UNIVERSITY of WASHINGTON

CHEMLETTER

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LETTER FROM THE CHAIR

Dear Friend of Chemistry,

These are exciting times in the world of chemistry. Our department is fortunate to have superb undergraduate and graduate students who continue to make us proud in many ways. Each year, the Husky 100 honors 100 UW undergraduates and graduate students in all areas of study. We congratulate Jie Win, Sedona Ewbank, and Lauren Kang for being named to the 2018 Husky 100.

The UW is a big place. Each year, we welcome several thousand new students and graduate a similar number. From each cohort, a medalist is chosen as the top student in their class. I am pleased to share with you that biochemistry major Alder Strange has been named the Junior Medalist and that biochemistry major Grace Wang has been named the Freshman Medalist.

Graduating senior Tim Welsh has been awarded a Churchill Scholarship, which will support a year of study at Cambridge. Tim plans to return to the U.S. next year to enter the Ph.D. program at the University of California, San Francisco. Congratulations to John Goldstone (B.S. Chemistry, March 2018) for receiving a $225,000 NSF grant to support his startup company, Boydston Chemical Innovations, Inc. (BCI). BCI uses patent-pending technology discovered in the UW Department of Chemistry Boydston research group to utilize a metal-free approach to making high performance resins and polymers. The company hopes they will be able to provide efficient routes to producing lightweight high-toughness production parts.

Our graduate students have won numerous awards. Each year, we encourage our eligible graduate students to apply for the highly competitive National Science Foundation Graduate Research Fellowship. In the competition this year, Rob Weakly (Khalil group) and Zack Cohen (Keller group) were successful.

Our faculty have won several awards. Jesse Zalatan has been awarded the prestigious Maximizing Investigators' Research Award from the National Institutes of Health (NIH). Jesse will use this to further his studies of multiprotein signaling complexes and higher order genome structures. A collaboration between Assistant Professor Josh Vaughan and Professor Daniel Chiu has led to a Director's Transformative Research Award from the NIH. Daniel and Josh will use this award to develop a method to interrogate the gene expression of a single cell in a complex tissue sample. (See page 3 for details.)

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IN THIS ISSUE

PROMOTIONS

Brandi Cossairt and Stefan Stoll Promoted to Associate Professor with Tenure; Munira Khalil Promoted to Professor

The Department of Chemistry congratulates Brandi Cossairt, Munira Khalil, and Stefan Stoll on their promotions, effective September 16, 2018. Assistant Professors Brandi Cossairt and Stefan Stoll were promoted to associate professor with tenure. Associate Professor Munira Khalil was promoted to professor.

BRANDI COSSAIRT

The Cossairt research group uses synthetic inorganic chemistry approaches to address key problems related to sustainability, such as developing new, efficient light emitting materials for display technologies, designing catalysts to make fuel from water or carbon dioxide and sunlight, and exploring new inexpensive materials for solar energy harvesting. To advance clean energy technology, the Cossairt group is developing low-tech solution methods to synthesize high-tech electronic materials from Earth-abundant elements, as well as methods to capture and store solar energy in the form of chemical bonds. They have advanced the understanding and control of leading alternatives to replace toxic cadmium-containing materials in solid-state lighting and display applications through innovative syntheses of phosphide nanocrystals, particularly zinc phosphide (Zn_3P_2) and indium phosphide (InP). They are also building energy conversion devices for water reduction to generate solar H_2 based on the motif of catalyst-modified photocathodes, developing new hydrogen evolution catalysts that can be easily attached to electrode or semiconductor surfaces.

To learn more about Professor Cossairt and her research, please visit her faculty page (http://depts.washington.edu/chem/people/faculty/cossairt.html), research group website (http://brandicossairt.wixsite.com/cossairtlab), or contact her directly at 206-543-4643 or cossairt@chem.washington.edu.

MUNIRA KHALIL

Research in the Khalil group focuses on the development and application of advanced spectroscopic techniques to understand the ultrafast structural dynamics of light-driven chemical and biological processes in solution. Using multidimensional infrared (IR) and ultrafast x-ray absorption spectroscopies, the Khalil group studies how coupled electron and vibrational motions and their interactions with the surrounding solvent dictate the course of ultrafast charge transfer reactions in chemical and biological systems. This work will ultimately provide fundamental understanding of molecular energetics and the dynamics of chemical reactions, with broad practical applications in the design of new materials and molecular devices.

To learn more about Professor Khalil and her research, please visit her faculty page (http://depts.washington.edu/chem/people/faculty/mkhalil.html), research group website (https://sites.google.com/a/uw.edu/khalilgroup/), or contact her directly at 206-543-6682 or mkhalil@uw.edu.

STEFAN STOLL

The Stoll research group uses cutting-edge magnetic resonance tools to study the structure and function of proteins and enzymes. Central to this work is their use of advanced electron paramagnetic resonance (EPR) spectroscopy, a spectroscopic method that provides information on the structure and dynamics of systems with unpaired electrons (i.e., paramagnetic systems)—while conceptually similar to nuclear magnetic resonance (NMR), in EPR the magnetic moments observed are electron spins rather than nuclear spins. In addition to continuing contributions to the field of theoretical and computational EPR spectroscopy, particularly through the EasySpin EPR spectra simulation package, the Stoll group is advancing the experimental and theoretical methodology for pulse EPR spectroscopy and its application to important problems in structural biology.

To learn more about Professor Stoll and his research, please visit his faculty page (http://depts.washington.edu/chem/people/faculty/stoll.html), research group website (depts.washington.edu/stollgrp/), or contact him directly at 206-543-2906 or stst@uw.edu.

UW RESEARCHERS CHOSEN FOR

NIH HIGH-RISK, HIGH-REWARDS PROGRAM

The National Institutes of Health (NIH) has awarded 86 grants to scientists working in biomedical research as part of this year's High-Risk, High-Reward Research program. Of the three faculty members from the University of Washington honored with a grant, two are from the Department of Chemistry.

