CHAIR’S MESSAGE

The Department of Chemistry continues to grow at an exciting pace in research, undergraduate education, facilities and outreach.

Recruiting outstanding faculty remains a priority. Over the past five years, we have recruited one third of our faculty from top institutions around the country, and we are not done yet. This past year, Ann Valentine, William Wuest and Vincent Voelz joined the faculty, bringing expertise in bioinorganic, bioorganic, and computational biochemical research, respectively.

The size of the Undergraduate Research Program has more than doubled, with considerable support from the Dean’s Office. The department now has more than 50 undergraduate research projects underway, ranging from high performance computing protein folding calculations in the Voelz laboratory to carbon nanotube research in the Borguet Group.

Sponsored research funding has increased by 200 percent since 2007. Publications in top journals grew by a similar degree, with some 80 publications appearing in the last year. To expand transformative research efforts, we recently acquired a mass spectrometry and x-ray crystallography facility and NSF-funded transmission electron microscope.

Faculty, graduate students and undergraduates received numerous awards, scholarships and grants, both from Temple University and outside organizations. These include Franklin Davis winning the ACS Paul Gassman Award, Hai-Lung Dai winning the ACS Langmuir Lectureship, and Professor Borguet and myself winning the ACS Philadelphia Section Award.

Even in a difficult economy, chemistry graduates continue to find success in the job market and in prestigious graduate programs. Financial contributions to the department from alumni and friends have reached an all time high.

The work of our faculty in the classroom and the laboratory continues to impact the quality of life in the Philadelphia region and beyond. With your help the department will continue to move forward. I am grateful to the many colleagues, students, staff and graduates who have helped make the department so successful. Thank you for all you do for chemistry.

Sincerely,

Robert Levis

New Chemistry Faculty Bring Research Expertise and Passion for Teaching

Ann Valentine,
Associate Professor
Ann Valentine taught at Yale University for 10 years in the chemistry department as an assistant and then as an associate professor. She earned her PhD from the Massachusetts Institute of Technology working on bioinorganic hydrocarbon oxidation using an enzyme extracted from a thermophile bacteria. As a postdoctoral research associate at Penn State, Valentine worked on the structure and mechanism of the bacteriophage T4 primosome.

Vincent Voelz,
Assistant Professor
Vincent Voelz earned his PhD from the University of California–San Francisco, where he studied the zipping and assembly search strategy that was used to simulate and monitor proteins in their physical folding process. He showed that the zipping and assembly method was fast enough to predict protein structure with an atomically detailed force field. As a postdoctoral research associate at Stanford University, Voelz continued his work on the understanding of protein folding using theory and simulation.

William Wuest,
Assistant Professor
William Wuest, an expert in organic and bioorganic chemistry, earned his PhD from the University of Pennsylvania. At Penn, Wuest developed a synthetic effort for the total synthesis of {+)-Peloruside A. As a postdoctoral research associate at the Harvard Medical School he investigated the cloning, overproduction, purification and characterization of enzymes for use in the development of new natural product biosynthesis strategies.
The Undergraduate Research Program (URP) gets chemistry students into the laboratory with world-class researchers, offering a chance to participate in advanced projects as undergraduates. URP hosts an annual research symposium at which students present their research findings either through a presentation or a poster. This year, chemistry major Kristina Pavlenko was named First Place Winner for the Poster Session. Her research, Cannabidiol and mechanisms in preventing chemotherapy neuropathic pain in female mice C57/Bl/6, explored neuropathic pain—sensitivity to cold, heat or touch—commonly experienced by cancer patients undergoing chemotherapy.

“Sometimes the treatment has to be stopped because they can no longer handle the pain,” explains Pavlenko. “We need a drug that can stop the pain and allow patients to remain on chemotherapy.”

