

Black History Month Presentations

**Hartwig Group
Group Meeting Presentations
February 2022**

In honor of Black History Month, we are recognizing and celebrating black chemists. We are doing this to educate ourselves and each other about important chemists that, due to widespread racism and marginalization, may not be recognized to the extent that their contributions warrant. While we must actively recognize and support black chemists all year long, we will take the opportunity of Black History Month to explicitly celebrate specific chemists and their work.

Mae Jemison



Background

- Born October 17th, 1956 in Decatur Alabama, youngest of three children
- Father was supervisor for charity organization, mother was an elementary school teacher
- She wanted to be a scientist and astronaut from a young age; however, her teachers discouraged her
- Her response to the Apollo missions *“everybody was thrilled about space, but I remember being really really irritated that there were no women astronauts”*
- She began her undergraduate career in 1973 at Stanford University at the age of 16 and earned a degree in chemical engineering and African and African-American studies in 1977
- She earned a medical degree from Cornell University
- She worked as a doctor for the Peace Corps in Liberia and Sierra Leone until 1983-1985
- She applied to NASA and joined from 1987-1993



Career as an Astronaut

- She was chosen out of 2,000 candidates to be one of 15 people in the NASA Astronaut Group 12, the first group after the Challenger
- In 1989 she was selected for the STS-47 crew as a Mission Specialist with a role focused on scientific experiments
- She was in space for 190 hours, 30 min, 23 seconds and orbited earth 127 times
- Her experimentation aboard the STS-47 were Fluid therapy System, bone cell research experiments, and tadpole development in zero gravity
- She resigned from NASA in 1993 to start her own company



Post-NASA Success and Impact

- Served on the board of directors of the World Sickle Cell Foundation
- Founded the Jemison Group inc. and Dorothy Jemison Foundation for Excellence
- Was a professor of environmental studies at Dartmouth and Professor-At-Large at Cornell University
- She is a strong advocate for science education and getting minority students interested in science
- She is a member of the American Medical Association, **American Chemical Society**, Association of Space Explorers, and American Association for the Advancement of Science
- Her organization the Dorothy Jemison Foundation for Excellence made the winning bid for the DARPA 100 Year Starship project and Jemison is the current principal for the program
- She has written many books, some targeted at sparking children's interest in science
- She was the first real-life astronaut to appear on an episode of Star Trek
- She has used her platform as an astronaut to be an active public speaker promoting science and technology
- In 2017, LEGO released the "Women of NASA" set which featured a minifigure of Jemison
- Her quote, which appeared on Google doodle on the 2019 International Women's Day is **"Never be limited by other people's limited imagination"**



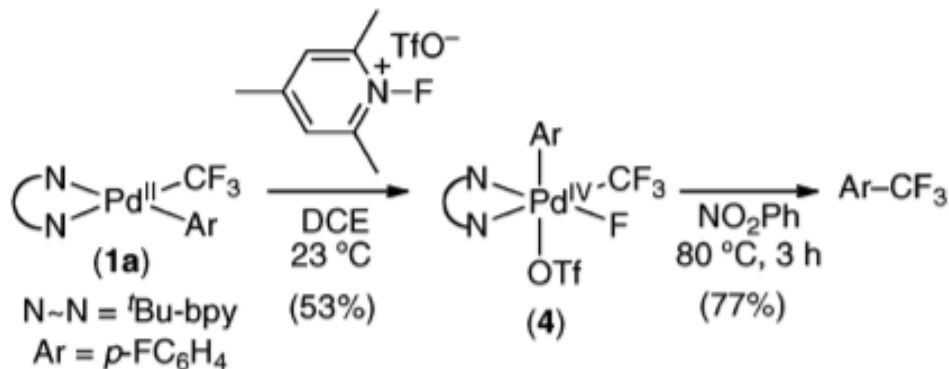
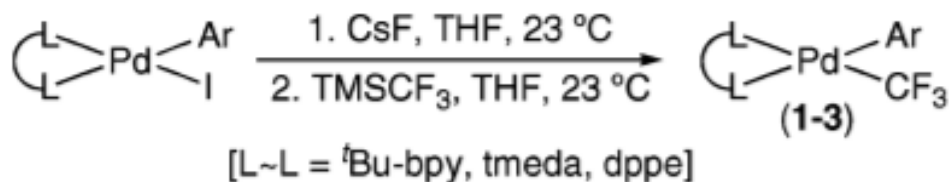
Nicholas D. Ball

- Grew up in Chattanooga, TN.
- B.A.: Macalester College (Sonogashira reactions)
- Ph.D.: University of Michigan – Ann Arbor (Sanford lab, structure and reactivity of Pd-F and Pd-CF₃ complexes toward the formation of organofluorine compounds)
- Postdoc: Caltech (Tirrell lab, chemical biology, the role of selenium-based amino acids for the identification of low-abundant proteins)
- Independent career:
 - Assistant Prof., Amherst College (2013-2015)
 - Associate Prof., Pomona College (2015-present)



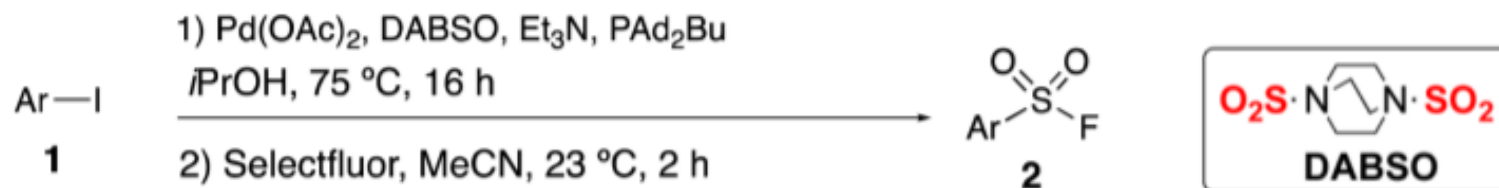
Research Highlights

- Ph.D. work



JACS **2009**, 131, 3796–3797;
JACS **2010**, 132, 2878–2879;
JACS **2011**, 133, 7577–7584.

- Independent career

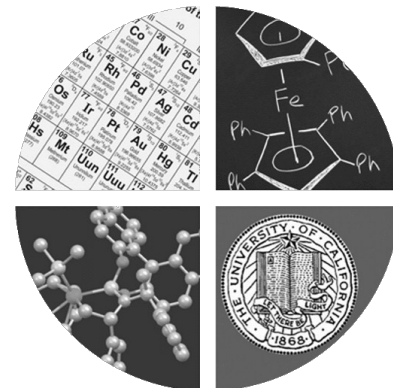
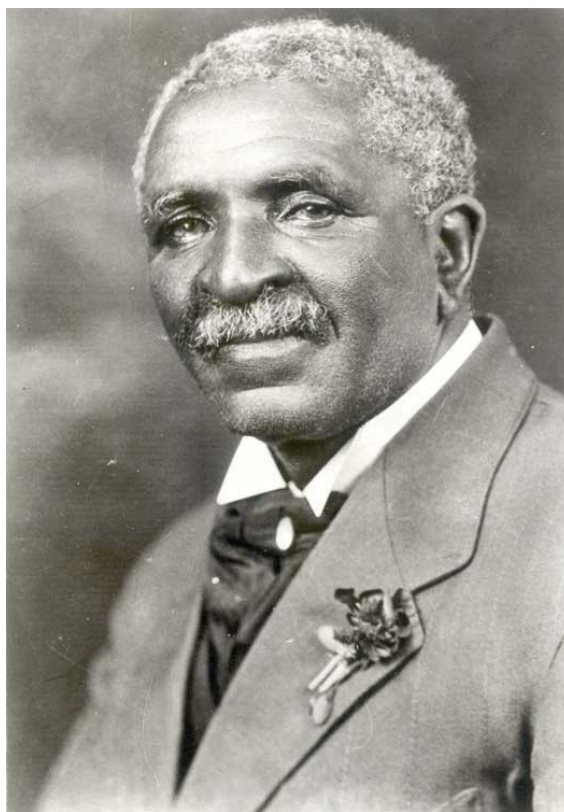


J. Org. Chem. **2017**, 82, 2294–2299.

- Also working on metal-catalyzed activation of SF₆ to make sulfonylated compounds.



