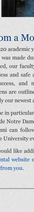
UNIVERSITY of NOTRE DAME

Department of Chemistry and Biochemistry

SUMMER 2020 NEWSLETTER

JULY 2020



Updates from a Most Unusual Year

While the 2019-2020 academic year began as usual, it ended unlike any other to date. When the announcement was made during spring break that classes would be moved on-line and labs would be closed, our faculty and staff worked tirelessly to ensure that this transition would be as seamless and safe as possible. Though not an easy task, by all accounts the efforts were a success, and many students praised the creativity and flexibility of our departmental citizens are outlined below. We look forward to welcoming students back to campus, particularly our newest alumni to celebrate their accomplishments next May.

At this difficult time in particular, we thank all of you who have given to Notre Dame. If you would like to include Notre Dame in your giving, undergraduate alumni can follow this link, and graduate alumni can follow this link. Thank you for supporting the efforts of the department and the University even in challenging times!

As always, if you would like additional information on the stories in this newsletter, please visit the departmental website or Facebook page, and if you have news or feedback, we would love to hear from you.

COVID-19

As the world began dealing with the COVID-19 pandemic, our own faculty and researchers shifted quickly to work on solutions.

Mayland Chang, Olaf Wiest and Shahriar Mobashery initiated a drug-discovery program for COVID-19. Their efforts target the proteome of the virus SARS-CoV-2, which is the cause of COVID-19. The work entails discovery and optimization for *in vivo* efficacy of molecular templates as potential pharmaceutical drugs. The three groups interact with Prof. Jeff Schorey on the use of the BSC-3 facility in Galvin for work with live virus in this drug discovery effort.

Brian Baker normally works on immunology for cancer treatment, specifically looking at T-cell responses to cancer. His lab is now examining the SARS-CoV-2 genome for portions that might interact with T-cells. This information will then be used to develop potential T-cell vaccines that trigger anti-viral immune responses to COVID-19.

Matthew Champion and Norm Dovichi began work on sequencing the genome of SARS-CoV-2 and determining if it can be detected in water. In collaboration with Prof. Kyle Bibby, they are studying wastewater samples to see if virus outbreaks can be tracked or predicted by sampling wastewater.

Emily Tsai and DeAnne Goodenough-Lashua developed creative ways to perform laboratory experiments even during distance learning. Tsai sent students kits for making electrochemical cells at home following video instructions. Goodenough-Lashua had students watch experiments being completed while they analyzed the data and made observations. Both also created Super Analytical Devices (PADs) from the Lieberman lab to enable hands-on chemistry work at home.

Research News

The Notre Dame graduate program in Analytical Chemistry has climbed to #13 in the U.S. News & World Report rankings. Strategic hiring, support from the University, and the contributions of the Advanced Diagnostics & Therapeutics initiative have all significantly aided in this increase.

Gold nanowire IR-PHI

Ken Kuno, Greg Hartland, and Jon Camden recently reported the use of infrared photothermal heterodyne imaging (IR-PHI) to study single gold nanowires, which is the first time this has ever been done with IR. This work demonstrates how different plasmon resonances look within the nanowires and how the frequencies change with the dimensions of the nanowires.

Clark Protein Folding

Patricia Clark has shown that synonymous mutations in genetic sequences, long ignored as background noise, can actually influence protein folding. Proper protein folding is critical to cell health, as misfolded proteins can lead to many diseases such as Alzheimer's, cystic fibrosis, and some types of cancer.

ORNL Microscope

Jon Camden, working with Oak Ridge National Lab (ORNL), was the first to report the observation of electron-beam induced plasmonic Fano interference. The interference is considered unique because it occurs when a quantum transition that is long-lived interacts with one that is not, producing a mixture of corresponding discrete and continuum configurations.

Laurie Littlepage reported on the identification of two proteins, CXCL5 and CXCR2, that cause breast cancer cells to rapidly reproduce and spread throughout bone and marrow. Nearly 75% of women who die from breast cancer have bone metastasis, so understanding more about the processes that cause this metastasis is crucial to improving prognoses.

