

UNIVERSITY of WASHINGTON

# CHEM LETTER

SUMMER 2016 / VOLUME XXXIV NO. 2

## LETTER FROM THE CHAIR

### Dear Friend of Chemistry,

I am pleased that the study of chemistry continues to be very popular with UW students. We continue to have record levels of enrollment in our undergraduate classes. Our graduate students are a vital part of our teaching program, serving as teaching assistants and key mentors for these large groups of undergraduates. In September, we will welcome a class of 48 students entering our graduate program. Forty of these students hail from 18 U.S. states, while 8 are from abroad. Our total graduate student population in the fall will be approximately 220.

These new students will join the research programs of our distinguished faculty. I am pleased to announce that our faculty continues to win national and international recognition for their work. AJ Boydston has been named as a 2016 Camille Dreyfus Teacher-Scholar. Rob Synovec has received the prestigious Marcel Golay award for his work in chromatography. David Ginger was named as a finalist for the Blavatnik award.

Higher education in our nation continues to experience challenging times. Reduced state appropriation has led to rapidly rising tuition, effectively diminishing state subsidies and transferring more of the cost to students and their families. Here in our state, the legislature has directed that tuition for state resident undergraduates be decreased, which is a welcome change. Unfortunately, the State has not completely made up for the lost tuition revenue. We are struggling to make ends meet in the coming academic year. We continue to operate with state funding for higher education in Washington that is quite low by national standards.

In spite of these lean budgets, our administration has been very supportive of our efforts to upgrade our facilities. The remodeling of the large lecture hall, Bagley 131, is approaching completion. (See page 9.) Beginning this autumn, our students will enjoy their introductory chemistry lectures in a modern facility.

After some delays to secure sufficient funding, we are also going ahead with our very important project to remodel Bagley 293 to provide a fifth upgraded room for the sophomore organic chemistry laboratory course. This project will be completed late next year, providing relief of a serious bottleneck in our introductory program. We are very grateful to the dean of Arts & Sciences and the Office of the Provost for their support of this very expensive initiative.

In contrast to tepid support from the State, our donors are very generous. Your gifts provide the critical extra support that enables us to maintain and improve the quality of our programs of both instruction and research. Many, many thanks to our donors!

Sincerely,



**D. Michael Heinekey**  
*Professor and Chair*



### IN THIS ISSUE

1 Letter from the Chair   2 Faculty News   4 Focus on Research   6 Alumna Profile   9 Department News





## DAVID MASIELLO RECEIVES **PRESIDENTIAL EARLY CAREER AWARD** **FOR SCIENTISTS AND ENGINEERS**

David Masiello, assistant professor of chemistry and adjunct assistant professor of applied mathematics, has been awarded the Presidential Early Career Award for Scientists and Engineers (PECASE). President Barack Obama named 105 researchers as recipients of the award, granting them the U.S. government's highest award for scientists and engineers in the early stages of their independent research careers. Masiello was one of three UW faculty members to receive this honor. Each recipient will receive up to five years of federal research funding.



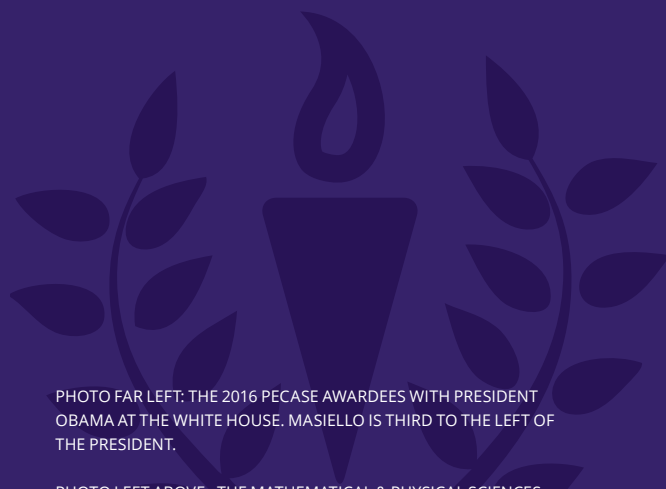


PHOTO FAR LEFT: THE 2016 PECASE AWARDEES WITH PRESIDENT OBAMA AT THE WHITE HOUSE. MASIELLO IS THIRD TO THE LEFT OF THE PRESIDENT.