George Washington Carver



Group Meeting
Steffen Heuvel
February 24, 2022

Life and Education

- born around 1864 into slavery in Diamond, Missouri
- adopted and raised by former owner after slavery was abolished
- diploma from the Minneapolis High School, Kansas
- started art and piano studies at Simpson College, Iowa in 1890 and botanical studies at Iowa State Agricultural College, Iowa in 1891 as the first black student at Iowa State
- bachelor degree in 1894 and master's in 1896
- invited to head the Agriculture Department of the Tuskegee Institute, Alabama
- died in 1943 after 47 years of teaching and research at Tuskegee Institute, Alabama

Inventions and Research

- founded an education program for local farmers to produce useful substances such as bleach, spices etc. from their own cultural products
- brought peanut crops to the farmers as an important alternative to normal cotton → introduced crop rotation
- found a method to help polio patients with their atrophied muscles using peanut oil
- produced hundreds of new plant-based dyes
- found over 400 uses or products made from peanuts or sweet potatoes including medicines, cosmetics and other useful substances
- honorary doctors from Simpson College, Iowa (1945) and Selma University, Alabama (1947)
- George Washington Carver National Monument (1943)

John R. Cooper Sr.

14 October 1930 – 04 August 2016

Graduated HS as a 1948 National Merit Scholar, president of his senior class, clarinetist, and member of the football team

Yale University, BS Chemistry 1952; member of Phi Lambda Upsilon Honorary Chemistry Society

University of Cincinnati, PhD 1956 w/ Prof. Hans Zimmer

-Proctor and Gamble Fellow

Thesis: *An Investigation of the Structure of Celastrol*

Done before the advent of NMR spectroscopy!

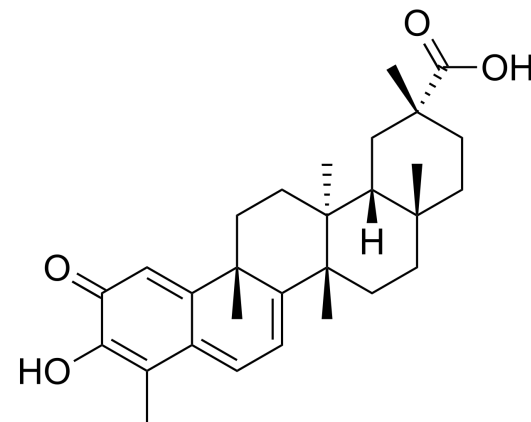
Worked at DuPont for 35 years and held 17 patents in his time at the company.

Superintendent of Elastomers Chemical Department 1956-1965.

Supervisor of Fluoroelastomer Division 1965-1969.

Director of Environmental Affairs (?) -1991.

Head of Research and Development Division 1969-1991.



Chemistry Developed by J.R. Cooper

Patents (a few):

Process of Reacting a Polyisocyanate with a Compound Having Active Hydrogen Using a Tertiary Amine N-Oxide Catalyst (1960)

Hydrogen Peroxide-Tertiary Amine Catalysts (1964)

Tertiary Amine N-Oxide Catalysts (1964)

Tertiary Amine N-Oxide in Combination with Hydrogen Peroxide as a Catalyst (1964)

Tolylene Diisocyanate Composition Stabilized Against Light Discoloration (1968)

Process for Isolating a Fluorine-Containing Polymer (1971)

Fluorinated Polyether and Derivatives Thereof (1983)

Work mainly focused on oxidation of chemistry and the isolation of fluorinated polymer compounds.

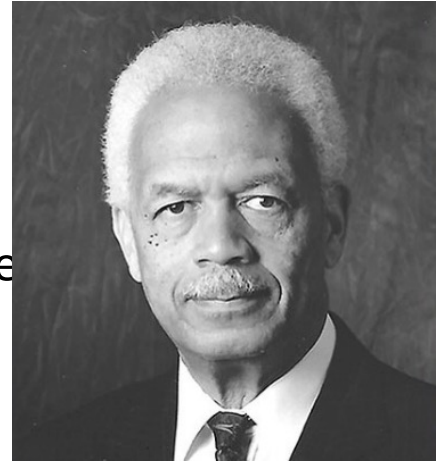
Developed fluorinated rubber compounds that are resistant to heat which are used in sealing jet engines.

Legacy of John R. Cooper Sr.

Retired 1991

Moved to Prescott, AZ in 1992 and continued working in public

- Community volunteer
- Board Chair SCORE (Service Corps of Retired Executives)
- Board Chair of Prescott Adult Center
- Board Chair of Prescott Public Access Channel
- Fundraiser for the Prescott Nature Center



City Councilman (1997-1999) and Mayor Pro Tempore (1999-2001) of Prescott, AZ

First black councilman and Mayor Pro Tempore elected in Prescott

Died 04 August 2016, survived by his wife of 61 years, Lula, 4 children, and 6 grandchildren

Marie Maynard Daly



- **First African American woman to receive a PhD in Chemistry in the US (1947)**
 - 1921 – 2003
 - Born in Queens, NY
 - Queens College (Flushing, NY), BS Chemistry
 - NYU, MS Chemistry
 - Columbia University, PhD Chemistry
 - Researched the digestive enzyme amylase (digestion)
 - Rockefeller Institute, NY, Post-Doc (Molecular Biology)
 - Researched the composition and metabolism of components of the cell nucleus
 - College of Physicians and Surgeons of Columbia University, teaching Biochemistry
 - Albert Einstein College of Medicine, Professor of Biochemistry & Medicine



- **Notable scientific contributions:**
 - Contributed to the understanding of **histones** (proteins involved in the organization of genomes and in gene expression)
 - Showed that **high blood pressure** (due to elevated cholesterol levels) led to clogged arteries
 - Investigated the role of smoking in high blood pressure
- **Outreach:**
 - Taught at Howard University and Albert Einstein College of Medicine
 - Advocate for increased enrollment of minorities in graduate and medical programs
 - Started a scholarship at Queens College in honor of her father who had to abandon his Chemistry studies at Cornell University due to the cost

Juana Mendenhall

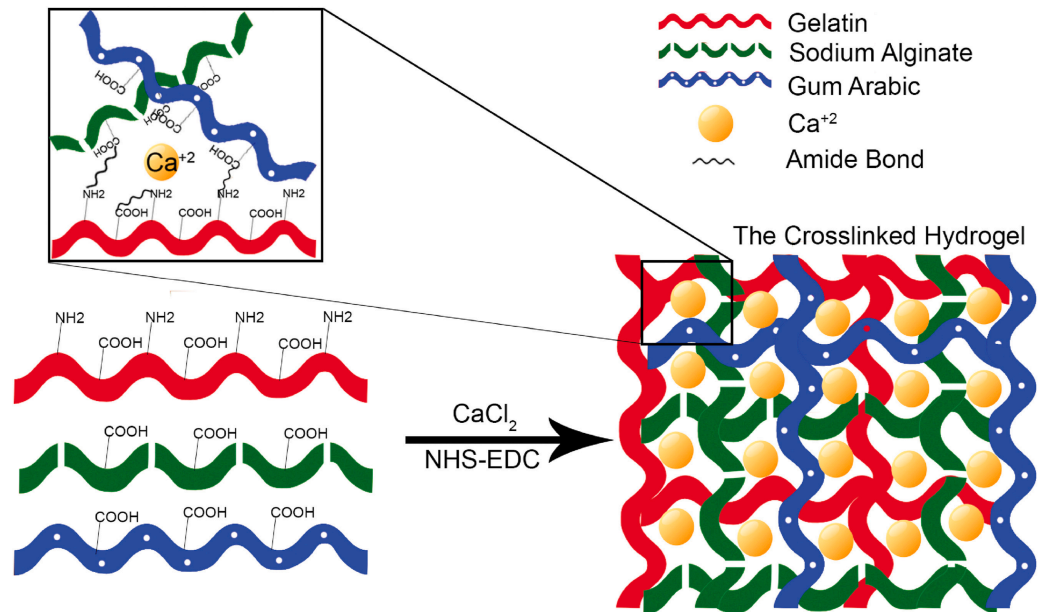
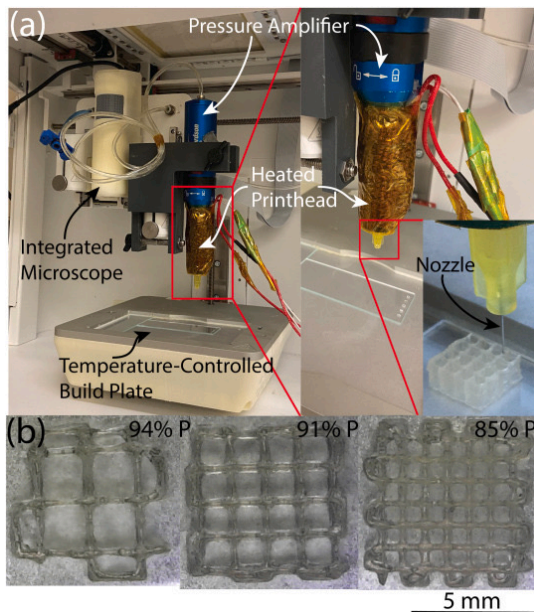
- Received her Bachelor in Science degree from North Carolina A&T State University.
- Briefly worked in the polymer industrial field.
- After this experience, she pursued her doctorate in polymer chemistry at Clark Atlanta University under Prof. Ishrat Khan.
- She did several single year postdocs at Cornell, Emory, and GIT.
- She is now the Walter E. Massey Professor of Physical Sciences at Morehouse College and Interim Department Chair of Chemistry.
- She is also the president and founder of TheraVisc™, a company that develops viscosupplement injectable gels to help with knee injuries.



