Cindy C. Pham, Ph.D.

Los Angeles, California | cpham90@gmail.coml cindycpham.com

Education

Jan 2018 **Ph.D. Chemistry | University of California Davis (UCD) | Davis, CA**
Thesis*: Spectroscopic Investigations of [FeFe]-Hydrogenase – Catalysis and Maturation*

June 2013 **B.S. Chemistry | California State University Long Beach (CSULB) | Long Beach, CA**

Industry Positions

Starting mid-Jan 2022 **Principal Systems Program Integration Engineer** | **Active Security Clearance**
Northrop Grumman, Space Parks | El Segundo, CA

- Support**ing the** Communication Systems Business Unit (CSBU) operations team
- Coordinating intern program for CSBU
- Taking over lead responsibilities for business resumption efforts including data calls and facilities coordination

2019-2021 **Senior Systems & Test Engineer | Active Security Clearance**
Lockheed Martin, Missiles & Fire Control | Santa Barbara, CA

- Tec Technical lead testing infrared Integrated Dewar Cooler Assembly (IDCA) and Focal Plane Array (FPA)
- Managed projects, stakeholder alignment, and schedule for development/low-rate production program
- Functional team lead for reviewing and approving validation plans, design drawings, test procedures, etc.
- Co- lead for restructuring Risk & Opportunity management tool for site-wide programs
- Software project lead for major production programs
- Executed and lead projects for design verification testing (DVT), Non-Reoccurring Engineering (NRE) testing, Test Readiness Reviews (TRR), validation plans, and Design Requirement Specifications (DRS), root cause analysis, and cost savings projects

Academic Positions

2018-2019 **Post-Doctoral Researcher |** Lawrence Berkeley National Laboratory | Berkeley, CA |
Laboratory Principle Investigator (PI): Junko Yano, Vittal Yachandra, and Jan Kern

- Managed projects, collaborator scope, and schedule for our team and world-wide collaborators
- Operated, upgraded, and customized components for mobile microfluidic delivery system to integrate with Xray Free Electron Laser (XFEL)
- Aligned XFEL and UV-Vis lasers for collecting data at Linear Coherent Light Source (LCLS), Stanford and Spring-8 Angstrom Compact free electron LASer (SACLA), Japan facilities
- Collected 2-D X-ray data on metallo-catalysts and analyzed XAS/XES data using python
- Expertise in preparation, purification, and characterization of metallo-proteins

2013-2018 **Graduate Researcher |** University of California Davis | Davis, CA |
Laboratory PI: Stephen P. Cramer

- Successfully integrated microfluidic or cryogenic systems with optical systems for FITR, Mössbauer, and NRVS measurements
- Designed and executed experiments with varying thermal and environmental conditions
- Project lead maintaining scope, schedule, and collaborator requirements for experiments at SpRing-8 Synchrotron, Japan and Advance Photon Source at Argonne National Laboratory, IL
- Laboratory manager 2016-2018: managed junior researchers, optical instruments, cryogenic and fluidic systems,

inventory/procurement of lab supplies and chemical, and maintained cryogenic sample integrity
- Analyzed optical metallo-materials data using python, Mathematica, MATLAB, WMoss, and MössWin
- Supported and/or co-authored federal funding applications, internal grant proposals, X-ray beam time proposals, and peer-reviewed publications

2013-2010 **Undergraduate researcher |** California State University Long Beach | Long Beach, CA
Laboratory PI: Michael P. Schramm
- Lead author of paper on the synthesis of a diverse series of dipyrrolemethanes using 2-carboxypyrrole building blocks
- Trained junior members on lab processes like synthesis, purification, and NMRS characterization of organic molecules
- Collected and/or analyzed NMR, spectrofluorometric, and mass spectrometry data

