

CHEMISTRY NEWS

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INSIDE THIS ISSUE

Department Retirements	2
New Faculty	3
Department Highlights	4
Alumni News.....	10
New Alumni.....	11
Awards/Scholarships	12
Recognizing Our Donors....	13
Endowed Funds.....	14
Give a Gift, Make a Difference!.....	15

From the Chair

The 18 months since our last newsletter have been filled with changes, accomplishments and more positive momentum for the department and the University. UT leadership, with significant input from the University community, has begun to implement the new, five-year strategic plan focusing on five core principles: 1) Student Success and Academic Excellence; 2) Research, Scholarship and Creative Activities; 3) Faculty, Staff and Alumni; 4) Fiscal Positioning and Infrastructure; 5) Reputation and Engagement. Anyone interested in reading the plan and the goals within each main principle can view the plan, *Path To Excellence*, at utoledo.edu/strategicplan. The department's goals are closely aligned to this strategic plan.

During the past year, four longtime faculty and staff members have retired. The paperwork says that Ron Viola and Andy Jorgensen retired and received emeritus status, but both are still active with their passions. Ron continues to work with students and pursue his research in biochemistry, while Andy just passed 200 presentations related to climate change education. To summarize their distinguished careers, their Emeritus Citations are reproduced inside this newsletter. Pannee Burckel, chemical instrumentation specialist, and Julie Mosher, chemical stockroom supervisor, also retired after many years of service to the University. We wish them happy and healthy new chapters in their lives.

This year, we welcomed Emanuela Gionfriddo and Matt Wohlever as new tenure-track faculty to the department. Emanuela is an analytical chemist specializing in sampling and extraction methods of analysis. She joined us in January 2018 and has already received

several awards for her research. Matt is a biochemist and an expert in membrane proteins and processes. Additionally, Amy Toole was hired as an assistant lecturer. Amy brings a wealth of experience in teaching introductory and environmental chemistry classes. On the staff side, Darpandeeep Aulakh joins us from the University of Michigan as the new chemical instrumentation specialist. We are excited about the expertise they all bring to the University and the department.

Inside this issue you will read of many impressive accomplishments by our students, faculty and alumni. Fall 2018 marks the 50th anniversary of the beginning of the PhD program in chemistry. Since the graduation of Norm Rapino, the first UT doctorate in chemistry, 218 students have conducted research to earn doctoral degrees in chemistry and biochemistry. Save the date of November 17, 2018 to attend a dinner to celebrate this tremendous milestone for the department and the University.

On a sad note, the department recently lost one of its strongest supporters and dearest friends. Virginia "Ginny" Black, wife of former colleague Art Black, passed away on August 25. Ginny's positive attitude, welcoming smile, and love for UT and its students will be missed by all of us who were fortunate to know her.

Please keep in touch, stop by and visit, and as always send us your news and career updates to share. Enjoy this version of *Chemistry News*.

Best wishes,

DEPARTMENT RETIREMENTS


**Emeritus
Citation for
Andy Jorgensen**

A scholar, teacher and recognized expert in chemical education, you received a BS in chemistry from Quincy College (1970),

a PhD in physical chemistry (1976) from the University of Illinois at Chicago, and conducted postdoctoral studies in chemical education at the University of Illinois at Champaign-Urbana (1976-77). You began your 40-year academic career in 1977 as an Assistant Professor at Southern Indiana University where you were promoted to Associate Professor in 1981. In 1985, you joined the faculty at Allegheny College. In 1988, you moved to The University of Toledo as Associate Chair and Associate Professor of Chemistry. You served as Associate Chair of Chemistry for 7 years and Director of General Chemistry for 17 years. You championed shared governance as Chair of Faculty Senate (2000-01, 2005-06). Administrative roles as Director of the Calendar Conversion Project (1995-98) and Assistant Vice President for Academic Affairs (1998-99) were crucial to the university. For your efforts in semester conversion, you received an Outstanding Leadership Award from the Board of Trustees (1997).

Your passion to help students learn and succeed was immeasurable. By introducing data driven placement testing, peer-led learning, and new methods for obtaining real-time student feedback in large lectures, student success and retention improved. You were also instrumental in developing the Master of Education in Science, chemistry track and the minor in sustainability. Recognition included University Outstanding Teacher (1992), being named a Master Teacher in the College of Arts and Sciences (2002-06), and nominations for the Carnegie Professor of the Year (2005, 2006).

You are widely considered an expert in climate change education giving over 180 presentations and serving as Associate Editor of the Encyclopedia of Earth and Senior Fellow for the National Council for Science and the Environment. You received the Edith Rathbun Award for Outreach and Engagement (2017) and the Committee on

Environmental Improvement Award for Incorporating Sustainability into Chemistry Education from the American Chemical Society (ACS) (2013).

Your exceptional service to the profession extends beyond The University of Toledo. Notably, you have been a 45-year member of the ACS, serving as Councilor for the Toledo Section and Chair of the Society Committee on Education. For your dedicated service to the ACS and the profession, you were named a Fellow of the American Chemical Society (2012).

In recognition of dedicated service to this University, and as a tribute from your faculty colleagues, you are commended publicly and named by the Board of Trustees to the rank of Associate Professor Emeritus.


**Emeritus
Citation for
Ron Viola**

A scholar, teacher and recognized expert in the function of enzymes and their structure, you received a BS in chemistry from

Fordham University in 1967. After serving your country for two years as a lieutenant in the United States Army Corp of Engineers in Frankfort, Germany, you earned a MS in organic chemistry in 1973 and a PhD in biochemistry in 1976 from Pennsylvania State University. You performed postdoctoral studies at the University of Wisconsin as an NIH Postdoctoral Fellow from 1977-1978.

You began your 38-year academic career in 1979 as an Assistant Professor at Southern Illinois University. In 1984, you joined the faculty at the University of Akron as an Associate Professor and were promoted to Professor in 1989. In 2000, you moved to The University of Toledo. During your 17-year career at The University of Toledo, you continued as a dedicated teacher of biochemistry at both the undergraduate and graduate levels. Students studying under your guidance earned 25 PhD and 15 MS degrees, and secured influential positions in academia and industry. In addition, nearly 50 undergraduate students and 5 American Chemical Society Project SEED high school students have been introduced

to the excitement of biomedical research in your laboratory. Your research lab focused on solving challenging problems related to understanding aspects of the aspartic acid enzymatic pathway, neurological disorders such as Canavan and Alzheimer's diseases, and the development of new drugs and therapeutic agents. Your research program has been supported by nearly \$10 million dollars in funding, which led to 125 published research papers and 7 patents to date. Scientists throughout the world have cited this work over 2500 times.