MOREHOUSE
COLLEGE

Juana Mendenhall

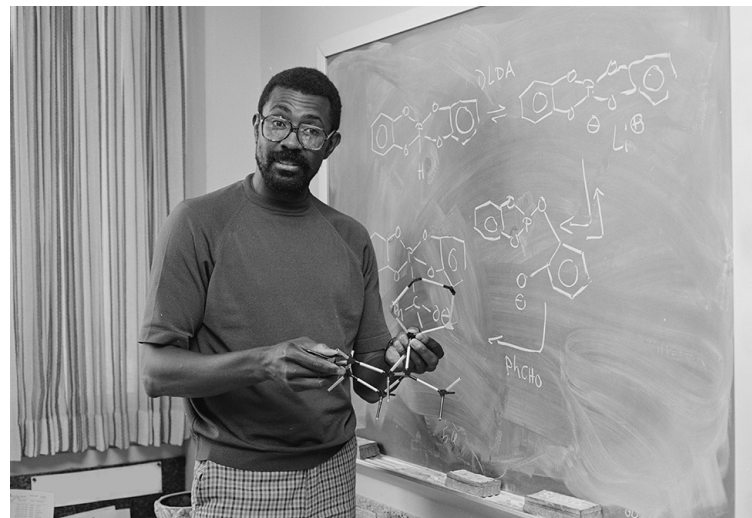
- Research is on polymer chemistry, with a focus on biomaterials and tissue engineering.
- One goal is injectable gels for knee and joint injuries.
- 3D printed, mechanically tunable, composite sodium alginate, gelatin and Gum Arabic (SA-GEL-GA) scaffolds
- Allowing for a manufacturing processes with a high level of control over the mechanical properties of such scaffolds and covalent cross-linking of all three components.



Slayton Evans Jr. (1943-2001)

Early Life and Education

- Born in Chicago, IL. and grew up in Meridian, MS.
- Lived in the segregated public housing project
- Helped pay for his tuition by 1) mowing lawns
2) Junior-assistant janitor 3) the high school cafeteria
- B.S. in Chemistry, Tougaloo college (1961-1965)
- Ph.D. in Chemistry, Case Western (1965-1970)
- Postdoc in U Texas at Arlington (1970-1971) and
U Notre Dame (1971-1972), studying stereochemistry under Ernest Eliel.



Independent Career in UNC Chapel Hill (1972-2001)

- First black chemist hired by the department
- Author of >85 papers. Focus: organophosphorus chemistry for asymmetric synthesis
(e.g. Studies toward the Asymmetric Synthesis of α -Amino Phosphonic Acids via the Addition of Phosphites to Enantiopure Sulfinimines, *JOC* **1997**, 62, 7532.)
- Also deeply committed to recruiting and supporting minority students
- Built international collaboration with France, Mexico, Germany, Greece and Russia
- Slayton Evans Memorial Lecture: seminar series highlighting the contribution of diverse chemists held annually in UNC

Isiah M. Warner

Biography

- Born in DeQuincy, Louisiana, on July 20, 1946
- Bachelor's Degree: Southern University, 1968
- Received his doctorate in Analytical Chemistry from the University of Washington in 1977
- From 1977 to 1982, Warner served as assistant professor of chemistry at Texas A&M University
- Warner moved his research laboratory to Emory University and was promoted to full professor in 1986
- In 1992, Warner joined the faculty at Louisiana as the Phillip W. West Professor of Surface and Analytical Chemistry and Boyd professor
- He is currently the Vice President of Strategic Initiatives at LSU and serves as a Howard Hughes Medical Institute Professor



Isiah M. Warner

Chemistry and Mentoring

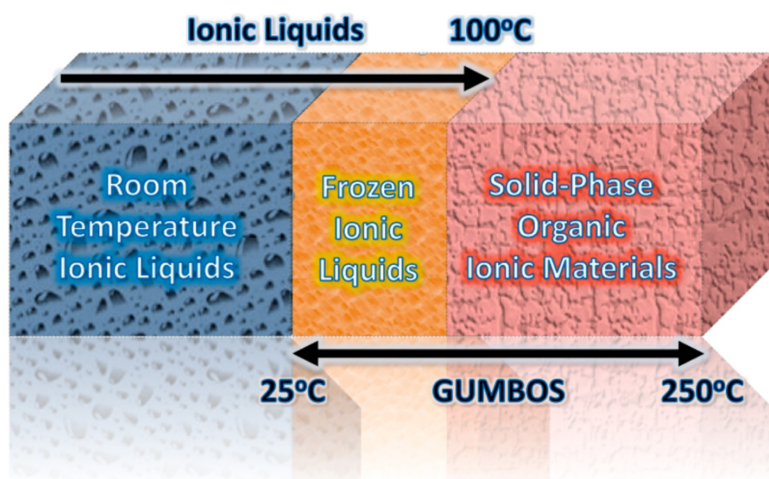
- Warner is an analytical/materials Chemist
 - ✓ Development of Ionic Liquids (ILs) and GUMBOS
 - ✓ Synthesis and production of nanoparticles for novel biomedical applications and bioanalytical measurements
 - ✓ Development and application of Molecular Spectroscopy
- Published over 230 articles, has given hundreds of presentations, holder of five patents
- Mentoring of Chemistry students
- CASE Louisiana Teacher of the Year Award in 2000; the 2000 LSU Distinguished Faculty Award; and the 1997 Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring from President Clinton



Isiah M. Warner

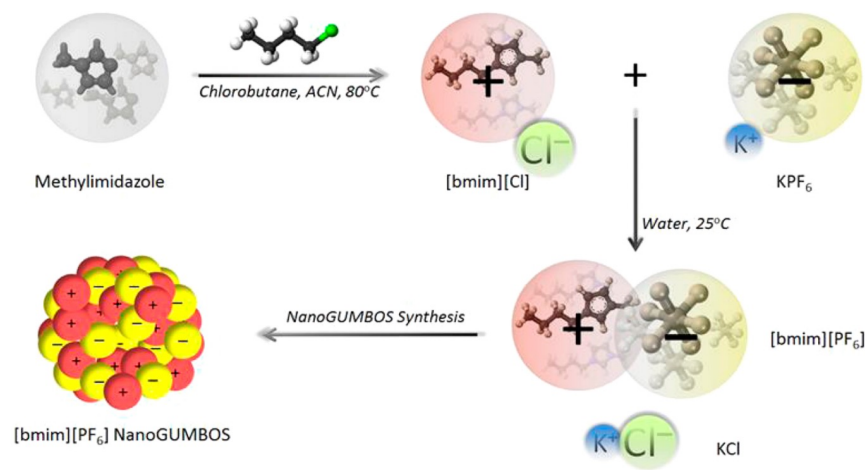
Research: GUMBOS Chemistry

(Group of **U**niform **M**aterials **B**ased on **O**rganic **S**alts)



Melting point difference between GUMBOS and ionic liquids (ILs).