CXCL5/CXCR2 Model

Olaf Wiest is the director of a new National Science Foundation center named the Center for Computer-Assisted Synthesis (C-CAS). This multi-university collaboration aims to transform how researchers plan the synthesis of complex organic molecules by applying data science and machine learning principles.

Adam Jaffe

Faculty & Staff News

We congratulate Laurie Littlepage on her promotion to Associate Professor, and Sarah West on her promotion to Associate Teaching Professor.

Welcome Adam Jaffe! He will be joining us as an Assistant Professor in the Fall of 2021 after completing an NIH Postdoctoral Fellowship at UC Berkeley. Adam received his Ph.D. from Stanford and A.B. from Princeton.

Gregory Hartland is the new Deputy Editor of The Journal of Physical Chemistry C.

Steve Corcelli is the winner of the 2020 Thomas P. Madden Award for his excellence in teaching first year students. Steve was also appointed Associate Dean for Interdisciplinary Studies and Faculty Development.

Dan Gezelter is the winner of the 2020 College of Science Shilts/Leonard Teaching Award for excellence in teaching at both the undergraduate and graduate levels and particularly for his work developing the Science & Engineering Scholars program. Dan was also appointed Associate Dean for Undergraduate Studies.

Marya Lieberman is the winner of the 2020 Reinhold Niehuhr Award for her work with Paper Analytical Devices (PADs). The Niehuhr Award recognizes a faculty member whose work promotes or exemplifies the pursuit of social justice.

Jon Camden, Dan Gezelter, and Paul Helquist were all winners of the 2020 Joyce Awards for Excellence in Undergraduate Teaching.

Francis Castellino celebrated 50 years at the University this year. He was also honored with the IISTH Esteemed Career Award.

Student & Alumni News

Christian Abraham Araujo (B.S. '20) is the winner of the Rev. Theodore Hesburgh, C.S.C. Award. This award "honors a graduating senior whose leadership has significantly advanced the climate of welcome and inclusion within or beyond the University community."

Nicole Butler (B.S. '20) was selected as the nation's Army ROTC Student of the Year and was added to the ROTC All-American team.

Dr. Brian Conway (B.S. '12) joined the Institute for Defense Analyses (IDA) as a Research Staff Member in IDA's Operational Evaluation Division.

Dr. Kyle Watson (Ph.D. '16) is now an Assistant Professor of Chemistry at Manchester University.

Dr. Charles Raley (B.S. '44) celebrated his 97th birthday this year and was highlighted by his local news.

Dave Henner (B.S. '73) is back to teaching chemistry after teaching AP Physics for many years at St. John's School in San Juan, Puerto Rico.

Jon Stefely (B.S. '09) graduated from the M.D./Ph.D program at the University of Wisconsin-Madison, where he conducted his Ph.D. in biochemistry in the laboratory of Dave Pagliarini (B.S. '99). Jon started a new position as a resident and research fellow in clinical pathology at the Massachusetts General Hospital in Boston, MA.

This past year, we added 20 Ph.D. graduates, 8 M.S. graduates, 46 B.S. graduates to our alumni. Congratulations to the following students.

Ph.D. Recipients

William Temple Andrews** (Amanda Hummon)
Marwa Aseer* (Sharon Stack)
Emily Bacher (Brandon Ashfeld)
Jason Devlin (Brian Baker)
Weiping Gan (Huifang Gao)
Jeffrey Henry (Richard Taylor)
John Herr (Paul Helquist and Olaf Wiest)
Melissa Huffhines* (Vlad Bier)
Kevin Koch (Paul Helquist and Olaf Wiest)
Sara Martin Brackett* (Christian Melander)
Yurii Morozov** (Masaru Kino)
Cunjia Qiu** (Francis Castellino)
Taylor Quinn (Paul Helquist and Olaf Wiest)
Ricardo Romero Moreno** (Laurie Littlepage)
Farhad Sahabi** (Paul Helquist and Olaf Wiest)
Rebeeca Schelsh (Prashant Kamat)
Angela Slaki-Devlin (D. Ann Kasten)
Madeline Smith-Eberle (Marya Lieberman)
Cynthia Spivey (Bradley Smith)
Sarah Wright (Norman Dovichi)

