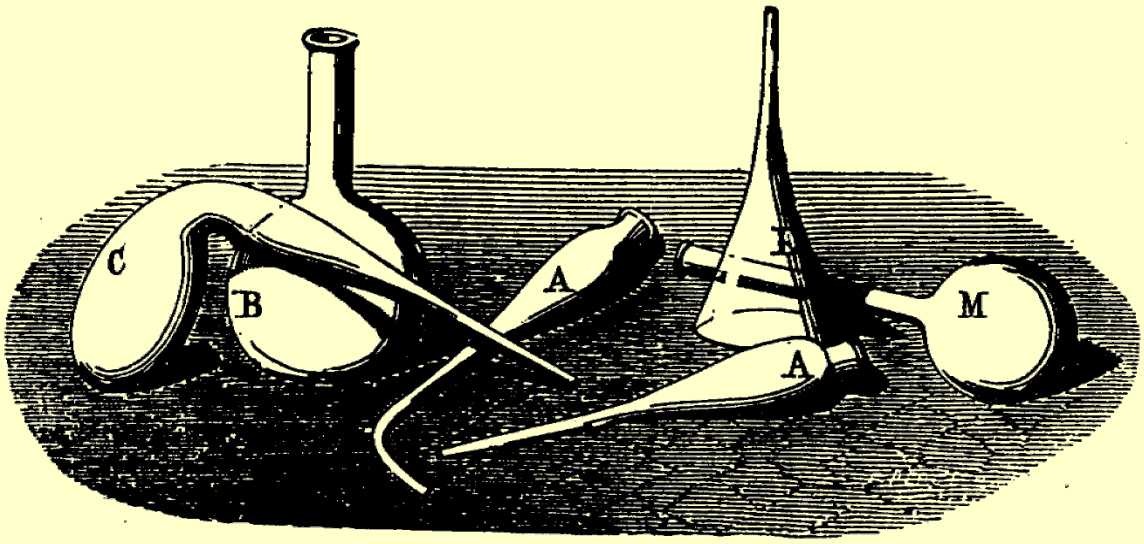
ACS Chemistry for Life®

American Chemical Society

DIVISION OF THE HISTORY OF CHEMISTRY



PROGRAM & ABSTRACTS

262nd ACS National Meeting
Atlanta, GA (in-person and virtual)
August 22-26, 2021

Nicolay V. Tsarevsky, Program Chair

Officers - Division of the History of Chemistry

Chair: Seth C. Rasmussen
Department of Chemistry and Biochemistry
North Dakota State University
NDSU Dept. 2735, P.O Box 6050
Fargo, ND 58108-6050
Phone: 701-231-8747
Email: seth.rasmussen@ndsu.edu

Chair-Elect: Arthur Greenberg
Department of Chemistry
University of New Hampshire
Parsons Hall
Durham, New Hampshire 03824
Phone: 603-862-1180
Email: art.greenberg@unh.edu

Past Chair: Daniel Rabinovich
Department of Chemistry
UNC Charlotte
9201 University City Blvd.
Charlotte, NC 28223
Phone: 704-687-5105
Email: drabinov@uncc.edu

Secretary-Treasurer: Vera V. Mainz
2709 Holcomb Drive
Urbana, IL 61802
Phone: 217-328-6158
Email: mainz@illinois.edu

Program Chair: Nicolay V. Tsarevsky
Department of Chemistry
Southern Methodist University
3215 Daniel Avenue
Dallas, TX 75275
Phone: 214-768-3259
Email: nvt@smu.edu

Associate Program Chair: Mihaela C. Stefan
Department of Chemistry and Biochemistry
University of Texas at Dallas
800 West Campbell Road
Richardson, TX 75080
Phone: 972-883-6581
Email: mihaela@utdallas.edu

***Bulletin* Editor**: Carmen J. Giunta
4827 Cavalry Green Dr.
Manlius, NY 13104
Phone: 315-632-4992
Email: giunta@lemoyne.edu

Councilor: Mary Virginia Orna
ChemSource, Inc.
39 Willow Drive
New Rochelle, NY 10805
Phone: 914-310-0351
Email: maryvirginiaorna@gmail.com

Councilor: Roger A. Egolf
Pennsylvania State University - Lehigh Valley Campus, 2809 Saucon Valley Road
Center Valley, PA 18034
Phone: 610-285-5110
Email: rae4@psu.edu

Alternate Councilor: David E. Lewis
Department of Chemistry and Biochemistry
UW-Eau Claire
PO Box 4004
Eau Claire, WI 54702
Phone: 715-836-4744
Email: lewisd@uwec.edu

Alternate Councilor: Christopher L. Heth
Division of Science
Cyril Moore Science Center, Rm 331
Minot State University
500 W University Ave.
Minot, North Dakota 58703
Phone: 701-858-3084
Email:christopher.heth@minotstateu.edu

Historian: Gary Patterson
3725 Wauna Vista Drive
Vancouver, WA 98661
Phone: 412-480-0656
Email: gp9a@andrew.cmu.edu

Archivist: John Sharkey
1559 Grouse Lane
Mountainside, NJ 07092
Phone: 908-654-3432
Email: johnbsharkey@me.com

Communications Chair: Kristine Konkol
Department of Natural Sciences
Albany State University
504 College Dr.
Albany, GA 31705
Phone: 229-500-2316
Email: kristine.konkol@asurams.edu

