Stanford

# Laura M.K. Dassama

Assistant Professor of Chemistry and of Microbiology and Immunology

## Bio

### BIO

Laura Dassama is a chemical biologist who uses principles from chemistry and physics to understand complex biological phenomena. Her group's primary goal is to use detailed understanding of the factors that enable interactions between biological molecules to provide insights that allow functional control of those molecules. Her research projects aim to 1) discover the drivers of biomolecular interactions and 2) leverage that information to modulate disease relevant proteins.

### ACADEMIC APPOINTMENTS

- Assistant Professor, Chemistry
- Assistant Professor, Microbiology and Immunology
- Member, Bio-X
- Member, SPARK at Stanford
- Member, Maternal & Child Health Research Institute (MCHRI)
- Institute Scholar, Sarafan ChEM-H
- Member, Wu Tsai Neurosciences Institute

### HONORS AND AWARDS

- New and Notable, Biophysical Society (2025)
- Rising Star in Biological, Medicinal, and Pharmaceutical Chemistry, American Chemical Society (2024)
- MAC3 Impact Philanthropies Faculty Fellow, Stanford University (2023-2025)
- Terman Faculty Fellowship, Stanford University (2022-2025)
- David Huntington Dean's Faculty Scholar, Stanford University (2021-2023)
- Trailblazer, Chemical & Engineering News (2021)
- Hellman Faculty Scholar, Stanford University (2019-2020)
- Alumni Achievement Award, Pennsylvania State University (2019)
- Gabilan Junior Faculty Fellowship, Stanford University (2018-2021)
- Terman Faculty Fellowship, Stanford University (2018-2021)
- Postdoctoral Enrichment Program Grant, Burroughs Wellcome Fund (2015-2018)
- Ruth L. Kirschstein National Research Service Award, National Institutes of Health (2014-2017)
- Alumni Association Dissertation, Pennsylvania State University (2013)

- Carl Storm Underrepresented Minority Fellowship, Gordon Research Conference (2011)
- Minority Ph.D. Scholar, Alfred P. Sloan Foundation (2009-2013)

### PROFESSIONAL EDUCATION

- B.S., Temple University , Biochemistry (2007)
- Ph.D., Pennsylvania State University , Biochemistry and Molecular Biology (2013)
- Postdoctoral fellow, Northwestern University , Molecular Biosciences (2017)
- Research Associate, Boston Children's Hospital, Harvard Medical School, and Dana-Farber Cancer Institute , Hematology/Oncology (2018)

### LINKS

- Lab Website: https://www.dassamalab.org/

## Teaching

### COURSES

**2025-26**

- The Chemical Principles of Life I: CHEM 141 (Win)

**2024-25**

- The Chemical Principles of Life I: CHEM 141 (Win)

**2023-24**

- Biological Chemistry Laboratory: CHEM 184 (Spr)
- Visualizing Biomolecules: BIO 218, CHEM 287 (Aut)

**2022-23**

- Biological Chemistry Laboratory: CHEM 184 (Spr)

### STANFORD ADVISEES

**Doctoral Dissertation Reader (AC)**

Matthew Brockley, Maggie Brueggemeyer, Gina El Nesr, Nina Fatuzzo, Robert Gipson, Austin Murchison, Ramon Rodriguez, Rina Wang

**Postdoctoral Faculty Sponsor**

Tim Precord, Olivia Shade

**Doctoral Dissertation Advisor (AC)**

Casey Decosto, Jeandele Elliot, Olga Merino-Chavez, Lisha Ou, Isaac Paddy

### GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Biophysics (Phd Program)
- Cancer Biology (Phd Program)
- Microbiology and Immunology (Phd Program)

## Publications

### PUBLICATIONS

- **Prediction and characterization of lipid-interacting proteins.** *Methods in enzymology*
  Alfonso, S., Decosto, C. M., Chatterjee, P., Precord, T., Dassama, L. M.