The program funds exceptionally creative scientists proposing to use highly innovative approaches to tackle major challenges in biomedical research. The program supports high-risk ideas with high-impact potential, and applicants are encouraged to think outside the box and to pursue exciting, trailblazing ideas in any area of research relevant to the NIH mission.

Assistant Professor Joshua Vaughan and Professor Daniel Chiu are co-recipients of a "Transformative Research Award." This award, established in 2009, promotes cross-cutting, interdisciplinary approaches and is open to individuals and teams of investigators who propose research that could potentially create or challenge existing paradigms. Chiu and Vaughan's award was one of eight issued in 2017.

Chiu and Vaughan are developing radical new technologies for high-resolution mapping of brain tissue, including circuit-level spatial information down to a resolution of 50 nanometers and comprehensive analysis of the types of proteins present across large regions of the brain. These techniques are needed because it is technically difficult to directly detect large numbers of proteins in brain tissue.

Instead of trying to measure proteins directly, most approaches measure RNA molecules—a precursor to proteins. But RNA detection in spatially complex brain tissue has its flaws. Current approaches struggle with dim signals that are difficult to detect over background noise in complex, thick tissues. Chiu and Vaughan will develop new fluorescent probes to light up RNA molecules in tissues and will use a novel, large-area light sheet microscope—together with sample processing techniques—to rapidly probe large volumes of brain tissue at high spatial resolution.

DANIEL CHIU

JOSHUA VAUGHAN

The 2017 High-Risk, High-Reward Research program awarded a total of approximately $263 million, pending available funds, and represent contributions from the NIH Common Fund; National Institute of General Medical Sciences; National Institute of Mental Health; National Center for Complementary and Integrative Health; and National Institute of Dental and Craniofacial Research.

For more information, visit Professor Chiu's and Professor Vaughan's faculty pages at http://depts.washington.edu/chem/people/faculty/chiu.html and http://depts.washington.edu/chem/people/faculty/vaughan.html

Adapted from the October 6, 2017 story by Jennifer Langston of UW News and Leila Gray of UW Health Sciences/UW Medicine.

UW AND PNNL LAUNCH NW IMPACT IN

JOINT PURSUIT OF NEW MATERIALS

By James Urton, UW News
January 31, 2018

Many innovations of 21st century life, from touch screens and electric cars to fiber-optics and implantable devices, grew out of research on new materials. This impact of materials science on today's world has prompted two of the leading research institutions in the Pacific Northwest to join forces to research and develop new materials that will significantly influence tomorrow's world.

With this eye toward the future, the Department of Energy's Pacific Northwest National Laboratory and the University of Washington announced the creation of the Northwest Institute for Materials Physics, Chemistry and Technology—or NW IMPACT—a joint research endeavor to power discoveries and advancements in materials that transform energy, telecommunications, medicine, information technology and other fields. UW President Ana Mari Cauce and PNNL Director Steven Ashby formally launched NW IMPACT during a ceremony on January 31 at the PNNL campus in Richland, WA.

"This partnership holds enormous potential for innovations in materials science that could lead to major changes in our lives and the world," said Cauce. "We are excited to strengthen the ties between our two organizations, which bring complementary strengths and a shared passion for ground-breaking discovery."

"The science of making new materials is vital to a wide range of advancements, many of which we have yet to imagine," said Ashby. "By combining ideas, talent and resources, I have no doubt our two

PNNL AND UW LEADERS ATTEND THE LAUNCH OF NW IMPACT AT THE PNNL CAMPUS ON JAN. 31. LEFT-TO-RIGHT: NW IMPACT CO-DIRECTOR DAVID GINGER; UW PRESIDENT ANA MARI CAUCE; PNNL DIRECTOR STEVEN ASHBY; NW IMPACT CO-DIRECTOR JIM DE YOREO. *ANDREA STARR/PNNL*

organizations will find new ways to improve lives and provide our next generation of materials scientists with valuable research opportunities."

The institute builds on a history of successful partnerships between the UW and PNNL, including joint faculty appointments and past collaborations such as the Materials Synthesis and Simulations Across Scales Initiative, the PNNL-led Battery 500 consortium, and the UW Molecular Engineering Materials Center, a new NSF-funded Materials Research Science and Engineering (MRSEC) Center. But NW IMPACT is the beginning of a long-term partnership, forging deeper ties between the UW and PNNL.

The goal is to leverage these respective strengths to enable discoveries, innovations and educational opportunities that would not have been possible by either institution alone.

"By partnering the UW and PNNL together through NW IMPACT, the sum will truly be greater than the parts," said David Ginger, a UW professor of chemistry and chief scientist at the UW Clean Energy Institute. "We are joining together our expertise and experiences to create the next generation of leaders who will create the materials of the future."

Ginger will co-lead the institution in its initial phase with Jim De Yoreo, chief scientist for Materials Synthesis and Simulation Across Scales at PNNL and a joint appointee at the UW.

Over its first few years, NW IMPACT aims to hire a permanent institute director, who will be based at both PNNL and the UW; create at least 20 new joint UW-PNNL appointments among existing researchers; streamline access to research facilities at the UW's Seattle campus and PNNL's Richland campus for institute projects; involve at least 20 new UW graduate students in PNNL-UW collaborations; and provide seed grants to institute-affiliated researchers to tackle new scientific frontiers in a collaborative fashion.

Some of the areas in which NW IMPACT will initially focus include:

- Materials for energy conversion and storage, which can be applied to more efficient solar cells, batteries and industrial applications. These include innovative approaches to create flexible, ultrathin solar cells for buildings or fabrics, long-lasting batteries for implantable medical devices, catalysts to enable high efficiency energy conversion and industrial processes, and manufacturing methods to synthesize these materials efficiently for commercial applications.
- Quantum materials, such as ultrathin semiconductors or other materials that can harness the rules of quantum mechanics at subatomic-level precision for applications in quantum computing, telecommunications and beyond.

"By combining ideas, talent and resources, I have no doubt our two organizations will find new ways to improve lives and provide our next generation of materials scientists with valuable research opportunities."