HIST Programming

Message from the HIST Program Chair

It is about two years since the last time HIST friends, supporters, and presenters were able to interact with each other in person at a large-scale event, such as the National Meeting of the ACS. Yes, the COVID-19 pandemic (which, alas, is still ongoing) halted many regular activities we had come to enjoy and love, and perhaps take for granted. Fortunately, in the meantime, science – once again – came to our rescue and the vaccines that were developed will likely make it possible for life to resume its normal course. The fall 2022 ACS Meeting will comprise in-person and virtual talks, which certainly feels like taking a step towards normality. On behalf of my friends at HIST, I am delighted to welcome you to our program, and I know you will enjoy the rather diverse lectures our presenters will offer – whether you see them in Atlanta or on a screen at your room. We will commence on Sunday afternoon with a two-session symposium on the contributions of African American chemists. It is organized by Sibrina Collins, Taiya Fabre, and Tracey Simmons-Willis, and by attending it, you will have the chance to learn about and find inspiration in the work of several African American chemical educators and scientists, who cab serve as true role models for the current and future generations of students, teachers, chemists – and for all of us. On Sunday evening and all day on Monday, we will continue with our traditional General Papers sessions. As always, a variety of topics will be covered by the presenters, including the life and work of famous or undeservedly forgotten (al)chemists and educators, as well as the history of compounds, techniques, and other impactful discoveries. You can find all details about the schedule and the abstracts on the subsequent pages of this *Newsletter*. In addition, you will be able to find out about future symposia and events. Please note that this fall, the HIST Award symposium honoring Larry Principe, organized by Gary Patterson, will take place at the Science History Institute in Philadelphia in October. In addition, a HIST symposium on the history of chemistry and art, organized by Sara Hubbard and Mary Virginia Orna, will be offered as part of the Southwest Regional Meeting (SWRM) of the ACS in Austin, TX, in late October and early November. We hope you will be able to attend these exciting gatherings.

I feel the need to add that during the past gloomy months, I came to realize that, while we may have felt severely restricted physically, the creative minds of many of our colleagues were not arrested in the slightest. You probably remember the *Elemental Art* contest, which was announced in previous issues of the HIST *Newsletter*, on the HIST website, and on the pages of *Chemical and Engineering News*. The competition closed at the end of April, after we extended the original deadline for submissions, and we received 60 entries (poems, cartoons, and photographs) from around the country and the world, which affirmed my statement above concerning the imagination and creativity of our fellow chemists. The winners will be announced, and their creations will be published (after potential copyright issues are cleared), in the next issue of the *Newsletter* but I wanted to use this space to express my gratitude to all who shared their beautifully crafted work, as well as to my HIST comrades Mary Virginia Orna and Art Greenberg who kindly agreed to serve as chairs of the Awards Committee and did a spectacular job. I am particularly indebted to them because, being unable to serve on the committee due to a conflict, I had to leave all the hard work in their hands. The winners will receive monetary prizes and certificates. Stay tuned for further

information. Based on the exceptional quality of the original artworks we received, I can certainly envision similar contests in the future.

An important new development related to HIST programming is that my dear friend of two decades Mihaela Stefan of the University of Texas at Dallas joined the Executive Committee as the Associate Program Chair of the Division. I am thrilled to work with her and would like to encourage you to share any thoughts and ideas about future symposia or events with us. We very much look forward to hearing from you.

Enjoy the meeting and please help us by sharing the news about HIST with your friends, students, teachers, and colleagues. Be well!

Nick Tsarevsky, *HIST Program Chair*

HIST SYMPOSIA, 262nd ACS Meeting, August 22-26, 2021

Schedules and abstracts are listed at the end of this Newsletter.

UPCOMING MEETINGS AND HIST DEADLINES

Subject to change. Check the HIST website (http://www.scs.illinois.edu/~mainzv/HIST/) for updates.

HIST Award Symposium, Science History Institute, October 16, 2021

HIST Award Symposium honoring Larry Principe (Invited). Organizer: Gary Patterson, Vancouver, WA, Phone: 412-480-0656, email: gp9a@andrew.cmu.edu. The symposium will be held at the Science History Institute on Saturday, October 16, 2021, from 10:30 am to 5:30 pm.

ACS Southwest Regional Meeting, Austin, TX, October 31-November 3, 2021

History of Chemistry and Art (Invited and Seeking Contributions). Organizers: Sara E. Hubbard, Department of Chemistry, Ouachita Baptist University, Arkadelphia, AR 71998, Phone: 870-245-5533, email: hubbards@obu.edu; Mary Virginia Orna, ChemSource, Inc., 39 Willow Drive, New Rochelle, NY 10805, Phone: 914-310-0351, email: maryvirginiaorna@gmail.com; mvorna@protonmail.com.