2026; 727: 253-289

- **A Machine Learning Model for the Proteome-Wide Prediction of Lipid-Interacting Proteins.** *Journal of chemical information and modeling*
  Chou, J. C., Chatterjee, P., Decosto, C. M., Dassama, L. M.
  2025
- **Investigating the Effect of Membrane Composition on the Selective Ammonium Transport of Escherichia coli AmtB Membrane Proteins** *ACS APPLIED ENGINEERING MATERIALS*
  Clark, B. D., Chou, J., Stafford, V., Lurie, F., Dassama, L. M. K., Tarpeh, W. A.
  2025
- **Engineering Cell-Specific Protein Delivery Vehicles for Erythroid Lineage Cells.** *ACS bio & med chem Au*
  Setegne, M. T., Cabral, A. T., Tiwari, A., Shen, F., Thiam, H. R., Dassama, L. M.
  2025; 5 (2): 268-282
- **Engineering Cell-Specific Protein Delivery Vehicles for Erythroid Lineage Cells** *ACS BIO & MED CHEM AU*
  Setegne, M. T., Cabral, A. T., Tiwari, A., Shen, F., Thiam, H., Dassama, L. M. K.
  2025
- **Identifying Opportunity Targets in Gram-Negative Pathogens for Infectious Disease Mitigation.** *ACS central science*
  Paddy, I. A., Dassama, L. M.
  2025; 11 (1): 25-35
- **Protein-Based Degraders: From Chemical Biology Tools to Neo-Therapeutics.** *Chemical reviews*
  Ou, L., Setegne, M. T., Elliot, J., Shen, F., Dassama, L. M.
  2025
- **Identifying Opportunity Targets in Gram-Negative Pathogens for Infectious Disease Mitigation** *ACS CENTRAL SCIENCE*
  Paddy, I. A., Dassama, L. M. K.
  2025
- **Lipid Trafficking in Diverse Bacteria.** *Accounts of chemical research*
  Chou, J. C., Dassama, L. M.
  2024
- **Unveiling of a messenger: Gut microbes make a neuroactive signal.** *Cell*
  Chatterjee, P., Dassama, L. M.
  2024; 187 (12): 2903-2904
- **Novel sterol binding domains in bacteria.** *eLife*
  Zhai, L., Bonds, A. C., Smith, C. A., Oo, H., Chou, J. C., Welander, P. V., Dassama, L. M.
  2024; 12
- **Rapid proteome-wide prediction of lipid-interacting proteins through ligand-guided structural genomics.** *bioRxiv : the preprint server for biology*
  Chou, J. C., Decosto, C. M., Chatterjee, P., Dassama, L. M.
  2024
- **Opportunities and challenges of protein-based targeted protein degradation.** *Chemical science*
  Shen, F., Dassama, L. M.
  2023; 14 (32): 8433-8447
- **Structures and mechanisms of a novel bacterial transport system for fatty acids.** *Chembiochem : a European journal of chemical biology*
  Zhai, L., Chou, J. C., Oo, H., Dassama, L.
  2023: e202300156
- **Evolution of nanobodies specific for BCL11A.** *Proceedings of the National Academy of Sciences of the United States of America*
  Yin, M., Izadi, M., Tenglin, K., Viennet, T., Zhai, L., Zheng, G., Arthanari, H., Dassama, L. M., Orkin, S. H.
  2023; 120 (3): e2218959120
- **A Cell-Permeant Nanobody-Based Degrader That Induces Fetal Hemoglobin.** *ACS central science*

Shen, F., Zheng, G., Setegne, M., Tenglin, K., Izadi, M., Xie, H., Zhai, L., Orkin, S. H., Dassama, L. M.
2022; 8 (12): 1695-1703

- **The enzymology of oxazolone and thioamide synthesis in methanobactin.** *Methods in enzymology*
  Chou, J. C., Stafford, V. E., Kenney, G. E., Dassama, L. M.
  2021; 656: 341-373

- **Nuclear Resonance Vibrational Spectroscopic Definition of the Facial Triad FeIV═O Intermediate in Taurine Dioxygenase: Evaluation of Structural Contributions to Hydrogen Atom Abstraction.** *Journal of the American Chemical Society*
  Srnec, M., Iyer, S. R., Dassama, L. M., Park, K., Wong, S. D., Sutherlin, K. D., Yoda, Y., Kobayashi, Y., Kurokuzu, M., Saito, M., Seto, M., Krebs, C., Bollinger, et al
  2020

- **Rational targeting of a NuRD subcomplex guided by comprehensive in situ mutagenesis.** *Nature genetics*
  Sher, F. n., Hossain, M. n., Seruggia, D. n., Schoonenberg, V. A., Yao, Q. n., Cifani, P. n., Dassama, L. M., Cole, M. A., Ren, C. n., Vinjamur, D. S., Macias-Trevino, C. n., Luk, K. n., McGuckin, et al
  2019

- **MbnH is a diheme MauG-like protein associated with microbial copper homeostasis.** *The Journal of biological chemistry*
  Kenney, G. E., Dassama, L. M., Manesis, A. C., Ross, M. O., Chen, S. n., Hoffman, B. M., Rosenzweig, A. C.
  2019

- **The biosynthesis of methanobactin** *SCIENCE*
  Kenney, G. E., Dassama, L. M. K., Pandelia, M., Gizzi, A. S., Martinie, R. J., Gao, P., DeHart, C. J., Schachner, L. F., Skinner, O. S., Ro, S. Y., Zhu, X., Sadek, M., Thomas, et al
  2018; 359 (6382): 1411-+