For your scholarly activities, you received The University of Toledo Outstanding Research Award in 2007 and earned the title of Distinguished University Professor in 2009. You were also Chair of the Department of Chemistry and Biochemistry from 2012-2014. Your leadership in promoting research excellence is well recognized, especially efforts to secure important upgrades in department instrumentation for protein crystallography, powder diffraction, and NMR spectroscopy, which greatly enhanced the research capabilities of scientists at The University of Toledo.

In recognition of dedicated service to this University, and as a tribute from your faculty colleagues, you are commended publicly and named by the Board of Trustees to the rank of Professor Emeritus.

Pannee Burckel, chemical instrumentation specialist, retired on December 31, 2017 after working at the University for 28 years. Pannee earned her MS (Edwards) and PhD (Pinkerton) degrees while working. She plans to travel to Thailand to visit family during her retirement.



Julie Mosher, chemical stockroom supervisor, retired on April 30, 2018 after 34 years of service to the University.

We wish them well in retirement!

NEW FACULTY



Emanuela Gionfriddo joined the department in spring 2018 as an assistant professor in analytical chemistry with a special interest in the development and application of microextraction

probes for sample preparation of food, environmental and biological matrices for both untargeted and targeted analysis. She earned her PhD in analytical chemistry in 2013 from the University of Calabria (Arcavacata di Rende, Italy) under the supervision of Professors Giovanni Sindona and Antonio Tagarelli. Her PhD project focused on the development of alternative derivatization strategies applied to solid phase microextraction (SPME) for determination of nutraceuticals in food and contaminants in environmental matrices and biological fluids. As part of her PhD program, she had an 18-month internship as visiting scientist in Professor Janusz Pawliszyn's research laboratory at the University of Waterloo (Waterloo, Ontario, Canada), where she studied the fundamentals of analyte behavior and displacement phenomena on SPME solid coatings in multicomponent mixtures. After her graduation, she joined Professor Pawliszyn's group in 2014 as post-doctoral fellow and manager of the gas-chromatography section of the Industrially Focused Analytical Research Laboratory (InFAReL), and within three years became a research associate.

Her post-doctoral research focused on the development and testing of new, matrix-compatible SPME coatings that can be used for both gas- and liquid-chromatography applications, and as direct immersion devices in complex matrices. She also was active in the development of new SPME methods for determination of contaminants at trace levels in various food and environmental matrices, as well as in pharmaceutical supplements by GC-MS, GC × GC-MS and direct coupling with mass spectrometry (MS). Emanuela has authored 20 research articles, four reviews and a patent on PTFE-based SPME coatings. She also has conducted various webinars for organizations such as Millipore-Sigma and Gerstel Inc., where she presented aspects of her research studies.

Research work in her lab will focus on analytical chemistry, which incorporates the use of basic and advanced analytical separation tools for the analysis of complex biological and environmental matrices, with particular emphasis on alternative green sample preparation methodologies. As part of her future goals, special emphasis will be given to the development of new microextraction devices able to selectively enrich and pre-concentrate analytes from complex matrices for targeted or untargeted analysis, e.g., in metabolomics studies. The development of microextraction devices of different geometries with diverse sorbents will be tailored to fit various analytical needs and their compatibility to different separation platforms, such as gas- and liquid-chromatography and capillary electrophoresis, will be tested. In addition, considering the emergence of new technologies for rapid screening analysis, devices will be explored for direct-coupling approaches to mass spectrometers. Finally, nanoparticles also will be considered for the development of novel probes capable of sub-milliliter volume sampling from biological matrices, with guaranteed minimal invasiveness for in-vivo sampling.



Matthew Wohlever joined the department in fall 2018 as an assistant professor. He received his PhD in 2013 from Massachusetts Institute of Technology and completed a post-doctoral

appointment at the University of Chicago, where he continued his interest in protein biochemistry. Robust membrane proteostasis networks are essential for cells to withstand proteotoxic stress arising from environmental insult and intrinsic errors in protein production. Membrane proteins present unique challenges to the proteostatic network, as they must be targeted to the correct membrane and overcome substantial thermodynamic barriers to enter and exit the lipid bilayer, all while avoiding the formation of potentially toxic aggregates in the cytosol. As the center for oxidative phosphorylation and apoptotic regulation, mitochondria play a critical role in human health. Failures in mitochondrial membrane proteostasis are associated with cancer, aging and a range

of cardiovascular and neurodegenerative diseases. The mechanistic understanding of mitochondrial quality-control pathways, particularly with membrane proteins, is remarkably incomplete as demonstrated by the recent discoveries of several new pathways. Research questions will address this critical knowledge gap by elucidating molecular mechanisms for quality control of mitochondrial membrane proteins.

Matt's lab will focus on two aspects of mitochondrial membrane quality control: (1) mistargeting of non-mitochondrial proteins to the outer mitochondrial membrane and (2) failure of mitochondrial membrane proteins to insert into the membrane at all. During his post-doctoral training, he studied these processes by focusing on two poorly understood proteins, Msp1 and Ubiquilins. Mutations in Msp1 and Ubiquilins are associated with seizures, amyotrophic lateral sclerosis, Alzheimer's disease and Huntington's disease. Building and testing detailed models for how these proteins function will illuminate the molecular basis for the neurological diseases associated with these proteins and uncover general insights into membrane proteostasis.



Amy Toole was hired as an assistant lecturer in fall 2018 after serving a year as a visiting assistant professor. Amy received her BS in biology from Bucknell University in 1983 and her PhD in agricultural and environmental

chemistry in 1988 from the University of California at Davis, focusing on the fate of organic compounds in seawater. She has extensive experience as an environmental consultant with Gradient Corporation and more than 20 years as a lecturer of general chemistry, most recently at Pennsylvania College of Technology since 2004.

Nathaniel Coleman, Jr. and Zin-Min Tun joined the department in fall 2018 as visiting assistant professors to assist in the department's teaching mission. Nate received his BA degree from Monmouth College and PhD in chemistry (inorganic materials) from the University of Iowa in 2015, focusing on the synthesis and

Continued on page 4

New Faculty continued from page 3

characterization of metal-doped titanium dioxide and other metal phosphides and sulfides. After post-doctoral positions at the University of Iowa and Kansas State University, he has been an instructor of chemistry at Heartland Community College and Lindenwood University.

Zin received her BS and PhD degrees at the University of Akron in 2006 and 2011, respectively, specializing in investigations of the properties and acid-base chemistry of chlorophosphazenes. Since graduation, she has served in teaching positions at Denison University, the University of Akron and Ohio State University-Mansfield, as well as an industrial position at National

Biochemical Corporation. At Ohio State-Mansfield, she was nominated for the Provost's Award for Distinguished Teaching by a lecturer.