M.S. Recipients

Kyle Alcohiet* (Gregory Hartland and Masaru Kano)
Michael Augugliaro (Paul Bohn)
Jeffrey Aseer**
Kayla Lewis-Rock** (Kenneth Henderson)
Arielle Lopez** (Paul Bohn)
Janel Reed (Steven Corcelli)
Danielle Romoser-Borrell (Richard Taylor)
Kevin Swartz (Vlad Bier)

B.S. Recipients

Biochemistry Majors
Christian Araujo
Emilio Arellano
Emily Asturita, *cum laude*
Nicole Butler, *cum laude*
Matthew Cenci, *cum laude*
Ryan Cotter
Martin Crowe
Elizabeth Fisher, *cum laude*
Robert Gipson, *summa cum laude*
Daniel Guza
William Huffman**
Cameron Hunter, *magna cum laude*
Veronika Kalvaitys, *magna cum laude*
Tyler Keslin
Reina Koran
Luke Krajewski
Charlotte Langbo, *cum laude*
Mary Lijo, *magna cum laude*
Hannah Martin, *magna cum laude*
Nicholas Milikich**
Caitlin O'Brien, *magna cum laude*
McKenzie Samson
Kevin Schmar
Michael Seraphin
Chase Soukup, *magna cum laude*
Emma Spiess
Marie St. Pierre
Ashley Sullivan, *cum laude*
Zachary Walker, *magna cum laude*
Matthew Wang, *cum laude*
Paul Wanwanich, *magna cum laude*
Kristen Wohner**
Jonathan Welsh, *summa cum laude*

Chemistry Majors
Samantha Barlock, *cum laude*
Clare Cahir, *cum laude*
James Drysdale, *cum laude*
Peter Eckard
Miranda Gonzales
Sarah Maasraoui
Sean Markovitz
Madison Mottey, *cum laude*
Rebecca Radomsky
Nicolas Robalin
Erica Vowen, *cum laude*

Chemistry with Business Majors
Jacob Kennard
Dennis Sullivan

*August 2019 Graduate

** January 2020 Graduate

In Memoriam

Richard Fessenden

Professor Emeritus Richard Fessenden passed away February 11, 2020. Fessenden authored more than 130 journal articles, was awarded the silver medal for chemistry by the International EPR (ESR) Society in Berlin, and was the recipient of the Zavoisky Award given by the Zavisky Physical-Technical Institute in Kazan, Tatarstan, Russia.

Dr. Paul Kropp (B.S. '37) passed away June 5, 2020. Kropp was a professor of chemistry at the University of Notre Dame.

Manuel "Matty" Morcos (B.S. '49) passed away July 12, 2020. Morcos was the owner of Central Transport International and the Ambassador Bridge between Detroit, MI and Windsor, Canada.

Dr. Chester Giza (Ph.D. '68) passed away June 10, 2020. Giza was the retired chemistry department chair of Wheeling Jesuit College.

Dr. David Berg (B.S. '59) passed away March 28, 2020. Berg spent his career at Eli Lilly.

Dr. Karl Petters (M.S. '60) passed away January 11, 2020. Petters spent his career with 3M.

Austin Gillis (B.S. '66) passed away January 3, 2020. Gillis spent the majority of his career with United Technologies Corporation.

Sister Katherine Bernard Gaffney, O.P. (Ph.D. '69) passed away January 1, 2020. Sister Gaffney served as co-administrator/director of Corazon Community for over 30 years.

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