James D. Moody

Department of Chemistry and Biochemistry, Brigham Young University, Provo, UT, 84602
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Education

University of Washington, Seattle, WA *Doctor of Philosophy, August 2014*

Dissertation: Computational and experimental engineering of novel binding proteins targeting cancer and epigenetic signaling pathways

Honors: National Science Foundation Graduate Research Fellowship, honorable mention, *2010 and 2011*

Brigham Young University, Provo, UT *Bachelor of Science, April 2007*

Major: Physiology and Developmental Biology

Honors: Brigham Young Scholarship, *2005*. W.D. Snow Scholarship, *2006*. Office of Research and Creative Activities grant recipient, *2007.* Graduated magna cum laude, *2007.*

Glendale Community College, Glendale, AZ *Associate of Science, May 2005*

Major: General Studies

Honors: Full tuition scholarship, *2000*. Half tuition scholarship, *2004.*

Funding

R15 AREA award Diversity Supplement, National Institutes of Health, National Institute of General Medical Sciences, Provo, UT, *June 2024 – May 2025*
TELSAM polymers are powerful crystallization chaperones meriting continued investigation, Diversity Supplement.

R15 AREA award, National Institutes of Health, National Institute of General Medical Sciences, Provo, UT, *May 2022 – May 2025*
TELSAM polymers are powerful crystallization chaperones meriting continued investigation.

Earl M. Woolley Innovation in Research Award, BYU Department of Chemistry and Biochemistry, Provo, UT, *December 2021*
TELSAM as a protein crystallization chaperone.

College High Impact Research Project Award, BYU College of Physical and Mathematical Sciences, Provo, UT, *April 2021*
Protein polymers to facilitate the formation of ordered protein crystals.

Earl M. Woolley Innovation in Research Award, BYU Department of Chemistry and Biochemistry, Provo, UT, *August 2020*
Computational redesign of radical S-adenosyl-L-methionine enzymes toward novel reactions.

Research Experience

Associate Professor, Brigham Young University, Provo, UT, *August 2017 – present*
Carry out computational and experimental protein engineering, protein crystallography and cryo-electron microscopy, small molecule and biologic drug development, and enzymology.

Postdoctoral Researcher, Montana State University, Bozeman, MT, *August 2014 – July 2017*

Laboratory of Dr. Joan Broderick. Co-mentored by Dr. Martin Lawrence. Carry out crystallography and enzymology of radical SAM enzymes, develop novel crystallization methods, mentor junior researchers, and oversee laboratory operations.

Graduate Student, University of Washington, Seattle, WA, *March 2010 – August 2014*
Laboratory of Dr. David Baker. Carried out computational design and biochemical characterization and engineering of novel protein-based inhibitors targeting cancer signaling pathways and explored new computational design and experimental methods.

Graduate Student, University of Washington, Seattle, WA, *January – March 2010*
Laboratory of Dr. Gabrielle Varani. Assisted in determination of the NMR structure of Borrelia Burgdorferi Acyl Carrier Protein, a pathogenic drug target.

Graduate Student, University of Washington, Seattle, WA, *September – December 2009*
Laboratory of Dr. Jeffery Chamberlain. Investigated the possibility of packaging oversize therapeutic DNA molecules into viral vectors for use in gene therapy.

Research Technician, University of Washington, Seattle, WA, *June 2008 – Sept. 2009*
Laboratory of Dr. David Baker. Carried out high-throughput mutagenesis and screening to improve computationally designed enzymes and methods.

Senior Chemist, Silliker Incorporated, Orem, UT*, April 2007 – June 2008*
Employed analytical chemistry to conduct quality control testing of multivitamins and herbal supplements and developed improved testing methods.

Research Assistant, Brigham Young University*,* Provo, UT, *January 2006 – April 2007*
Laboratory of Dr. Marc Hansen. Carried out biochemical studies of the actin regulatory proteins zyxin and VASP.

Peer-Reviewed Publications

Calvopina-Chavez DG, Bursey DM, Tseng YJ, Patil LM, Bewley KD, Bennallack PR, McPhie JM, Wagstaff KB, Daley A, Miller SM, Moody JD, Price JC, Griffitts JS. Micrococcin cysteine-to-thiazole conversion through transient interactions between the scaffolding protein TclI and the modification enzymes TclJ and TclN. **Applied and Environmental Microbiology**. 2024 Jun 18;90(6):e00244-24.

Nawarathnage S, Tseng YJ, Soleimani S, Smith T, Pedroza Romo MJ, Abiodun WO, Egbert CM, Madhusanka D, Bunn D, Woods B, Tsubaki E, Stewart C, Brown S, Doukov T, Andersen JL, Moody JD. Fusion crystallization reveals the behavior of both the 1TEL crystallization chaperone and the TNK1 UBA domain. **Structure.** 2023 Sep 25:S0969-2126(23)00326-X. doi: 10.1016/j.str.2023.09.001. Epub ahead of print.

