student orientation in August, 2011 and January, 2012, including building and campus tours
- created graduate student panels
- created a PAWS/MyUW tutorial
- became a Registered Student Organization (RSO) with the university to become eligible for activities funding
- made formal suggestions to the Graduate Sub-committee for improvements to the graduate student handbook
- planned Awards Day, including the introduction of a Faculty of the Year award
- held three "open forum" opportunities for students to voice concerns or suggestions for Awards Day, orientation, etc.



2011-12 pilot group: Sundari Rallapalli (Organic), Dhara Shah (Biochemistry), Matt Youngblut (Inorganic), Hannah Monday Wagie (Physical), and Sarah Oplawski (Analytical)



The new leadership has already had their first couple of meetings and are planning to continue the major events we started. I know they also want to do more networking events to help establish better support for students when they graduate – any alumni with suggestions, please contact Sandra Simon at sandram4@uwm.edu.

2012-2013 leadership: Reza Karim (Biochemistry), Veronica Marco-Alvarez (Analytical), Sandra Simon (Inorganic, president), Heather Adams (Physical), Jackie Trate (Chem Ed), and Matt Huisman (Organic)

Research Grants and Awards

Calorics Pharmaceuticals, Inc.

Assays on Propriety Compounds

Moran, Graham R. – Research \$22,470

Brookhaven National Laboratory

An Integrated Basic Research Program for Advanced Nuclear Energy Systems Based on Ionic Liquids

Dietz, Mark L. – Research \$116,400

National Institutes of Health

Antiviral Potential of Helicase Inhibitors

Frick, David N. – Research \$365,558

National Science Foundation

Science Literacy and Undergraduate Success: Incorporating Scale as a Theme in Introductory Chemistry

Murphy, Kristen L.; Geissinger, Peter – Research \$196,380

National Institutes of Health

Antiviral Potential of Helicase Inhibitors

Frick, David N. – Research \$33,233 and \$332,325

Advanced Chemical Systems

Water Sensor Research (Gap Funding)

Geissinger, Peter – Research \$6,743

National Science Foundation

Structure-function relationships in metallo enzymes with multiple redox-active centers

Pacheco, Arsenio Andrew; Schmidt, Marius – Research \$400,265

National Institutes of Health

Cellular Fluorescent Zinc Sensors: What Are They Imaging?

Petering, David H. – Research \$278,496

Harvard Medical School

Novel GABA-A Modulators as Cognitive Enhancers

Cook, James M.; Helmstetter, Fred J. – Research \$142,751

UWM Research Foundation

Real-Time Optical Fiber Sensors for Metals: Prototype Fabrication

Geissinger, Peter – Research \$30,000

UW-Madison

Tri-Modal Polymeric Micelles for “See and Treat” Applications in Surgical Oncology

Indig, Guilherme L. – Research \$30,619

National Institutes of Health

Dual-Function Biocatalysts for the Synthesis of Engineered Anti-MRSA Antibiotics

Silvaggi, Nicholas R. – Research \$73,850

National Science Foundation

Surface Reaction Pathways on Model Gold Palladium Alloy Catalysts

Tysoe, Wilfred T. – Research \$135,000

Carnegie Mellon University

Catalysis Science: Molecular-Level Design of Chiral Heterogeneous Catalysts

Tysoe, Wilfred T. – Research \$131,665

EDUCAUSE

A Socially-Centric Blended Learning Model for At Risk Youths in an Urban Institution

Wysocki, Anne F.; Murphy, Kristen L; Petto, Andrew J. – Instruction \$249,871

National Institutes of Health

Biology-Environmental Health Science Nexus: Inquiry, Content and Communication

Petering, David H.; Berg, Craig A. – Instruction \$267,300

Catalyst Grant

Nano-laminate Coatings

Aita, Carolyn – for the development of new processes and coatings that can be scaled up for manufacturing; these coatings address environmental problems with chromate coatings typically used in galvanized steel and may be extended to high-end coatings for biomedical applications

UWM Foundation Senior Faculty Award

Completed textbook “Understanding Single Crystal X-ray Crystallography”

Bennett, Dennis Bennett – Dr Bennett’s research explores the structures and bonding of molecules within crystals, and how these molecules are affected by differences in electron charge density. Among his accomplishments in the field of crystallography is revealing the complex decomposition process of sulfur-oxygen compounds, which had stumped other researchers. Of the book, Joseph Ferrara, a vice president at the Molecular Structure Corporation, writes, “If I were to teach a course in small molecule crystallography, this is the book I would use.... I can honestly say I wish I had this book when I was in school.”

UWM Foundation Senior Faculty Award

Geissinger, Peter – Dr. Geissinger’s record of accomplishment during the last 12 years at UWM includes securing \$2.25 million in funding and publishing 25 peer-reviewed journal articles and five book chapters. He has also transferred his research into a productive collaboration with local industry. Advanced Chemical Systems, a Milwaukee-based company that develops water treatment technologies, has signed an option to license Geissinger’s optical fiber sensor technology, which has been supported by the Bradley Foundation.

Friends of Chemistry

Your contributions enhance the educational experience of our students and strengthen the research and development of our faculty and staff. Please join us in thanking our current friends (gifts from 08/11 to 06/12).

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- Mr. Carl E. Wolff
- Mr. Hanching Wu

To become a Friend of Chemistry and Biochemistry, please see the pledge form on the back, visit our website or contact Wendy Grober at (414) 229-4098 or wgrober@uwm.edu.

2012 Shaw Scientist Award: Dr. Xiaohua Peng, Assistant Professor

The Shaw Scientist Program, originally called the Shaw Scholars Program, was established by the Greater Milwaukee Foundation in 1982. It is one of several programs implementing the wishes of the late Dorothy Shaw, who left a substantial bequest to create a permanent component fund in the Foundation.

The fund is committed to supporting research in the fields of biochemistry, biological sciences and cancer at the University of Wisconsin-Madison and the University of Wisconsin-Milwaukee. The Shaw Scientist Program is intended both to advance research in those fields and to give encouragement, at a critical stage in their careers, to young scholar-scientists who show great



promise of substantial scientific achievement. During the last thirty years, sixty young faculty members from the two institutions have received Shaw Scientist awards.

Congratulations to Dr. Peng on her award for Activated DNA Damaging Agents: Targeted Anticancer Drugs." She and her team aim to

develop non-toxic compounds that can be activated under tumor-specific conditions (e.g. increased oxidative stress) to release active drugs only to cancer cells.

We Want to Hear From You!

To share alumni news or provide feedback to the editor, please contact:

Department of Chemistry and Biochemistry Business Manager:
Michael Conway, conwaym@uwm.edu, 414-229-3880

Department of Chemistry and Biochemistry Chair:
Dr. Peter Geissinger, geissinger@uwm.edu, 414-229-5230

To discuss giving opportunities, please contact:

Christina Makal, cmmakal@uwm.edu, 414-229-4963



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