263rd ACS Meeting, San Diego, CA, March 20-24, 2022

HIST Award Symposium (Invited) Jeff Seeman, Department of Chemistry, University of Richmond, Richmond, VA 23273, email: jseeman@richmond.edu

Tutorial and General Papers (Seeking contributors) Nicolay V. Tsarevsky, Department of Chemistry, Southern Methodist University, Dallas, TX 75275, Phone: 214-768-3259, email: nvt@smu.edu

264th ACS Meeting, Chicago, IL, August 21-25, 2022

HIST Anniversary (Invited) Gary Patterson, Vancouver, WA 98661, 412-480-0656, email: gp9a@andrew.cmu.edu

HIST Award Symposium (Invited) Nicolay V. Tsarevsky, Department of Chemistry, Southern Methodist University, Dallas, TX 75275, Phone: 214-768-3259, email: nvt@smu.edu

History of Forensic Chemistry (Invited and contributed) Nicolay V. Tsarevsky, Department of Chemistry, Southern Methodist University, Dallas, TX 75275, Phone: 214-768-3259, email: nvt@smu.edu

Tutorial and General Papers (Seeking contributors) Nicolay V. Tsarevsky, Department of Chemistry, Southern Methodist University, Dallas, TX 75275, Phone: 214-768-3259, email: nvt@smu.edu

265th ACS Meeting, Indianapolis, IN, March 26-30, 2023

History of Glass (Invited and contributed) Seth C. Rasmussen, Department of Chemistry and Biochemistry, North Dakota State University, NDSU Dept. 2735, P.O. Box 6050, Fargo, ND 58108, Phone: 701-231-8747, email: seth.rasmussen@ndsu.edu; Dan Rabinovich, Department of Chemistry, UNC Charlotte, Charlotte, NC 28223, Phone: 704-687-5105, email: drabinov@uncc.edu

Tutorial and General Papers (Seeking contributors) Nicolay V. Tsarevsky, Department of Chemistry, Southern Methodist University, Dallas, TX 75275, Phone: 214-768-3259, email: nvt@smu.edu

Final Program

DIVISION OF THE HISTORY OF CHEMISTRY (HIST)

N. V. Tsarevsky, *Program Chair*

The sessions and lectures can be attended using the virtual program published on the ACS website. For HIST presentations, please refer to https://acs.digitellinc.com/acs/live/21/page/411/1?eventSearchInput=&eventSearchTrack%5B%5D=127

SUNDAY AFTERNOON: SESSION 1 (2:00 – 4:00 pm)

Section A

Virtual Session. Zoom Room 42

Contributions of African American Chemists

S. N. Collins, T. Simmons-Willis, *Organizers*
T. Fabre, *Organizer, Presiding*

2:00 Introductory Remarks.

2:10 The importance of storytelling in chemical education. **S.N. Collins**

2:35 Biochemistry and leadership in academic affairs. **A.W. Peters**

3:00 The importance of mentorship and science outreach to the next generation. **D.A. Boyd**

3:25 St. Elmo Brady: A life of service. **V.V. Mainz**, G. Girolami

3:50 Concluding Remarks.

SUNDAY AFTERNOON: SESSION 2 (4:30 – 6:30 pm)

Section A

Virtual Session. Zoom Room 41

Contributions of African American Chemists

S. N. Collins, T. Fabre, *Organizers*
T. Simmons-Willis, *Organizer, Presiding*

4:30 Introductory Remarks.

4:40 My career pathway at a national laboratory: What do you really need to know?. **N. Bridges**

5:05 Dr. Marie Maynard Daly: An African American pioneer in chemistry and a role model for every young woman who aspires for success. **P.D. Svoronos**

5:30 Destined. **S.C. Good**

5:55 History repeating: Spelman's legacy of cultivating agency in Black women in STEM through culturally relevant curriculum. **L. Winfield**

6:20 Concluding Remarks.

SUNDAY EVENING (7:00 – 9:00 pm)

Section A

Virtual Session: Zoom Room 39

General Papers & Tutorial: Chemists and Chemistry Concepts

N. V. Tsarevsky, *Organizer*
M. Stefan, N. V. Tsarevsky, *Presiding*

7:00 Melvin S. Newman's contributions to organic chemistry. **M.C. Stefan**, M.C. Biewer

7:30 Historical and philosophical evaluation of green chemistry. **M. Yatin**

8:00 2021: The sesquicentennial of the birth of the pioneer of pyridine chemistry, Aleksei Yevgen'evich Chichibabin (1871-1945). **D.E. Lewis**

8:30 Gomberg and Chichibabin: Two Russian expatriates and the triarylmethyl saga. **D.E. Lewis**

Resilience of (Women in) Chemistry

Sponsored by WCC, Cosponsored by HIST

MONDAY MORNING: SESSION 1 (8:00 – 10:00 am)

Section A

Georgia World Congress Center, B211 - B212

General Papers & Tutorial

N. V. Tsarevsky, *Organizer*
M. Stefan, N. Tsarevsky, *Presiding*

8:00 The mother of invention: Maria the Jewess and early contributions to chemical apparatus. **S.C. Rasmussen**

8:30 Invention of gas chromatography-mass spectrometry. **M.E. Jones**

9:00 Award siblings: The ACS national historic chemical landmarks and the HIST citation for chemical breakthrough programs. **C.J. Giunta**, J. Seeman

9:30 Wit and humor associated with famous chemists. **M. Chorghade**

MONDAY MORNING: SESSION 2 (10:30 am – 12:30 pm)

Section A

Georgia World Congress Center, B211 - B212

General Papers & Tutorial: History of Chemical Compounds

N. V. Tsarevsky, *Organizer*
M. Stefan, N. Tsarevsky, *Presiding*

10:30 From poison to life-saving medicine: The use of arsenic compounds in the twentieth-century China. **J. Niu**

