

Linda Columbus

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EDUCATION, RESEARCH EXPERIENCE, AND EMPLOYMENT

• University of Virginia, Charlottesville, VA

- Commonwealth Professor of Chemistry, August 2023 - present
- Director of the Arts & Sciences Faculty Led STEM Student Success Initiative, September 2021 – present
- Co-Director of UVA HHMI Driving Change Faculty Initiative May 2023 - present
- Professor of Chemistry, August 2019 – 2023
- Executive Associate Director of the Global Infectious Disease Institute, June 2017 – July 2022
- Associate Professor of Chemistry August 2013 – August 2019
- Assistant Professor of Chemistry, August 2007 – August 2013

• The Scripps Research Institute, La Jolla, CA

- Postdoctoral Fellow with Scott Lesley, June 2006 – July 2007
- Postdoctoral Fellow with Kurt Wüthrich, Aug. 2002 – June 2006

• University of California, Los Angeles, Los Angeles, CA

- Postdoctoral Fellow with Wayne Hubbell, June 2001 – August 2002

• University of California, Los Angeles, Los Angeles, CA

- Graduate research with Wayne Hubbell, Sept. 1996 – May 2001
Ph.D. in Biochemistry and Molecular Biology
Thesis: “Investigating backbone and side chain dynamics of α -helices in the nanosecond regime with site-directed spin labeling”

• Smith College, Northampton, MA

- Undergraduate research with David Bickar, June 1993 – May 1996
B.A. in Chemistry (*High Honors*)
Honors Thesis: “Investigation of MPP⁺ binding to neuroreceptors”

PUBLICATIONS

1. Gross A, **Columbus L**, Hideg K, Altenbach C, Hubbell WL. Structure of the KcsA potassium channel from *Streptomyces lividans*: A site-directed spin labeling study of the second transmembrane segment. *Biochemistry* 38:10324 – 10335 (1999). [PMID: 10441126](#)
2. Gaponenko V, Howarth JW, **Columbus L**, Gasmi-Seabrook G, Yuan J, Hubbell WL, Rosevear PR. Protein global fold determination using site-directed spin and isotope labeling. *Protein Science* 9:302 – 309 (2000). [PMID: 10716182](#)
3. **Columbus L**, Kalai T, Jeko J, Hideg K, Hubbell WL. Molecular motion of spin labeled side chains in α -helices: Analysis by variation of side chain structure. *Biochemistry* 40:3828 – 3846 (2001). [PMID: 11300763](#)
4. **Columbus L** and Hubbell WL. A new spin on protein dynamics. *Trends in Biochemical Sciences*, 27:288 – 295 (2002). [PMID: 12069788](#)
5. **Columbus L** and Hubbell WL. Mapping backbone dynamics in solution with site-directed spin labeling: GCN4-58 bZip free and bound to DNA. *Biochemistry* 43:7273 – 7287 (2004). [PMID: 15182173](#)