PHOTO LEFT ABOVE: THE MATHEMATICAL & PHYSICAL SCIENCES (MPS) AWARDEES NOMINATED BY THE NSF WITH THE NSF MPS DIRECTOR, FLEMING CRIM (LEFT) (MASIELLO, MIDDLE).

PHOTO LEFT BELOW: PECASE AWARDEES NOMINATED BY NATIONAL SCIENCE FOUNDATION WITH THE NSF DIRECTOR, FRANCE CÓRDOVA (FRONT, MIDDLE) (MASIELLO, FRONT, LEFT).

Masiello was nominated by the National Science Foundation (NSF) and received the award “for his cutting-edge research in the emerging field of theoretical molecular nanophotonics, and for his comprehensive educational and outreach programs including an exemplary focus on enhancing the scientific communication abilities of young researchers.” Masiello’s research group builds theoretical and computational tools to understand the optical, magnetic, electronic, and thermal properties of nanoscale materials.

Twelve federal departments or agencies nominate young scientists and engineers from across the country who show exceptional potential for leadership at the frontiers of scientific knowledge. Winners demonstrate the ability to broadly advance fundamental research and help the United States maintain its position as a leading producer of scientists and engineers. The final awards, first established by President Bill Clinton in 1996, are coordinated by the Office of Science and Technology Policy within the Executive Office of the President. The awards were presented at a White House ceremony in May.

“The awardees are outstanding scientists and engineers,” said NSF Director France Córdova. “They are teacher-scholars who are developing new generations of outstanding scientists and engineers and ensuring this nation is a leading innovator. I applaud these recipients for their leadership, distinguished teaching, and commitment to public outreach.”

“These early-career scientists are leading the way in our efforts to confront and understand challenges from climate change to our health and wellness,” President Barack Obama said in a statement. “We congratulate these accomplished individuals and encourage them to continue to serve as an example of the incredible promise and ingenuity of the American people.”

“Receiving the PECASE was an incredible honor for me,” wrote Masiello in a July e-mail. “And having the opportunity to meet President Obama at the White House was an off-the-charts amazing experience! I am tremendously grateful for all of the support that I have received both from the Department as well as the University to help make this happen.”

**For more information, contact Professor Masiello at 206-543-5579 or [masiello@chem.washington.edu](mailto:masiello@chem.washington.edu), or visit his faculty page <http://depts.washington.edu/chem/people/faculty/masiello.html> where you can also find a link to his research group site.**

# THE NEXT BIG THING?

BY **ALVIN L. KWIRAM** PROFESSOR EMERITUS

Often a breakthrough in technology is so broadly enabling that it can transform wide swaths of the economic landscape. We may be on the threshold of such an event with recent advances in electro-optic materials and devices.



PROFESSOR EMERITUS LARRY DALTON AND SHERLOCK

When we make a long distance call or use the internet, somewhere the electrical signal from our phone or computer gets converted to an optical signal and travels over fiber optic cables to its destination where it is converted back to an electrical signal for the benefit of the recipient. This has been a remarkably reliable and powerful technology that we all depend on. But with ever accelerating demands for greater speed and bandwidth the traditional approaches are bumping up against serious limits.

This is where some new technologies pioneered by Professor Larry Dalton and his collaborators are generating some palpable excitement. The current workhorse device for converting electrical to optical signals is the ubiquitous Mach-Zehnder (M-Z) electro-optic modulator that is built around a lithium niobate ( $\text{LiNbO}_3$ ) crystal as the active non-linear optical (NLO) material. Using this as a benchmark, we can compare the remarkable advances achieved by Professor Dalton, his students, and his collaborators such as Professors Bruce Robinson and Alex Jen at the University of Washington as well as those elsewhere in the U.S. and abroad.

The first challenge was to create entirely new classes of organic materials that would have better non-linear properties than  $\text{LiNbO}_3$ . Starting with materials with a value of a key parameter for the NLO materials an order of magnitude smaller than that of  $\text{LiNbO}_3$ , they designed organic materials that in five years (by 2005) were an order of magnitude larger than that of  $\text{LiNbO}_3$ . This achievement itself was significant because the voltage required to drive these devices is directly proportional to the key NLO parameter, which means that they had reduced the energy consumption by two orders of magnitude with the new materials.