11:00 Cellulose solutions: Early discoveries and applications. **N.V. Tsarevsky**

11:30 Di- and polysulfide polymers: Early investigations and industrial applications. **N.V. Tsarevsky**

12:00 Insulin's centennial: A philatelic history. **D. Rabinovich**

MONDAY AFTERNOON

Section A

Georgia World Congress Center, B310

General Papers & Tutorial: History of Chemical Education and Educators

N. V. Tsarevsky, *Organizer*
M. Stefan, N. Tsarevsky, *Presiding*

4:30 John Maclean (1771-1814): An early American chemist and slave owner. **W.P. Palmer**

5:00 Florence Schaeffer at the Woman's College of UNC and the legacy of Mount Holyoke College. **A. Haddy**

5:30 A historical comparison of fundamental general chemistry concepts. **R.M. Jones**, K. Zaidi

Resilience of (Women in) Chemistry

Sponsored by WCC, Cosponsored by HIST

MONDAY EVENING

Georgia World Congress Center, Hall B4

Sci-Mix

8:00 Gomberg and Chichibabin: Two Russian expatriates and the triarylmethyl saga. **D.E. Lewis**

8:00 2021: The sesquicentennial of the birth of the pioneer of pyridine chemistry, Aleksei Yevgen'evich Chichibabin (1871-1945). **D.E. Lewis**

Virtual Room

Sci-Mix

8:00 A historical comparison of fundamental general chemistry concepts. **R.M. Jones**, K. Zaidi

8:00 Historical and philosophical evaluation of green chemistry. **M. Yatin**

TUESDAY MORNING

Resilience of (Women in) Chemistry

Sponsored by WCC, Cosponsored by HIST

TUESDAY AFTERNOON

Resilience of (Women in) Chemistry

Sponsored by WCC, Cosponsored by HIST‡

WEDNESDAY AFTERNOON

Understanding Enzyme Function in 3D: Celebrating 50 Years of the Protein Data Bank

Sponsored by CINF, Cosponsored by BIOL, CHED, COMP, and HIST

ABSTRACTS

Paper ID: 3579238

The importance of storytelling in chemical education

Sibrina N. Collins, *sibrina.collins@gmail.com. The Marburger STEM Center, Lawrence Technological University, Southfield, Michigan, United States*

Storytelling is an important pedagogical tool to address equity in chemistry. The intellectual contributions of Black, Indigenous and people of color (BIPOC) are generally not celebrated in the chemistry curriculum. In this discussion, the author will highlight the scientific achievements of women and BIPOC chemists and teaching strategies to engage students in the chemistry classroom.

Paper ID: 3580440

Biochemistry and leadership in academic affairs

Angela W. Peters, *angelawpeters@gmail.com. Academic Affairs, Albany State University, Albany, Georgia, United States*

This presentation discusses the importance of role models and mentors in science, technology engineering and mathematics (STEM). To attract and retain female scientists we must utilize methods that have proven to be impactful such as mentoring, professional development activities and providing role models for support and encouragement. The mentoring arrangement can be informal or formal such as one-on-one peer mentorship arrangements or even programs that match new faculty with alumnae and local professionals. Too often, girls and women who venture into STEM find themselves pushed out of the field because of feelings of isolation or not feeling confident in their own skillsets. This presentation provides experiences and evidence of how to attract and retain more women in STEM while preparing them for leadership roles in the discipline. Conversations surrounding outreach, mentorship, professional development, leadership development and experiential learning will enhance the overall experience of female students in STEM, and provide a launchpad for their promotion throughout the academy, industry, laboratory and/or the K-12 classroom

Paper ID: 3591682

The importance of mentorship and science outreach to the next generation

Darryl A. Boyd, *drboydthechemist@gmail.com. Science Made Simple, LLC, Fort Washington, Maryland, United States*

The journey that led Dr. Darryl Boyd into a career in science, and ultimately into STEM (Science, Technology, Engineering and Mathematics) entrepreneurship, is detailed. His recollections of people, programs and events that led to his success in the scientific realm clearly show that exposure to science at an early age, and mentorship from science educators can have a positive and profound impact on a child's desire to pursue science as a career. Particular focus is given to several influential women who have served a prominent role in his success as a scientist and STEM entrepreneur.

Paper ID: 3591571

St. Elmo Brady: A life of service

Vera V. Mainz[1], *mainz@illinois.edu, Gregory Girolami*[2]*. (1) School of Chemical Sciences, University of Illinois at Urbana-Champaign, Urbana, Illinois, United States (2) Chemistry, University of Illinois at Urbana-Champaign, Urbana, Illinois, United States*

St. Elmo Brady (1884 – 1966) was the first African American to obtain a Ph.D. degree in chemistry in the United States; earning this degree at the University of Illinois at Urbana-Champaign in 1916. Brady went on to serve leadership roles at four historically black colleges and universities (HBCUs): Tuskegee, Howard University, Fisk University, and Tougaloo College, where he helped build strong undergraduate curricula and founded graduate programs in chemistry. At Brady's retirement from Fisk, Dr. Joseph C. Dacons, Acting Head of the Chemistry Department, described Brady's accomplishments eloquently, as follows: "One of the greatest contributions anyone can make to society, and certainly one that should afford a large amount of satisfaction, is to be useful helping young people to take their places as useful if not leading citizens in the communities in which they live. Dr. Brady can always feel that he has done an admirable and successful job in this respect. Many are the chemists, medical doctors, dentists and people in all walks of life who will always be grateful for the early education and guidance received at the hands of Dr. St. Elmo Brady. He is one with whom scarcely any ambitious person can be associated even for the shortest period of time without feeling that he has benefited by the association. He has been an inspiration not only to students but also to those who have worked with him." St. Elmo Brady was honored with an ACS National Historic Chemical Landmark designation on February 5, 2019, at the University of Illinois at Urbana-Champaign. The paper will focus on his life, scientific and educational achievements.