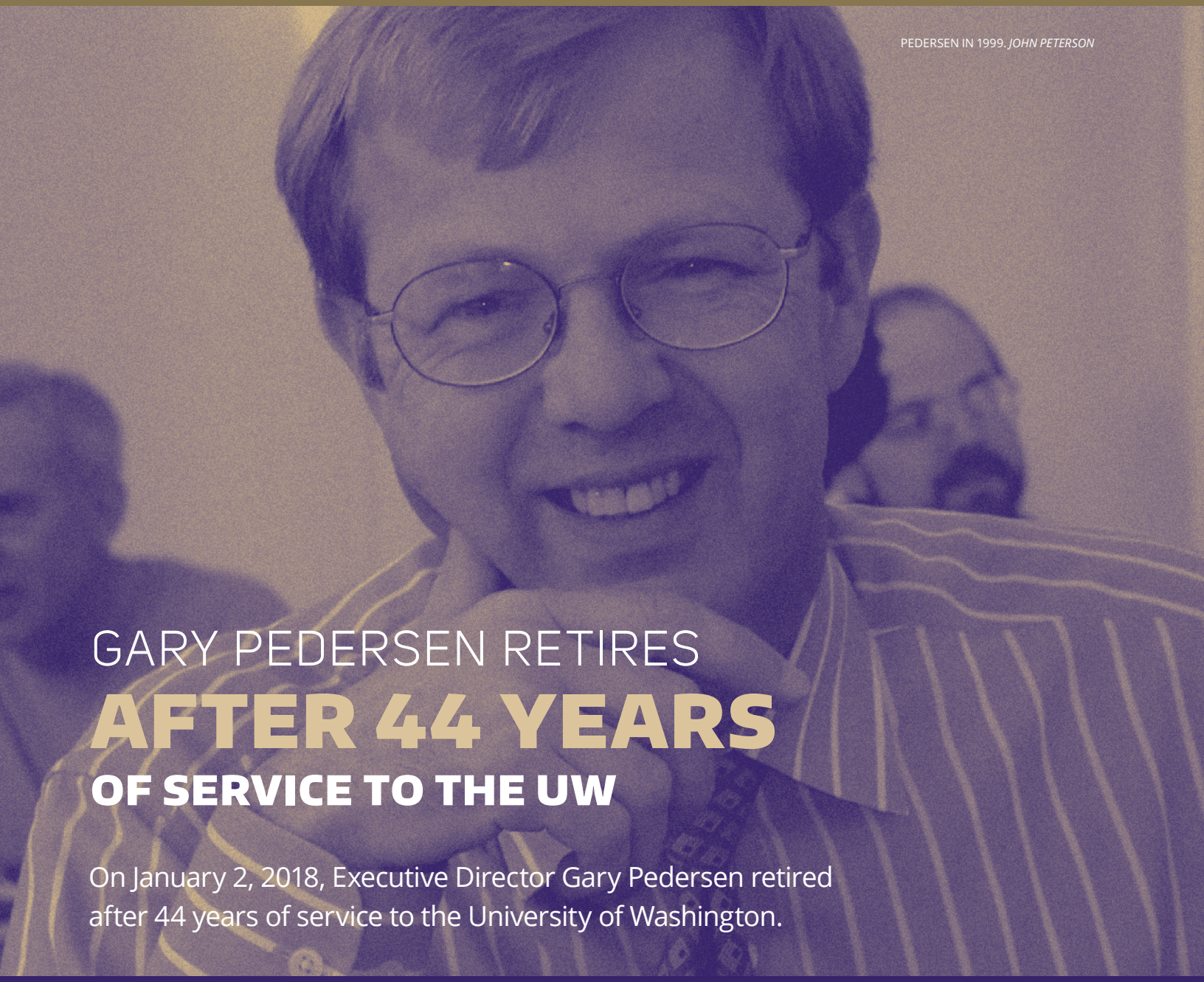
STEVEN ASHBY, PNNL DIRECTOR

- Materials for water separation and utilization, which include processes to make water purification and ocean desalination methods faster, cheaper and more energy-efficient.
- Biomimetic materials, which are synthetic materials inspired by the structures and design principles of biological molecules and materials within our cells—including proteins and DNA. These materials could be applicable in medical settings for implantable devices or tissue engineering, and for self-assembled protein-like scaffolds in industrial settings.

"The science of making materials involves understanding where the atoms must be placed in order to obtain the properties needed for specific applications, and then understanding how to get the atoms where they need to be," said De Yoreo.

NW IMPACT will draw on the unique strengths and talents of each institution for innovative collaborations in these areas. For example, PNNL has broad expertise in materials for improved batteries. The lab also offers best-in-class imaging, NMR and mass spectrometry capabilities at EMSL, the Environmental Molecular Sciences Laboratory, a DOE Office of Science user facility. DOE supports fundamental research at PNNL in chemistry, physics and materials sciences that are key to materials development. The UW brings complementary facilities and equipment to the partnership, such as the Washington Clean Energy Testbeds and a cryo-electron microscopy facility, as well as expertise in a variety of "big data" research and training endeavors, highly rated research and education programs, and ongoing materials research projects through the National Science Foundation-funded Molecular Engineering Materials Center.

For more information, contact James Urton with the UW News Office at 206-543-2580 or jurton@uw.edu and Susan Bauer with the PNNL News & Media Relations Office at 509-372-6083 or susan.bauer@pnnl.gov.



PEDERSEN IN 1999. *JOHN PETERSON*

GARY PEDERSEN RETIRES AFTER 44 YEARS OF SERVICE TO THE UW

On January 2, 2018, Executive Director Gary Pedersen retired after 44 years of service to the University of Washington.

In January 1974, Pedersen began as a student helper in the Chemistry purchasing and accounting office. He finished his bachelor's degree in chemistry in 1976 and became an accounting assistant. Within a few years, he was promoted to lead the purchasing and accounting team. In 1987, Chair Tom Engel selected Pedersen to lead all Chemistry staff as director of facilities and services. In the early 2000s, Pedersen served as administrator in the School of Aquatic and Fishery Sciences for five years until being recruited back to Chemistry in 2006 by Chair Paul Hopkins to serve as the executive director. Pedersen advised four chairs in Chemistry: Thomas Engel, Robert Watts, Paul B. Hopkins, and D. Michael Heinekey.