Darpandeeep Aulakh joins the department as chemical instrumentation specialist, working with faculty and students needing training and experimental assistance with instrumentation in the department and the Natural Sciences and Mathematics Instrumentation Center. Darpan earned

her BSc and MSc from Guru Nanak Dev University in Punjab, India, followed by her PhD from Clarkson University in Potsdam, N.Y., in 2017. She began her position at The University of Toledo in June 2018 after a year-long post-doctoral position at the University of Michigan. She has extensive expertise in materials characterization and X-ray crystallography, and will focus her efforts on the operation and training of students on the scanning electron microscope, X-ray diffraction (single crystal and powder), thermal analysis, atomic absorption, FTIR and GC-mass spectrometry equipment.

DEPARTMENT HIGHLIGHTS

Grant\$\$

External grant awards

Don Ronning's and **Steve Sucheck's** National Institutes of Health (NIH) R01-funded project, *Mycobacterial Trehalose Metabolism as Drug Targets*, was renewed for five years (2018-23) for \$2,130,000 to investigate aspects related to tuberculosis.

Steve Sucheck was part of a collaborative NIH R21 proposal with Professor Kyle Rohde from the University of Central Florida that received \$422,950 for their project *Synthesis of Natural Product Scaffold Selectively Active Against Dormant Mycobacterium Tuberculosis*.

Jianglong Zhu received a new, four-year NIH U01 grant with Dr. Liming Zhang of the University of California at Santa Barbara. The grant is titled *Development of Novel Approaches for Stereoselective Construction of Glycosidic Linkages*, with an award amount of \$2,492,485. Jianglong's UT share is \$1,246,242, which will run from Aug. 1, 2017 through May 31, 2021.

Peter Andreana is a collaborator with Dr. David Crich of Wayne State University on a four-year NIH U01 grant awarded in summer 2017. The grant is titled *Novel Methods and Technologies for Synthesis of Biomedically Relevant Carbohydrates* for more than \$2 million. Peter's UT share

is \$1,031,960 from Aug. 1, 2017 through June 30, 2021.

Joint faculty member **Viranga Tillekeratne** (medicinal and biological chemistry), Bill Taylor (biological sciences) and **Dragon Isailovic** (chemistry and biochemistry) were awarded a \$449,000, three-year NIH R15 grant titled *Novel Small Molecule Ferroptotic Compounds to Target Mesenchymal Breast Cancer and Breast Cancer Stem Cells*.

Dragon Isailovic was co-PI on four two-year grants with colleagues on the Health Science Campus from the Ohio Department of Higher Education (ODHE) related to studies on microcystin. These include (1) *Effects of Inflammatory Bowel Disease on Susceptibility to Microcystin-LR*, PI: S. Haller, Co-PIs: D. Kennedy, B. Levison, D. Isailovic, T. Blomquist. \$149,715; (2) *High-throughput Analysis of Human Toxicity and Therapeutics Targets of Cyanotoxins across Organ Systems in Health and Disease*, PI: D. Kennedy, Co-PIs: S. Haller, J. Willey, D. Isailovic, T. Blomquist. \$148,404; (3) *Novel Therapies for Microcystin-induced Hepatotoxicity in Pre-existing Liver Disease*, PI: D. Kennedy, Co-PIs: S. Haller, B. Levison, D. Isailovic, T. Blomquist. \$147,707; (4) *Testing and Optimization of Microcystin Detoxifying Water Biofilters*, PI: J. Huntley, Co-PI: D. Isailovic. \$148,405.

Michael Young received a five-year award of \$250,000 for his project *Rapid and Economic Synthesis of Next Generation Herbicides via Carbon Dioxide-directed C-H Bond Functionalization* from the Herman Frasch Foundation for Chemical Research. The grant began July 5, 2017.

Ajith Karunarathne received a three-year \$441,000 NIH15 award titled *Diverse Membrane Affinities of G γ Members Differentially Modulate the G $\beta\gamma$ Effectors and Cell Behaviors* beginning September 15, 2018.

University of Toledo research grants funded for 2016-2018

Seven undergraduate students received University of Toledo USRCAP Awards to perform research in the Department of Chemistry and Biochemistry in summer 2018. Mentors are in parentheses: Kern Baxter (Michael Young), Evan Diemler (Michael Young), Zehra Fasih (Ajith Karunarathne), John Kenney (Michael Young), Kyle Meyer (Steve Sucheck), Natalie Schulte (Steve Sucheck) and Michaelangelo Zullo (Steve Sucheck).

Don Ronning, URFO Biomedical Research Innovation Program, \$45,000, *Screening Essential Mycobacterial Enzymes using TB-active Compounds and Fragments* (2017).

Dragan Isailovic with collaborators from the Health Science Campus, URFO Interdisciplinary Research Initiation Award, \$20,000, *Novel Diagnostic and Therapeutic Strategies for Microcystin Hepatotoxicity in Vulnerable Populations* (2017).

Edith Kippenhan with collaborators from the College of Arts and Letters, URFO Interdisciplinary Research Initiation Award, \$20,000, *Recruitment, Retention and Advancement of Women and URM in STEM Disciplines* (2017).

Wei Li, Summer Research Award and Fellowship, \$12,500, *Conversion of Feedstock Chemicals to Medicinally Relevant Structures* (2017).

Tim Mueser, deArce-Koch Memorial Endowment Fund, \$5,000, *Development of a High-throughput Assay for Aminoacyl-tRNA Synthetase Inhibition* (2017).

Joe Schmidt, Summer Research Award and Fellowship, \$10,756, *The First Nickel Catalysts for Enantioselective Allene Hydroamination* (2017).

Jon Kirchoff and **Dragan Isailovic**, URFO STEM Innovation Proposal,

\$50,000, *New Materials for the Detection, Analysis, and Removal of Cyanotoxins* (2018).

Steve Sucheck, deArce-Koch Memorial Fund, \$16,000, *Probes for Chemical Proteomics in M. Tuberculosis and M. Abscessus* (2018).

Tim Mueser, UT URFO Small Grant Support Award, \$950 (2018).

Michael Young and **Steve Sucheck** received travel support from the Foy & Phyllis Penn Kohler Fund for International Studies for their travel to international scientific meetings in summer 2018.