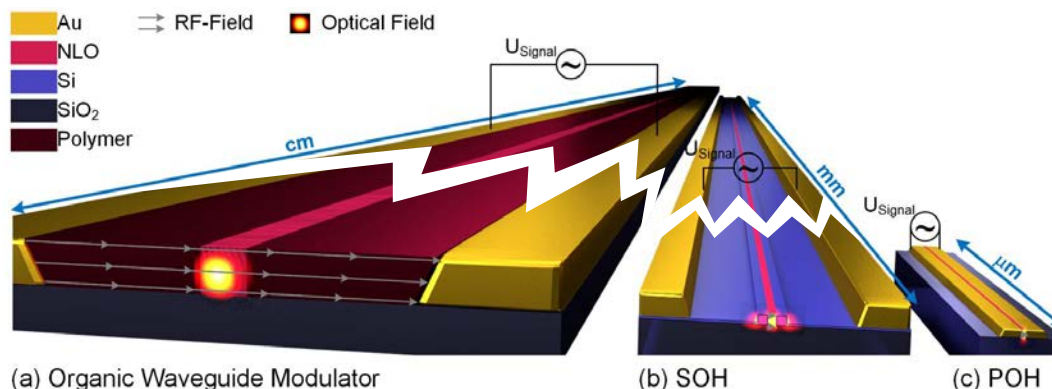
But the story doesn't stop there. Collaborators at Cornell University, who were members of the consortium (headed by Professor Dalton) that made up the Science and Technology

Overview—Device Performance Improvement  
 $\mu = \text{micron} = 10^{-6} \text{ meters}$

Material/Device: Year	$\text{LiNbO}_3$ (2000) (1990 - )	Hybrid OEO (2000)	Hybrid OEO (2015)	Factor
Voltage-Length (V- $\mu$ )	$40 \times 10^4$	$10^3$	40	$10^4$
Footprint ( $\text{micron}^2$ )	$10^8$	$3 \times 10^6$	1	$10^8$
Energy Efficiency (femtojoule/bit)	$10^6$	$10^3$	1	$10^6$
Bandwidth	40 GHz	100 GHz	>> 100 GHz	~10
Insertion Loss	5-6 dB	8 dB	10 dB	
Signal Linearity (SFDR; BER)	Excellent	Excellent	Record Setting	

All satisfy Telcordia stability standards and device crosstalk requirements but commercial application will likely require Voltage-Length performance of 5-10 V-micron. The 2000 results are for SOH, and the 2015 results are for POH.

ARTISTIC VIEW OF DIFFERENT MODULATOR DEVICES: (A) A CONVENTIONAL ELECTRO-OPTIC MODULATOR. LIGHT (OPTICAL MODE PROFILE), GUIDED WITHIN A WAVEGUIDE FORMED BY THE NONLINEAR OPTICAL (NLO) MATERIAL (WHICH COULD BE EITHER  $\text{LiNbO}_3$  OR AN ORGANIC MATERIAL), IS PHASE MODULATED BY THE APPLIED RF DRIVE VOLTAGE  $U_{\text{Signal}}$  AND DROPS OVER A FEW MICRONS AS INDICATED BY THE RF-FIELD (GRAY). THIS LEADS TO CM-LENGTH DEVICES. (B) SILICON-ORGANIC HYBRID (SOH) MODULATOR WITH LENGTHS OF 100S OF MICRONS. THE LENGTH REDUCTION IS DUE TO THE MUCH BETTER NON-LINEAR PROPERTIES OF THE ORGANIC NLO MATERIAL, THE IMPROVED CONFINEMENT OF THE OPTICAL FIELD IN THE SI SLOT AND THE GREATER OVERLAP OF THE OPTICAL AND ELECTRICAL FIELDS. HOWEVER, THE PERFORMANCE IS STILL NOT OPTIMUM BECAUSE THE LIGHT IS NOT COMPLETELY CONFINED TO THE SLOT DUE TO DIFFRACTION EFFECTS. (C) THIS CAN BE OVERCOME BY THE PLASMONIC-ORGANIC-HYBRID APPROACH WHICH IS NOT DIFFRACTION LIMITED AND ENABLES MODULATOR LENGTHS OF ONLY A FEW MICRONS.  $V_{\pi}$  IS THE VOLTAGE AT WHICH  $U_{\text{Signal}}$  CAUSES A  $180^\circ$  PHASE SHIFT.