A former dean of the College of Arts & Sciences said that Chemistry is the "best run" department in the College. This is undoubtedly high praise given that Chemistry is an extremely complex unit in a college of more than 40 departments, and the credit for this goes to Pedersen's many years of leadership.

In the School of Aquatic and Fishery Sciences, Pedersen became administrator at a time, says Professor Emeritus David Armstrong, "that marked the rebuilding phase in many ways." Armstrong was then director of the School and he "had no idea how important and essential an administrator was until I worked with Gary. [He] became a true partner with faculty and me in a real metamorphosis of the School."

In his 39 years in the Department of Chemistry, Pedersen has had a hand in basically every aspect of department administration and physical infrastructure. His combined financial, analytical, and problem-solving skills served the Department extremely well during a time of nearly constant growth of both instructional and research programs. One major achievement in Chemistry was his contribution to the planning and construction of the Chemistry Building.

"Gary deserves much of the credit for the success of the Chemistry Building due to his leadership in all aspects of siting, designing, and building the Chemistry Building," stated Chair Emeritus Paul Hopkins at Pedersen's retirement reception in December 2017. "From exterior design—such as the pattern of the brick colors—lab layout, mechanical systems, cabinet materials, Gary made countless decisions, both practical and esthetic."

"It was a remarkably time-consuming activity and Gary did a superb job keeping the project on track," remembers Professor Robert Watts who was chair at the time construction occurred.

Upon Pedersen's retirement, Professor Wes Borden wrote, "[Gary], more than any of the other members who worked on the 'New Building,' deserve credit for its success."

Much less gratifying than the completion of a new building is the maintenance of an old one. The fact that 82-year-old Bagley Hall functions as well as it does owes much to Pedersen; he has overseen the renovation of lab and office space totaling tens of thousands of square feet in Bagley Hall, including nearly all of the instructional laboratories that as of the late 1990s were characterized by Frederick Campbell, a former dean of Undergraduate Education, as "something out of Dickens."

Pedersen has made tremendous contributions not only to Chemistry, but also to the UW more broadly. His far-reaching influence includes the development of MyFinancial.desktop, a web interface which has been in use for some 20 years and affects the entire University's method of doing business. Other university-wide contributions include his extensive work on the University Services Renewal Project, which led to the success of various systems such as the Online Payroll Update System and the Access to Systems, Tools, Resources and Applications.

Pedersen's creativity in problem solving, whether he was designing a lab or an accounting system, allowed him to succeed where others would be defeated by insurmountable problems.

Pedersen's willingness to go the extra mile was evident in his double- and triple-checking drawings for a renovation, poring over budgets to find the problem, and responding immediately to facilities emergencies such as fires and floods. In a letter of support for Pedersen's nomination for the Distinguished Staff Award (which he won in 2006), Jeanne Marie Isola, then director of the Strategic Initiatives Office, testified to Pedersen's "tireless commitment." Pedersen always went beyond what most would consider required.

Another key part of Pedersen's skillset is his deep sense of fundamental fairness. Hopkins said, "Countless times it appeared to me that meeting one person's need was going to come at a cost to someone else. Take lab space assignments, for example. Gary was remarkably good at finding an outcome that worked for everyone." Director of Technical Services Jim Gladden supported this sentiment in remarks he shared about the importance of having a boss with whom you were never fearful of dealing. Borden acknowledged Pedersen as a peacemaker.

Multiple colleagues attest to Pedersen's calmness, especially at moments of great stress. Watts recalls, "During our five years together we faced several stressful experiences including an audit, personnel issues, and a couple of years of the budget being under constant pressure. My main memory of Gary is his cool, calm, and considered approach to what could have been major disasters."

Pedersen is one of those rare people who is able to predict the future, especially the unintended negative consequences of most actions. Hopkins recounts, "Once I understood this, it became my standard practice to seek out from this oracle his predictions of consequences of my ideas…brainstorming with Pedersen was a critical step before taking just about any significant action."

Pedersen was a supportive supervisor and led by example. Brian Holm, staff machinist and facilities manager who retired in 2015 after 27 years in the Department, credits Pedersen for the patience, compassion, and professionalism he learned during their time together: "Attributes that enhanced my life both during and after my career at the UW."

Randa Knudson credits her ability to become an administrator in another department to Pedersen's mentorship and management style. She was hired by Pedersen in 1983 as an accounting assistant and worked her way up to the director of finance in Chemistry. Knudson recalls, "Gary was supportive and trusted people to do their jobs. He was there to provide guidance when you needed it, but he let you do it on your own and grow. It really was a better way to learn."

In Pedersen's August 9, 2017 email announcing his retirement, he wrote, "Working with all of you has been a remarkable and rewarding experience. I have found Chemistry to be a great place to learn, a great place to work, and a great place to grow older and wiser. I am fortunate and thankful to have stumbled into a career I have thoroughly enjoyed."

We in Chemistry are very fortunate that Gary changed his major from music to chemistry, bringing him to this department more than 40 years ago. Gary deserves great credit for his service and his accomplishments. Thank you, Gary, for everything. Enjoy your much deserved retirement.

IN MEMORIAM

WOLFGANG MANFRED "FRED" SCHUBERT

PROFESSOR EMERITUS

FEBRUARY 16, 1920–NOVEMBER 19, 2017

Wolfgang Manfred "Fred" Schubert, an accomplished organic chemist and a dedicated and exacting teacher, passed away on November 19, 2017 at the age of 97.

Fred grew up in St. Louis, in a tough neighborhood, after his family emigrated from Germany in 1923. His parents were actors in the German theater in the city, and some of his earliest memories were of the camaraderie at a "bierstube" after a show. As a kid, he would race the streetcar to see the Cardinals, watching the games in the bleachers with his friends. In high school Fred took up track, and set citywide records in the 440 and 880.