6. Liang ZC, Lou Y, Freed JH, **Columbus L**, Hubbell WL. A multifrequency electron spin resonance study of T4 lysozyme dynamics using the slowly relaxing local structure model. *Journal of Physical Chemistry B* 108:17649 – 17659 (2004). [Abstract](#)
7. **Columbus L**, Peti W, Herrmann T, Etezady T, Wüthrich K. NMR structure determination of the conserved hypothetical protein TM1816 from *Thermotoga maritima*. *Proteins: Structure, Function and Bioinformatics* 60:552 – 557 (2005). [PMID: 15937903](#)
8. **Columbus L**, Lipfert J, Klock H, Millet I, Doniach S, Lesley SA. Expression, purification, and characterization of *Thermotoga maritima* membrane proteins for structure determination. *Protein Science* 15: 961 – 975 (2006). [PMID: 16597824](#)
9. Lipfert J, **Columbus L**, Chu V, Doniach S. Analysis of small-angle X-ray scattering data of protein-detergent complexes with singular value decomposition. *Journal of Applied Crystallography* 40: S235 – 239 (2007). [Abstract](#)
10. Lipfert J, **Columbus L**, Chu V, Lesley SA, Doniach S. Size and shape of detergent micelles determined by small-angle X-ray scattering. *Journal of Physical Chemistry B* 111: 12427 – 12438 (2007). [PMID: 17924686](#)
11. McCleverty C*, **Columbus L***, Kreusch A, Lesley SA. Structure and ligand binding of the soluble domain of a *Thermotoga maritima* membrane protein of unknown function TM1634. *Protein Science* 17: 869 – 877 (2008). [PMID: 18369189](#)
12. **Columbus L**, Lipfert J, Jambunathan K, Fox DA, Sim AYL, Doniach S, Lesley SA. Mixing and matching detergents for membrane protein NMR structure determination. *Journal of the American Chemical Society* 131: 7320 – 7326 (2009). [PMID: 19425578](#)
13. Beuck C, Szymczyna BR, Kerkow DE, Carmel AB, **Columbus L**, Stanfield RL, and Williamson JR. Structure of the GLD-1 homodimerization domain: Insight into STAR protein-mediated translational regulation. *Structure* 18: 377 – 389 (2010). [PMID: 20223220](#)
14. Kroncke BM, Horanyi P, **Columbus L**. Structural origins of nitroxide side chain dynamics on membrane protein α -helices. *Biochemistry* 49: 10045 – 10060 (2010). [PMID: 20964375](#)
15. Dewald AH, Hodges, JC, **Columbus L**. Physical determinants of β -barrel membrane protein folding in lipid vesicles. *Biophysical Journal* 100:2131 – 2140 (2011). [PMID: 21539780](#)
16. Kroncke BM and **Columbus L**. Identification and removal of nitroxide spin label contaminant: Impact on PRE studies of α -helical membrane proteins in detergent. *Protein Science* 21:589 – 595 (2012). [PMID: 22389096](#)
17. Johnstone SR, Kroncke BM, Straub AC, Best AK, Dunn CA, Mitchell LA, Peskova Y, Nakomoto RK, Koval M, Lampe PD, **Columbus L**, Isakson BE. MAPK phosphorylation of connexin 43 promotes binding of cyclin E and smooth muscle cell proliferation. *Circulation Research* 11:201 – 211 (2012). [PMID: 22652908](#)
18. Straub AC, Lohman AW, Billaud M, Johnstone SR, Dwyer ST, Lee MY, Bortz PS, Best AK, **Columbus L**, Gaston B, Isakson BE. Endothelial cell expression of hemoglobin α regulates nitric oxide signaling. *Nature* 491: 473 – 477 (2012). [PMC3531883](#)
19. Elkin SR, Kumar A, Price CW, **Columbus L**. A broad specificity nucleoside kinase from *Thermoplasma acidophilum*. *Proteins: Structure, Function and Bioinformatics* 81:568 – 582 (2013). [PMC3595323](#)
20. Oliver RC, Lipfert J, Fox DA, Lo RH, Doniach S, **Columbus L**. Dependence of micelle size and shape on detergent alkyl chain length and head group. *PLoS ONE* 8(5): e62488. (2013). [PMC3648574](#)
21. Fox, DA and **Columbus L**. Solution NMR resonance assignment strategies for β -barrel membrane proteins. *Protein Science*. 22:1133 – 1140 (2013). [PMC3832050](#)
22. Anton BP, Chang Y-C, Brown P, Choi H-P, Faller LL, et al. (2013) The COMBREX Project: Design, Methodology, and Initial Results. *PLoS Biology* 11(8): e1001638. [PMC3754883](#)