Center, based at the UW and funded by the National Science Foundation, developed a remarkable new device structure in silicon dubbed a slotted waveguide. As the name suggests, not only are optical waves confined to the nanometer-scale slots, but when the slots are filled with the organic NLO materials the modulator characteristics are improved significantly. Whereas the size of a typical M-Z modulator is on the order of 10 cm, the device based on the slotted waveguide in Si is about a millimeter in length with a slot width of roughly 100 nm. One way to compare performance of the different devices is with a figure of merit for the voltage-length parameter,  $V_{\pi}L$ , where  $V_{\pi}$  is the rf voltage required to shift the phase of the optical signal by  $180^\circ$  and  $L$  is the length of the active region of the NLO material. For  $\text{LiNbO}_3$  this figure is roughly  $40 \times 10^4$  V-microns, whereas the silicon-organic hybrid (SOH) NLO device has a value that is 400 times better (roughly  $10^3$  V-microns). This has yielded energy efficiencies of less than 1 femtojoule/bit for digital information processing. This far exceeds the efficiency of any other modulation technology including those based on the latest III-V semiconductors.

This already represented a dramatic advance, but it now raised the question as to whether one could push this technology even further to achieve an even smaller footprint and even greater energy efficiency. That led to the development of a new approach based on plasmonics. In these devices the optical signal is confined to a metal-insulator-metal slot on silicon with the organic NLO material in the slot. The result is a value of  $V_{\pi}L$  that is a 10,000 times smaller than that of  $\text{LiNbO}_3$  (approximately 40 V-microns), a footprint that is more than six orders of magnitude smaller (tens of square microns), and energy efficiency six orders of magnitude better than  $\text{LiNbO}_3$ . These are astounding numbers. In terms of the footprint and energy

measures alone there is a roughly 14 orders-of-magnitude improvement! Add to that the fact that the bandwidth is an order of magnitude greater as well. Indeed, the fundamental bandwidth of organic electro-optic materials is on the order of 100 terahertz, but conventional waveguide architectures limit bandwidths to less than 100 GHz. With organic-plasmonic devices bandwidths of hundreds of gigahertz have already been demonstrated and terahertz bandwidths may be possible.

But here is the truly revolutionary advance: these plasmonic devices when combined with the organic NLO materials (the so-called Plasmonic-Organic Hybrid or POH devices) have a footprint that is within an order of magnitude of the size of the basic electronic elements on a silicon chip. This now offers the tantalizing possibility that maybe one could devise a way to achieve one of the long-standing goals in signal processing: how to integrate electronics and photonics on a standard CMOS platform in silicon. That breakthrough is now being vigorously explored and may well lead to another revolution in signal processing—the long sought goal of “chip-scale integration” of electronics and photonics (optics). The applications are untapped in fields as diverse as computing, telecommunications, transportation, sensing, medical diagnostics and others. With any luck, this could have a transformative impact on these fields and lead to entirely new devices and technologies in a range of industries. A key question is whether this technology will be exploited first in the U.S. or whether the commercial opportunities will be left by default for other countries to develop.

DOI: 10.1109/JPROC.2016.2547990

**The 2016 Paul B. Hopkins Faculty Award Lecture by Professor Dalton on this topic can be seen at <https://youtu.be/bl48NijNCz0>.**



1913

B.S. IN CHEMISTRY  
UNIVERSITY OF  
CHICAGO

1916

M.S. IN CHEMISTRY  
UNIVERSITY OF  
WASHINGTON

**ZALIA JENCKS ROWE:**

A Remarkable Woman

1920

PH.D. IN CHEMISTRY  
YALE



The Zalia Jencks Rowe Scholarship is one of the Department of Chemistry's 78 endowed funds that support our teaching and research programs. It was established in 1971 by a gift from the estate of Zalia Jencks Rowe in appreciation for the scholarships she received as a student.