He secured a track scholarship to the University of Illinois and went on to earn his Ph.D. at the University of Minnesota. He investigated the synthesis of analogs of α-tocopherol (vitamin E), and spent two years at American Cyanamid Company in Connecticut. When he joined the University of Washington faculty in 1947, Fred turned his focus to physical organic chemistry, outlining his research plan on a single page of his job application. Fred also credited the "the enthusiastic teachings of Dr. Richard T. Arnold" at Minnesota, a leader in the field of physical organic chemistry, as inspiration for joining the area.

Over his career, Fred published more than sixty papers, examining fundamental aspects of organic reactions, in particular the effects on chemical reactivity of both a compound's structure and the solvent in which it is immersed.

One of his key contributions was ascertaining the role of solvents in chemical reactions. Explains Weston Borden, a former colleague and current UW affiliate professor of chemistry: "Physical organic chemists were trying to figure out the origin of the so-called Baker-Nathan order, in which small alkyl groups appear to act as better electron donors than large alkyl groups." At the time, most chemists thought the explanation was that the C-H bonds in small alkyl groups, such as methyl groups, are better electron donors than the C-C bonds in larger groups, such as tert-butyl groups.

"Contrarian that he was, Fred thought otherwise. He correctly deduced that ease of solvation, rather than inherent electron donor ability of alkyl groups, is responsible for the Baker-Nathan order." The basic understanding that solvent effects can dominate the effects of structural differences is important in explaining many phenomena that were only discovered when it became possible to study ions in the gas-phase, in the absence of solvents. For example, toluene is a stronger acid than methanol in the gas-phase; but the greater ease of solvating the smaller methoxide anion makes methanol the stronger acid in solution (by 25 pKa units).

Adds Borden, "In understanding that solvation plays a major role in the relative stabilities of ions in solution, Fred was ahead of his time."

Fred also had a reputation as a tough instructor. J. Michael "Mickey" Schurr recalls the gist of one student evaluation: "Don't take a course in chemistry unless absolutely necessary, and if you do, be sure that you don't take a course from anyone whose last name begins with S."

When former chemistry undergraduate students, however, recalled their favorite teachers at social functions, "In my random sampling, far more students mentioned Fred than any other faculty member" says Schurr, also proudly an "S" professor. "What they carried away from his courses evidently really lasted."

Fred encouraged people to do their best, and cheered them when they did. Whenever a student would score 100% on one of his exams, a rare event, Fred would take him or her out for a beer. At his last undergraduate organic chemistry lecture in 1990, upon his retirement, he received a standing ovation.

Such appreciation stemmed in part from Fred's ability to convey fundamentals and his insistence that students think deeply about an observation.

"He was convinced that success in chemistry depends on immersing oneself in basic principles to a point of near-intuitive familiarity," says Simo Sarkanen, UW alumnus and professor at the University of Minnesota.

Colleagues remember Fred's dry wit, as well as his decency. Usha Varanasi, an affiliate professor of chemistry and one of 49 graduate students he mentored, recalls that in the middle of her studies she had to leave the country for an extended family emergency — Fred encouraged her to take a leave of absence and provided a research assistantship upon her return. "He demanded and extracted the best performance from his students," recalls Varanasi, "But in my life Fred Schubert played a much more significant role as a father figure, and helped me out at a crucial time." Later, he helped her secure a position at the Northwest Fisheries Science Center in Seattle, which she went on to direct.

"In understanding that solvation plays a major role in the relative stabilities of ions in solution, Fred was ahead of his time."

WESTON BORDEN, UW AFFILIATE PROFESSOR

Says Schurr, "Fred was an exceptionally able, forthright, honorable, and hard-working colleague, and his opinions were highly valued by many of us."

Two sabbaticals took Fred back to Germany. In 1960 he was a Guggenheim fellow at the Technische Hochschule in Stuttgart and in 1972 he conducted research at the University of Munich.

Fred was first married to Anna (Timmerman), then Ilze (Jirgens) — the mother of his children Frederick and Charlotte, who survive him, as do his grandchildren Wolf, Karina and Elsa — and then Carolyn (Savage), his widow. Fred liked to hike, ski, and spend weekends tinkering with his beloved BMW 2002, swearing happily. He was also an avid classical music fan and played the violin.

Fred was active through his last years, golfing into his 90s, walking in Sand Point Park with Carolyn and their schnauzer Mozart, and cheering on his grandkids at their baseball and soccer games. A celebration of life took place on December 22, 2017.

The Department of Chemistry kindly thanks Charlotte Schubert, a science writer, for compiling this obituary of her father for our publication.

SCHUBERT AT HIS DESK IN AN UNDATED PHOTO. *COURTESY OF FREDERICK SCHUBERT.*

FRED SCHUBERT, USHA VARANASI, RAO VARANASI, AND CAROLYN SCHUBERT. *COURTESY OF USHA VARANASI.*

IN MEMORIAM CONTINUED

IRVING SHAIN

ALUMNUS, FORMER PROVOST and
VICE PRESIDENT for ACADEMIC AFFAIRS

JANUARY 2, 1926–MARCH 6, 2018

Former University of Washington Provost and Vice President for Academic Affairs Irving Shain passed away on March 6, 2018 after a brief illness. He was 92.

Shain received a B.S. in chemistry (1949) and his Ph.D. (1952) from the University of Washington. His graduate work with Professor Alden Crittenden was in the area of electrochemistry and the kinetics and mechanisms of electrode reactions. He was a noted scholar and mentor and widely published in his field.

Born on January 2, 1926, in Seattle, Shain served in the Army during World War II and studied at the University of Washington after the war. After completion of his Ph.D., Shain and his wife Mildred moved to Madison, Wisconsin where he served as a professor and administrator at the University of Wisconsin for more than 35 years, including approximately ten years as the chancellor of the university. During this time, the Shains briefly returned to Seattle when Dr. Shain was appointed provost and vice president for Academic Affairs at the University of Washington from 1975 to 1977.