Paper ID: 3580217

My career pathway at a national laboratory: What do you really need to know?

***Novella Bridges**, nnbridges@msn.com. US Department of Homeland Security Countering Weapons of Mass Destruction Office, Washington, District of Columbia, United States*

What are the expectations of a chemist working at a national laboratory? This discussion will provide an overview of my career working at a national laboratory. Specifically, the discussion will highlight the recruitment process and the different pathways to becoming a staff member.

Paper ID: 3595556

Dr. Marie Maynard Daly: An African American pioneer in chemistry and a role model for every young woman who aspires for success

***Paris D. Svoronos**, psvoronos@qcc.cuny.edu. Chemistry, Queensborough Community College, Bayside, New York, United States*

Dr. Marie Maynard Daly (1921-2003) was born and raised in Corona, Queens and attended Hunter College High School. She was accepted to Queens College and graduated *magna cum laude* and as a Queens College scholar with a degree in chemistry (1942). She proceeded to earn her master's at New York University and her doctorate at Columbia University, the first ever African American woman to reach this level of achievement in the United States. She first started as a faculty member at Howard University and continued with a seven-year career at the Rockefeller Institute studying the protein construction in the body. She then joined Columbia University and finished her academic career at the Albert Einstein College of Medicine at Yeshiva University, where she principally taught biochemistry to medical students. Until her retirement (1986) and beyond she was a serious advocate of including and promoting minority women in the health sciences and was recognized for her efforts to build a pathway for their contributions and success. She has had many peer-reviewed publications and was bestowed many awards that recognized her pioneering efforts. Dr. Daly's life and a brief synopsis of her research accomplishments will be presented.

Paper ID: 3595443

Destined

***Sonya C. Good**, sonya.good@tsu.edu. Chemistry, Texas Southern University, Houston, Texas, United States*

Sonya Caston Good's journey in chemistry is not the one she envisioned. With some bumps in the road, her path led to academia, her destiny. A synopsis of how she entered academia, faced the challenges of teaching millennials and triumphed over promotion and tenure is provided. Sonya Caston Good is a native of Mississippi and a HBCU graduate of Jackson State University.

Paper ID: 3580027

History repeating: Spelman's legacy of cultivating agency in Black women in STEM through culturally relevant curriculum

Leyte Winfield, *lwinfield@spelman.edu. Chemistry and Biochemistry, Spelman College, Atlanta, Georgia, United States*

According to the National Center for Science and Engineering Statistics, Spelman College is the No. 1 HBCU and the top undergraduate institution of origin for Black women who have earned doctoral degrees in science, technology, engineering, and mathematics (STEM). Institutions like Spelman have provided culturally relevant learning environments designed to build social capital, provide academic development, and increase students' sense of agency. Spelman continues to expand and reimagine the liberal arts learning environment to ensure the rigor and relevance of all disciplines, including chemistry. Such an environment is ripe for the creation of culturally relevant curricula and black feminist pedagogies. With culturally relevant curriculum, individuals at the College have created strategies to promote students' voices, allowing them to see themselves in the space. The strategies capitalize on the inclusion of black women's intellectual contributions and privileging their knowledge and creativity to develop learning resources. This presentation will address Spelman's history in cultivating STEM talent by showcasing efforts in the Department of Chemistry and Biochemistry. Particular attention will be paid to traditional and contemporary strategies for allowing students to co-create knowledge within their educational experience. The presentation will also showcase curricular resources contributing to the burdening repository of black feminist pedagogy at the College. Example resources include *A Chemist Like Me*, *Beyond the Experiment*, *Letter to my Future Self*, peer-leed virtual workshops, and the creation of quilts. Examples of each will be shared.

Paper ID: 3593126

The mother of invention: Maria the Jewess and early contributions to chemical apparatus

Seth C. Rasmussen, *seth.rasmussen@ndsu.edu. Chemistry & Biochemistry, North Dakota State University, Fargo, North Dakota, United States*

Various modern forms of chemical apparatus can find their origins in alchemical traditions, many of which have been attributed to the first century alchemist Maria the Jewess. Specific inventions for which she is credited include distillation apparatus, the water-bath (which is still called the bain-marie in France), and the kerotakis apparatus. Unfortunately, little is really known about Maria other than writings ascribed to her, which survive only in quotations by the later alchemist Zosimos. Yet, Maria remains the earliest known female figure in the history of chemistry and a notable contributor to chemical instrumentation. The current collected knowledge concerning Maria and her contributions will be presented.