Very little was known about Zalia Jencks Rowe except that she received a bachelor of science in chemistry from the University of Chicago in 1913, an M.S. from the University of Washington in 1916, and her Ph.D. in chemistry from Yale in 1920. There was no record of relatives or any stewards of her endowed fund.

In December 2015, Zoha Syed was awarded the Zalia Jencks Rowe Scholarship. As Professor Anne McCoy said, "It's hard not to know Zoha" around here. Zoha is a senior majoring in chemistry and biochemistry. She has conducted undergraduate research with Assistant Professor Gojko Lalic and currently works with Professor Karen Goldberg. She is a chemistry TA, the president of Free Radicals and Phi Lambda Upsilon (the undergraduate chemistry club and honor society), vice president of activities of the American Medical Student Association, a writer for *The Daily*, and was recently named to the inaugural cohort of the Husky 100 (see page 11).

When Zoha received the award letter for this scholarship, "a line stuck out that left me perplexed." It said:

*Unfortunately, we do not have the names and addresses of her survivors so that you can thank them for their mother's generosity.*

The only information provided in the letter was Zalia's academic record, which awed Zoha. "Her story was one that was largely unknown and, quite frankly, mysterious," says Zoha.

"Women received their right to vote in the United States in 1920 with the addition of the Nineteenth Amendment to the Constitution. Prior to this, Zalia had already completed a level of higher education unthinkable for even a man at the time, let alone a woman. Her narrative was waiting to be unearthed."

Not long after Zoha received the scholarship, Professor Mike Heinekey approached her about finding Zalia's descendants. He suspected it would be difficult to find any record of her online, since he previously asked University Advancement's research team to look into her, and they hit a dead end. The director of planned giving wrote in an e-mail that their researcher "has tried several different ways to...determine if there are any surviving Rowe family members. He was not able to find anything. He could not find an obituary about Ms. Rowe, which made it hard to identify family members...I don't think there is anything else we can do..."

Zoha began a Google search and Professor Karen Goldberg couldn't resist joining in. Two of the first discoveries were census records of Zalia with the last name Gailey and her thesis "Studies in the Regeneration of Blood" with her new surname "Gailey" written in with pencil (see photo page 8). Her married name Gailey was the missing link that led to finding a descendant: Matthew Gailey.

Heinekey found Matthew Gailey in the white pages and called. To his surprise, Gailey called back—and obligingly filled in Heinekey on the missing pieces. It was a mutually beneficial conversation, as Gailey was unaware of his mother's legacy at the University of Washington. Gailey himself is an alumnus; he earned a B.S. in ceramic engineering in 1963.

The year Zalia earned her Ph.D. from Yale, she married Walter R. Gailey, whom she met while they were students at the University of Washington; Walter Gailey obtained his bachelor's and master's degrees here. Zalia and Walter lived in Seattle until Walter passed away in 1955.

In 1919, while a graduate student at Yale, Zalia became the first woman named as an honorary member of the American Electro-Plater's Society (see photos page 8). The July 1919 issue of *Brass World and Platers' Guide* ("a monthly journal devoted to the art of refining, alloying, casting, rolling, founding and electroplating of all the non-ferrous metals and their alloys") reports:

*Miss Jencks started out professionally to be a doctor and she delved into the chemistry of the body, but this somehow didn't appeal, but chemistry, per se, did, so she became a really, truly chemist. She concluded she would go to Yale and get her Ph.G. [graduate in pharmacy]...The young lady seems to be carving a career for herself to which the Ph.G. degree will merely seem a dignified bauble, because her distinction will be the record.*

Zalia was employed by the University of Washington as instructor of chemistry in the 1920s. She did research in physiological chemistry at the UW and for private industry in Seattle. In 1922,

Zalia co-authored "The Role of Hydrogen-Ion Concentration in the Precipitation of Colloids" with Herman V. Tartar, professor of chemistry at the UW from 1917 to 1952 (see photo below); his service to the UW included three years as chair of the Department of Chemistry. He was a distinguished researcher known for his leadership ability and warm personality.