In Pavlenko’s project mice are injected with paclitaxel, a drug commonly used to fight breast and lung cancers, and then tested for their sensitivity to touch. Another set of mice, among other control groups, is injected with both paclitaxel and cannabidiol, a nonpsychoactive compound found in cannabis. “Mice were less sensitive with the drug combination,” says Pavlenko, who worked with Sara Jane Ward, research assistant professor at the School of Pharmacy. “Cannabidiol appears to be effective in reducing neuropathic pain.

Research is now a viable career option for Pavlenko. “URP is the best opportunity Temple could offer,” she says. “It made me realize another great way I can help people.”

**FACULTY AWARDS**

- The Italia–Eire Foundation Distinguished Teacher of the Year Award
  - Francis Spano, Professor

- The Dean’s Distinguished Teaching Award
  - Steven Fleming, Professor
    (Teaching/Instructional)

**GRADUATE STUDENT AWARDS AND SCHOLARSHIPS**

- Der-Min Fan Chemistry Graduate Student Scholarship
  - Matthew Sender, Chemistry

**UNDERGRADUATE STUDENT AWARDS AND SCHOLARSHIPS**

- Abraham and Ruth Clearfield Scholarship
  - Megan Jennings, Chemistry with Teaching

- Albert B. Brown Chemistry Scholarship Fund
  - Carrie Carson, Chemistry

- Andrea Broad Scholarship in Biological Sciences
  - John Mikitish, Biochemistry

- Hazel M. Tomlinson, PhD Memorial Scholarship
  - Michael Cleaveland, Chemistry
  - Mateusz Dobrowski, Biochemistry
  - Vasile Donos, Chemistry
  - Nicole Haloupek, Biochemistry
  - Jin Leung, Chemistry
  - John Mikitish, Biochemistry
  - Chigoziem Oguh, Chemistry
  - Akash Patel, Biochemistry
  - Joseph Trout, Chemistry
  - Haibin Zhu, Biochemistry

**Alumnus gift to create chemistry’s first endowed professorship**

A $500,000 gift from the estates of Robert L. Smith (MA ’49, Chem) and his wife, Lucretia, will be used to support promising young chemistry faculty and to help jump start their research careers.

Recipients for the Robert L. Smith Early Career Professorship in Chemistry, the first named professorship in the department, will be selected by the dean of the college with recommendations from the chair of the chemistry department. The award will rotate to a new recipient every three years.

Most innovative research initiatives must often secure initial results before funding from government and other outside sources becomes available. The Smith Professorship will provide young faculty with seed money for investigations that may have a tremendous potential payoff and form the foundation of a successful academic career. The award would also provide the kind of flexible funding for curricular development that would enable recipients to be more skilled teachers in the classroom.

**Henry A. Sloviter Student Research Award in Chemistry**

- Jacqueline Mejia, Chemistry

**Morna Brennen Memorial Scholarship Fund**

- Amy Gutekunst, Chemistry with Teaching

**Natan Luehrmann-Cowen Award Fund**

- Ananthi Rajamoothi, Biochemistry

**Shirley and Bernard Brown Scholarship in Chemistry**

- Angela Snow, Chemistry

**The Dean’s Scholarship**

- Mateusz Dobrowski, Biochemistry
Active Research Grants

Rodrigo Andrade
- Asymmetric Synthesis of Strychnos and Aspidosperma Alkaloids, NSF

Eric Borguet
- A Molecular Resolution Investigation/Electron, NSF
- Acid Base Chemistry at the Aqueous-Mineral, American Chemical
- Array Piezoelectric Nanocantilever Sensors, Benjamin Franklin Tech Partners
- CRC: Long Range Electron Transfer, NSF
- Development of a Novel Single Channel Biosensor Chip Utilizing Piezoelectric Acoustic Plate Waves, Aviana Molecular Technologies Inc.
- Guidelines for the Preparation of Project Plans/Gas Analytical System Based on Nanosensor to Analyze Fire-Presage Gases, North Atlantic Treaty Organization
- Nanoscale Cellular Probes, Benjamin Franklin Tech Partners