Synthesis of GUMBOS and nanoGUMBOS



- Solid phase organic salts with melting points up to 250°C
 - wide range of melting points for solid phase applications
- Other organic and inorganic materials as counterions
 - Fluorescence, magnetism, biocompatibility, and biodegradability

Robert J. Gilliard Jr.

Brief Bio:

- Born in Hartsville, South Carolina.
- B.S. in Chemistry (with Rhett C. Smith): Clemson University (2009).
- Ph.D. (with Gregory H. Robinson): University of Georgia (2014).
- UNCF/Merck, Ford Foundation Fellow, ETH Zürich and Case Western Reserve University (2014-2017).
- Assistant Professor at University of Virginia (2017-present).
- Works on s- and p- block (“main-group”) chemistry.

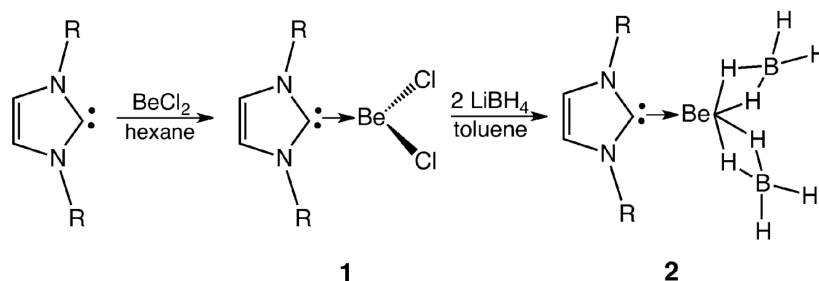
Awards and Honors:

- Forbes Magazine’s ”30 under 30” in Science (2016)
- C&EN Talented 12 (2020)
- Packard Fellow (2021)
- NSF Career Award (2021)
- Kavli Fellow (2021)
- Advisory board of ACIE, Chem. Comm., Inorg. Chem.

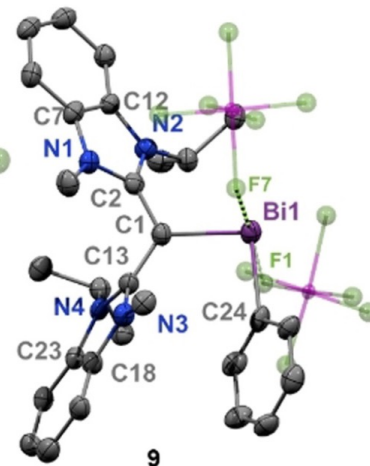
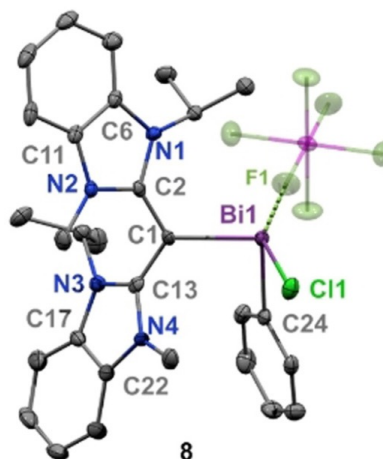
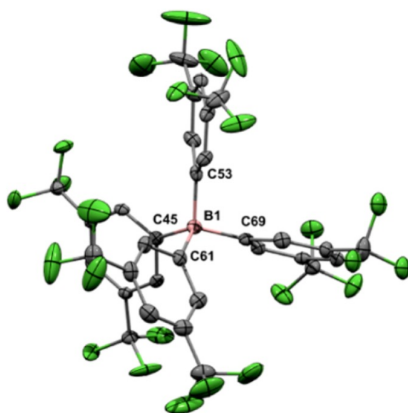
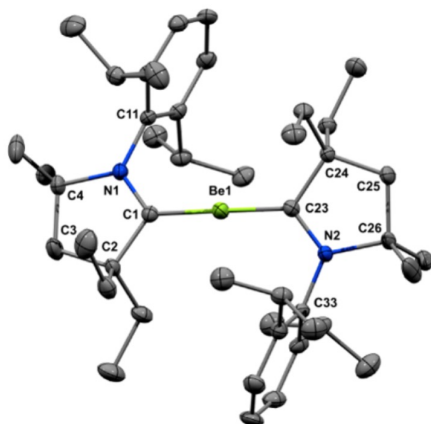


Research:

Graduate work with Robinson:



Independent career:



First crystallographically characterized Be(I)!

CDC-bismuthenium and dication

Almost 30 papers in his independent career on s-block hydrides, heavier heterocycles, emphasis on Be, Ge, Bi chemistry.

He's also the speaker for Feb 25th's inorganic seminar!

(1859-1912)



Jeremy Nicolai
Hartwig Group
February 17, 2022

Josephine Silone-Yates: Early Life

Born in Mattituck, NY in 1859



Moved to Philadelphia, PA at age 11

- Attended the Institute for Colored Youth, the first high school for Black students in the U.S.



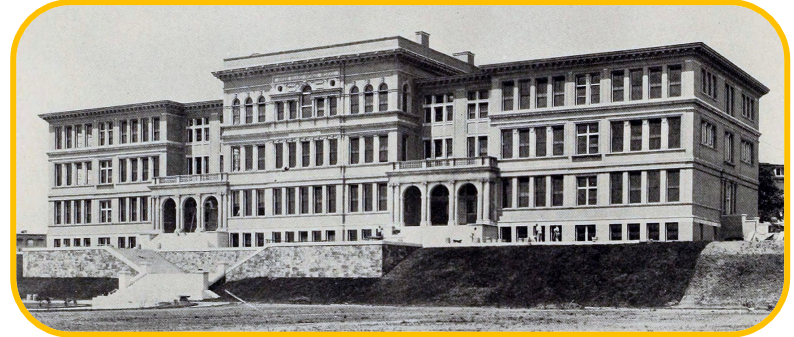
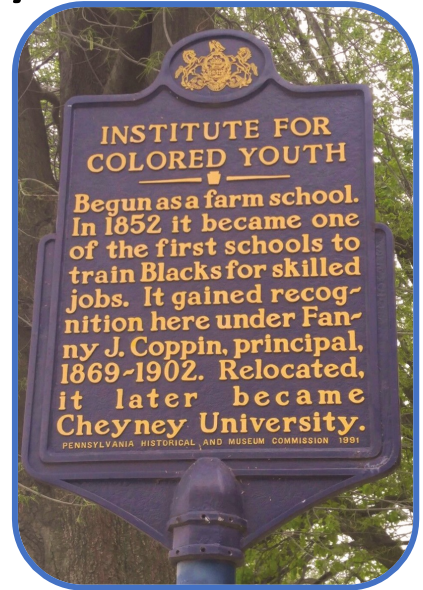
Moved to Newport, RI

- The only Black student to attend Rogers High School
- Her exceptional level of achievement convinced her science teacher to let her do additional experiments in chemistry
- **Graduated a year early as valedictorian in 1877**



Enrolled in the Rhode Island State Normal School in Providence, RI to become a teacher

- Graduated with Honors in 1879- again as the only Black student
 - Highest score in RI history on the teaching certification exam
 - **Became the first Black person certified to teach in RI**
- Later Received her Masters from the National University of Illinois (1903)



A Life Full of Firsts

Career at Lincoln Institute, MO



Chemistry Labs at Lincoln Institute, 1907-1908

-
- Offered a position as a “female assistant” in 1881, where she taught chemistry, botany, physiology, and drawing
 - By 1886, she had risen to be the head of the Natural Science department, becoming the **first Black woman to head a college science department.**
 - She was so highly regarded that Booker T. Washington asked her to join the Tuskegee Institute; she declined and became the **first Black woman to be named full professor in the U.S.**
 - Resigned from Lincoln in 1889 after marrying her husband- raised two children.
 - Returned as the head of the Department of English and History from 1902-1910

A Life Full of Firsts

In 1889, she moved to Kansas City, MO, and became involved with many advocacy groups that fought against racial prejudice and pursued the uplift of the Black community in the U.S.