Zalia was a member of the Oxygen chapter of Iota Sigma Pi, a national honor society for women in chemistry, and the presiding officer at their third and fourth triennial conventions held at Iowa State University in 1924 and Western Reserve University in 1927.

Walter and Zalia adopted Matthew, who was born in 1930. Zalia taught chemistry, Latin, and mathematics at the Helen Bush School in the 1930s and 1940s, and then taught chemistry at Bremerton Junior College in the 1950s.

After Walter's death, Zalia married H. Gordon Rowe, whom she knew from her studies at Yale, and lived in New England. She passed away in 1971 at the age of 79.

Zoha now sees Zalia Jencks Rowe as more than an ancient namesake of a scholarship fund:

*Zalia was scientist in a day and age where without raw determination and ambition, science was restricted to simply those lucky enough to access it (usually male). These are traits which can't be taught, but are a key prerequisite to being a successful scientist. She possessed characteristics in a time where much less was expected for women, and as a result, excelled.*

*As young chemists, we often face the question of why we do what we do. Or why we put in countless hours into a project that may not even get off the ground. Determination and ambition is what drives us to venture into the dark tunnels of research, setting up experiments we don't even know will work. Careers such as Zalia Jencks Rowe's, prove there is a light at the ends of these tunnels.*

### Zalia Jencks Rowe Scholarship Recipients

Zoha H. Syed 2015-16	Katja Kranz Dove 2008-09
Alice T. Chu 2014-15	Joan Vea Bleecker 2006-07
Amilla R. Frehner 2014-15	Vanessa Rae Palmer 2006-07
Kristin N. Kontogianis 2013-14	Sarah B. Swarts 2005-06
Sarah N. Redmond 2013-14	Hsin-Pin Lin 2005-06
Jordan A. Rixon 2013-14	Brianne Sanaye Chittenden 2004-05
Stephanie Wang 2013-14	Sariah Khormae 2004-05
Yasaman Azodi 2012-13	Trisha L. Andrew 2003-04
Margaret E. Bruce 2012-13	Nicole Y. Hinnebusch 2003-04
Vicky Herrera 2012-13	Kellie L. Rosinski 2002-03
Aila Co 2011-12	Devon Livingston-Rosanoff 2002-03
Ngan Kim Hoang 2011-12	Erin K. Dunn 2001-02
Mia Jaffe 2009-10	Mary Elizabeth Beattie 2001-02
Carmen Lau 2009-10	

L TO R: ZALIA BECOMES THE FIRST FEMALE HONORARY MEMBER OF THE AMERICAN ELECTRO-PLATERS' SOCIETY. PUBLISHED IN BRASS WORLD AND PLATERS' GUIDE, VOL. XV, NO. 7, JULY 1919. ZALIA PICTURED WITH THE ELECTROPLATING STAFF, DIVISION V, SECTION 2, CHEMISTRY, BUREAU OF STANDARDS, WASHINGTON. PUBLISHED IN BRASS WORLD AND PLATERS' GUIDE, VOL. XV, NO. 7, JULY 1919. THE TITLE OF ZALIA JENCKS' DOCTORAL THESIS: "STUDIES IN THE REGENERATION OF BLOOD," FEATURING HER MARRIED SURNAME "GAILEY," WRITTEN IN PENCIL. A PUBLICATION IN THE JOURNAL OF THE AMERICAN CHEMICAL SOCIETY CO-AUTHORED WITH FORMER UW DEPARTMENT OF CHEMISTRY PROFESSOR HERMAN V. TARTAR, FONDLY REMEMBERED FOR HIS COMPASSION AS A MENTOR, TEACHER, AND FRIEND.

#### Miss Zalia Jencks Becomes the First Woman Honorary Member of the Society

The morning session of Wednesday supplied the sentimental incident of the proceedings as well as a surprise to the party of the first part—Miss Zalia Jencks, a chemist attached to the Bureau of Standards. The following abstract from the report will best tell what occurred.