Hai-Lung Dai
- Molecular Interaction with colloidal surfaces probed by nonlinear light scattering, NSF
- Structure and Spectroscopy/Buried Interfaces/Organic, Air Force Office of Scientific Research

Franklin Davis
- Asymmetric Synthesis of Substituted Tropanes, Biostrategy Partners

Steven Fleming
- Bio-organic Reaction Animations, NSF

Michael Klein
- Advanced Modeling of Ions in Solutions, DOE
- Building Computational Models to Probe Membrane Fusion, NSF
- Center of Excellence for Materials Research and Innovation, NSF (University of Pennsylvania)
- Collaborative Research: Cyberinfrastructure and Research Facilities Chemical Computations on Future High End Computers, NSF
- Design and Mechanistic Studies of Mimics of Antimicrobial Peptides, NIH (UCSF)
- Development of Drugs that Target the M2 Proton Channel from the Influenza A Virus, NIH (UCSF)

Robert Levis
- Filament-Based Raman Detection of Radioactive Materials, Defense Threat Reduction Agency
- Multidimensional Detection of Explosive Devices, Office of Naval Research
- Nanomaterials and Nanomanufacturing by Design, Army Research Laboratory
- Shaped Intense Laser Detection and Surveillance, U.S. Army Research, Development and Engineering Command
- Strong Field Control of Molecular Processes, NSF

Spiridoula Matsioka
- Combining High Level Ab Initio Calculations/Laser, DOE
- Theoretical Studies of Nonadiabiotic Photoinitiated Processes in Complex Systems, NSF
- Understanding Laser Control of Molecular Dynamics, DOE

Allen Nicholson
- Reactivity Epitomes of Ribonuclease III Substrates, NIH
- Reactivity Epitopes for Ribonuclease III Substrates, NIH

Christian Schafmeister
- Development of Protein Surface Binding, Low Entropy Oligomers, National Institute of General Medical Sciences/NIH/DHHS
- Disrupting Protein-Protein Interactions with Bis-peptides, NIH
- Investigating Cell Membrane Permeation as a General Mechanism to Promote Bacterial Cell Death: Developing Antimicrobial Bis-Peptides, Cephalon Inc.
- Molecular Lego Based Catalysis, Defense Threat Reduction Agency

Scott Sieburth
- Silanediols Serine and Threonine Protease Inhibitors, NIH

Francis Spano
- Modeling the Optical Properties of Conjugated Polymer Assemblies: Intercaten vs. Intracaten Interactions, NSF
- Using Circularly Polarized Light to Probe Optical Excitations in Organic Supramolecular Systems, NSF

Robert Stanley
- Photoinduced Electron Transfer in DNA Photolyase, NSF

For more news, go to www.temple.edu/cst/chemistry.
Lasers could help detect radioactive threats

The Center for Advanced Photonics Research (CAPR) received a $450,000, three-year grant from the Defense Threat Reduction Agency to further develop laser-based technologies created by CAPR for the potential standoff, or at a distance, detection of radioactive materials.

CAPR researchers will study concepts that emerged from previous projects to create standoff detection of improvised explosive devices. Researchers discovered that they could detect signature molecules in the air by using a commercially available laser and a $50 lens. “If you take the output of a commodity laser and put the pulse through a 2 meter lens in air, after about 3 meters, you get a really short, few-cycle pulse. This automatically creates one of the shortest laser pulses in the world and used to cost up to a $1 million to create,” said chemistry chair Robert Levis. “But now you can get this short pulse basically for free right out in the air.”

Levis said that any molecules caught in the short pulse start to move in perfect unison, with each type of molecule creating its own pattern or signature. The question is whether radioactive decay in the air creates enough new signature molecules to allow detection. “When the molecules begin moving as one and you put a weak laser beam through the same volume, you can identify the molecules by their signature movement,” he said. “We realized we could use this process to perform gas phase Raman spectroscopy to identify the molecules.”