AWARDS/ACHIEVEMENTS



Emanuela Gionfriddo received awards for consecutive years at the 19th and 20th International Symposia on Advances in Extraction Technologies (ExTech), held in Santiago de Compostela, Spain

in 2017 and Ames, Iowa in 2018. The awards were for the Best Poster Presentation by a Young Scientist (2017) by the Royal Society of Chemistry (Separation Science Group) and the Young Author Prize (2018) for the best oral presentation. The 2018 recognition includes a travel award to attend the 2019 ExTech Symposium in China. She also received the *Excellence in Sample Prep* best poster award at the North American Chemical Residue Workshop (NACRW2018) in Naples, Fla. in July 2018. This award was sponsored by United Chemical Technologies.



Jialong Zhu received the 2017 Ohio Cancer Research Discover Award in December 2017 for his work on the development of new antitumor antibiotics. Established in 1982, Ohio Cancer Research is an independent, statewide, nonprofit organization dedicated to the cure and prevention of the many forms of cancer and the reduction of its debilitating effects through aggressive, basic seed money

research, cancer information and awareness. He also received the 2017 T. Ogawa Young Investigator Award from the *Journal of*

Carbohydrate Chemistry for his recent publications and contributions to carbohydrate chemistry.

Jialong Zhu and **Tim Mueser** were promoted to full professor in March 2017 and April 2018, respectively. Joint faculty member **Amanda Bryant-Friedrich** also was promoted to full professor in April 2018.

Don Ronning and **Kristin Kirschbaum** (pictured below) were two of 26 UT faculty and staff recognized by President Sharon L. Gaber for outstanding contributions to University scholarship and creative activity from 2015-17.



Steve Sucheck is the 2018-19 program chairperson for the Carbohydrate Division of the American Chemical Society.

Nina McClelland (dean emerita) received a key to the city from Mayor Paula Hicks-Hudson at the Ohio section of the American Water Works Association meeting in fall 2017. The award was

Continued on page 6

Awards/Achievements continued from page 5

for her outstanding contributions to improving and maintaining water quality throughout her career. She also received the 2017 Dr. Alice H. Skeens Outstanding Woman Award for her expertise in environmental chemistry to make the world a better place.

Amanda Bryant-Friedrich was named a 2018 Fellow of the American Chemical Society, joining Nina McClelland and Andy Jorgensen from our department.

Steven Sucheck and **Kathy Wall's** (Department of Medicinal and Biological Chemistry) collaborative research project utilizing cancer vaccines to enhance the immune system was featured in *The [Toledo] Blade*, toledoblade.com/Medical/2018/05/06/UT-researchers-harnessing-the-immune-system-with-cancer-vaccine.html.

Mark Mason was awarded a sabbatical leave for academic year 2017-18.



Cohen-Fray

Claire Cohen-Fray competed in and completed the Boston Marathon in 3:42:22 in brutal weather conditions.

John Payton accepted a position to teach chemistry at Kenyon College in Gambier, Ohio. He has been a visiting assistant professor from 2015-18.

Members of the department were recognized for their years of service: 30 years – **Pamela Samples**; 20 years –

Steven Moder; 10 years – **Terry Bigioni**, **Claire Cohen-Fray**, **Vladimir Zhurov**.

The **UT student chapter of the ACS** was designated as an outstanding chapter for its 2016-17 events and outreach.

They also received the Green Chemistry award. Members

received their awards during the spring ACS meeting in San Diego in March 2018.

Joseph McTague, senior biology and biochemistry student, received one of the 2018 Frank E. Horton Presidents Club scholarships.

Laura Skebba graduated in December 2017 as the first graduate with a professional science master's degree in green chemistry and engineering. See Laura's story at <https://youtu.be/GNZgxe0-fQ>.

Badri Bhattari (PhD '18, Bigioni) and **Yasaman Saleh** (PhD student, Mason) attended the ACS Summer School for Green Chemistry and Sustainable Energy at the Colorado School of Mines in June 2017. Funding was provided by the ACS Petroleum Research Fund and the American Chemical Society.

Sylvania Northview High School Student **Nora Kaushy Gera**, who performed research in the UT laboratory of **Ajith Karunarathne**, received a Department of Defense medal for her 3rd place finish at the National Junior Science and Humanities Symposium in Hunt Valley, MD from May 2-5, 2018.

Abhishek Vartak (PhD student, Sucheck) received a travel award from the Organic Division of the American Chemistry Society to attend the national meeting in Boston in August 2018.

Celine Schreidah, senior biochemistry major, received a \$1,000 scholarship from the University Women's Commission for her academic achievement, support of women's and gender issues and campus involvement.

Daniel Liu received High Honors in the National Chemistry Olympiad Competition for being in the top 50 students nationally (See the article on page 9 for more of Daniel's accomplishments).

NOTABLE PUBLICATIONS

- *Direct Visualization of Critical Hydrogen Atoms in a Pyridoxal 5'-Phosphate Enzyme*. The work was published in *Nature Communications* and performed at Oak Ridge National Laboratory (ORNL) by Steven Dajnowicz of **Tim Mueser's** laboratory with ORNL's Andrey Kovalevsky, Jerry Parks, Ryne C. Johnston and Kevin L. Weiss; Matthew P. Blakeley of the Institut Laue-Langevin; David A. Keen of Rutherford Appleton Laboratory; and Oksana Gerlits of the University of Tennessee.
- *Mycyltransferase from Mycobacterium tuberculosis in Covalent Complex with Tetrahydropipstatin Provides Insights into Antigen 85 Catalysis*. **Don Ronning** with UT graduate students Christopher Goins and Steven Dajnowicz, and ORNL collaborators Micholas D. Smith and Jerry M. Parks in *Journal of Biological Chemistry*.
- *Gold-Polyppyrrrole Nanocomposite Sorbent Material for Solid-Phase Extraction, Quantification and Selective Determination of Microcystins in Water*. **Jon Kirchoff** and **Dragan Isailovic** with UT graduate students Amila Devasurendra, Dilrukshika Palagama, Ahmad Rohanifar, and Jared Anderson from Iowa State University; in *Journal of Chromatography A*.
- *Carbon Dioxide-Mediated C(sp³)-H Arylation of Amine Substrates*. **Mike Young** with post-doctoral associate Mohit Kapoor and undergraduate Daniel Liu in *Journal of the American Chemical Society*.
- *Blue Light Excited Retinal Intercepts Cellular Signaling*. **Ajith Karunarathne** with UT graduate student Kasun Ratnayake and research scientists John Payton and Harshana Lakmal in *Scientific Reports*.