H. H. Posbeck, of the Chicago Branch, A. E. S., arose and said:

The sun is born and rises in the east. The further west it travels the stronger and more powerful it becomes until

it reaches the state of Illinois. There it bursts forth in its glory and strength, and lovingly hesitating, lingers as if unwilling to depart and resume its westward journey. The sun likes Illinois, the state that has given generals, statesmen and more than one President to our glorious country. Today Illinois is here to give you



one of her daughters. Illinois loves her and gladly shares with you the first woman scientist that you have found worthy to give an address before this convention. This



Electroplating Staff, Division V, Section 2, Chemistry, Bureau of Standards, Washington. Left to right, top row: Dr. W. Blum, E. G. Reid, L. M. Ritchie. Second row: Geo. B. Hogaboom, F. J. Liscomb, W. E. Bailey, Thos. Slattery. Third row: E. B. Ham, A. Frieden. Bottom row: A. D. Bell, Misses H. A. Nixon, Zalia Jencks and H. Hester.

Reprinted from THE AMERICAN JOURNAL OF PHYSIOLOGY  
Vol. 89, No. 1, February, 1922

#### STUDIES IN THE REGENERATION OF BLOOD<sup>1</sup>

ZALIA JENCKS *Gayley*

From the Sheffield Laboratory of Physiological Chemistry, Yale University,  
New Haven, Connecticut

Received for publication September 8, 1921

[CONTRIBUTION FROM THE CHEMISTRY DEPARTMENT OF THE UNIVERSITY OF  
WASHINGTON]

#### THE ROLE OF HYDROGEN-ION CONCENTRATION IN THE PRECIPITATION OF COLLOIDS (Preliminary Report)

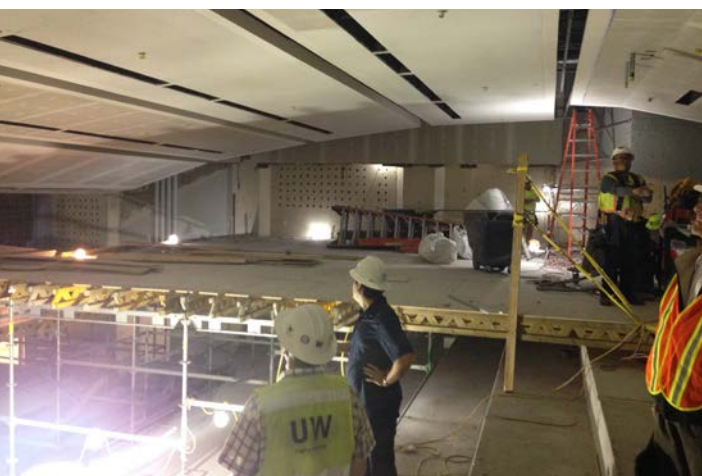
By HERMAN V. TARTAR AND ZALIA JENCKS GAYLEY

Received July 17, 1922

A large amount of experimental work has been done on the precipitation of colloids by electrolytes. An extensive review of the literature on this subject would be out of place here; for this information the reader is referred to standard texts on colloid chemistry and to certain papers, especially to Burton,<sup>1</sup> Whitney and Ober,<sup>2</sup> and Wo. Ostwald.<sup>3</sup> In spite of the extensive work in this field, there are at present only a very limited number of generalizations and these are not quantitative. For this paper, it will suffice to point out and discuss briefly only those factors which have a very direct relation to the experimental results presented.



# BAGLEY LECTURE HALL 131 RENOVATION

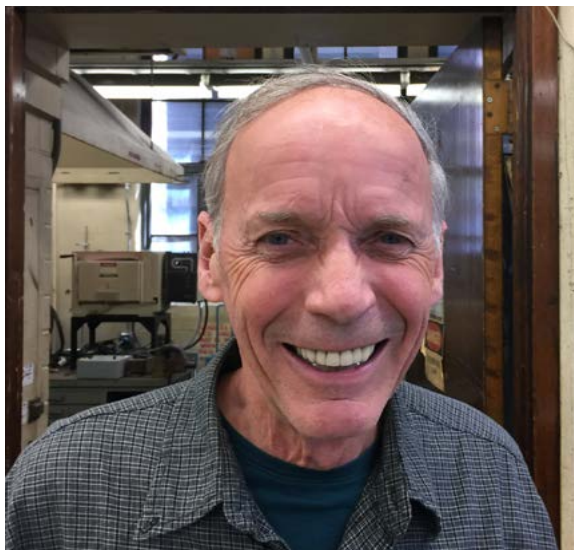


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ARCHITECT'S RENDERING OF THE BAGLEY 131 RENOVATION. COURTESY OF SCHACHT ASLANI ARCHITECTS; THE CONSTRUCTION CREW ON SCAFFOLDING DURING THE INSTALLATION OF THE "FLOATING CLOUD" CEILING PANELS; AN EARLY-60S VINTAGE PERIODIC TABLE WAS REVEALED AFTER REMOVING CHALKBOARDS; BAGLEY 131, MID-RENOVATION.