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Skills
- *Optical Methods*: Fourier Transform Infrared Spectroscopy (FTIR), Nuclear Resonance Vibrational Spectroscopy (NRVS), Mössbauer, X-ray Free Electron Laser (XFEL), X-ray Absorption and Emission Spectroscopy (XAS/XES), acquisition X-ray Diffraction, infrared radiometric testing, Electron Paramagnetic Resonance (EPR), UV-Vis spectroscopy, and Nuclear Magnetic Resonance (NMR)
- *Software/Agile tools*: MATLAB, Python, Mathematica, bitbucket, GIT, Sourcetree, JIRA, confluence, SAP, Windchill, MossWin, WMoss, PyMol, Chimera, ChemDraw, Endnote, Kaleidagraph , and Microsoft office programs
- *Mechanical/hardware:* cryogenic systems (liquid He/N_2), microfluidic systems, high vacuum assemblies, blackbody, GPIB, frame grabbers, Lakeshore temp controllers, Agilent power supplies, thermal chambers, Swagelok systems, soldering, anaerobic gloveboxes, Schleck line and other gas assemblies

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Publications

2021

14. S.M.Keable…**C.C.Pham**…V.K. Yachandra, J. Yano, A. Zouni, J. Kern, *Room Temperature XFEL Crystallography reveals asymmetry in the vicinity of the two phylloquinones in Photosystem I.* Nature Comm. November 2021

13. XP.Rabe… **C.C.Pham**…V.K.Yachandra, J.Yano, J.F. Kern, A.M. Orville, and C.J. Schofield *X-ray free electron laser studies reveal dioxygen binding to isopenicillin N synthase induces correlated motions during catalysis.* Science Advances. August 2021.

2020

12. V. Srinivas.…**C.C. Pham**… V.K. Yachandra, J, Yano, J.D. Lipscomb, J. Kern, M.Högbom. . *High Resolution XFEL Structure of the Methane Monooxygenase Hydroxylase Complex with its Regulatory Component at Ambient Temperature in Two Oxidation States.* Journal of the American Chemical Society, July 2020.

11. M. Ibrahim,… **C.C. Pham**, … J. Kern, V.K. Yachandra, and J. Yano. *Untangling the sequence of events during the S2 → S3transition in photosystem II: Implications for the water oxidation mechanism.* Proceedings of National Academy of Science. *June* 2020.

2019

10. E.S Burgie, …**C.C. Pham**… R. Alonso-Mori, M.S. Hunter, J.E. Koglin, J. Yano, V.K. Yachandra, N.K Sauter, AE Cohen, J. Kern, A.M. Orville, G.N. Phillips, R.D. Vierstra. *Photoreversible interconversion of a phytochrome photosensory module in the crystalline states.* Proceedings of National Academy of Sciences. January 2020.

9. R. Chatterjee… **C.C. Pham**…V.K. Yachandra, J. Kern, J. Yano *XANES and EXAFS of dilute solutions of transition metal of XFELS*. Journal of Synchrotron Radiation. September 2019.

2018

8. **C.C. Pham…** Y. Yoda, and S.P. Cramer: *Terminal Hydride Species of [FeFe]-Hydrogenases are Vibrationally Coupled to the Activated Site Environment.* Angewandte Chemie, August 2018.

7. M.R. Carlson, D. L. Gray, C.P. Richers, W. Wang, P.H. Zhao, T.B. Rauchfuss, V. Pelmenschikov, **C. C. Pham**, L.B. Gee, H. Wang, S. P. Cramer: *Sterically Stabilized Terminal Hydride of a Diiron Dithiolate*. Inorganic Chemistry 01/2018; 57(4)., DOI:10.1021/acs.inorgchem.7b02903

2017

6. *V.Pelmenschikov, *J.A. Birrell, ***C.C. Pham**,…Yoshitaka Yoda, Thomas B Rauchfuss, Wolfgang Lubitz, Stephen P Cramer: *Reaction Coordinate Leading to H2 Production in [FeFe]-Hydrogenase Identified by NRVS and DFT*. Journal of the American Chemical Society 10/2017; 139(46)., DOI:10.1021/jacs.7b09751

5. *E.J. Reijerse, ***C. C. Pham**, … Wolfgang Lubitz, Thomas B. Rauchfuss, Stephen P. Cramer: *Direct Observation of an Iron-Bound Terminal Hydride in [FeFe]-Hydrogenase by Nuclear Resonance Vibrational Spectroscopy*. Journal of the American Chemical Society 03/2017; 139(12)., DOI:10.1021/jacs.7b00686