NEWS

QM Recognition for Distance Learning Classes

Numerous online classes have been designed by Department of Chemistry and Biochemistry faculty during the past several years to support many programs. One of the department's goals is for all distance learning classes to receive Quality Matters (QM) recognition. The QM designation or certification is earned through a rigorous evaluation process by a team of reviewers who consider eight general standards and 43 specific standards related to factors such as course design, course delivery, the learning management system, faculty and student readiness, and infrastructures. Five faculty members have earned QM recognition for their courses during the past two years: **Lisa Zhurova** for Chem 1090: *Elementary Chemistry*; **Claire Cohen-Fray** for Chem 5100: *Principles of Organic and Inorganic Chemistry*; **Dean Giolando** for Chem 5230: *Chemistry of Sustainable Materials*; **Andy Jorgensen** for Chem 6210: *Environmental Chemistry*; and **Mark Mason** for Chem 6200: *Green Chemistry*. Chem 6200 was officially the 50th QM-certified course at The University of Toledo.

Condolences



Ginny Black receiving her 75-year Alumni Association pin from associate vice president of alumni engagement Dan Saevig.

Virginia “Ginny” Black, wife of chemistry faculty member Arthur H. Black, passed away at age 98. Ginny was widely considered “the first lady of chemistry” and a dedicated supporter of our students and department. She was a 76-year member of the UT Alumni Association and gave much of herself to UT and its organizations in many leadership

and supporting roles over the years. Ginny and Art created two endowed funds to benefit UT students: The Arthur H. Black Award in Analytical Chemistry and the Arthur H. and Virginia R. Black Scholarship in Chemistry. She was a fixture at the annual department honors tea and enjoyed meeting the students receiving the award and scholarships. Her warm smile, positive attitude, and immeasurable kindness were an inspiration to all. A more detailed description of her life and career can be found in the *The [Toledo] Blade* (toledoblade.com).

The family requests memorial gifts be directed to the Arthur H. Black Professorship Fund at The University of Toledo Foundation [Fund #1301088], the PEO Foundation/J Bradshaw Fund [#7021], or the Sunset Retirement Communities (Employee Appreciation Fund).

Doctoral Program Turns 50!

The administration of the department, which had been under the direction of Dr. Harold G. Oddy since 1944, passed into the hands of Nelson W. Hovey in 1965. A year later, Jack G. Kay (PhD, Kansas) was appointed professor of chemistry and chairman of the chemistry department, with the expressed purpose of initiating a graduate program leading to the doctoral degree. He prepared a proposed curriculum that was submitted in October 1966 to the Ohio Board of Regents (OBOR). In September 1967, the OBOR approved granting a PhD degree, pending its accreditation by the North Central Association. President William S. Carlson received notification from the association that the PhD in chemistry was granted preliminary accreditation in 1968. This represented the final step in adding a doctorate to the chemistry curriculum, which officially began in September 1968.

The first PhD was awarded in 1971 to Norman G. Rapino, whose dissertation was titled *A study of the mechanism of the nickel (II) catalyzed reaction of bromobenzene and trialkyl phosphites*. His advisor was Claibourne E. Griffith, who also served as chair from 1969-74. Dr. Rapino is executive director of Rocket Innovations at The University of Toledo.

As of July 2018, 218 doctoral degrees in chemistry have been conferred by the University. The department plans to host a dinner to celebrate this milestone on Saturday, Nov. 17, 2018 at the Radisson Hotel on the Health Science Campus. Contact Charlene Hansen at charlene.hansen@utoledo.edu for more information.

UT Chemistry PhD #1

by Dr. Norman G. Rapino

1969. Neil Armstrong and Buzz Aldrin walk on the moon, Woodstock rocks, Easy Rider rolls, and Eloise marries Norm and we come to Toledo. Epic events. We are with others from the research group of Dr. Clay Griffin, who leaves the hilly campus of the University of Pittsburgh as he becomes chair of the chemistry department in Toledo. No more hills. Eloise gets hired by the chair of the biochemistry department at the very new Medical College of Ohio and works on the original campus on S. Detroit Avenue, soon moving to the new campus on Arlington Avenue. Ends up with 12 or so publications.

We live in Kenwood Gardens, and I ride my motorcycle to work. I start my 3rd year of PhD work in the newly completed Bowman-Oddy Laboratories, and find a very smart and collegial group of faculty and other students who welcome us to the community. By 1971, my research is finished and I type a thesis draft of my project and give it to Clay. A week later, I get it back with corrections in red ink, type the new version and I am done.

I remember being so nervous at my thesis defense that I yawned at least 100 times as I fought for oxygen and the answers to the questions posed. Evidently, it went well, as I graduated. In the end only two publications resulted. Eloise was smarter than me then and is still smarter than me now. That worked out very well for me, and my advice is to “marry up.” The problem is that the other person has to “marry down.”

Eloise's boss was so afraid that now that I had my degree, we would move away and he would lose her, that I was offered a biochemistry post-doc with Erwin Reimann at the medical college. I worked on rabbit gastric mucosa in a cold room, and was neither happy nor very good as a researcher. After a year-and-a-half, I went to see Erwin and said I was going to quit, and he said "great;" I was trying to find a way to fire you. We hugged and I left to have a career as an entrepreneur.

My training as a chemist was fabulous, because what I learned about the scientific method proved essential to me in all of my other five or six (depends on how you count them) careers. I am now back at UT in a fantastic job, working on accelerating great ideas and research outcomes with very smart people. Everyone is still collegial and welcoming, and Toledo continues to be a gem of a city and a remarkable University. Thanks very much to both!

Living Science: The Ever-Changing Periodic Table Dedicated

Adapted from an article written by Christine Billau, UT News, January 9, 2017 printed with permission

The Ever-Changing Periodic Table was dedicated on Sept. 13, 2017 with Provost Andrew Hsu in attendance. The "Living Science: The Ever-Changing Periodic Table" was funded by a grant to Dr. Kristin Kirschbaum from The University of Toledo's Women & Philanthropy, a collaborative effort of Toledo's Women & Philanthropy and the University's Division of Advancement that supports institutional initiatives.

The 800-pound, interactive periodic table bolted to the wall inside the main entrance to The University of Toledo's Wolfe Hall features 118 LED-illuminated glass boxes. Each box represents an element, and members of the community and alumni are invited to fill boxes



Provost Hsu speaking at the dedication.

with examples of how each element relates to everyday life and current events.