## ED MCARTHUR RETIRES AFTER 54 YEARS OF SERVICE TO THE UW



ED MCARTHUR; PICTURED WITH ERIC STRAKBEIN, PROGRAM OPERATIONS MANAGER OF CHEMISTRY FACILITIES AND THE MACHINE SHOP.

On May 5, 2016, Chemistry staff machinist Ed McArthur retired following an astounding 54 years of service to the University of Washington. He worked in the Department of Chemistry since 1973. He retired in 1996, only to return as a part-time employee for an additional 20 years.

With deep appreciation of his service, the Department hosted a reception in Ed's honor. Speeches were made (by many except for Ed, who already gave a retirement speech once), refreshments were enjoyed, and we all tried to restrain our temptation to ask if he might stay on a few more years.

Executive Director Gary Pedersen announced Ed's retirement in an e-mail to faculty and staff. "I can't imagine the Department without him, perhaps because I have never experienced the Department without Ed. It is true for almost all of us.

"Ed is a talented machinist and an incredibly creative individual, not to mention a kind and generous human being."

While some recounted personal stories of the projects they worked on with Ed over the years, Mike Zimmerman, fiscal specialist, summed it up nicely, "It has been an honor to be your co-worker."

**Thanks, Ed! Enjoy your much deserved retirement.**





## HUSKY 100

The Husky 100 recognizes 100 UW undergraduate and graduate students from all three campuses and in all areas of study who are making the most of their time at the UW. Five chemistry students (*five!*) were recognized as part of the inaugural Husky 100 this spring: graduate students Heidi Nelson and Sarah Vorpahl, and undergraduate students Haley Amemiya, Dylan Moore, and Zoha Syed. Here, we present Heidi and Dylan. To read about Haley, Zoha, and Sarah, please visit <http://www.washington.edu/husky100/>.

### Heidi Nelson

MILWAUKEE, WI / PH.D. CHEMISTRY '18

As co-founder and president of the student group Women in Chemical Sciences (WCS) at the UW, I've gone beyond my role as a chemistry graduate student and researcher to explore the culture and context of science. With WCS, I've helped start conversations about diversity and build community around our shared experiences as graduate students. We provide resources for everyone in our department, inspire the community through outreach, and empower students to get involved and make a difference.

### Dylan Moore

PULLMAN, WA / B.S. BIOCHEMISTRY '16

Moving beyond the UW, I hope to continue bridging the traditional boundaries between scientific inquiry and social problems, guiding my scientific curiosity with social consciousness and responsibility. By listening and sharing stories between different, otherwise disparate realities, I hope to play a role in bringing more people into the difficult work of facing our histories and present situations, that we may find solutions together.

SARAH VORPAHL, HEIDI NELSON, AND ZOHA SYED, PICTURED AT THE HUSKY 100 AWARDS BANQUET ON MAY 16, 2016, ARE THREE MEMBERS OF THE STUDENT ORGANIZATION WOMEN IN CHEMICAL SCIENCES AT THE UW WHO WERE SELECTED INTO THE INAUGURAL HUSKY 100 (COURTESY OF UW PHOTOGRAPHY).

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If you have any questions, please contact Diana Knight at (206) 543-1611.

The *ChemLetter* is typically distributed in August, December, and April/May. We appreciate your understanding as we learn to manage your new contact preferences. If there is ever a problem, you miss an issue, or you receive the *ChemLetter* in the incorrect format, please contact Diana Knight at (206) 543-1611 or [chemdept@uw.edu](mailto:chemdept@uw.edu).

Thank you for being part of our great academic community. We are thankful for your support and engagement!

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