Paper ID: 3594497

Invention of gas chromatography-mass spectrometry

Mark E. Jones, *acs_mj@mjphd.net. Retired, Midland, Michigan, United States*

Gas chromatography-mass spectrometry (GC-MS) is arguably one of the most powerful and flexible analytical tools ever developed. It is a prime example of two technologies, each with severe limitations, coupled together and working in concert to produce something that is truly more than the sum of the parts. The journey began in Michigan in 1955, with scientists from the Dow Spectroscopy Lab connecting a GC with a Bendix time-of-flight mass spectrometer. They continued development and refinement, laying the foundation for an analytical tool that remains important to this day. Midland is now a National Chemical Heritage Landmark for this important advance.

Paper ID: 3589640

Award siblings: The ACS national historic chemical landmarks and the HIST citation for chemical breakthrough programs

Carmen J. Giunta[1], *giunta@lemoyne.edu, Jeffrey Seeman*[2]*. (1) Chemistry, Le Moyne College, Syracuse, New York, United States (2) University of Richmond, Richmond, Virginia, United States*

The American Chemical Society's National Historic Chemical Landmarks program (NHCL) recognizes chemical achievements that impact on society and the environment, from Bakelite to St. Elmo Brady, since 1993. The Citation for Chemical Breakthrough awards program (CCB) of the ACS Division of the History of Chemistry has been celebrating seminal breakthrough publications since 2006, from Avogradro's number to the structure determination of DNA. Similarities and differences between the programs in missions, procedures, scales, and resources expended will be described.

Paper ID: 3596037

Wit and humor associated with famous chemists

Mukund Chorghade, *chorghade@gmail.com. Chemistry, THINQ, HILLSBOROUGH, New Jersey, United States*

Some humorous stories of celebrated chemists will be presented

Paper ID: 3586104

From poison to life-saving medicine: The use of arsenic compounds in the twentieth-century China

Jia Niu, *jia.niu@bc.edu. Chemistry, Boston College, Chestnut Hill, Massachusetts, United States*

During the 20th century, China underwent some of the most dramatic transitions that that land has ever seen: from an empire to a Communist state, and from a weak country that suffered a century of humiliation to an emerging superpower. Based on a few case studies, this presentation focuses on the use of arsenic compounds in China in the 20th century, first as a potent poison involved in the political power struggle, later as a medicine that offered hopes of life to numerous cancer patients. From a chemist's perspective, the transition of the use of arsenic compounds over this period reflects the transition that China as a country has undergone.

Paper ID: 3592156

Cellulose solutions: Early discoveries and applications

Nicolay V. Tsarevsky, *nvt@smu.edu. Department of Chemistry, Southern Methodist University, Dallas, Texas, United States*

In the 19th Century, numerous efforts were made to dissolve cellulose and examine (and find applications of) the formed solutions. Some of the early attempts involved chemical transformations (e.g., nitration and later acetylation) of the natural polymer, which afforded soluble cellulose derivatives. Regeneration of cellulose was not possible in these cases. The preparation of solutions of cellulose, from which it could be isolated unchanged, proved more challenging until 1857 when the Swiss chemist Eduard Scweizer (1818–1860) reported that the dark blue solutions formed by the reaction of copper(II) compounds with excess of strong ammonia dissolved efficiently plant fibers. It was ascertained that when the solutions of cellulose thus prepared were added to acids, cellulose precipitated again – a process, which served as the basis of the viscose process for production of cellulose (rayon) fibers, patented in 1890 by the French chemist Louis-Henri Despeissis. In 1892, another important finding was patented by Charles Frederick Cross (1855-1935), Edward John Bevan (1856-1921), and Clayton Beadle (1868-1917), namely the dissolution of cellulose in carbon disulfide in basic media with the formation of soluble cellulose xanthate, which could then be easily converted (by acidic hydrolysis) again to cellulose. The early research on cellulose solutions and their uses in the production of fibers ("artificial silk") and films will be described.

Paper ID: 3587019

Di- and polysulfide polymers: Early investigations and industrial applications

Nicolay V. Tsarevsky, *nvt@smu.edu. Department of Chemistry, Southern Methodist University, Dallas, Texas, United States*

Synthetic linear macromolecules containing polysulfide groups as structural elements, -(R-S_x)$_n$- (x > 1), were first reported in the late 1830s and early 1840s by Carl Loewig (1803-1890) and his assistant, Salomon Weidmann, who noticed that the reaction between “chloraetherin” (essentially 1,2-dichloroethane) and potassium (poly)sulfides, yielded a product, which “becomes soft… turns dark yellow… and elastic like rubber." Similar polymers were studied by Victor Meyer (1848-1897) in the late 1880s, but it was not until the late 1920s that the useful properties and applications of these materials were fully realized. Patents issued to Jean Baer in 1928 and to Joseph Cecil Patrick and Nathan Maxwell Mnookin in 1929 fueled the interest in the polysulfide artificial rubbers. It was shown that they could serve as excellent sealants or plastics, which could be molded and machined. The properties and therefore the applications depended on the type of dihaloalkane used in the synthesis and the number of sulfur atoms in the polymer chain. In 1929, Thiokol Co. (from the Greek words θείο (sulfur) and κόλλα (glue)) was founded in Trenton, NJ, by Bevis Longstreth who served as President and General Manager until his death in 1944. In this talk, the early studies and applications of linear polysulfide polymers (including ones prepared by ring-opening polymerization of cyclic disulfides) will be described.