Upon retiring from academia, Shain joined the Olin Corporation as corporate vice president and chief scientist. He retired from Olin in 1992 and returned to Madison, where he served the University of Wisconsin in several volunteer activities, especially at the Department of Chemistry and the School of Music.

Although he spent the lion's share of his career in Madison, Shain left a lasting impact at the University of Washington. He and his wife created the Irving and Mildred Shain Endowed Fund in Chemistry in 1995 to provide support for the Department of Chemistry's greatest need in the areas of research and educational activities. If not otherwise needed, it was the Shains' wish for the income to provide a merit award for graduate students nearing completion of their Ph.D. work.

Shain was also an important resource to Hunter Simpson (UW Board of Regents) during preliminary conversations regarding the establishment of a research foundation similar to the Wisconsin Alumni Research Foundation (WARF) at the University of Wisconsin. Shain's experience with WARF made him a valuable sounding board for Simpson.

At the University of Wisconsin–Madison, Shain was honored in 2006 with the dedication and naming of the Shain Research Tower of the Chemistry Building. A decade later, Shain's children endowed the Irving Shain Chair in Chemistry to support the research programs of the department chair in recognition of their father's contributions in that position.

"I was very fond of Irving. He was a valued adviser when I was department chair," said Paul Hopkins, chair emeritus of the University of Washington Department of Chemistry. "He always had good advice."

Shain was preceded in death by his wife of 68 years, Millie, in 2015. He is survived by four children, Kathy, Steve, John, and Paul, and three grandchildren, Nathan, Isabel, and William.

A celebration of life took place in Madison on March 12, 2018. Memorial donations can be made to the University of Washington Foundation to support the Irving and Mildred Shain Endowed Fund in Chemistry.

Adapted from the March 7, 2018 story by Eric Hamilton of University of Wisconsin–Madison News and University of Washington News' March 14, 2018 story.

IRVING SHAIN WORKING IN A CHEMISTRY LABORATORY IN 1958. *UW–MADISON ARCHIVES*

2018 **CHEMISTRY AWARDS** DINNER

The Department of Chemistry hosted the 27th annual Awards Dinner in April to celebrate our award winning students, postdoctoral researchers, and faculty and to thank our alumni and friends who so generously support departmental scholarships, fellowships, awards, professorships and endowed chairs.

Newborn Screening Roundtable

HOSTED BY MICHAEL GELB

By Patricia S. Guthrie

After University of Washington Professor Michael H. Gelb invited more than three dozen doctors, scientists, researchers, parent advocates and others to a January 23 roundtable forum on newborn screening he had doubts.

"I was worried we wouldn't have anything to say for five hours," Gelb joked after a day's worth of lively, insightful discussions. The conversations could have continued long past 4:00 p.m. that day if dinner and a lecture weren't next on the agenda.

That evening, Gelb explained how newborn screening is used to detect treatable genetic diseases during the annual University Faculty Lecture. The award honors an individual whose work has made a significant impact on their profession, on the research or performance of others, and on society as a whole.

Gelb is the Boris and Barbara L. Weinstein Endowed Chair in Chemistry and an adjunct professor in the Department of Biochemistry. He's known internationally for his research on enzymes and inborn genetic diseases called lysosomal storage diseases.

Since the practice of mandating that babies undergo newborn screening began more than 50 years ago, many ethical, political and scientific debates concerning its use, expansion and follow-up care have swirled.

Newborn screening's many controversies are fueled by advances made in unraveling the DNA genetic code and the technological advances made in detecting rare genetic diseases and disorders using tandem mass spectrometry.

Roundtable participants discussed how there continues to be a lack of information and access to care following a positive newborn screen diagnosis. The situation is getting worse, they said, as extremely rare disorders are added.

"When we consider adding a disease, we really need to take a critical look at all the system needs so newborn screening doesn't end at diagnosis and is just handed off," remarked Tony Steyermark, Ph.D., of Minnesota's Department of Health information technology.

"The amount of expert care is not coming fast enough," added Joe Orsini, Ph.D., with New York State's Newborn Screening Program.

One participant pointed out that as diseases are being added to the newborn screening panel, inadequacies in follow-up care still remain for the first disorder ever screened—phenylketonuria (PKU).

Many families and adults with PKU struggle to pay for the cost of food and supplements needed to maintain low phenylalanine levels. Insurance in some states cover costs; others don't. The National PKU Alliance is pressing Congress to pass the Medical Nutrition Equity Act, which would require insurance companies to cover the cost of PKU medical formulas and foods. Its argument: Since newborn screening is mandated and paid for by the government, shouldn't its treatment also be covered?

Rodney Howell, M.D., FAAP, FACMG, who has the long view on newborn screening as the founding chair of the U.S. Department of Health and Human Services Secretary's Advisory Committee on Heritable Disorders in Newborns and Children, added to the follow-up discussion. Howell said he continues to hear about parents who have been told their child has a positive screen are passed off to their pediatrician, who probably does not have prior knowledge or is properly equipped to treat rare diseases.

"In Georgia, there is a direct referral to an expert," Howell said.

The challenges of late-onset diseases, such as Pompe and Krabbe diseases, repeatedly came up. Comments from parents and doctors alike revealed the frustration and fear such disorders present.

"It's the right to know and the right not to know," as one participant put it.

"Knowledge is power or ignorance is bliss."

Screening only for diseases that can be successfully treated has always been the gold standard of all screening, whether it be for metabolic disorders or prostate cancer. But screening can also provide an answer for parents suffering through the nightmare of a diagnostic odyssey when their child's health suddenly deteriorates from a very rare disease.

"Even if you can't stop the progression, just knowing what the disease is is important," remarked Dean Suhr, president of the MLD Foundation.

John Thompson, director of the Washington State Newborn Screening Lab, also pointed out that gene therapy breakthroughs play a role in the to-screen-or-not-to screen quandary.

"Don't screen and kids die, and they also don't have the chance to take advantage of future gene therapy," he said.

The lack of consistency from state to state regarding the type of disorders being scrutinized continues to poke holes in the touted public health benefit of newborn screening, some noted.

