ACS Local Section
Portland
American Chemical Society

Portland Section Meeting Notice

Vol 64 no 1 http://www.acsportland.org January 2025

Electrifying the Chemical Industry

a talk by

Prof. Paul Kempler
Research Assistant Professor, Chemistry and Biochemistry
Associate Director, Oregon Center for Electrochemistry
Director of the Electrochemistry Master's Internship Program (EMIP)
at University of Oregon

Thursday January 9, 2025, 6:30-9 PM

Our meeting day returns to Thursday. This meeting features a catered dinner from a local Portland eatery, a short talk by University of Oregon electrochemistry masters student Andrew Goldman, and a keynote lecture from Dr. Kempler. This event is all ages welcome and encouraged.

Dinner Reservations

Venue: Helioterra Winery
2025 SE 7th Ave.
Portland, OR 97214

Schedule: Doors open at 6:30pm on Wednesday December 11th.

Helioterra Winery is a women-owned and operated small scale winery.
Wines are available from Helioterra for purchase,
as well as beer and non-alcoholic beverages.

Prof. Kempler Bio/Abstract next page.
also, Jonathan Xu Abstract and graphic from December 11 ACS meeting presentation.

Electrifying the Chemical Industry

Paul Kempler

Talk Summary: Electrochemistry is well-positioned to connect inexpensive and clean electricity to the production of commodity chemicals and materials. In this talk, I will talk about career opportunities for students with degrees in electrochemistry based on the first 75 graduates from the Electrochemistry Masters Internship Program at the University of Oregon. Next, I will present recent research results from my group related to the production of green hydrogen and the reduction of iron ore to metal for green steel.

Speaker Bio: Paul Kempler is an Assistant Professor of Chemistry and Biochemistry and the Director of the Electrochemistry Master's Internship Program (EMIP). His current research efforts include studying interfacial ion-transport processes and developing electrochemical cells for producing iron for emissions-free steelmaking. He received the UO Sustainability Award for Research and Scholarship in 2023.

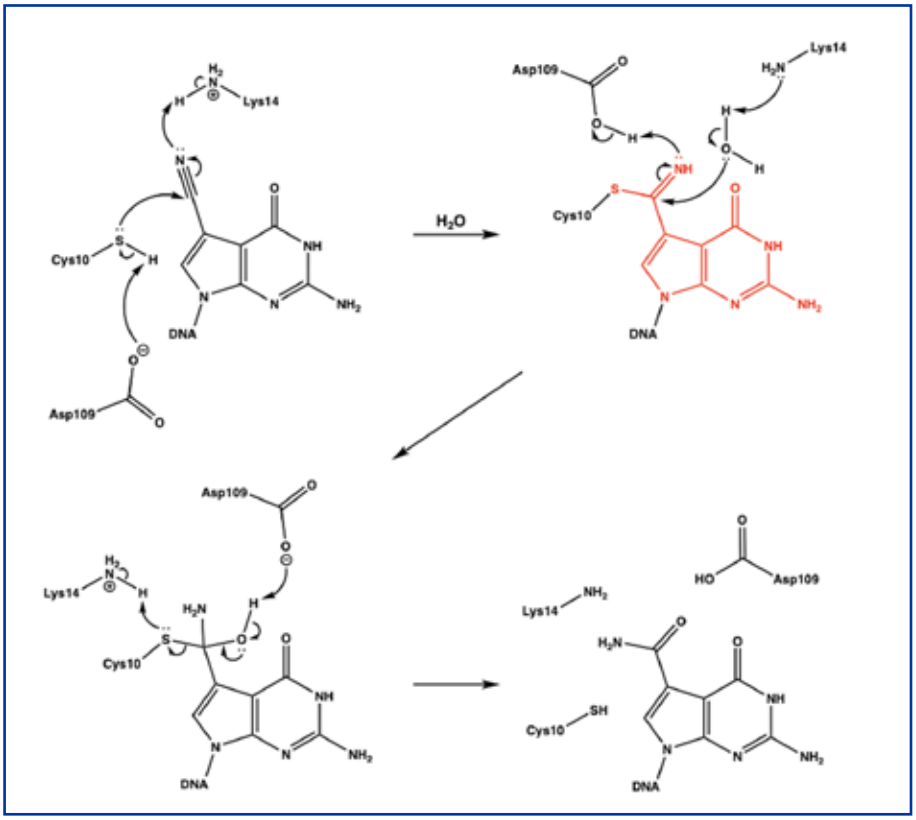
DpdC in Salmonella Montevideo: Potentially Novel Catalytic Mechanism for Nitrile Hydratase Activity

Jonathan Xu, Andrew Buckley, Dirk Iwata-Reuyl

Ed: Jonathan Xu presented findings from his research during the December 11 ACS meeting. He provides this Abstract and graphic of his project.

Jonathan Xu (Photo Dibblee).

Chemical modification of nucleotides in DNA is vital to restriction-modification (RM) in bacterial and phage systems. While this typically involves the methylation of bases in recognition sequences, recently we reported the presence of structurally diverse 7-substituted-7-deazaguanines in bacterial and phage DNA that constitute previously unknown RM systems. These studies established the formation of one such modified nucleoside, 2'-deoxy-7-amido-7-deazaguanosine (dADG), as the hydrolysis product of 7-cyano-7-deazaguanine ($preQ_0$) modified DNA by the enzyme DpdC. Notably, the enzyme's lack of active site metal-binding sequences characteristic of nitrile hydratases suggests that DpdC follows an alternative, potentially novel mechanistic pathway. Here we propose the nucleophilic formation of a thioimide intermediate preceding hydrolysis involving a conserved cysteine residue (Cys^{10}) in the putative active site of DpdC enzymes, and demonstrate significantly reduced dADG synthesis following mutagenesis of Cys^{10} to Ser^{10}. This attenuation in activity is consistent with the residue's involvement in catalysis, warranting further mechanistic investigation.



Proposed DpdC Catalytic Mechanism.png