23. Kroncke BM and **Columbus L**. Backbone ^1H , ^{13}C , ^{15}N resonance assignments of the α -helical membrane protein TM0026 from *Thermotoga maritima*. *Biomolecular NMR Assignments* 7: 203 – 206 (2013). [PMC3543498](#)
24. Li J, Liu Q, Xiao L, Haverstick DM, Dewald A, **Columbus L**, Kelly KA, Landers JP. A Label-free Method for Cell Counting in Crude Biological Samples via Paramagnetic Bead Aggregation. *Analytical Chemistry*. 85:11233 – 11239 (2013).
25. Kenwood BM, Weaver JL, Bajwa A, Poon IK, Byrne FL, Murrow BA, Calderone JA, Huang L, Divakaruni AS, Tomisg JL Okabe K, Lo RH, Coleman GC, **Columbus L**, Yan Z, Saucerman JJ, Smith JS, Homes JW, Lynch KR, Ravichandran KS, Uchiyama S, Santos WL, Rogers GW, Okusa MD, Bayliss DA, Hoehn KL. Identification of a novel mitochondrial uncoupler that does not depolarize the plasma membrane. *Molecular Metabolism*. 3:114 – 123 (2014). [PMC3953706](#)
26. Butcher JT, Johnson T, Beers J, **Columbus L**, Isakson B. Hemoglobin alpha in the blood vessel wall. *Free Radical Biology & Medicine*. 73C:136 – 142 (2014). [PMC4135531](#)
27. Fox DA, Larsson P, Lo RH, Kroncke BM, Kasson P, **Columbus L**. The Structure of the Neisserial outer membrane protein Opa₆₀: Loop flexibility essential to receptor recognition and bacterial engulfment. *Journal of the American Chemical Society*. 136:9938 – 9946 (2014). [PMC4105060](#)
28. Lo RH, Kroncke BM, Solomon T, **Columbus L**. Mapping membrane protein dynamics: a comparison of site-directed spin labeling to NMR ^{15}N -relaxation measurements. *Biophysical Journal*. 107:1697 – 1702 (2014). [PMC4190660](#)
29. Straub AC, Mutchler S, Billaud M, Mykhaylo A, Palmer L, Le TH, Somlyo AV, **Columbus L**, Isakson BE. Hemoglobin α /eNOS coupling in endothelium is required for nitric oxide scavenging during vasoconstriction. *Arteriosclerosis, Thrombosis, and Vascular Biology*. 34:2594 – 2600 (2014). [PMC4239174](#)
30. Baker LA, Chakraverty D, **Columbus L**, Feig AL, Jenks WS, Pilarz M, Stains M, Waterman R, and Wesemann J. Cottrell Scholars Collaborative New Faculty Workshop: Professional Development for New Chemistry Faculty. *The Journal of Chemical Education*. 91: 1874-1881 (2014).
31. Oliver RC, Lipfert, Fox DA, Lo RH, Kim JJ, Doniach S, **Columbus L**. Tuning micelle dimensions and properties with binary surfactant mixtures. *Langmuir*. 30:13353 – 13361 (2014).
32. Johnson MB, Ball LM, Daily KP, Martin JN, **Columbus L**, and Criss AK. Opa+ *Neisseria gonorrhoeae* has reduced survival in human neutrophils via Src family kinase-mediated bacterial trafficking into mature phagolysosomes. *Cellular Microbiology*. 17:648 – 665 (2015). [PMC4402142](#)
33. **Columbus L** and Kroncke B. Solution NMR Structure Determination of polytopic α -helical membrane proteins: A guide to spin label paramagnetic relaxation enhancement restraints. *Methods in Enzymology*. 557: 329 – 348 (2015).
34. **Columbus L**. Post-expression strategies for structural investigations of membrane proteins. *Current Opinion in Structural Biology*. 32: 131 – 138 (2015). [PMC4512879](#)
35. Gray C, Price CW, Lee C, Dewald A, Cline MA, McAnany CE, **Columbus L**, Mura C. Known Structure, Unknown Function: An Inquiry-based Undergraduate Biochemistry Lab Course. *Biochemistry and Molecular Biology Education*. 43:245 – 262 (2015). [PMC4758391](#)
36. Shu X*, Keller TC*, Begandt D, Butcher JT, Biber L, Keller AS, **Columbus L**, Isakson BE. Endothelial nitric oxide synthase in the microcirculation. *Cellular and Molecular Life Sciences*. 72:4561 – 4575 (2015). [PMC4628887](#)
37. Keller TC, Butcher JT, Marziano C, Martin JN, Rogers S, Broseghini-Filho GB, Cabot M, Sgu X, Ning B, Best AK, Padilha AS, Purdy M, Yeager M, Peirce SM, Hu S, Doctor A, Barrett E, Le TH, **Columbus L**, Isakson BE. Modulating vascular hemodynamics with an alpha globin mimetic peptide (Hb α X). *Hypertension* 68:1494 – 1503 (2016). [PMC5159279](#)
38. Martin J, Ball L, Solomon T, Criss A, **Columbus L**. Neisserial Opa protein – CEACAM interactions: competition for receptors as a means for bacterial invasion and pathogenesis. *Biochemistry* 55: 4286 – 4294 (2016). [PMC4980159](#)