2016

4. D.L.M Suess, **C.C. Pham**, I. Bürstel, J. R. Swartz, S.P. Cramer, R.D. Britt: *The Radical SAM Enzyme HydG Requires Cysteine and a Dangler Iron for Generating an Organometallic Precursor to the [FeFe]-Hydrogenase H-Cluster*. Journal of the American Chemical Society 01/2016; 138(4)., DOI:10.1021/jacs.5b12512

2015

3. D.L. M. Suess, … **C.C. Pham**, S.P. Cramer, J. R. Swartz, R.D. Britt: *Cysteine as a ligand platform in the biosynthesis of the [FeFe]- hydrogenase H cluster*. Proceedings of the National Academy of Sciences 08/2015; 112(37)., DOI:10.1073/pnas.1508440112

2. R.Gilbert-Wilson, J.F. Siebel, A. Adamska-Venkatesh, **C.C Pham**, E.Reijerse, H. Wang, S.P. Cramer, W. Lubitz, T.B. Rauchfuss: *Spectroscopic Investigations of [FeFe]-Hydrogenase Maturated with* $[^{57}Fe_2(adt)(CN)_2(CO)_4]^{2-}$. Journal of the American Chemical Society 06/2015; 137(28)., DOI:10.1021/jacs.5b03270

2013

1. **C.C. Pham,** M.H. Park, J.Y. Pham, S.G. Martin, M.P. Schramm, *Modular Preparation of Diverse Dipyrrolemethanes*. ChemInform 08/2013; 44(34)., DOI:10.1002/chin.201334099

*These authors contributed equally.

Teaching and Mentoring Experience

2021 Lockheed Martin | Goleta , CA

- Students mentored: Shaley German

2019 Lawrence Berkeley National Laboratory | Berkeley, CA

- Students Mentored: Alexandra Holmes (Undergraduate), Ramzi Masad (Undergraduate), Alexander Jackson (High School), and Isabel Bogacz (Graduate Student)

2014-2018 University of California, Davis | Davis, CA

- Undergraduate Students Mentored: Kyle Gibson, Nathaniel Grimes, Lindsay Basore, Kristopher Quon, Justin Okomoto, Gerson Naverette, Anne Kutt, and Alexander Jackson (High School Student)
- Teaching Assistant (TA) Courses : General Chemistry (Che 2A) , Advance Methods in Physical Chemistry(Che 215), Physical Chemistry: Properties of Atoms and Molecules (Che 110b), Physical Chemistry for the Life Science(Che 107B), Organic Chemistry (118b), Organic Chemistry a Brief Course(Che 8b), X-ray and Synchrotron spectroscopy (Che 248b - Graduate level course), Forensic Application of Analytical Chemistry (Che 104)

Awards, Nominations, and Recognitions

2021

- Multiple spotlight awards from site management for strengthening our foundation at Lockheed Martin recognizing work completed on my program and for site-wide improvements

2020

- Nomination: Proud Alumni award nomination from CSULB chapter for being a model Alumni of Louis Stokes Alliance for Minority Participant (LSAMP) Fellowship

2015-2016

- Grant: UC Davis Chemistry Department Travel Grant awarded twice for conference participation with an accepted poster or talk

2014

- Fellowship: Graduate Assistance in Areas of National Need (GAANN) grant was awarded to one first year and third year graduate student for their commitment to pursuing an academic career

2013

- Award: American Chemical Society (ACS) Green Chemistry Award awarded to Students Association of American Chemical Society (SAACS), Student Chapter
- ACS Commendable Award for SAACS Student Chapter
- ACS Community Interaction Grant: Award to SAACS 2012 board members for their support in student outreach programs like demos for education
- Award: Plaque received from CSULB Associated Student Inc. (ASI), Student Organization of The Year awarded to SAACS (Chair of public relations)
- Plaque received from Student Life and Development Award for Silver in Excellence
- Organization Management of SAACS, CSULB 2012 board members

2012

- Scholarship: Research Initiative for Scientific Enhancement (RISE) – (NIH grant)
- Scholarship: NHK Inc. Scholarship for Certification of Excellence in Chemistry and Biochemistry
- Scholarship: Louis Stokes Alliance for Minority Participation scholar for 2012-2013 academic year (NSF #HRD-080262
- Award: Tony Horalek Award, for Outstanding Service for Department of Chemistry and Biochemistry
- Award: National Meeting Travel Grant (NMTG) for 243rd ACS National Meeting Award: CSULB Chemistry Department Travel Grant

