American Chemical Society
Susquehanna Valley Section

NOVEMBER 2024 NEWSLETTER

LOCAL SECTION ELECTIONS:

Our Local Section needs nominations for the following position:

- **Secretary** (three-year term)

Additional nominations may be submitted for these as well:

- **Chair-elect** (one year term as Chair-Elect, one year as Chair, and one year as Past Chair)
- **Treasurer, Councilor, and Alternate Councilor** (all three-year terms)

If interested, please contact the Section Councilor.

Our Local Section needs a full slate of officers to be in good standing with our Society.
More information on these positions can be found in this newsletter (see below).
Expect a ballot to be emailed to you later in the fall.

MONTHLY DINNER MEETING:

The four hundred and seventy-seventh meeting of the Susquehanna Valley Section of the American Chemical Society will be held on Wednesday, November 13th, 2024, at 7:00 pm in room G09 of the Heim Science Building on the campus of Lycoming College. The speaker will be Julien Panetier of the Chemistry Department at The State University of New York at Binghamton. The presentation will be preceded by a dinner at 5:00 in the Jonas Room in the Wertz Student Center.

"*Understanding the Electronic Structure and Reactivity of Carbon Monoxide Dehydrogenase Model Systems for CO_2 Reduction*"

Dr. Julien Panetier
Department of Chemistry
The State University of New York
at Binghamton
Binghamton, NY13902

ABSTRACT: The fixation of CO_2 to reduced carbon compounds of higher energy will tremendously impact the economy and the environment. One strategy is to use sunlight to convert CO_2 and H_2O into value-added products, whereby energy is stored in chemical bonds and used as needed. However, existing earth-abundant materials for the CO_2 reduction reaction (CO_2RR) often require large overpotentials and suffer from poisoning by the intermediates and products formed during catalysis. They also have low Faradaic efficiencies due to the formation of undesired side products. Therefore, there is a critical need to design new catalysts that selectively reduce CO_2 to fuels and chemicals using H_2O as the proton source while operating at low overpotential. Not meeting this need will limit our efforts toward solving our environmental and energy-related challenges. Biological organisms, such as carbon monoxide dehydrogenase (CODH) enzymes, can selectively and efficiently fix CO_2 under mild conditions. Thus, the enzymatic pathways can guide the rational design of bioinspired molecular electrocatalysts for CO_2RR over the competing hydrogen evolution reaction (HER). One CODH of great importance is the Ni,Fe-carbon monoxide dehydrogenase II from Carboxydothermus hydrogenoformans, in which the active site is called the C-cluster (Fig.1). Here, we employ computational methods to understand the electronic structure and reactivity of molecular electrocatalysts that mimic essential structural features and functions of CODH for CO_2-to-CO conversion. Homogeneous catalysts allow us to effectively tune the environment of the active site relevant to catalysis by controlling the first, secondary, and outer coordination spheres, leading to the rational design of earth-abundant catalysts for artificial photosynthesis. Our research is performed in close collaboration with experimentalists.

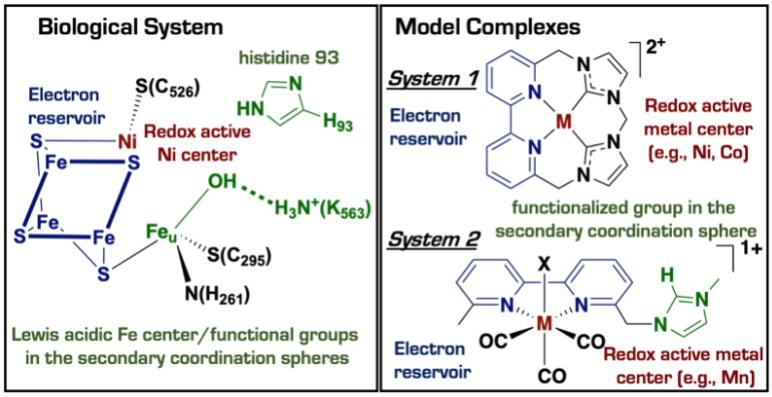


Fig. 1: *Left*: Key features of the C-cluster in Ni,Fe-CODH. *Right:* Model complexes that mimic key structural features and functions of the active site.

BIOGRAPHY: Julien obtained a B.S. degree in Physics (2005) at the Université de Reims Champagne-Ardenne, Reims (France), and his M.S. in Chemistry with Materials (2008) from Heriot-Watt University, Edinburgh (U.K.). He earned his Ph.D. (2012) from the same university under the supervision of Stuart Macgregor, where his research involved computational studies of C–F bond activation of perfluoroaromatics at transition metal centers. After a postdoctoral fellowship under the guidance of Martin Head-Gordon at the University of California, Berkeley, and in the Joint Center for Artificial Photosynthesis (JCAP) at Lawrence Berkeley National Laboratory, he moved to SUNY Binghamton in 2015 to start his independent career, where he is an associate professor of Physical Chemistry. His research group uses computational methods to understand electrocatalysts' chemical structure and reactivity relevant to artificial photosynthesis and small molecule activation. Julien has been a member of the American Chemical Society since 2013 and is currently the ACS Binghamton Local Section Councilor.

DINNER:
Dinner will be at 5:00 pm on campus in the Jonas Room, which is in the Wertz Student Center. When entering the Wertz Student Center, go up the stairs and immediately to the left. The Jonas Room will be the second on the right. Dinner will consist of turkey breast, wild rice pilaf, glazed carrots, a garden salad, and dessert. Cost for the dinner is $20 and a vegetarian option is available upon request. Those that would like to attend the dinner should contact Debbie Smith (570-321-4180 or smithdeb@lycoming.edu) by Monday, 4 November 2024.