Gajjar PL, Pedroza Romo MJ, Litchfield CM, Callahan M, Redd N, Nawarathnage S, Soleimani S, Averett J, Wilson E, Lewis A, Stewart C, Tseng YJ, Doukov T, Lebedev A, Moody JD. Increasing the bulk of the 1TEL-target linker and retaining the 10×His tag in a 1TEL-CMG2-vWa construct improves crystal order and diffraction limits. **Acta Crystallogr D Struct Biol.** 2023 Oct 1;79(Pt 10):925-943. doi: 10.1107/S2059798323007246. Epub 2023 Sep 25.

Moody JD, Hill S, Lundahl MN, Saxton AJ, Galambas A, Broderick WE, Lawrence CM, Broderick JB. Computational engineering of previously crystallized pyruvate formate-lyase

activating enzyme reveals insights into SAM binding and reductive cleavage. **J Biol Chem**. 2023 Jun;299(6):104791. doi: 10.1016/j.jbc.2023.104791.

Lin HL, James I, Hyer CD, Haderlie CT, Zackrison MJ, Bateman TM, Berg M, Park JS, Daley SA, Zuniga Pina NR, Tseng YJ, Moody JD, Price JC. Quantifying In Situ Structural Stabilities of Human Blood Plasma Proteins Using a Novel Iodination Protein Stability Assay. **J Proteome Res**. 2022 Dec 2;21(12):2920-2935. doi: 10.1021/acs.jproteome.2c00323.

Nawarathnage S, Soleimani S, Mathis MH, Bezzant BD, Ramírez DT, Gajjar P, Bunn DR, Stewart C, Smith T, Pedroza Romo MJ, Brown S, Doukov T, Moody JD. Crystals of TELSAM-target protein fusions that exhibit minimal crystal contacts and lack direct inter-TELSAM contacts. **Open Biol**. 2022 Mar;12(3):210271. doi: 10.1098/rsob.210271.

Walls WG, Moody JD, McDaniel EC, Villanueva M, Shepard EM, Broderick WE, Broderick JB. The B12-independent glycerol dehydratase activating enzyme from Clostridium butyricum cleaves SAM to produce 5'-deoxyadenosine and not 5'-deoxy-5'-(methylthio)adenosine. **J Inorg Biochem**. 2022 Feb;227:111662. doi: 10.1016/j.jinorgbio.2021.111662.

Chan TY, Egbert CM, Maxson JE, Siddiqui A, Larsen LJ, Kohler K, Balasooriya ER, Pennington KL, Tsang TM, Frey M, Soderblom EJ, Geng H, Müschen M, Forostyan TV, Free S, Mercenne G, Banks CJ, Valdoz J, Whatcott CJ, Foulks JM, Bearss DJ, O'Hare T, Huang DCS, Christensen KA, Moody J, Warner SL, Tyner JW, Andersen JL. TNK1 is a ubiquitin-binding and 14-3-3-regulated kinase that can be targeted to block tumor growth. **Nat Commun**. 2021 Sep 9;12(1):5337. doi: 10.1038/s41467-021-25622-3.

Coates TL, Young N, Jarrett AJ, Morris CJ, Moody JD, Della Corte D, Current computational methods for enzyme design. **Modern Physics Letters B**. 2021;33(0):2150155-1–30. doi: 10.1142/S0217984921501554.

Ludlam WG, Aoba T, Cuéllar J, Bueno-Carrasco MT, Makaju A, Moody JD, Franklin S, Valpuesta JM, Willardson BM. Molecular architecture of the Bardet-Biedl syndrome protein 2-7-9 subcomplex. **J Biol Chem**. 2019 Nov 1;294(44):16385-16399. doi: 10.1074/jbc.RA119.010150.

Moody JD, Levy S, Mathieu J, Xing Y, Kim W, Dong C, Tempel W, Robitaille AM, Dang LT, Ferreccio A, Detraux D, Sidhu S, Zhu L, Carter L, Xu C, Valensisi C, Wang Y, Hawkins RD, Min J, Moon RT, Orkin SH, Baker D, Ruohola-Baker H. First critical repressive H3K27me3 marks in embryonic stem cells identified using designed protein inhibitor. **Proc Natl Acad Sci U S A**. 2017 Sep 19;114(38):10125-10130. doi: 10.1073/pnas.1706907114.

Janda CY, Dang LT, You C, Chang J, de Lau W, Zhong ZA, Yan KS, Marecic O, Siepe D, Li X, Moody JD, Williams BO, Clevers H, Piehler J, Baker D, Kuo CJ, Garcia KC. Surrogate Wnt agonists that phenocopy canonical Wnt and β-catenin signalling. **Nature**. 2017 May 11;545(7653):234-237. doi: 10.1038/nature22306.

Swiderski K, Shaffer SA, Gallis B, Odom GL, Arnett AL, Scott Edgar J, Baum DM, Chee A, Naim T, Gregorevic P, Murphy KT, Moody J, Goodlett DR, Lynch GS, Chamberlain JS. Phosphorylation within the cysteine-rich region of dystrophin enhances its association with β-dystroglycan and identifies a potential novel therapeutic target for skeletal muscle wasting. **Hum Mol Genet**. 2014 Dec 20;23(25):6697-711. doi: 10.1093/hmg/ddu388.