2011

- Scholarship: Louis Stokes Alliance for Minority Participation fellow for 2011-2012 academic year (NSF #HRD-0802628)

Conference and Presentation Proceedings

2020

• University of California, Santa Barbara – Society of Asian Scientist & Engineer | Santa Barbara, CA
Panelist and recruiter for Lockheed Martin

2019

• Gordon Research Seminar: Bioiorganic | Ventura, CA
Poster Presentation, "Simultaneous X-ray Diffraction and X-ray Emission Studies of Metalloenzymes at Room Temperature using an XFEL"

2018

• Gordon Research Seminar: Bioiorganic | Ventura, CA

Speaker Presentation, *"Nuclear Resonance Vibrational Spectroscopy: Investigation of Fe-H modes in [FeFe]-hydrogenase and its variants"*

2016

- Gordon Research Conference and Seminar: Metallocofactors | Boston, MA

Speaker Presentation, "*A pathway towards a better hydrogen catalyst: a comprehensive study of [FeFe]-hydrogenase catalysis, maturases, and oxygen reactivity* "

2015

- University of California Symposium for Chemical Sciences (UCSCS) | Lakearrowhead, CA.
  Speaker Presentation, "*A pathway towards better hydrogen catalysts: a comprehensive study of [FeFe]- hydrogenase catalysis, maturases, and oxygen reactivity"*
- Gordon Research Conference and Seminar: Bioniorganic | Ventura, CA
  Poster Presentation, "*Mossbauer and NRVS study of [FeFe]Hydrogenase and maturase hydG*
- 8th Annual North American Mössbauer Symposium | Boston, MA
  Poster Presentation, *"Mossbauer Study of HydG: A Maturase of [FeFe] Hydrogenase"*

2012-2013

- 243rd American Chemical Society National Conference | San Diego, CA
  Poster Presentation, *"Preparation of 3- and 4-substituted pyrroles: Progress towards an alpha-helical peptidomimetic library"*
- Student Research Symposium- California State University | Long Beach, CA
  Poster Presentation, "*Preparation of 3- and 4-substituted pyrroles: Progress towards an alpha-helical peptidomimetic library"*
- Physical Sciences Oncology Center Short Course - University of Southern California | Los Angeles, CA
  Poster Presentation, "*Preparation of 3- and 4-substituted pyrroles: Progress towards an alpha- helical peptidomimetic library"*
- Summer Enhancement Conference for LSAMP students - California State University | Sacramento CA
  Poster Presentation, "*Preparation of 3- and 4-substituted pyrroles: Progress towards an alpha- helical peptidomimetic library"*

Volunteering Experience

2021-2022 **Events Committee | Santa Barbara, CA**

- Events committee lead responsible for determining scope, plan, schedule, and budget for site-wide events
- Coordinating all Business Resource Groups (BRG's)
- Maintained budget with limited resources and executed plans accommodating changing COVID restrictions

2020 – 2021 **T'ena Foundation | Los Angeles, CA**

- *Principle investigator* for the research division: focused on grant applications, collecting data on the homeless population, providing data for social media team in a digestible manner, and building mobile care facility
- Our organization aims to provide care kits and a mobile care clinic with basic healthcare and dental needs for the homeless members of our community

2014-2017 **University of California, Davis | Davis, CA**

- *Safety Committee* - Graduate student representative
  - Worked on regulations,
- Provided scientific demonstrations and activities and also panelist to female youth groups such as AAUW TechTrek Science & Math Camp for girls and Girl Scouts Event for STEM

2013-2010 **California State University, Long Beach | Long Beach, CA**

- *Grade Appeal Committee* - Undergraduate student representative
- *Student Affiliates of American Chemical Society (SAACS)* – CSULB Student Chapter
- *Founder and Editor-in-Chief* of student chemistry newsletter, *The Beaker*
- Public Relations chair
- Structured and coordinated student outreach within our community
  - demonstrated science experiments for students at Madison Elementary, McPherson Magnet School, and

Franklin Classical Middle School

- Science fair judge for McPherson Magnet School - Provided feedback and spoke as a college panelist