The display has a touch-screen that allows visitors to explore a variety of apps that share stories and videos about the elements, contents of the element boxes and who contributed the items for each element. Unique about this display is the fact that the



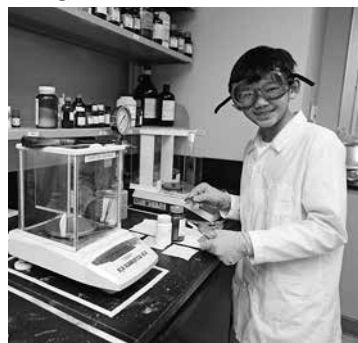
Celebratory periodic table cupcakes.

community is filling the boxes; we have children as young as six, retired police staff, homemakers, entire school classes, law faculty and artists discovering how the chemical elements are part of their lives. There are still many boxes that need to be filled, and others will be changed from time-to-time. There is even money available to reimburse contributors. If you would like to be part of this exciting display and leave your mark at UT, contact Kristin Kirschbaum at 419.530.7847 or kristin.kirschbaum@utoledo.edu. Additional information is at utoledo.edu/nsm/ic/periodictable.html.

13-Year-Old UT Student Creates Faster, Cheaper Way to Make Pharmaceutical Drugs, Agricultural Pesticides

By Christine Billau (printed with permission of UT News, as published in the June 11, 2018 edition)

Like many 13-year-olds, Daniel Liu enjoys reading books and wears T-shirts covered in cartoon characters. Unlike most boys and girls his age, Liu has been honored at the White House for his science achievements and is now a published scientific researcher at The University of Toledo.



The Ottawa Hills High School student has been taking classes at UT for more than a year through Ohio's College Credit Plus program.

Liu is one of three members of a UT green chemistry lab team that created a chemical

reaction that results in a faster, cheaper, more environmentally friendly way to make pharmaceutical drugs and agrochemicals, such as pesticides and herbicides.

The team's research, which was recently published in the *Journal of the American Chemical Society*, shows how carbon dioxide in the form of dry ice is used to break up carbon-hydrogen bonds, reactions known as C-H activation.

"We showed that we could run this reaction with many different starting materials and produce very diverse products," said Liu, a co-author on the paper.

"When you take an unreactive carbon-hydrogen bond, which is found in most organic compounds, and break it to convert it into a new type of bond, you make new molecules more quickly and

community is filling the boxes; we have children as young as six, retired police staff, homemakers, entire school classes, law faculty and artists discovering how the chemical

more sustainably, especially in pharmaceutical and agrochemical molecules,” said Dr. Michael Young, assistant professor in the UT Department of Chemistry and Biochemistry.

That means, much like Liu’s skyrocketing academic journey, you skip grades or steps in the process, reducing the time and resources it takes to achieve results.



“This chemical reaction cuts up to five steps out of a process that normally takes six or seven,” Liu said. “C-H activation also improves overall synthetic efficiency. We found a way to potentially help patients, farmers and the environment when it comes to how medicine and pesticides are made.”

Dr. Mohit Kapoor, UT post-doctoral researcher in medicinal and sustainable chemistry, said Liu has demonstrated an incredible ability to learn and discover at the collegiate level.

“I now see him as a co-worker in my lab. He is a genius and a prodigy,” Kapoor said. “But I remember in the beginning thinking, ‘How could he handle all these things?’ He has proven that he has the knowledge. He can do the work properly and learns quickly.”

“While this is highly unusual, Daniel has unusual talent and great support from his parents,” Young said. “He has already taken most of the junior-level course work in the chemistry program. While he doesn’t have the emotional maturity or physical stature of an older student, he is intellectually advanced compared to his peers.”

Young, Kapoor and Liu are the three authors of the research paper. The scientists say Liu was involved in every step of the project, investing more than 400 hours of work.

“Daniel made many of the starting materials for the reactions and also performed many of the key reactions. He also remade the compounds to validate that we could do this, help make enough of them to characterize them, and prove they were what we said they were,” Young said. “Plus, he helped us craft the manuscript. He went through and made suggestions on how to present our work.”

UT has filed a provisional patent on the work, and the team is looking to market to pharmaceutical companies that make generic drugs.

“We’re excited about the potential to commercialize this because it is much cheaper and more easily recyclable,” Young said.

“This really could be a benefit to the synthetic community.”

Liu’s passion lies in developing new pharmaceutical drugs to help people fight different diseases.

“I feel like this is the start of a career, and hopefully I can do more of this research in the future,” Liu said. “I’m starting work on a couple of these projects by myself. I simply want to help people.”

Liu started high school at the age of 10.

In 2016, Liu visited the White House and met President Barack Obama after winning the national “You Be the Chemist” challenge — defeating 30,000 other students. He was the youngest ever to win the Chemical Education Foundation’s competition.

Recently, he received high honors in the National Chemistry Olympiad.

Liu also is assistant principal cellist in the University orchestra. It’s one way he has become involved in UT’s vibrant, diverse campus.

“I had an adjustment period, but this is normal to me now,”

Liu said. “I feel at home here and supported in my studies. I’m trying to take advantage of all that UT has to offer so I can keep learning and growing. I want to go to graduate school. I’m also considering medical school. I want to do more stuff that changes the world and helps people.”

ACS Senior Director and CEO Visits UT



Dr. Nina McClelland introducing Dr. Connelly.

The department was honored to have Dr. Thomas Connelly, senior director and CEO of the American Chemical Society, visit the University and present a colloquium on ACS: *Journals and Information Solutions* on Nov. 13, 2017. Dr. Connelly was in Toledo to celebrate the centennial anniversary of the Toledo Local Section of the ACS

and serve as the keynote speaker at the banquet on Nov. 11. Prior to assuming his current position at ACS in 2015, Dr. Connelly worked at E.I. Du Pont de Nemours and Company for 36 years, with his most recent position being executive vice president and chief innovation officer.

Continued on page 10.

News/Highlights continued from page 9

ACS Project SEED

The department held a special seminar in fall 2017 to give Project Seed students the opportunity to present their research to students and faculty and to celebrate their hard work. Project SEED is sponsored by the American Chemical Society to provide stipend support to financially disadvantaged high school students so they can explore scientific research under the mentorship of a faculty member. The 2017 participants were:

Morgan Dussel – Maumee High School (Li), *Conversion of Feedstock Chemicals to Medicines*

Kayla Goolsby – Notre Dame Academy (Young), *Synthesis and Post-synthetic Modification of Metal-organic Frameworks toward New Ligand Platforms for Gold Catalysis*



Zhane Crockett – Jesup W. Scott High School (Zhu), *Chemical Synthesis of Complex Biologically Significant N-Linked Glycans*

A fourth high school student was a volunteer researcher in summer 2017.

Nora Kaushy Gera – Sylvania Northview High School (Karunarathne), *Design of Algorithms to Quantify Subcellular Fluorescence*

ALUMNI NEWS

Births

Govind Sharma Shyam Sunder (PhD student, Kirchhoff) and his wife, Edla Swapna, announced the birth of their daughter, Darshee Sharma on July 14, 2018.