39. Yang J, Zong Y, Su J, Li H, Zhu H, **Columbus L**, Zhou L, and Liu Q. A novel conformation of the polypeptide-binding pocket supports an active substrate release from Hsp70s. *Nature Communications* 8:1201 – 1214 (2017). [PMC5662698](#)
40. Caldwell T*, Baoukina S*, Brock A, Oliver RC, Glover KJ, Tieleman DP, **Columbus L**. Low q bicelles are mixed micelles. *Journal of Physical Chemistry Letters*. 9:4469 – 4473 (2018). [PMC6353637](#)
41. Hays JM, Kieber MK, Li JZ, Han JI, **Columbus L**, Kasson PM. Refinement of highly flexible protein structures using simulation-guided spectroscopy. *Angewandte Chemistry*. 57:17110 – 17114 (2018). [PMC6424112](#)
42. Kieber M, Ono T, Oliver RC, Nyenhuis, SB, Ashtari M, Tieleman DP, **Columbus L**. The fluidity of phosphocholine and maltoside micelles and the effect of CHAPS. *Biophysical Journal*. 116:1682 – 1691 (2019). [PMC6506624](#)
43. Shu XH, Ruddiman CA, Keller TCS, Keller AS, Yang Y, Good ME, **Columbus L**, Best AK, and Isakson BE. Heterocellular contact can dictate arterial function. *Circulation Research*. 124: 1473 – 1481 (2019). [PMC6540980](#)
44. Kuhn J, Smirnov A, Criss AK, **Columbus L**. CEACAM targeted liposome delivery. *Molecular Pharmaceutics*. 16:2354 - 2363 (2019). [PMC6740330](#)
45. Werner LM*, Palmer A*, Smirnov A, Belcher-Dufresne M, **Columbus L**, Criss AK. Imaging flow cytometry analysis of CEACAM binding to Opa-expressing *Neisseria gonorrhoeae*. *Cytometry: Part A*. 97:1081 – 1089 (2020). [PMC8062897](#)
46. Swope N, Lake, KE, Barrow GH, Yu D, Fox DA, **Columbus L**. TM1385 from *Thermotoga maritima* functions as a phosphoglucose isomerase via cis-enediol-based mechanism with active site redundancy *BBA - Proteins and Proteomics*. 1869:140602 (2021).
47. Keller TCS, Lechauve C, Keller AS, Brooks S, Weiss M, **Columbus L**, Ackerman H, Cortese-Krott M, Isakson BE. The role of globins in cardiovascular physiology. *Physiological Reviews*. 102:859 – 892 (2022). [PMC8799389](#)
48. Dufresne MB*, Swope N*, Kieber M, Yang J, Han J, Li J, Moremen KW, Prestegard JH, **Columbus L**. Human CEACAM1 N-domain Dimerization is Independent from Glycan Modifications *Structure*. 30: 1- 13 (2022). [PMC9081242](#)
49. Alcott AM, Werner LM, Baiocco CM, Dufresne MB, **Columbus L**, and Criss AK. Variable expression of Opal proteins by *Neisseria gonorrhoeae* influences bacterial association and phagocytic killing by human neutrophils. *Journal of Bacteriology*. 204:e0003522 (2022). [PMC9017356](#)
50. Caldwell T, Vickery ON, Colburn J, Stansfeld PJ, **Columbus L**. Conformational dynamics of the membrane enzyme LspA upon antibiotic and substrate binding. 121:2078 – 2083 *Biophysical Journal*. (2022). [PMC9247476](#)
51. Williams RV, Huang C, McDermott C, Ahmed T, **Columbus L**, Moremen KW, Prestegard JH, Amster IJ. Site-to-Site Crosstalk in OSTB Glycosylation of hCEACAM1-IgV. *PNAS* 119:e2202992119 (2022). [PMC9618145](#)
52. Keller TCS, Keller AS, Broseghini-Filho GB, Butcher JT, Page HRA, Islam A, Tan ZY, DeLalio LJ, Brooks S, Sharma P, Hong K, Xu W, Padilha AS, Ruddiman C, Best AK, Macal E, Kim-Shapiro D, Christ G, Yan Z, Cortese-Krott MM, Ricart K, Patel R, Bender TP, Sonkusare S, Weiss MJ, Ackerman H, **Columbus L**, Isakson BE. Endothelial alpha globin is a nitrite reductase. *Nature Communications*. 13:6405 (2022). [PMC9613979](#)
53. Werner LM, Alcott A, Mohlin F, Ray JC, Dufresne MB, Smirnov A, **Columbus L**, Blom AM, Criss AK. C4b-binding protein suppresses neutrophil anti-gonococcal activity in a complement-independent manner. *PLOS Pathogen*. 19:e1011055. (2023). [PMC10013916](#)
54. Necelis MR, McDermott C, Dufresne MB, Baryames CP, **Columbus L**. Solution NMR investigations of integral membrane proteins: challenges and innovations. *Current Opinion in Structural Biology*. 82:102654 (2023).

55. Nygaard R, Graham CLB, Dufrisne MB, Colburn JD, Pepe J, Hydron MA, Corradi S, Brown CM, Ashraf KU, Vickery ON, Briggs NS, Deering JJ, Kloss B, Botta B, Clarke OB, **Columbus L***, Dworkin J*, Stansfeld PJ*, Roper DI*, and Mancina F* Structural basis of peptidoglycan synthesis by *E. coli* RodA-PBP2 complex. *Nature Communications*. 14:5151 (2023). [PMCID10449877](https://doi.org/10.1038/s41467-023-49877-7)
56. Wolpe AG, Luse MA, Baryames C, Wyatt, SJ, Wolpe JB, Johnstone SR, Dunaway LS, Juskiewicz ZJ, Loeb SA, Askew Page HR, Chen Y, Sabapathy V, Pavelc CM, Wakefield B, Cifuentes-Pagano E, Artamonov MV, Somlyo AV, Straub AC. Sharma R, Beier F, Barrett EJ, Leitinger N, Pagano PJ, Sonkusare SK, Redemann S. **Columbus L**, Penuela S, Isakson BE Pannexin-3 stabilizes the transcription factor Bcl6 in a channel-independent manner to protect against oxidative stress. *Science Signaling*. 17:eadg2622 (2024).