Grange J, Moody JD, Ascione MP, Hansen MD. Zyxin-VASP interactions alter actin regulatory activity in zyxin-VASP complexes. **Cell Mol Biol Lett**. 2013 Mar;18(1):1-10. doi: 10.2478/s11658-012-0035-2.

Wang L, Althoff EA, Bolduc J, Jiang L, Moody J, Lassila JK, Giger L, Hilvert D, Stoddard B, Baker D. Structural analyses of covalent enzyme-substrate analog complexes reveal strengths and limitations of de novo enzyme design. **J Mol Biol**. 2012 Jan 20;415(3):615-25. doi: 10.1016/j.jmb.2011.10.043.

Moody JD, Grange J, Ascione MP, Boothe D, Bushnell E, Hansen MD. A zyxin head-tail interaction regulates zyxin-VASP complex formation. **Biochem Biophys Res Commun**. 2009 Jan 16;378(3):625-8. doi: 10.1016/j.bbrc.2008.11.100.

Worldwide Protein Data Bank Depositions (wwPDB IDs)

2KWL, 5WP3, 7N1O, 7N2B, 7U4W, 7U4Z, 7TDY, 7T8J, 7TCY, 8FSI, 8FO0, 8FOL, 8FZU, 8FZV, 8FT6, 8FT8, 8FZ4, 8E1F, 8FZ3, 8THA

Oral Presentations

Summer RosettaCon 2021, held virtually, August 9th, 2021. Moody JD. Fusion to the TELSAM Protein Polymer Improves the Success Rate and Speed of Protein Crystallization by Stabilizing Weak Crystal Contacts.

American Crystallographic Association Annual Meeting, held virtually August 5th, 2021. Moody JD, Nawarathnage S, Soleimani S, Mathis MH, Bezzant BD, Ramírez DT, Gajjar P, Bunn D, Stewart C, Smith T, Pedroza Romo MJ, Brown S, Towne T. Fusion to the TELSAM Protein Polymer Improves the Success Rate and Speed of Protein Crystallization by Stabilizing Weak Crystal Contacts.

Invited seminar at the Hauptman-Woodward Institute, held virtually, July 28th, 2021. Moody JD. Fusing Proteins of Interest to Protein Polymers Increases their Crystallization Rate and Propensity.

Invited seminar at The University of Warsaw, held virtually, March 24th, 2021. Moody JD, Sarath Nawarathnage SD, Soleimani S, Mathis MH, Bezzant BD, Ramírez DT, Gajjar P, Bunn D, Stewart C, Smith T, Pedroza Romo MJ, Brown S, Doukov T. Protein Polymers to Facilitate the Formation of Ordered Crystals of Proteins of Interest.

Summer RosettaCon 2020, held virtually, August 4th, 2020, Moody JD, Tseng YJ, Young N, Woods, B, Della Corte D, Coates C, Jarrett J. Enzyme Design of Radical SAM Enzymes.

Invited Junior Keynote address at Winter RosettaCon 2020, New York City, NY, February 10th, 2020, Moody JD, Sarath Nawarathnage SD, Longhurst ML, Nishimura E, Ramirez D, Saxton AJ, Belnap D, Broderick JB, Lawrence CM, Galambas AK, Drennan CL, Whittenborn EC. Protein Crystallization Facilitated by Protein Polymers.

Invited seminar at Brigham Young University, Provo, UT, 8 July 2016, Moody JD, Kim W, Levy S, Xing Y, Tempel W, Dong C, Dang LT, Carter L, Chao X, Min J, Orkin SH, Ruohola-Baker H, Baker D. The role of PRC2 in human embryonic stem cells revealed using a computationally designed protein-based inhibitor of the EED-EZH2 interaction.

Professional Service

Reviewer, Acta Crystallographica Section D, International Union of Crystallography. *October 2023*

Reviewer, Matter Journal, Cell Press. *October 2023*

Editorial Board, Review Editor, Frontiers in Molecular Biosciences, Structural Biology. *September 2023–present*

Reviewer, Biotechnology and Biological Sciences Research Council, UK. *June 2021*

Reviewer, Chemical Reviews. *July 2018*

Reviewer, PLOSone journal. *May 2016*

Commentary article: Broderick JB, Moody JD. Cutting Choline with Radical Scissors. Cell Chemical Biology. *2016 Oct 20;23(10):1173-1174.*

Professional Memberships

American Crystallographic Association. *2021–present*

The Protein Society. *2018, 2021*

Rosetta Commons. *2019–present*

Patents

Garcia KC, Baker D, Janda CY, Dang L, Moody JD. Wnt signaling agonist molecules. PCT International Application No. PCTUS2015/049829.

Honors

Eagle Scout, Boy Scouts of America. *Jun 1999*