As of November 2016, the Recommended Universal Screening Panel (RUSP) included 34 core conditions and 26 secondary conditions.

Currently, Arkansas tests for 31 conditions, New York screens 58 disorders, Tennessee tests for 69 and Washington, 33. In other words, the lack of uniform national standards means parents continue to unwittingly play "screening roulette," a term advocates first used some 15 years ago when they sought consistency.

"This state by state thing is very scary," Gelb remarked. "Maybe the American College of Obstetrics has to step up and demand national guidelines."

Discussion of the delay of starting to screen for a new disorder once it has been approved evoked strong responses.

In Illinois, lawmakers added Krabbe to the state's newborn screening program in 2007. But because of bureaucratic missteps, the state lab did not begin testing newborns for Krabbe until December 2017. At least four babies died of the disease in the intervening decade.

California passed a law in 2016 requiring new diseases on the RUSP must be implemented in the state within two years.

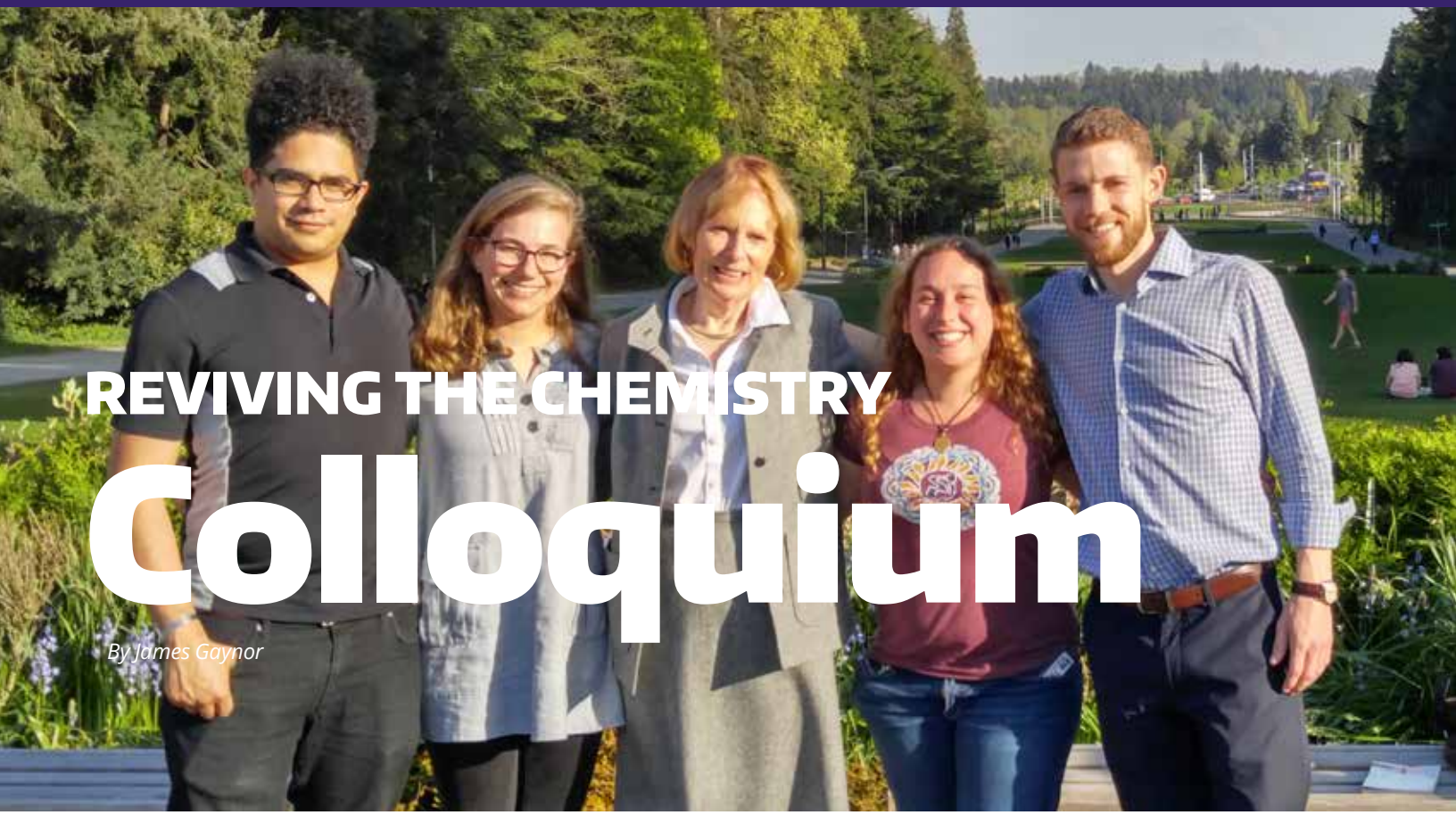
"If you wait for everything you need in the U.S. to be in place, you'll never do the screen and children will die," Howell said.

As the roundtable discussions wrapped up, many participants said they found it refreshing to be in a room filled with a variety of viewpoints.

"[At] a lot of conferences, it's newborn screening people talking among themselves," said Mei Baker, M.D., FACMG, with the University of Wisconsin School of Medicine and Public Health and Wisconsin State Laboratory of Hygiene.

"But here, we were getting every aspect in the same room. Everybody is very respectful and I think we have common ground," Baker added. "It's important we listen to everybody."

PROFESSOR GELB DELIVERING THE UNIVERSITY FACULTY LECTURE, FOLLOWING THE NEWBORN SCREENING ROUND TABLE ON JANUARY 23, 2018. *PATRICIA GUTHRIE*



REVIVING THE CHEMISTRY Colloquium

By James Gaynor

Since at least the early 2000s, the Department of Chemistry has supported the graduate students' initiative to invite world-class scientists to visit campus, deliver a lecture, and interact with the students, postdoctoral researchers, and faculty on a quarterly basis. The Chemistry Colloquium, as this seminar series has since been named, was designed to emphasize networking opportunities for graduate students and postdocs with leading figures in various areas of chemical research. The catch, however, is that these colloquia are to be entirely student-led, from speaker invitations to organizing the speaker's meeting agenda. Unfortunately, active participation in hosting the Chemistry Colloquia dwindled in 2011 and, as a result, the quarterly Colloquium had been dormant for the past seven years.