SUBMITTED

57. Luse MA, Schug WJ, Dunaway LS, Loeb SA, Carvalho A, Tessema R, Pavelic C, Keller TCS, Shu , Ruddiman CA, Kosmach A, Sveeggen TM, Mitchell R, Levental I, Minshall RD, Letinger N, **Columbus L**, Levental K, Pagher P, Cortese-Krott M, Isakson BE. Nitrosation of CD36 regulates endothelial function and serum lipids. Under revisions (2024).
58. Billings EA, **Columbus L**, Casanova JE. Phosphorylation of the inner core oligosaccharide of lipopolysaccharide mediates recognition and phagocytosis of Gram-negative bacteria by Brain Angiogenesis Inhibitor 1 (BAI1). *bioRxiv*, 2023.01. 30.525907 (2023)

IN PREPARATION

59. Necelis MR*, Park S*, Baryames CP, Tieleman P, Im W, **Columbus L**. Size and Shape of Bicelles: Experimentally-driven modeling with CHARM-GUI. (2024)
60. Necelis MR, Baryames CP, Park S, Tieleman P, Im W, **Columbus L**. Detergent shape determines lipid segregation in bicelles. (2024).

Underlined authors are undergraduate students; *These authors contributed equally

BOOK CHAPTERS

1. **Columbus L**, Nakamoto, R.K., Cafiso, D.S. Properties of Membrane Proteins in Wiley *Encyclopedia of Chemical Biology* (2008). [Abstract](#)
2. Leibovich A, Hildreth M, **Columbus, L**. Leading Change in Undergraduate STEM Education in ACS Symposium Series: *Educational and Outreach Projects from the Cottrell Scholars Collaborative* (2017).
3. Heemstra J, Waterman R, Antos J, Beuning P, Bur S, **Columbus L**, Feig A, Fuller A, Gillmore J, Leconte A, Londergan C, Pomerantz W, Prescher J, and Stanley L. Throwing away the cookbook: implementing course-based undergraduate research experiences (CUREs) in chemistry in ACS Symposium Series: *Educational and Outreach Projects from the Cottrell Scholars Collaborative* (2017).

OTHER PUBLICATIONS

1. Giering, J., **Columbus, L.**, & Hunger, G. (2019). Cultivating Inquiry and Discovery in STEM: A Redesign of Introductory General Chemistry. The RC20/20 Project: A digital publication of the Reinvention Collaborative. Retrieved from <https://www.rc-2020.org/columbusgieringhunger>

PATENTS

U.S. Application Serial No. 14/437,548 and European patent (2908848): Composition and Methods for Regulating Arterial Tone

provide an understanding of the lipid-protein interactions that dictate fold and function of membrane proteins.

2R01GM087828-09 NIH/NIGMS Award amount: \$2,725,957 Structure and dynamics of bacterial membrane protein - receptor interactions	Columbus (PI)	2009 – 2019
UVA Ivy Foundation Biomedical Innovation Grants Award Amount: \$80,000 Targeting the hemoglobin α /eNOS complex for novel anti-hypertensives	Columbus and Isakson (Co-PI)	2015 – 2016
Cottrell Scholar Award Research Corporation for Science Advancement Award Amount: \$75,000 (total; no cost extension) Hijacking the hijackers: taking advantage of the chemistry of bacterial pathogens	Columbus (PI)	2011 – 2015
DUE 1044858 NSF Award Amount: \$199,927 (total) Known structure, unknown function: An undergraduate research curriculum	Columbus (Co-PI with C. Mura)	2011 – 2014
MCB 0845668 NSF Award Amount: \$680,000 (total) CAREER: An innovative study of membrane protein – detergent interactions	Columbus (PI)	2009 – 2014
Jeffress Trust Awards Program Jeffress Memorial Trust Award Amount: \$100,000 Using hybrid computational and NMR structure determination to study host-pathogen interactions at the molecular level.	Columbus (PI)	2014 – 2015
HRD 1202181 Award Amount: \$700,000/year (total) – no funds directly to my lab Role: Co-Principal Investigator The Virginia-North Carolina Alliance for Minority Participation: Mid-level LSAMP	Martin (PI) Columbus and Vallas (Co-PI)	2012 – 2017