Paper ID: 3590565

Insulin’s centennial: A philatelic history

Daniel Rabinovich, *drabinov@uncc.edu. Dept. of Chemistry, University of North Carolina at Charlotte, Charlotte, North Carolina, United States*

The story of insulin, a protein hormone widely used in the treatment of diabetes, began 100 years ago with the pioneering research of Frederick Banting and coworkers at the University of Toronto. This presentation uses postage stamps and related philatelic materials to illustrate milestones in the history of insulin, such as the determination of the amino acid sequence of the two polypeptide chains of bovine insulin by Frederick Sanger in the early 1950’s. Likewise, Dorothy Crowfoot Hodgkin's elucidation of the molecular structure of insulin, completed in 1969, five years after she received the Nobel Prize in Chemistry “for her determinations by X-ray techniques of the structures of important biochemical substances”, will be discussed in this presentation. Finally, a number of stamps, postmarks, and special covers that highlight awareness campaigns and scientific conferences, which underscore the importance and general interest in the prevention and treatment of diabetes, will be presented.

Paper ID: 3588533

John Maclean (1771-1814): An early American chemist and slave owner

***William P. Palmer**, drspalmer@optusnet.com.au. STEM, Curtin University, Perth, Western Australia, Australia*

John Maclean had a short but interesting life which had an impact on the development of chemistry in America. He was born on 1st March 1871. Both his parents died when he was young and he was brought up by his guardian, George Macintosh who was the father of Charles Macintosh, the inventor of the raincoat (Macintosh). He was accepted by the University of Glasgow before his thirteenth birthday. In about 1887 he left Glasgow to continue studies in Edinburgh, London and Paris. In 1790 he resumed his studies at the University of Glasgow receiving a Diploma that allowed him to practice surgery and pharmacy in 1791. In 1795, he moved to America to practice medicine and surgery in Princeton, New Jersey. He also was appointed as a Professor of Chemistry and Natural History at the College of New Jersey (Princeton), being the first Professor of Chemistry in America not affiliated with a medical school. He stayed at Princeton until just before his death in 1814. His significance in American chemical history was his support of Lavoisier's views of combustion and his vigorous opposition to Priestley's phlogiston theory. He was also the owner of three slaves, which may affect the way in which his life is evaluated today.

Paper ID: 3591559

Florence Schaeffer at the Woman's College of UNC and the legacy of Mount Holyoke College

***Alice Haddy**, aehaddy@uncg.edu. Chemistry and Biochemistry, University of North Carolina at Greensboro, Greensboro, North Carolina, United States*

Florence Schaeffer was head of the Department of Chemistry at the Woman's College of the University of North Carolina (now the University of North Carolina at Greensboro) from 1934 until 1964 and a member of the faculty for fifty years starting in 1922. An important influence on the women chemists who graduated from the Woman's College, Florence benefited from the unique example provided by her experience at Mount Holyoke College where she received her Master's degree. With productive research programs in chemistry, Mount Holyoke College was a leader in the research training of young women chemists, many of whom went on to receive PhDs at other universities. Although records of her work are sparse, Florence evidently pursued studies toward a PhD at Yale University focusing on synthesis of antiseptics, an area making advances at the time. This study of her life looks at the path she took in her graduate studies, the possible reasons her PhD went uncompleted, and the lasting influence she had on generations of women chemists at the Woman's College.

Paper ID: 3594984

A historical comparison of fundamental general chemistry concepts

***Rebecca M. Jones**, drrebeccajones@gmail.com, Kiran Zaidi. George Mason University, Fairfax, Virginia, United States*

Chemistry has been taught at colleges in the United States since the late 18th century and the evolution of chemical education is of interest to science educators today. We analyzed two primary sources from the Library of Congress; Lecture Notes from General Chemistry by Elijah Patrick Harris from Amherst College (1888) and Lecture Notes on Chemistry for Dental Students by Henry Carlton Smith from Harvard University (1917). We compared the content and topics in these sources to that which is general chemistry courses in 2021. We used Chemistry and the Molecular Nature of Matter and Change (2015) by Silberberg and Amateius and Chemistry, 6th edition (2020) by Gilbert, Kirss, Bretz, and Foster for modern sources. We explored the general definition of chemistry and the units used in the field, as well as the concepts of valence theory and descriptions of an atom. The definition of chemistry is very similar across the sources, however the descriptions of an atom and valence are very different. This presentation will compare and contrast the terms and language used in the different sources and make connections to the historical development of chemistry as a science. As our understanding of chemistry has changed over time, so has the way topics have been taught.

Paper ID: 3596792

Melvin S. Newman's contributions to organic chemistry

***Mihaela C. Stefan**, mci071000@utdallas.edu, Michael C. Biewer. Chemistry and Biochemistry, The University of Texas at Dallas School of Natural Sciences and Mathematics, Richardson, Texas, United States*

Melvin Spencer Newman (Mel) was born on Mach 10, 1908 in New York City. He received his B.S. degree magna cum laude in 1929 and his Ph.D. in 1932 from Yale University. He did postdoctoral research work at Yale University, Columbia University, and Harvard University. He joined the Department of Chemistry at the Ohio State University in 1936, where he remained until the end of his academic career. In 1956, he edited the book "Steric Effects in Organic Chemistry". He also published "An Advanced Organic Laboratory Course" in 1976. He reported the Newman projection formulas in his seminal paper published in 1952. This paper earned him recognition in the field of organic chemistry. His name is known to every student taking organic chemistry and learning about Newman projections. Professor Newman served on the editorial boards of the Journal of the American Chemical Society, the Journal of Organic Chemistry, Organic Syntheses, and Synthetic Communications. He was a member of the National Academy of Sciences. He received many honors for his scientific work, including the Roger Adams Award from the American Chemical Society, the Morley Medal from the Cleveland ACS section, the Columbus Section Award, the Cross Medal from Yale University, and the Sullivan Medal from The Ohio State University. In the presentation, we will show his most significant contributions to organic chemistry and the significance of teaching Newman projections in the introductory organic chemistry course.