Recognizing the chance to revive an important aspect of the educational experience and opportunity for career advancement for chemistry students, graduate students James Gaynor and Marco Howard assembled information about how previous colloquia were organized. Following many conversations with faculty such as Sarah Keller, Forrest Michael, Munira Khalil, and Mike Heinekey, the graduate students crafted a proposal for the return of the Colloquium which was approved by the Department in 2016 and, hence, the planning of future colloquia was under way. By spring quarter 2017 the Colloquium was starting to take an exciting form. The Committee expanded when graduate students Julia Greenwald and Johanna Schwartz joined the team later in 2017. Together, the four graduate students set the precedent for organizing future colloquia with the goal of re-establishing the Colloquium as a mainstay in the Department.

The renewed mission of the Chemistry Colloquium is not too different from the original: the Chemistry Colloquium is a quarterly seminar series organized by, and for, the graduate student and postdoc community in the Department. The two distinguishing features of the Colloquium are 1) each speaker is selected through a nomination and voting process by the student body and 2) the speaker's meeting agenda is inverted from the weekly divisional seminars in the department, giving graduate students and postdocs (instead of faculty) the priority for individual meetings with the speaker. The Colloquium Committee is responsible for facilitating this event in its entirety, with the primary goal of bringing the highest caliber of scientists to campus whom the graduate students and postdocs have selected by popular demand. The design of the Colloquium Committee is intended to include graduate students with backgrounds in different divisions and research interests so that the scope of each Colloquium is broad enough to appeal to as much of the scientific community at the University of Washington as possible.

Professor Finlayson-Pitts' lecture highlighted the importance of serendipity in her atmospheric chemistry research with a take-home message: nature hides its secrets well from us, and it may give pleasantly unexpected results.

The official revival of the Chemistry Colloquium was marked on February 14, 2018, by the visit of Professor Emily Weiss of Northwestern University. Her lecture titled "Colloidal Photocatalysis" was very well received, and her career discussion with graduate students and postdocs was incredibly informative. The spring 2018 Colloquium was delivered by Professor Barbara J. Finlayson-Pitts of the University of California, Irvine, on April 25, which was an equally enjoyable experience to the first Colloquium for all who participated—students, postdocs, and faculty. Professor Finlayson-Pitts' lecture highlighted the importance of serendipity in her atmospheric chemistry research with a take-home message: nature hides its secrets well from us, and it may give pleasantly unexpected results.

The Chemistry Colloquia for the 2018-2019 academic year have already been scheduled. The following scientists will be visiting: Professor John Hartwig of the University of California, Berkeley (Autumn), Professor Cathy Murphy of the University of Illinois at Urbana–Champaign (Winter), and Professor Harry Gray of the California Institute of Technology (Spring). Current UW graduate students can stay informed on these events by checking *The Bagley Bulletin* for announcements. For more information, contact the Chemistry Colloquium Committee at chemcoll@uw.edu.

THE CHEMISTRY COLLOQUIUM COMMITTEE AND BARBARA J. FINLAYSON-PITTS ON RAINIER VISTA FOLLOWING THE COLLOQUIUM RECEPTION. FROM LEFT TO RIGHT: MARCO HOWARD, JULIA GREENWALD, BARBARA J. FINLAYSON-PITTS, JOHANNA SCHWARTZ, AND JAMES GAYNOR. *PHOTO COURTESY OF ROBERT WEAKLY.*

Reestablishing contact with our postdoctoral research alumni

The Department of Chemistry is hoping to reestablish contact with our former postdoctoral research associates. We have contact information for just a small number of the hundreds of postdocs who have studied with us through the years. Can you help us? Do you know the whereabouts of any postdocs you knew or worked with when you were at the UW? If so, we would appreciate you contacting them on our behalf to ask them to email us at chemdept@uw.edu. Thank you!

CORRECTION: In the Autumn 2017 issue's list of Graduate Fellowships & Awards (pages 9 to 10), we unintentionally omitted **Julia Greenwald**, **Benjamin Figueroa**, and **Sarah Pristash** as recipients of the 2017 National Science Foundation Graduate Research Fellowship. We apologize for the error, and we congratulate Julia, Ben, and Sarah on their successful proposals, along with Sam Berry (whose name appears on page 9 of the Autumn 2017 issue) and 2018 NSF Graduate Research Fellowship recipients Robert Weakly and Zachary Cohen. You make us proud!

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LETTER FROM THE CHAIR *continued from page 1*

In January, Michael Gelb, the Boris and Barbara L. Weinstein Endowed Chair in Chemistry, presented the annual University Faculty Lecture. His moving descriptions of his research on newborn screening was very powerful. In conjunction with this lecture, we organized a roundtable meeting of stakeholders in newborn screening. (See page 12 for details.)

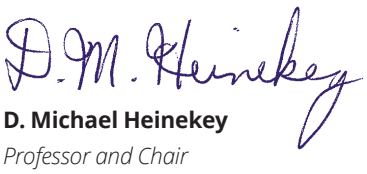
Several faculty have been promoted this year. Assistant Professors Brandi Cossairt and Stefan Stoll were promoted to associate professor. Associate Professor Munira Khalil has been promoted to professor. In spite of these promotions, we remain a very young faculty, with nine faculty members at the rank of assistant professor.

While federal support has been steady at about $26 million per year, our state budget allocation remains meager. The College of Arts & Sciences has imposed a budget cut of 1.5% across all units.

Our vital support for teaching assistants has been cut as well. These are lean times.

I close with thanks to all of you for your generous contributions to the Department. Your gifts make possible many vital activities, including the recruiting of outstanding faculty and graduate students. We are very grateful for your generosity in giving back to today's students.

With best wishes,



D. Michael Heinekey
Professor and Chair

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