RECENT INVITED SEMINARS (OUT OF ~195)

2025	Membrane Protein Folding Gordan Research Conference, Chair Barcelona, Spain
2024 (Sept)	Molecular Evolution of Membrane Proteins, Woods Hole Don't forget the lipids
2024 (June)	Biological Membranes and Membrane Proteins: Challenges for Theory and Experiment Santa Fe, NM
2024 (June)	Biophysical Society Conference Molecular Biophysics of Membranes, Chair Tahoe, CA

- 2024
(May) Department of Chemistry at the University of Washington, Seattle
Impact of the lipid environment on membrane protein structure, dynamics, and function and
Reimagine Chemistry Courses Starting with Introductory Chemistry
- 2024 Department of Chemistry, Smith College
Honoring David Bickar: Fueling the learning cycle, a story of a polar plunge, fireworks, and a bone saw.
- 2024 Membrane Structure and Function Subgroup Symposium at the Annual Biophysical Society Meeting
Philadelphia, PA
- 2023 UNC Chapel Hill Graduate Student Retreat Keynote Speaker
One woman's journey (through STEM)
- 2023 UVA Chemistry Retreat Keynote Speaker
One woman's journey (through STEM)
- 2023 Cottrell Scholar Conference, Tucson AZ
STAR award presentation
- 2023 Proteins Gordon Research Conference
Impact of Membrane(ish) Properties on Membrane Protein Structure and Dynamics
- 2023 13th « NMR a tool for Biology » conference at the Institut Pasteur Paris, France
Properties of micelles, bicelles, and membranes impact on membrane protein structure and dynamics
- 2022 Department of Cell Physiology and Molecular Biophysics, Texas Tech University Health Sciences
Vignettes from Biophysical Investigation of Membranes, Membrane Mimics, and Membrane Proteins: How They Assemble, Interact, and Move
- 2022 Department of Chemistry, Virginia Commonwealth University
Vignettes from Biophysical Investigation of Membranes, Membrane Mimics, and Membrane Proteins: How They Assemble, Interact, and Move
- 2022 Biophysical Society Conference Molecular Biophysics of Membranes
Co-Chair and presenter
Impact of Lipid-Membrane Protein Interactions on Membrane Protein Structure and Dynamics
Tahoe, California
- 2022 Symposium on Membrane Protein Production and Analysis at Columbia University
Center on Membrane Protein Production and Analysis (COMPPA)
Properties of membrane mimics and membranes and their impact on membrane protein structure and dynamics
- 2022 Department of Chemistry and Biochemistry at the University of Maryland
Vignettes from biophysical investigation of membranes, membrane mimics, and membrane proteins: how they assemble, interact, and move

Undergraduate Courses

Spring 2017, 2018, 2019

CHEM1420 Introductory Chemistry II

Redesign of lecture course using active-learning approaches. Significant reduction in performance gaps for underserved populations.

Fall 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023

CHEM 1410 Introductory Chemistry I

Redesign of lecture course using active-learning approaches. Significant reduction in performance gaps for underserved populations.

Fall 2007 and 2008

CHEM4410 Biological Chemistry I

Lecture course focused on the structure and function of biomolecules.

~150 students in each offering of the course

Fall 2008, 2009, 2011, 2012, 2014

CHEM4411 Biological Chemistry Lab I

Inquiry-based laboratory course focused on recombinant methods and protein structure/function. The course is designed to prepare students for the research-based laboratory CHEM4421.

~85 students in each offering of the course

Spring 2009, 2011, 2013, 2016

CHEM4421 Biological Chemistry Lab II

Research based biochemistry laboratory that has students apply knowledge from the fall semester to design experiments to investigate protein function based on structure.

~85 students in each offering of the course

Fall 2009

Mead Chemistry Lunch Series

Eight research-active chemistry majors and I met every Friday for lunch and each of us presented twice on our research. The first presentation included background and significance of our research. Then, we each presented a piece of data and talked about how it was generated and what it meant.

Fall 2011, Spring 2013, Spring 2014

CHEM4430 From Lab Bench to Your Medicine Cabinet

Seminar style undergraduate course that teaches students to read scientific literature and assemble information and ideas into a cohesive understanding of the basic research that is involved in the development of therapeutics.

10 – 15 students

Fall 2015, 2016, Spring 2016

CHEM4961, 4951, 3961, and 3951 Research for Credit

Organize ~100 chemistry majors in research for credit, have faculty mentors affirm and assess student's involvement in research, provide feedback on a mid-semester and end-of-the-semester assignment.