Paper ID: 3596414

Historical and philosophical evaluation of green chemistry

Mustafa Yatin[1,2], myatin@salemstate.edu. *(1) Chemistry and Physics, Salem State University, Salem, Massachusetts, United States (2) Chemistry, Brandeis University, Waltham, Massachusetts, United States*

This presentation investigates the history and relationship of environmental philosophy and green chemistry. In its broad definition in connection to human survival in the environment, the roots of ecological philosophy go back to ancient times in history. Modern environmental ethics as a social phenomenon only recently emerged in the 1970s after Carson's "Silent Spring" developed from several earlier publications on how pesticides affect the ecological chain. As perceived and accepted in its current construction, green chemistry initially evolved to respond to the Pollution Prevention Act and strict regulatory laws. In 1998, Anastas and Warner published 12 principles of green chemistry. The Presidential Green Chemistry Award, a federal government, awards program established in 1996, and since then, political and institutional recognition and support have exponentially grown for green chemistry. Multiple universities are now offering Ph.D. programs in green chemistry, and almost every university in the US has a green chemistry course or program in the curriculum. Although academia and the chemical industry accept and brace green chemistry as an environmentally healthy, eco-friendly, and sustainable practice, minimal studies connect environmental ethics and philosophical evaluation of green chemistry principles. In a historical context, the ancient traditions of human societies, present-day philosophy of science, and ecological ethics should criticize and improve green chemistry's efforts for a sustainable environment and evaluate its "12 Principles.".

Paper ID: 3592759

2021: The sesquicentennial of the birth of the pioneer of pyridine chemistry, Aleksei Yevgen'evich Chichibabin (1871-1945)

David E. Lewis, lewisd@uwec.edu. *Chemistry and Biochemistry, University of Wisconsin-Eau Claire, Eau Claire, Wisconsin, United States*

Aleksei Yevgen'evich Chichibabin is best known for his work in pyridine chemistry, which began when he was carrying out research for his *Magistr Khimii* degree at Moscow University. Chichibabin's life reads very much like a Greek tragedy: his battle from an impoverished upbringing through all sorts of adversity during his education finally allowed him to rise to become a respected member of the USSR Academy of Sciences. His happiness was short-lived, however: just a year after he had been elected a Full Member of the Academy of Sciences, his only daughter was killed by an entirely preventable accident in the dye-works when an autoclave filled with oleum that she was running exploded. This incident, which took the onlychild he ever had, was so horrific that he was allowed to leave the Siviet Union for his wife's mental health. His refusal to return to Soviet Russia led to his expulsion from the Academy, and to the loss of his Soviet citizenship. Following the break-up of the Soviet Union, one of the last acts of the USSR Academy of Sciences was the restoration of his status as Academician. The life and chemistry of this persevering chemist will be discussed.

Aleksei Yevgen'evich Chichibabin

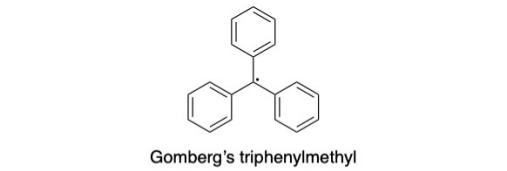
Paper ID: 3592641

Gomberg and Chichibabin: Two Russian expatriates and the triarylmethyl saga

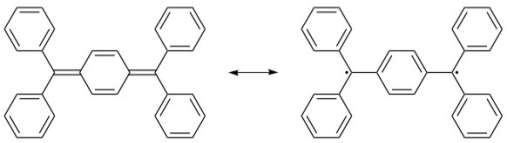
David E. Lewis, *lewisd@uwec.edu. Chemistry and Biochemistry, University of Wisconsin-Eau Claire, Eau Claire, Wisconsin, United States*

In 1900, Russian expatriate, Moses Gomberg (1866-1941), who had left Russia in 1884, during the anti-Jewish programs that followed the assassination of sar Alexander II, provided unequivocal evidence for the existence of the first free stable radical in solution. He obtained triphenylmethyl by the dehalogenation of the triphenylmethyl halides with metallic silver. In the solid form, the compound was a colorless solid that dissolved in benzene to give a yellow solution with a lower molecular weight. He and others propsed that the solid was hexaphenylethane. Two years later, another Russian chemist, Aleksei Yevgen'evich Chichibabin (1871-1945), who later left the Stalinist Soviet Union and went into exile in Paris, was the first to give definitive proof that the structure of the dimer was not hexaphenylethane, but a derivative of *p*-benzhydryltetraphenylmethane. In the course of his studies of trivalent carbon, Chichibabin developed the synthesis of what is now known as "Chichibanin's hydrocarbon." The work of these two Russian expatriates will be explored.

Moses Gomberg A. Ye. Chichibanin



Gomberg's triphenylmethyl



Chichibanin's hydrocarbon