Organizer and first president (1893)- The Women's League of Kansas City. She had such a profound effect on the women's club movement that many later clubs were named in her honor.

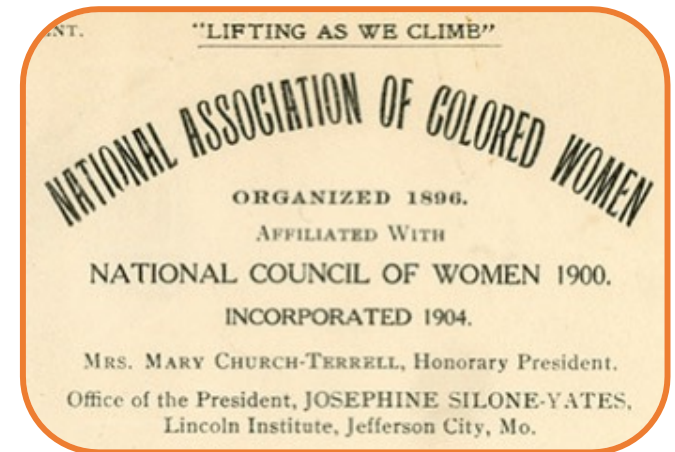
Vice president (1897), treasurer (1899), and two-time president (1901-1904)- The National Association of Colored Women

Columnist - The Woman's Era, the first monthly magazine published by Black Women in the US; the Indianapolis Freedman, and the Kansas City Rising Son.

Columnist (as R.K. Porter) – Boston Herald and Los Angeles Herald

The young Misses of the city are requested to meet at the home of August Jackman on North Washington ave. Wednesday evening at 7.30 o'clock for the purpose of organizing a club as an auxiliary to the Josephine Silone Yates Art Club Mrs. Mattie L. Teeters will help to institute the new organization.

Sedalia, MO Weekly Conservator (Jan 27, 1908)



"The [Colored Women's League] branch in Kansas City, with a membership of upward of one hundred and fifty, already has begun under their vigorous president, Mrs. Yates, the erection of a building for friendless girls."

– Anna Julia Cooper, to the World's Congress of Representative Women, Chicago, 1893

Resources for Additional Information:



- <https://bennington-vt.aauw.net/3110-2/>
- <https://www.blackpast.org/african-american-history/yates-josephine-silone-1852-1912/>
- <https://aaregistry.org/story/josephine-silone-yates-professor-born/>
- <https://wednesdaywomen.com/history-making-black-professor-and-stem-advocate-josephine-silone-yates/>
- <https://www.awis.org/historical-women/josephine-silone-yates/>
- <https://aahtkc.org/josephine-silone-yates>
- <https://bluetigercommons.lincolnu.edu/yates/>
- https://blogs.loc.gov/inside_adams/2017/09/a-pioneering-science-educator/
- <https://kchistory.org/islandora/object/kchistory%253A115240>

Joseph S. Francisco



B.S. Chemistry, UT Austin, 1977

Ph.D Chemistry, MIT, 1983

Research Fellow, University of Cambridge, 1983-1985

Postdoc, MIT, 1985-1986

President's Distinguished Professor of Earth and Environmental Science and Professor of Chemistry at Upenn

Research focuses on atmospheric chemistry

Joseph S. Francisco: Biography

Born on March 26, 1955 in New Orleans, Louisiana

Grew up in Beamont Texas with his grandmother

Childhood was limited; college was a “far-fetched dream”



Richard B. Price of Lamar University, who he met by chance, encouraged him to pursue a college education

President of ACS from 2009-2010

Served on the president’s committee on the National Medal of Science from 2010-2014

Joseph S. Francisco: Research

Research focuses on understanding chemical processes of atmospheric chemistry



Article

pubs.acs.org/JACS

New Mechanistic Pathways for Criegee–Water Chemistry at the Air/Water Interface

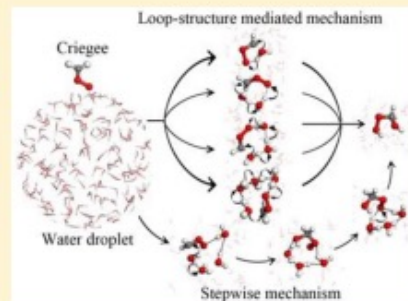
Chongqin Zhu,^{†,‡} Manoj Kumar,[†] Jie Zhong,[†] Lei Li,[†] Joseph S. Francisco,^{*,†} and Xiao Cheng Zeng^{*,†,‡}

[†]Department of Chemistry, University of Nebraska—Lincoln, Lincoln, Nebraska 68588, United States

[‡]Beijing Advanced Innovation Center for Soft Matter Science and Engineering, Beijing University of Chemical Technology, Beijing 100029, China

Supporting Information

ABSTRACT: Understanding Criegee chemistry has become one of central topics in atmospheric research recently. The reaction of Criegee intermediates with gas-phase water clusters has been widely viewed as a key Criegee reaction in the troposphere. However, the effect of aerosols or clouds on Criegee chemistry has received little attention. In this work, we have investigated the reaction between the smallest Criegee intermediate, CH_2OO , and water clusters in the gas phase, as well as at the air/water surface using ab initio quantum chemical calculations and adaptive buffered force quantum mechanics/molecular mechanics (QM/MM) dynamics simulations. Our simulation results show that the typical time scale for the reaction of CH_2OO with water at the air/water interface is on the order of a few picoseconds, 2–3 orders of magnitude shorter than that in the gas phase. Importantly, the adbf-QM/MM dynamics simulations suggest several reaction pathways for the CH_2OO + water reaction at the air/water interface, including the loop-structure-mediated mechanism and the stepwise mechanism. Contrary to the conventional gas-phase CH_2OO reaction, the loop-structure is not a prerequisite for the stepwise mechanism. For the latter, a water molecule and the CH_2OO at the air/water interface, upon their interaction, can result in the formation of $(\text{H}_3\text{O})^+$ and $(\text{OH})\text{CH}_2(\text{OO})^-$. Thereafter, a hydrogen bond can be formed between $(\text{H}_3\text{O})^+$ and the terminal oxygen atom of $(\text{OH})\text{CH}_2(\text{OO})^-$, leading to direct proton transfer and the formation of α -hydroxy methylperoxide, HOCH_2OOH . The mechanistic insights obtained from this simulation study should motivate future experimental studies of the effect of water clouds on Criegee chemistry.



Joseph S. Francisco: Other Nuggets of Info

My favorite drink is sparkling water (or club soda) with lime.

In a spare hour, I love to listen to classical music with a conductor's score.

My motto is "it is by logic that we prove, but it is by intuition that we discover".

The secret of being a successful scientist is being curious, and learning to identify good and important problems; selecting the right and significant questions to investigate; being flexible to think outside the box; and be willing and courageous to challenge the status quo.

The most important thing I learned from my students is seeing how they think, how they go about things, learning about their method of work to get things done.

My favorite music is Steve Reich's *Piano Phase* and especially Anne Teresa De Keersmaeker's choreography of it.

The natural talent I would like to be gifted with is recognizing a problem ripe for a solution and the good sense to recognize the simplest and most elegant solution.

My favorite time of day is early morning. All is quiet, and one has a clear mind.

I advise my students to be our own harshest critics and to take great pains in verifying the facts.

My favorite way to spend a holiday is Christmas on Hilton Head Island with family. The walks on the beach are a perfect way to unwind and have time to think. Some of my profound ideas germinated during this time.