Graduate courses

Spring 2008, 2011, 2012

Biophysics 5060 Molecular Physiology: From Molecular Machines to Biological Information Processing

Two lectures titled NMR Spectroscopy: Principles of NMR and NMR Spectroscopy: Multidimensional NMR and Structure Determination 1 lecture on the application of EPR to biomolecular dynamics.

~ 6 students in each offering of the course

Spring 2008

PHY8000 Magnetic Resonance Spectroscopy of Macromolecules

1 lecture titled Product Operators and NOE

~6 students in each offering of the course

Fall 2008 and 2012

PHY8130 Membrane Biophysics

1 lecture on the thermodynamics of micelle and protein-detergent complex formation

~6 students in each offering of the course

SUPERVISED RESEARCH

High School Students

Haylee Witworth 2013 (summer)

Emma Guiberson 2013 (summer)

Collin Price 2013 (summer)

Anha Telluri 2016 (summer)

Undergraduate supervised research

Christopher Reyes 2007 – 2009

Tsega Solomon

2009 – 2012

Huong Thien Nguyen 2007 – 2009

Chris Lee

2011 – 2012

Rita Digrazia 2008 – 2009

Joseph Breheny

2011 (summer)

Justin Kim 2008 – 2011

Eli Chen

2011 (summer)

Ashley Keller	2008 – 2011	Cynthia Gray	2011 – 2014
Upneet Chawala	2009 – 2010	Kanishk Jain	2011 – 2013
Jacqueline Hodges	2009 – 2012	Audrey Ogendi	2012 – 2013
Golda Harris	2009 – 2012	Kiera Matthews	2012 and 2013 (summer)
Elleansar Okwei	2011 – 2014	Sebastien Ortiz	2012 – 2015
Tomihiko Ono	2012 – 2014	Sidney Bush	2012 (summer and fall)
Sarah Elkin	2009 – 2012	Jessica Yoo	2013 – 2015
Nana Bosomtwe	2013 – 2016	Keturah Wallace	2013 (summer)
Shelby Lipes	2013 – 2016	Jason Li	2015 – 2017
Serap Vatansever	2014 – 2016	So He Son	2015 (summer)
Ji In Han	2015 – 2018	Kelvin Li	2015 – 2018
Maria Villanueva	2016 (summer)	Tanquez Willis	2016 (summer)
Katherine Ahn	2017 – 2019	Edward Contreras	2018 – 2018
Katherine Lake	2018 – 2020	Ivana Daniels	2019 – 2020
Nicole Laines	2021 – 2024	Thomas Basta	2023 - present

Graduate (Ph.D.) supervised research

Alison Dewald	2008 – 2012
Brett Kroncke	2007 – 2012
Daniel Fox	2007 – 2013
Ryan Lo	2009 – 2014
Ryan Oliver	2010 – 2014
Ashton Brock	2011 – 2016
Jennifer Martin	2011 – 2016
Marissa Kieber	2012 – 2018
Jason Kuhn	2012 – 2018
Steven Keller	2015 – 2019
Nicole Swope	2015 – 2020
Tracy Caldwell	2016 – 2020
Matthew Necelis	2020 – present
Connor McDermott	2020 – present
Jackson Bartholomew-Schoch	2022 – present
Juaneisha Finnie	2023 – present
Aninda Dutta	2023 – present
Kevin Nguyen	2024 – present

Graduate (MS) supervised research

Chris Lee	2011 – 2013
Catrina Campbell	2012 – 2014
Ethan SESCO	2020 – 2022

Graduate (MA) supervised research

William Peairs	2007 – 2010
Spencer Grewe	2019 – 2021

Postdoctoral fellows supervised research

Kalyani Jambunathan	2007 – 2009
David Shultis	2009 – 2010
Carol Price	2009 – 2011
Jennifer Martin	2016 – 2019
Jason Kuhn	2018 – 2019
Christopher Baryiames	2021 – 2023
Meagan Dufriene	2018 – present

PROFESSIONAL MEMBERSHIPS

Biophysical Society Member 1997 – present
 American Chemical Society 2007 – present
 Protein Society 1998 – present

PROFESSIONAL SERVICE

Department

2007 – 2008	Faculty Search Committee (Biological)
2007 – 2012	Department Seminar Committee
2008 – 2009	Faculty Search Committee (Physical Chemistry)
2009 – 2011	Department Webmaster
2009 – 2011	Awards & Development Committee
2010 – 2013	Graduate Recruitment Committee