DIRECTIONS TO LYCOMING COLLEGE:

GPS address of the entrance to the Lynn Lot: 124 Washington Blvd, Williamsport, PA 17701

From I-80: take U. S. Route 15 north. Travel approximately 15 miles to Williamsport. Continue over the Market Street Bridge (stay in left lane) and follow the signs for the Business District. Go to the fourth traffic signal and turn right onto Little League Boulevard. Go one block east and turn left at the stop sign onto Mulberry Street. At the next traffic signal, turn right onto Washington Boulevard. The entrance to the Heim Building/Lynn Science Center parking lot will be the first right.

From I-180/US-220: exit onto Market Street (Exit 27A). Turn left from the exit ramp at the traffic signal and follow Market Street north into the city. Go to the third traffic signal and turn right onto Little League Boulevard. Go one block east and turn left at the stop sign onto Mulberry Street. At the next traffic signal, turn right onto Washington Boulevard. The entrance to the Heim Building/Lynn Science Center parking lot will be the first right. Proceed straight after entering the main doors of the Lynn Science center into the Heim Building.

Detailed directions can be found at the following internet address:
https://www.lycoming.edu/admissions/visit/directions.aspx

A detailed campus map can be found at the following internet address:
https://www.lycoming.edu/admissions/ourcampus/campusmap.aspx

LOCAL SECTION NEWS:

OPEN POSITIONS IN THE LOCAL SECTION:

Do you want to use your talents to help other chemists in the Susquehanna Valley section? Listed below are examples of positions that need to be filled by willing individuals along with websites that give organizing ideas:

- Susquehanna Valley Local Section Chair-Elect
  This three-year position is the usual office taken on by local chemists who want to begin to become more involved in the local section.
- Susquehanna Valley Local Section Secretary
  Create and distribute the monthly newsletter by email. Coordinate with the webmaster.
- Susquehanna Valley Local Section Treasurer
  Maintain the finances of the local section with routine reports to the Executive Committee.
- WCC (Woman Chemists Committee) Chair
  Help attract, retain, develop, promote, and advocate for women to positively impact diversity, equity and inclusion in the Society and the profession.
- CMA (Committee on Minority Affairs) Chair
  Help increase the number & participation of racially & ethnically underrepresented scientists in the Society and its governance.
- Project SEED (Summer Experiences for the Economically Disadvantaged) Coordinator
  Coordinators are responsible for establishing programs, identifying mentors, recruiting students, fundraising, and organizing activities such as field trips.
- SCC (Senior Chemists Committee) Chair
  Help improve communication among senior chemists, increase the number of senior chemists' groups, and the level of their engagement within local sections.
- CCEW (Chemists Celebrate Earth Week) Coordinator
  Help promote the positive role that chemistry plays in the protecting our planet.

If you are interested in learning more about these volunteer activities, please contact the section Councilor (Donald Mencer, donald.mencer@wilkes.edu).

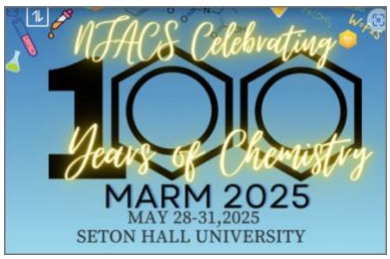
LOCAL STEM COMPETITIONS:

A list of all STEM competitions for high school students is posted on our website. If you have any questions about the contests or have suggestions for others, please contact the person indicated on the site. Questions may also be directed to the Local Section Councilor.

2024 – 2025 UPCOMING LOCAL SECTION MEETINGS:

REGIONAL ACS NEWS:

MIDDLE ATLANTIC REGIONAL MEETING:



The 53rd Middle Atlantic Regional Meeting (MARM 2025) - "Celebrating 100 years of Chemistry" will be held at Seton Hall University 28 - 31May 2025
Sponsored by the North Jersey Local Section of the ACS

NATIONAL ACS NEWS:

ACS LEGISLATIVE ACTION NETWORK:

Legislation that may impact the chemical enterprise comes before Congress on a regular basis, and the ACS is committed to keeping its members informed and encouraging them to weigh in on high-priority issues. To see the position of the ACS on many legislative issues visit the ACS LAN website: https://www.acs.org/content/acs/en/policy.html To find out how to become more active in ACS advocacy activities, see the advocacy website.

Joining the ACS' grassroots legislative advocacy network, ACT4CHEMISTRY will allow you to stay up to date on policy issues and contact legislators on behalf of chemistry and chemists, go to their website, follow the Act4Chemistry X account, or email advocacy@acs.org.

Act4Chemistry Advocacy Issues. To take action go to the website
https://www.acs.org/policy/memberadvocacy.html

NATIONAL MEETINGS:

Spring 2025 ACS National Meeting
The Spring 2025 national meeting will be a hybrid event.

The meeting will be held 23 - 27 March 2025, and the in-person event will take place in San Diego, CA.

See the website for more information.

JOIN THE ACS:

If you know of anyone who would benefit from being a member of the American Chemical Society, please direct them to the membership website: https://www.acs.org/membership.html

Susquehanna Valley Section Web Page: svs-acs.org. Please send any comments about the monthly newsletter to your Local Section Councilor Donald Mencer.