Karamba Diaby

Born November 27th, 1961, in Marsassoum, Senegal

He has three siblings and was raised by the oldest sister, because his parents died early

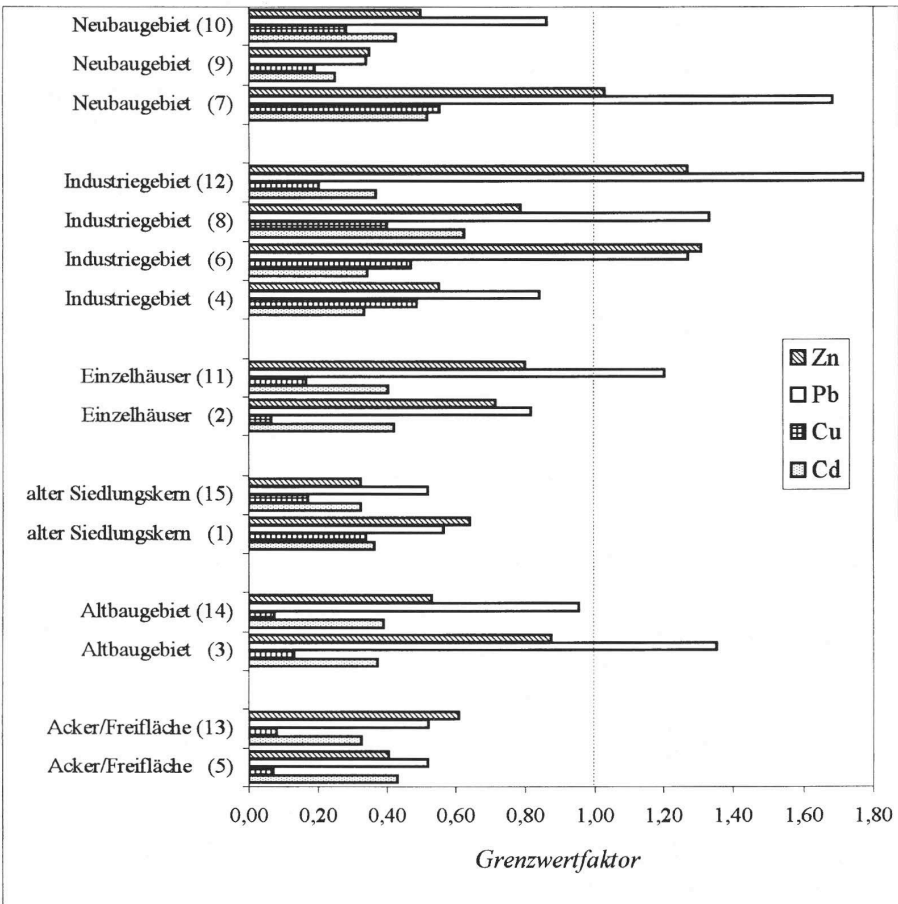
From 1982 to 1984 he studied biology and geology in Dakar and met the current President Macky Sall

He was awarded a scholarship in 1985 by GDR to study chemistry in Halle an der Saale

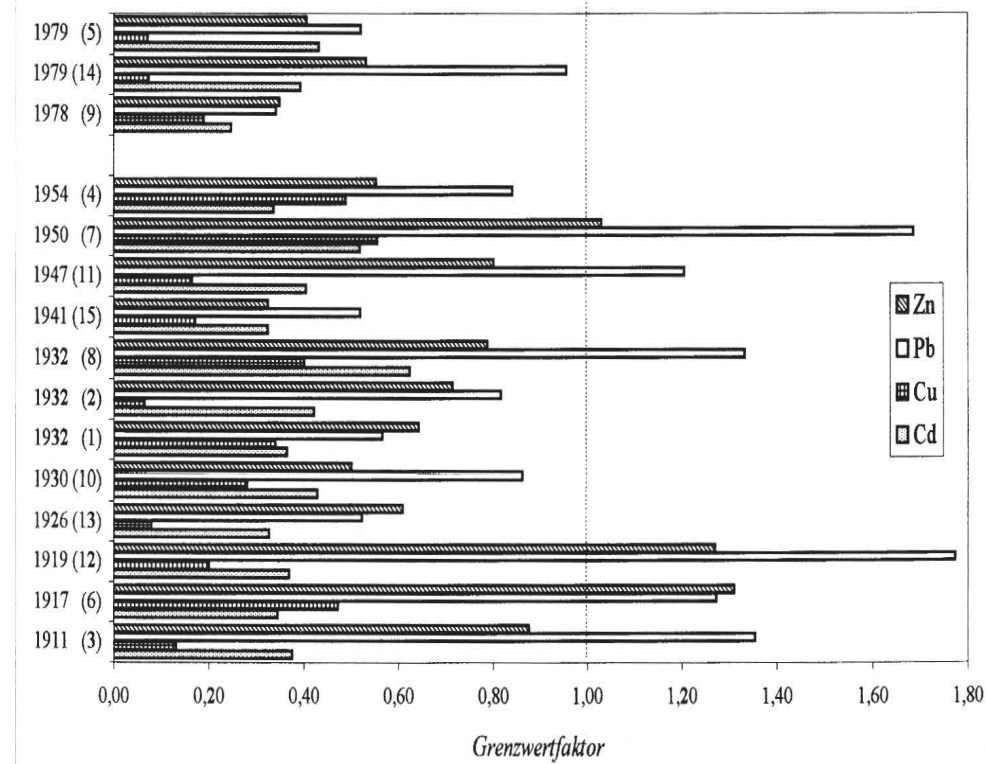
After graduating in 1991, he pursued a PhD in Halle; Topic: *heavy metal and nutrient concentration in german community gardens*



Karamba



Heavy metal concentration depending on location



Heavy metal concentration depending on foundation year

Karamba Diaby

After his PhD he got socially engaged and fought for the right of education for foreigners

In 2008 he became a member of the *Social Democratic Party* and part of the city council in Halle an der Saale

In 2013 he became the first black politician to be part of the *Bundestag* (german parliament) and is now mainly responsible for economical growth



Kristala L. J. Prather

- From Longview, TX
- SB in chemistry from MIT in 1994
- PhD in chemistry from UC Berkeley in 1999, adviser J. Keasling
- Worked at BioProcess R&D and Merck and Co. for four years studying biocatalysis for the transformation of small molecules and therapeutic proteins
- In 2004, she was appointed to the faculty at MIT and became the Arthur Dehon Little Professor and Department Executive Officer (ChemE)
- Appointed as a fellow for the Radcliffe Institute of Advanced Study at Harvard in 2014 for her interdisciplinary research
- On the advisory board for the Woodrow Wilson International Center for Scholars
- Has been involved in DEI initiatives such as the National Society for Black Engineers
- (Some of many) Honors and Awards:
 - NOBCCHE/DuPont Graduate Fellowship Award, 1996
 - National Science Foundation CAREER Award, 2010
 - MLK Leadership Award, 2017
 - Fellow of the AAAS, 2018
 - Gordon Y. Billard Award, 2021
 - AIChE's Andreas Acrivos Award for Professional Progress in Chemical Engineering, 2021



Prather Lab

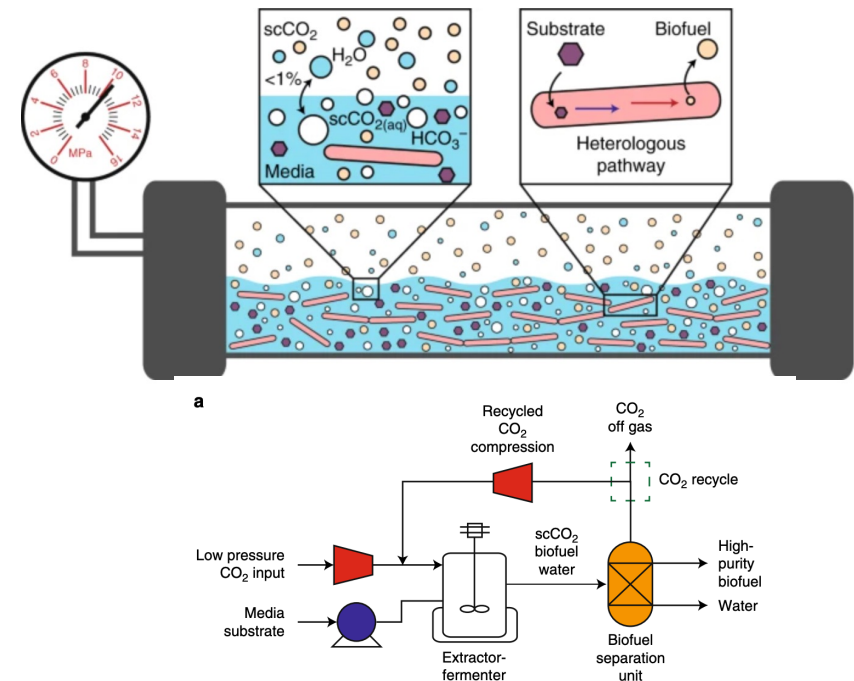
- “Design and assembly of novel pathways for biological syntheses”
- “Enhancement of enzyme activity and control of metabolic flux”
- “**Bioprocess engineering and design**”
 - Extending the biosynthesis into more ‘commercially relevant’ systems
 - Engineering microbial strains for more efficient performance in bioprocesses