Amila Devesurendra (PhD '17, Kirchhoff) and **Palagama Dilrukshika** (PhD student, Isailovic) are proud parents of a little girl, Arya Shanvi, who was born May 19, 2018. She joins big brother Mihi Sayum.

Qinzhe Wang (PhD, '17, Viola) and **Danyang Zhu** (PhD, '15, Zhu) are proud parents to Lucas, who was born on July 7, 2017.

Wei Li (assistant professor) and Sha Li welcomed Leonardo (Leo), born March 20, 2017.

Wedding

Tien Ho (PhD '14, Anderson) and Honglian Yu were married on July 7, 2018.

Career updates

Phil Blosser (BS '91) has been home-brewing beer since the early 1990s. He entered his recipe in the American Homebrewers Association's regional competition in Milwaukee and his beer won the gold medal and an entry in the

national competition in Minneapolis in summer 2017. He was invited to Toledo's Black Cloister Brewing Company to make a batch of his lager they called "Phil's Lager." In October 2017, Black Cloister took the recipe to the Great American Beer Festival Pro-Am in Denver. Phil works for a local chemical company and has been a member of the Glass City Mashers home brewing club for a number of years.

Nguyen (Wellington) Pham (BS '95) is an associate professor of radiology and biomedical engineering at Vanderbilt University's School of Engineering in Nashville, Tenn.

Nick Richardson (PhD '97, Davies) was named associate provost for academic affairs at Wagner College in Staten Island, NY.

Jennifer Sealy (MS '98, Flowers) recently moved to North Carolina after 20 years in California to continue working in the forensic field.

Chau (Victoria) Pham (MS '98, Funk) "After school, I worked for Regeneron for two years. I then moved to San Francisco and have been with Genentech since 2000. Things are going pretty well, though there have been lots of changes after Roche acquired Genentech. I am still under Genentech research and early development, working in the proteomics lab."

Duane Wilson (BS '02) is working at Owens Corning Science and Technology as an inorganic analytical leader. He spent five years in Denver with U.S. Borax and four years with Kemira in Atlanta.

Qinfeng (Sarah) Liu (PhD '05, Kirchhoff) was promoted to associate professor at Campbell University, Buies Creek, N.C.

Tien Ho (PhD '14, Anderson) recently accepted a new position as research scientist II at Gilead in Foster City, Calif. Tien previously worked at Abbvie in Chicago.

Amila Devasurendra (PhD '17, Kirchhoff) accepted a position as senior research lab specialist in the Department of Environmental Health Sciences, School of Public Health, at the University of Michigan.

Krishnakant Patel (PhD '17, Andreana) is a senior chemist at Anatrace Products in Maumee, Ohio.

Vince Kowalski (MS '17, Mason) is a research chemist at Hampford Research in Stratford, Conn. He develops and manufactures specialty chemical solutions for the electronics, adhesives/coating, printing/imaging, dental and personal care industries.

New Alumni (August 2016-May 2018)**BA**

Joseph Nunnari
Adnan Rammouni
Hunter Dickson
Tyler Goltry
Jeffrey Huynh
Robert Mitchell
Clayton Rice
Kelan Zielaskiewicz

BS

Nicole Albright
Travis Brege
Miranda Dermanelian
Miranda Dziobak

Luis Gomez
Troy Jordan
Jennifer Kim
Karley MacLean
Kevin Markus
Gulustan Ozbay
Valerie Ranes
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Ibrahim Barayseh
Jack Carter

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Victoria Drago
James Dunaway
Joshua Hanenkrath
Alex Hanes
Fatima Jaber
Stephanie McCaskey
Rodney Park
Sarah Schaaf
Sheila Shahri
Danielle Sturwold
Alec Weiker
Ronald Wheeler

MS

Siddhita Shirsat
Gurdat Premnauth
Yeakub Zaker
Anthony Bernadelli
Praneeth Siripurapu
Vincent Kowalski

PhD

Sandeep Thanna
Aydar Atnagulov
Jennifer Gadiant
Amila Devasurendra
Krishnakant Patel
Vinay Mutthamsetty
Chris Goins

Miriam Basiouny
Nasim Estimi
Gwenn Parungao
Bharani Thanguvelu
Raymond West
Rachel Marvin
Ajith Yapa Mudiyaasilage
Mengchao Shi
Kevin Trabbic
Sharmeen Nishet
Hosein Tafazolian
Brian Conn
Hai Nguyen
Saad Alqahtani
Qinzhe Wang

SAVE THE DATE

by Nick Butler, Director of Development, College of Natural Sciences and Mathematics

The University of Toledo's annual Rocket Forward: You Launch Lives campaign will take place from midnight on Tuesday, Oct. 16, through noon Wednesday, Oct. 17.

This year, the Department of Chemistry and Biochemistry's goal is to raise \$25,000 to create a new endowed fund to commemorate the 50th anniversary of the PhD program. This fund will be used to provide fellowships to enhance the stipends of entering PhD students. These fellowships will be used to recruit exceptional students to The University of Toledo doctoral program in chemistry and biochemistry. Donations to the Chemistry Progress Fund during the Rocket Forward Campaign will be

added to donations from chemistry faculty and staff to initiate this fund.

If you would like to make a gift in advance of **The University**

of Toledo's Rocket Forward: You Launch Lives that will serve as a challenge or matching gift, please contact Nick Butler, director of

development for the College of Natural Sciences and Mathematics, at 419.530.5413 or nick.butler@utoledo.edu.

The graphic features the text "DAY OF GIVING" in large, bold, black letters, with the word "OF" in white. Below this, the University of Toledo logo (a shield with "UT" and a star) is followed by the text "ROCKET FORWARD" in large, bold, white letters. Underneath, a stylized rocket icon is followed by the text "YOU LAUNCH LIVES" in white. The background is a light gray with a repeating pattern of "DAY OF GIVING" in a smaller, lighter font.



