

# Cindy C. Pham, Ph.D.

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## 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**

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## Industry Positions

*Starting*

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

*2019-2021*     **Senior Systems & Test Engineer | Active Security Clearance**

Lockheed Martin, Missiles & Fire Control | Santa Barbara, CA

- Technical test lead for infrared Integrated Dewar Cooler Assembly (IDCA) and Focal Plane Array (FPA) testing from development to low-rate production program – Low-Rate Production (LRP)
  - Maintained scheduled and troubleshoot deliverables for an LRP and Full Rate Production (FRP)
  - Functional team lead for reviewing and approving validation plans, design drawings, test procedures, etc.
  - Co- lead for restructuring Risk & Opportunity management for site-wide programs
  - Software lead for multiple major production programs
  - Managed budget, schedule, and/or performance for (but not limited to) design verification testing (DVT), Non-Reoccurring Engineering (NRE), and Test Readiness Review (TRR) tasks
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## Academic Positions

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

- Expertise in preparation, purification, and characterization of metallo-proteins
  - Aligned XFEL and UV-Vis lasers for testing
  - Maintained, operated, upgraded, and customized components for microfluidic delivery system to characterize protein samples at XFEL
  - Managed scope and schedule for our team and collaborators statewide and international during beam time
  - Submitted and co-authored grant funding proposal and scientific publications
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*2013-2018*     **Graduate Researcher | University of California Davis | Davis, CA |**

Laboratory PI: Stephen P. Cramer

- Project lead maintaining scope, schedule, and collaborator requirements for experiments at national lab facilities statewide and internationally
- Designed and successfully executed experiments with varying environmental conditions for metallo-proteins for spectroscopic characterization (full list in skills)
- Daily operations manager 2016-2018: managed junior researchers, laboratory (lab) instrumentations and equipment, inventory/procurement of lab supplies and chemical, and maintained sample integrity
- Analyzed spectroscopic data using python, Mathematica, MATLAB, WMoss, MössWin, and spectra.tools
- Supported and/or co-authored federal funding applications, internal grant proposals, X-ray beam time proposals, and eight 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

- *Analytical/ Spectroscopic 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), infrared radiometric testing, Electron Paramagnetic Resonance (EPR), Nuclear Magnetic Resonance (NMR), and UV-Vis
- *Software*: MATLAB, Python, Mathematica, bitbucket, GIT, Sourcetree, JIRA, confluence, MossWin, WMoss, spectra.tools, PyMol, Chimera, ChemDraw, Endnote, iNMR, Kaleidagraph, and Microsoft office programs
- *Mechanical/ hardware*: microfluidic systems, high vacuum assemblies, gas assemblies, cryostats and cryogenics (liquid He/N<sub>2</sub>), anaerobic glovebox, Schleck line, blackbody, Agilent power supplies, GPIB, Lakeshore temp controllers, thermal chambers, water chillers, Swagelok systems, soldering, and operation and maintenance of turbo pumps
- *Languages*: English and Vietnamese
- *Relevant certifications and courses*: Mental Health First Aid Responder Certified, Engineering Project Management Course (In Progress)

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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 phyloquinones 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 → S3 transition 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. Pelmeshnikov, **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 H<sub>2</sub> 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 Matured with [<sup>57</sup>Fe<sub>2</sub>(adt)(CN)<sub>2</sub>(CO)<sub>4</sub>]<sup>2-</sup>*. 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.

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## 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)

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## 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)

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## 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: Bioinorganic | 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: Bioinorganic | 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) | Lake Arrowhead, 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: Bionorganic | Ventura, CA  
Poster Presentation, “*Mossbauer and NRVs study of [FeFe]Hydrogenase and maturase hydG*”
- 8<sup>th</sup> Annual North American Mössbauer Symposium | Boston, MA  
Poster Presentation, “*Mossbauer Study of HydG: A Maturase of [FeFe] Hydrogenase*”

2012-2013

- 243<sup>rd</sup> 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*”
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## **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