Engineered microbial biofuel production and recovery under supercritical carbon dioxide

Abstract

Culture contamination, end-product toxicity, and energy efficient product recovery are long-standing bioprocess challenges. To solve these problems, we propose a high-pressure fermentation strategy, coupled with in situ extraction using the abundant and renewable solvent supercritical carbon dioxide (scCO_2), which is also known for its broad microbial lethality. Towards this goal, we report the domestication and engineering of a scCO_2 -tolerant strain of *Bacillus megaterium*, previously isolated from formation waters from the McElmo Dome CO_2 field, to produce branched alcohols that have potential use as biofuels. After establishing induced-expression under scCO_2 , isobutanol production from 2-ketoisovalerate is observed with greater than 40% yield with co-produced isopentanol. Finally, we present a process model to compare the energy required for our process to other in situ extraction methods, such as gas stripping, finding scCO_2 extraction to be potentially competitive, if not superior.

Fig. 1



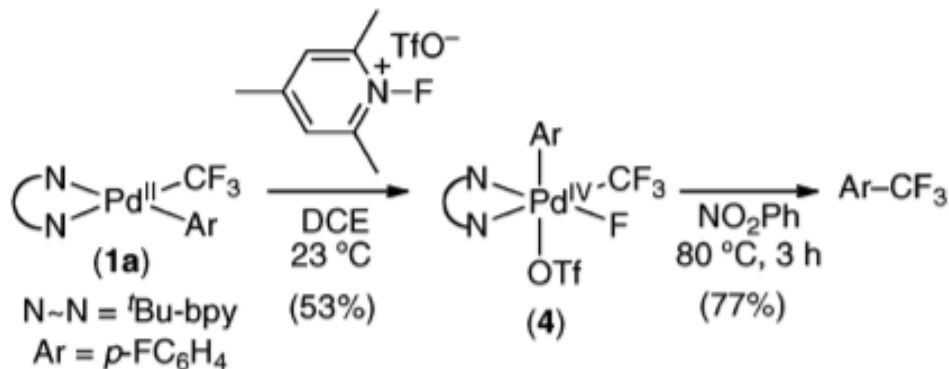
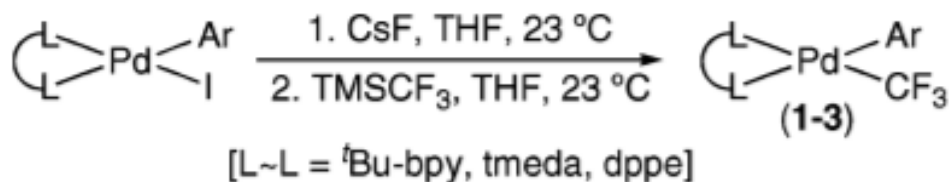
Nicholas D. Ball

- Grew up in Chattanooga, TN.
- B.A.: Macalester College (Sonogashira reactions)
- Ph.D.: University of Michigan – Ann Arbor (Sanford lab, structure and reactivity of Pd-F and Pd-CF₃ complexes toward the formation of organofluorine compounds)
- Postdoc: Caltech (Tirrell lab, chemical biology, the role of selenium-based amino acids for the identification of low-abundant proteins)
- Independent career:
 - Assistant Prof., Amherst College (2013-2015)
 - Associate Prof., Pomona College (2015-present)



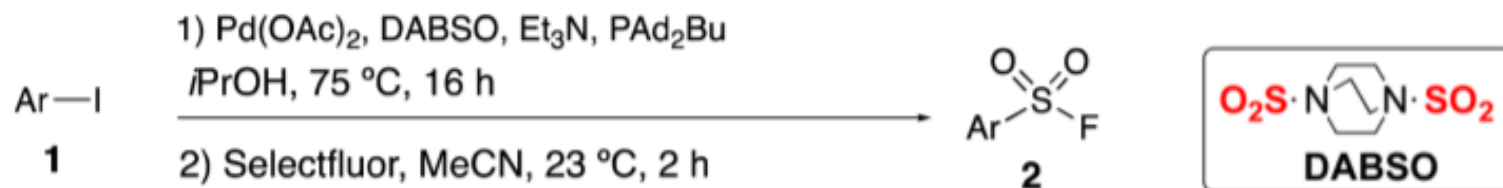
Research Highlights

- Ph.D. work



JACS **2009**, 131, 3796–3797;
JACS **2010**, 132, 2878–2879;
JACS **2011**, 133, 7577–7584.

- Independent career



J. Org. Chem. **2017**, 82, 2294–2299.

- Also working on metal-catalyzed activation of SF₆ to make sulfonylated compounds.

Rodney Priestly: Bio

- Born 1979
- Grew up interested in science from watching Nat. Geo. and specifically interested in marine biology
- Undergraduate degree in chemical engineering from Texas Tech (2003)
- During undergrad, did REU program at UConn and encountered polymers (developing artificial bone material)
- PhD with John Torkelson at Northwestern (2008).
Worked on nanoscale confinement of polymers.
Specifically, used fluorescence spectroscopy to investigate how confinement impacts Tg of polymers.
- Postdoc at ESPCI (Paris).
- 2009, joined faculty at Princeton to work on nanoscale properties of polymeric materials for novel device applications (research next slide).
- Promoted to full Professor 2019, Vice Dean of Innovation in 2020.
- Associate editor of *JACS Au*
- 2020 ACS Macromolecules Young Investigator Award among many others



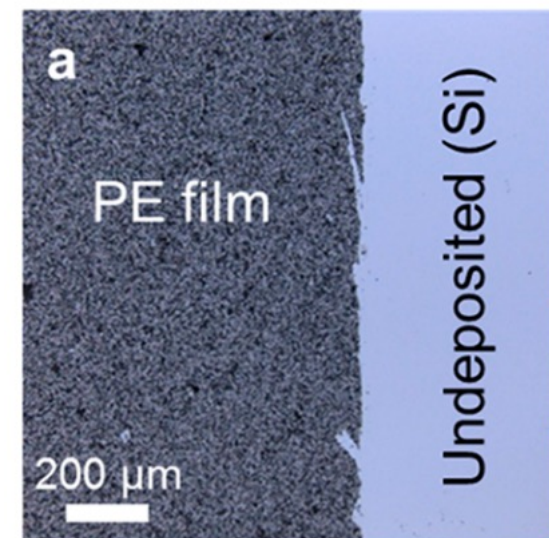
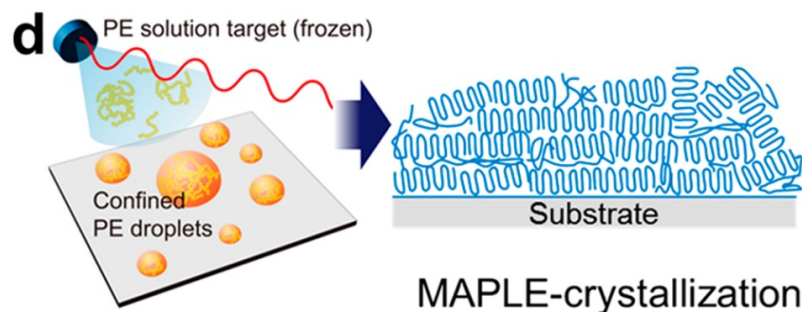
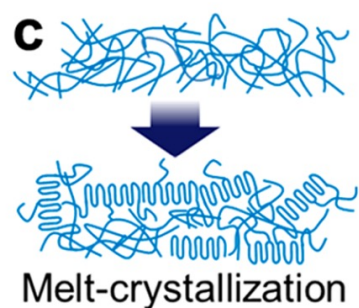
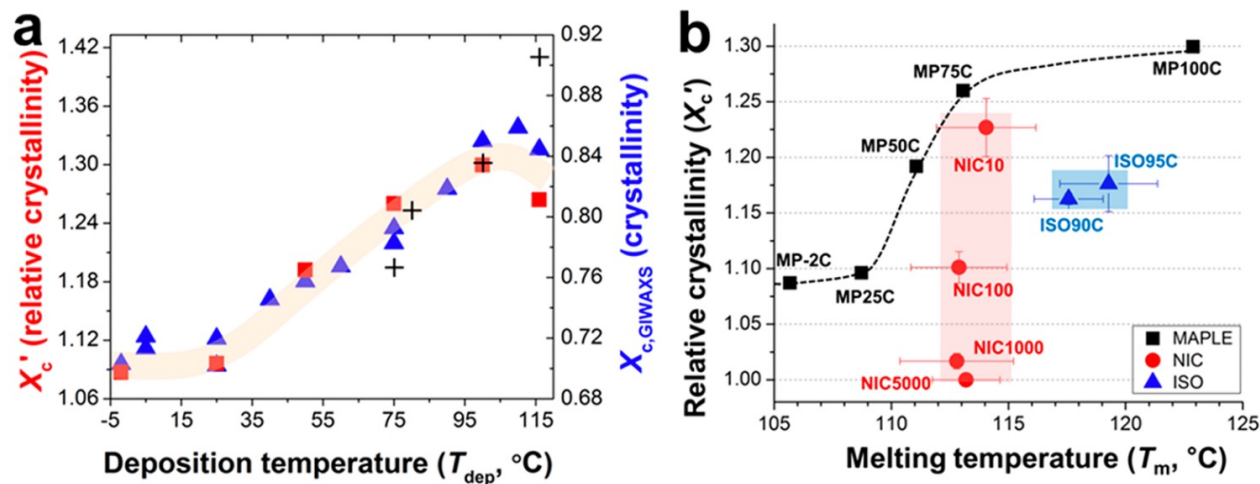
Rodney Priestly: Research