- **Copper transport in methanotrophic bacteria**
  Kenney, G., Dassama, L., Ro, S., Rosenzweig, A.
  AMER CHEMICAL SOC.2017

- **Bacterial copper acquisition**
  Rosenzweig, A. C., Kenney, G. E., Dassama, L. M. K., Ro, S. Y.
  FEDERATION AMER SOC EXP BIOL.2017

- **O-H Activation by an Unexpected Ferryl Intermediate during Catalysis by 2-Hydroxyethylphosphonate Dioxygenase** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*
  Peck, S. C., Wang, C., Dassama, L. M. K., Zhang, B., Guo, Y., Rajakovich, L. J., Bollinger, J., Krebs, C., van der Donk, W. A.
  2017; 139 (5): 2045–52

- **Methanobactins: from genome to function** *METALLOMICS*
  Dassama, L. M. K., Kenney, G. E., Rosenzweig, A. C.
  2017; 9 (1): 7–20

- **Methanobactin transport machinery** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Dassama, L. M. K., Kenney, G. E., Ro, S. Y., Zielazinski, E. L., Rosenzweig, A. C.
  2016; 113 (46): 13027–32

- **Direct Measurement of the Radical Translocation Distance in the Class I Ribonucleotide Reductase from Chlamydia trachomatis** *JOURNAL OF PHYSICAL CHEMISTRY B*
  Livada, J., Martinie, R. J., Dassama, L. M. K., Krebs, C., Bollinger, J., Silakov, A.
  2015; 119 (43): 13777–84

- **Geometric and electronic structure of the Mn(IV)Fe(III) cofactor in class Ic ribonucleotide reductase: correlation to the class Ia binuclear non-heme iron enzyme.** *Journal of the American Chemical Society*
  Kwak, Y., Jiang, W., Dassama, L. M., Park, K., Bell, C. B., Liu, L. V., Wong, S. D., Saito, M., Kobayashi, Y., Kitao, S., Seto, M., Yoda, Y., Alp, et al
  2013; 135 (46): 17573-17584

- **Geometric and Electronic Structure of the Mn(IV)Fe(III) Cofactor in Class Ic Ribonucleotide Reductase: Correlation to the Class Ia Binuclear Non-Heme Iron Enzyme.** *Journal of the American Chemical Society*
  Kwak, Y., Jiang, W., Dassama, L. M., Park, K., Bell, C. B., Liu, L. V., Wong, S. D., Saito, M., Kobayashi, Y., Kitao, S., Seto, M., Yoda, Y., Alp, et al

2013; 135 (46): 17573-17584

- **A 2.8 angstrom Fe-Fe Separation in the Fe-2(III/IV) Intermediate, X, from Escherichia coli Ribonucleotide Reductase** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*
  Dassama, L. M. K., Silakov, A., Krest, C. M., Calixto, J. C., Krebs, C., Bollinger, J., Green, M. T.
  2013; 135 (45): 16758–61
- **Structural Basis for Assembly of the Mn-IV/Fe-III Cofactor in the Class Ic Ribonucleotide Reductase from Chlamydia trachomatis** *BIOCHEMISTRY*
  Dassama, L. M. K., Krebs, C., Bollinger, J., Rosenzweig, A. C., Boal, A. K.
  2013; 52 (37): 6424–36
- **Novel approaches for the accumulation of oxygenated intermediates to multi-millimolar concentrations** *COORDINATION CHEMISTRY REVIEWS*
  Krebs, C., Dassama, L. M. K., Matthews, M. L., Jiang, W., Price, J. C., Korboukh, V., Li, N., Bollinger, J.
  2013; 257 (1): 234–43
- **Radical-Translocation Intermediates and Hurdling of Pathway Defects in "Super-oxidized" (Mn-IV/Fe-IV) Chlamydia trachomatis Ribonucleotide Reductase** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*
  Dassama, L. M., Jiang, W., Varano, P. T., Pandelia, M., Conner, D. A., Xie, J., Bollinger, J. M., Krebs, C.
  2012; 134 (50): 20498-20506
- **O-2-Evolving Chlorite Dismutase as a Tool for Studying O-2-Utilizing Enzymes** *BIOCHEMISTRY*
  Dassama, L. M. K., Yosca, T. H., Conner, D. A., Lee, M. H., Blanc, B., Streit, B. R., Green, M. T., DuBois, J. L., Krebs, C., Bollinger, J.
  2012; 51 (8): 1607–16
- **Evidence That the beta Subunit of Chlamydia trachomatis Ribonucleotide Reductase Is Active with the Manganese Ion of Its Manganese(IV)/Iron(III) Cofactor in Site 1** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*
  Dassama, L. M. K., Boal, A. K., Krebs, C., Rosenzweig, A. C., Bollinger, J.
  2012; 134 (5): 2520–23