2018 Honors Tea scholarship and award recipients.

Awards/Scholarships

The following awards and scholarships were presented at the spring 2017 and 2018 Honors Teas (2018 awardees noted in *italic*):

Alfred F. Foster Health Science Award

Andrew Rava (fall) and Megan A. Simon (spring)
Nu Le (fall) and Jessica Fair (spring)

Analytical Chemistry Award

Kyle Meyer; *Cory Honigford*

Arthur H. Black Award for Analytical Chemistry

Rodney A. Park and Jennifer Hammar
Kevin Makus, Shannon Saluga and Matthew Stojavljevic

Biochemistry Award

Jennifer Kim; *Celine Schreidah*

CRC Press Freshman Chemistry Achievement Award

Erik Reep; *Kevin Fruth and Alexander Vogel*

Outstanding Graduating Senior

Alex Hanes; *Jennifer Kim*

Inorganic Chemistry Award

Cory Honigford and Lauren Walchanowicz; *Paul Moenar*

Organic Chemistry Award

Daniel Liu and Joshua Steiner; *James Easler*

Physical Chemistry Award

Shannon Saluga; *Daniel Liu*

Arthur H. and Virginia R. Black Merit Scholarship

Shannon Saluga; *Skyler Weber*

Joseph A. and Mary A. Capobianco Memorial Scholarship

Nicole Weis; *Jonathan Graczyk*

Chemical and Allied Industries of Northwest Ohio (CAI-NWO) Scholarship

Jared Doremus and Nicole Weis; *Joseph McTague*

Andrew Dollimore Award in Chemistry

Jennifer Kim and Kyle Meyer; *Jared Doremus*

The Chemistry Faculty Scholarship, Dr. Lancelot Thompson Scholar

Evan Diemler

The Chemistry Faculty Scholarship, Dr. John Chrysochoos Scholar

Collin Tassie

The Chemistry Faculty Scholarship – The Brundage Scholar

Shannon Saluga

David R. Hostetler Memorial Scholarship

Brandi Kaskel and Katelyn Sanders; *Alexander Vogel*

Henry R. Kreider Scholarship in Chemistry

Jennifer Kim, Kyle Meyer and Celine Schreidah
Brandi Kaskel, Kyle Meyer and Celine Schreidah

William B. Silverman Scholarship

Evan Diemler and Jonathan Graczyk; *Nathan Gembreska*

James E. and Margaret M. Sander Scholarship in Chemistry

Collin Tassie; *Joan Onwunma*

CV Wolfe Scholarship in Natural Sciences

Eve Sroczynski

Bodo Diehn Scholar

Skyler Weber

Outstanding Teaching Assistant

Ahmad Rohanifar; *Christine Jette*

Outstanding Graduate Student Research Paper of the Year

Michael Banco; *Steven Dajnowicz*

Outstanding First-Year Graduate Student

Alex Landgraf; *Gwendal Loarer and Cecile Petit*

Recognizing Our Donors

The department recognizes and thanks all donors who generously made gifts during the period of July 1, 2016 to Dec. 31, 2017. Donors are listed alphabetically.

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Donors to the University can designate their contributions to a specific fund in a department where it will have the greatest impact. Most chemistry alumni and friends of the department choose this option and donate directly to the fund of their choice in the chemistry and biochemistry department. Many enhance their contributions even further through matching gift programs through their employers. Endowed funds available for donations are:

Arthur H. Black Professorship

Chemistry Progress Fund

Frontiers in Chemistry Lecture Series

Undergraduate Research Fund

Henry R. Kreider Scholarship

David R. Hostetler Memorial Scholarship

William B. Silverman Chemistry Scholarship

Chemistry Faculty Scholarship

Chemical and Allied Industries of Northwest Ohio Scholarship

ACS Student Group

Arthur H. Black Award in Analytical Chemistry

Dollimore Award Fund

Organic Chemistry Progress Fund

Bodo Diehn Chemistry Scholarship

James E. and Margaret M. Sander Scholarship

Thank you to everyone who has made or considered making a contribution to support chemistry and biochemistry students working to become the next generation of chemists, teachers and medical professionals. Through your generosity and thoughtfulness, many dreams have been and will be achieved.

Send us your news

We love to hear about our alumni and friends and will share your news with others through the newsletter. Please send us updates on your address, career and family. Information also can be emailed to utchem@utoledo.edu. In addition, check out the department's website at utoledo.edu/nsm/chemistry.

 Follow us on Twitter @ChemistryToledo

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Please join other alumni in supporting education and excellence in the Department of Chemistry and Biochemistry at The University of Toledo!

For more information about giving, including setting up scholarships or additional gift funds, please contact Nick Butler, major gifts officer for the College of Natural Sciences and Mathematics, and College of Languages, Literature and Social Sciences at 419.530.5413 or nicholas.butler@utoledo.edu.

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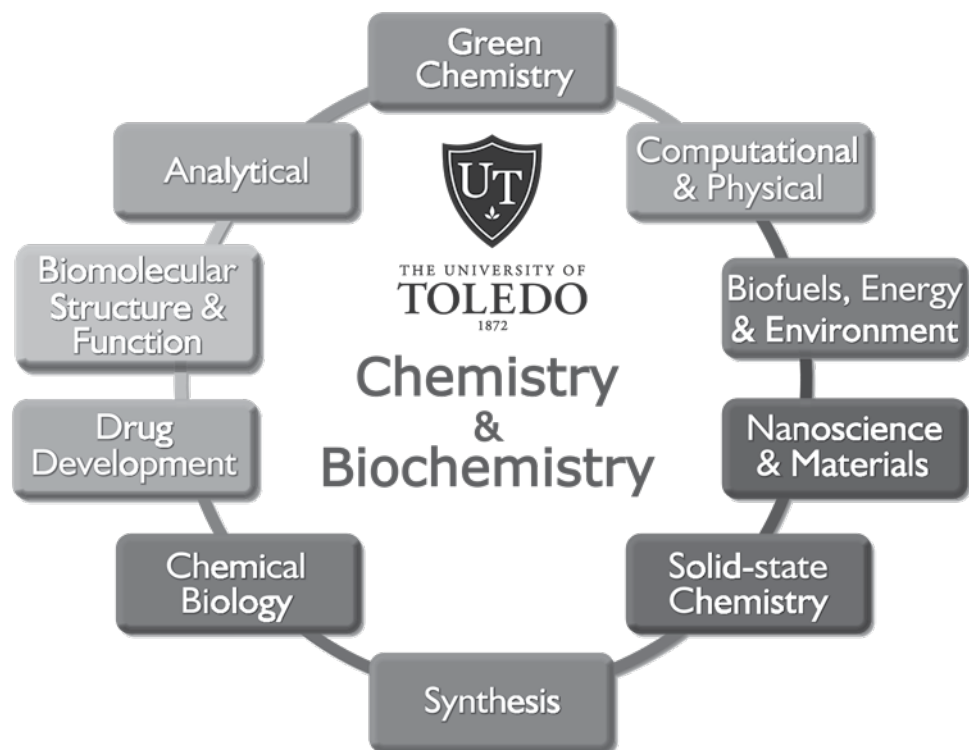
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