- *“Our work aims to advance the fundamental understanding of how processing combined with confinement and interfacial effects modify materials properties, and how these modifications can be exploited for new materials design.”*
- Research themes:
 - Glass formation and glassy behavior of polymer thin films and nanocomposites
 - Physical vapor deposition of macromolecules
 - Scalable and sustainable formation, and application of polymer-based colloids



Tuning Morphology and Melting Temperature in Polyethylene Films by MAPLE

Hyuncheol Jeong,[†] Mithun Chowdhury,^{†,‡,§,¶} Yucheng Wang,[†] Melda Sezen-Edmonds,^{†,¶} Yueh-Lin Loo,^{†,||,¶} Richard A. Register,^{†,§,¶} Craig B. Arnold,^{‡,§} and Rodney D. Priestley^{*,†,§,¶}



Valerie Ashby (née Sheares)

- She was born in Clayton, North Carolina and became interested in STEM from her father, a high school math and science teacher
- Inspired to pursue chemistry as a major after taking a high school chemistry course
- B.A. in Chemistry (1988) from UNC Chapel Hill
- Ph.D. in Chemistry (1994) from UNC Chapel Hill (~3.5 years)
 - Doctoral Advisor Joseph M DeSimone
 - Synthesis and Characterization of Thiophene-Based Poly(arylene ether ketone)s and Poly(arylene ether sulfone)s.
- Visiting Scientist at IBM and The Eastman Chemical Company
 - Poly(ether imides) and Poly(ester amides)
- Postdoc: Johannes Gutenberg University of Mainz Institute for Organic Chemistry (1994-1995)
 - NSF Postdoc Fellow, NATO Postdoc fellow
 - ABC Block Copolymers



Independent Career

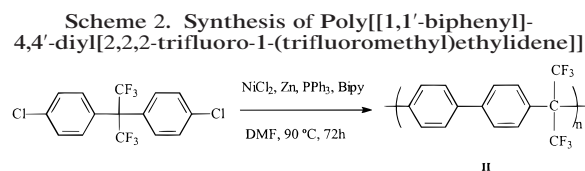
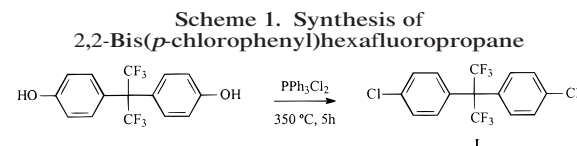
- Started her career in academia at Iowa State University in 1996 — becoming an Associate Professor of Chemistry in 2002.
- Moved to UNC Chapel Hill in 2003 as an Associate Professor and was granted the title of full Professor in 2007.
 - Bowman and Gordan Grey Distinguished Term Professor of Chemistry (2007-2012)
- Became Chair of the Department of Chemistry at UNC Chapel Hill in 2012.
 - Chemistry Ph.D. completion rate for underrepresented minorities increased from 60% to 83%.
- Move again to Duke University in 2015 as a Professor of Chemistry.
 - Dean of the Trinity College of Arts and Science (2015)
- Awards
 - NSF Career Development Award (1998)
 - DuPont Young Faculty Award (1998-2000)
 - 3M Young Faculty Award (1999-2001)
 - NAACP Academic Service Award (2014)



Research

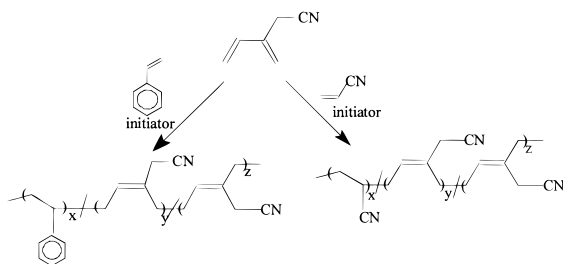
- “Design and synthesis of polymers and the design and fabrication of polymer composites”
 - Focused on Ni(0)–catalyzed coupling polymerization, free-radical polymerization of butadienes, and controlling the shape memory of polymers
- Authored at least 49 articles and holds at least 8 patents in the fields of polymer synthesis and copolymer composite development

Macromolecules, Vol. 32, No. 20, 1999



Macromolecules, Vol. 33, No. 17, 2000

Scheme 1. Copolymerization of CMBD with Styrene and Acrylonitrile



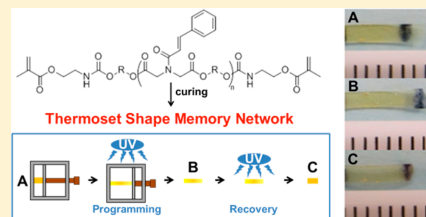
Photoresponsive Polyesters for Tailorable Shape Memory Biomaterials

Jason M. Rochette and Valerie Sheares Ashby*

Department of Chemistry, University of North Carolina—Chapel Hill, 131 South Rd., Chapel Hill, North Carolina 27599, United States

Supporting Information

ABSTRACT: The synthesis of a library of poly(ester urethane)s (PEUs) containing pendant photoresponsive moieties afforded through the incorporation of one of two novel bifunctional monomers resulted in degradable materials with a range of tunable thermal and mechanical properties. Utilizing light irradiation, macroscopic temporary shapes were fixed by increasing the cross-link density of a thermoset network via photoinduced reversible [2 + 2] cycloaddition of cinnamamide or cinnamate pendant groups under UV light ($\lambda = 302$ nm). Further irradiation with UV light ($\lambda = 254$ nm) led to the cleaving of the temporary cross-links and recovery of the original shape. Examination of these materials under physiological conditions displayed tunable degradation with rates faster than PCL-based materials, and initial biocompatibility studies exhibited negligible cytotoxicity for HeLa cells based on results of ATP assay. The ability to tune thermal properties also allowed specific polymer compositions to boast transition temperatures within a range of applicable temperature for thermal shape memory.



References

- https://trinity.duke.edu/sites/trinity.duke.edu/files/documents/Valerie_Ashby_6_15_CV.pdf
- <https://web.archive.org/web/20150516223428/http://www.chem.unc.edu/people/faculty/ashby>
- <https://pubs.acs.org/doi/pdf/10.1021/cen-v080n034.p034>
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- *Macromolecules* **2000**, 33, 6262–6268
- *Macromolecules* **2013**, 46, 2134–2140