2013 – 2014 Faculty Search Committee, Chair (Successful hire of Ken Hsu)
 2014 – 2017 Undergraduate Studies Committee, Chair
 2014 – 2016 Graduate Studies Committee
 2014 – 2017 Executive Committee
 2014 – 2016 Assessment Committee
 2015 – 2017 Director of Undergraduate Programs
 2015 – 2022 Junior Faculty Mentor
 2016 – 2021 Reform of Introductory Chemistry
 2017 – 2020 Pilot study of Undergraduate Success in Chemistry at UVA
 2020 – 2023 Chemistry Department Director of Research and Faculty Development
 2021 Co-organized and facilitated new faculty workshop “New Faces in Chemistry”
 2022 Chaired Marilyne Stains promotion committee
 2023 Wrote and lead organization of departmental self-study for external review
 2023 Chaired Marcos Pires promotion committee

University

2009 – 2011 Faculty Search Committee, Dept. of Molecular Physiology and Biological Physics
 2009 – 2015 Postdoc Programs Faculty Advisory Board
 2009 – present College Science Scholars Advisor
 2009 – present Echols Scholars Program Advisor
 2010 – 2015 1st and 2nd year academic advisor
 2012, Fall “Developing a research identity” presentation and discussion with Excellence in Diversity Fellows
 2013 – 2016 Biotechnology Training Grant Executive Committee
 2013 – 2016 College Curriculum Planning Committee
 2014, Spring Jefferson Scholar Graduate Fellowship Selection Committee
 2014, Spring Leadership in Academic Matters Fellow
 2014 – 2017 Biophysics Training Grant Executive Committee
 2014 – 2017 MSTP faculty Advisory Committee
 2015 – 2017 Health Professions Advising Task Force
 2015 – 2020 Provost’s Academic Strategy Committee
 2017 – 2022 Executive Associate Director of the UVA Global Infectious Disease Institute
 2018 – 2019 External member of the Astronomy Department faculty search
 2018 – 2024 College of Arts & Sciences Steering Committee
 2018 Co-organizer of Reducing Sexual Harassment: A UVA Day of Discussion on October 10th, 2018
 2019 Bachelor's Completion Working Group
 2019 – 2023 Co-chair of the College of Arts & Sciences Steering Committee
 2021 – present University Representative for HHMI’s Inclusive Excellence 3 Learning Community (IE3LC) and Driving Change Initiatives
 2021 – present Director of the Arts & Sciences Faculty Led STEM Student Success Initiative
 2021 – present Creator and Director of the College of Arts & Sciences Advance Fellow Program
 2021 – present Leadership Team for HHMI Driving Change initiative

2024	Search Committee for the College of Arts & Sciences Associate Dean of Sciences
National	
2009 – present	Faculty of 1000 Faculty Member
2009, 2010	Ad hoc reviewer for NSF
2010 – 2013	Cottrell Scholar Collaborative Think & Do Tank
2010 – 2016	National High Magnetic Field Laboratory NMR/MRIs Advisory Committee
2010 – 2018	NSF National High Magnetic Field Laboratory User Program external reviewer
2010 – 2015	Cottrell Scholar Collaborative New Faculty Workshop Organizer
2011 – 2013	Organizer of Workshop “Teaching Science Like We Do Science” at the Annual Biophysical Meeting
2011 – 2018	Biophysical Society Education Committee member
2012, 2013	Ad hoc NIH Special Emphasis Panel
2012 – present	Faculty1000 Research’s Editorial Board
2013	Ad Hoc member of the NIH Biochemistry and Biophysics of Membrane’s Panel
2013 – 2019	RCSA Cottrell Scholar Program Committee
2013 – present	AAU STEM Undergraduate Education Initiative Advisory Committee
2014 – 2018	Charter member of the NIH Biochemistry and Biophysics of Membrane’s Study Section Panel
2014 – 2019	Executive Editor of <i>Protein Expression and Purification</i>
2017 – present	Biological Magnetic Resonance Bank Advisory Board (Chair, 2021 - 2024)
2017 – 2023	Biophysical Society Publications Committee
2018 – 2021	Biophysical Society Council Member
2018 – present	Advisory Board for the <i>Biophysicist</i>
2019 – 2020	Biophysical Society Task Force on Sexual Harassment
2022	Co-organizer of Biophysical Society Conference Molecular Biophysics of Membranes
2022	American Chemical Society Journal of Physical Chemistry A/B/C Editorial Advisory Board
2022 – 2025	Chair of Biophysical Society Awards Committee
2022 – present	Advisory committee member for wwPDB
2022 – present	NMRFAM P41 Advisory Committee
2023	Vice Chair of Gordon Research Conference Membrane Protein Folding
2024	Organizer of Biophysical Society Conference Molecular Biophysics of Membranes. Tahoe, California
2025	Chair of Gordon Research Conference Membrane Protein Folding. Barcelona, Spain