CURRICULUM VITAE

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University of Colorado Boulder (CU-Boulder)
Boulder, CO 80309-0596

POSITIONS HELD

7/15 – present	Glenn L. Murphy Professor of Engineering, CU-Boulder
4/04 – 12/19	Senior Editor, *Langmuir*
7/12 – 6/16	Chair, Department of Chemical & Biological Engineering, CU-Boulder
7/12 – 6/15	Alfred and Betty Look Professor of Engineering, CU-Boulder
9/04 – 6/12	Professor, Dept. of Chemical & Biological Engineering, CU-Boulder
1/01 – 8/04	Associate Professor, Dept. of Chemical & Biological Engineering, CU-Boulder
7/98 – 12/00	Associate Professor, Department of Chemistry, Tulane University
7/94 – 6/98	Assistant Professor, Department of Chemistry, Tulane University
9/92 – 7/94	Postdoctoral Associate, Dept. of Chemistry and Biochemistry University of California Los Angeles with Charles M. Knobler
4/91 – 8/92	Postdoctoral Associate, Dept. of Chemical and Nuclear Engineering University of California Santa Barbara with Joseph A. Zasadzinski

EDUCATION

Ph.D. in Physics, Harvard University (Advisor: Peter S. Pershan) (1991)
A.B. *summa cum laude* in Chemistry and Physics, Harvard University (1984)

SELECTED HONORS AND AWARDS

Dean's Award for Outstanding Research (2014, 2016)
Department Award for: Overall Performance (2014), Research (2015), Grad Teaching (2016), Undergrad Teaching (2021)
Fellow of the American Chemical Society (2014)
Fellow of the American Physical Society (2011)
Graduate Teaching Award (student-awarded), CU-Boulder ChBE Dept. (2011, '15, '17, '19)
Faculty Research Award, CU-Boulder College of Engineering (2010)
Boulder Faculty Assembly Award for Excellence in Research (2008)
CU-LEAD Alliance Faculty Appreciation Award (2006)
Camille Dreyfus Teacher-Scholar Award (1999)
NSF/CAREER Award (1998)
Mortarboard Honor Society Salute for Excellence in Teaching (1997, 1998, 1999)
Camille & Henry Dreyfus Foundation New Faculty Award (1994)
Stone and Webster Fellowship, Harvard University (1985)
Detur Prize (given to top first-year students), Harvard University (1981)

SYNERGISTIC ACTIVITIES

Senior Editor (2004–2019), *Langmuir – the ACS Journal of Fundamental Interface Science*
Chair (2016), American Chemical Society Colloid & Surface Chemistry Division
Founding Director (2003–2012), NSF REU Site Program in Functional Materials
Founding Director (1998–2000), Tulane Science Scholars Program
Curriculum Developer, *Creative Technology*, a course that introduced alternative energy, biotech, and nanoscience concepts to more than 7000 non-science undergraduates.

PUBLICATIONS

1. J.F. Lynch, D.K. Schwartz, and K. Sivaprasad, *J. Acoust. Soc. Am.* **78**, 575 (1985)
"On the use of Focused Horizontal Arrays as Mode Separation and Source Location Devices in Ocean Acoustics"

2. D.K. Schwartz, A. Braslau, B. Ocko, and P.S. Pershan, *Phys. Rev. A* **38**, 5817 (1988)
"X-ray Reflectivity Studies of a Microemulsion Surface"

3. M.L. Schlossman, D.K. Schwartz, E.H. Kawamoto, G.J. Kellogg, P.S. Pershan, B.M. Ocko, M.W. Kim, and T.C. Chung, *Mat. Res. Soc. Symp. Proc.* **177**, 351 (1990)
"X-ray Studies of the Liquid/Vapor Interface: Water and Polymer and Fatty Acid Monolayers on Water"

4. D.K. Schwartz, M.L. Schlossman, E.H. Kawamoto, G.J. Kellogg, P.S. Pershan, and B.M. Ocko, *Phys. Rev. A* **41**, 5687 (1990)
"Thermal Diffuse X-ray Scattering Studies of the Water/Vapor Interface"

5. G. Swislow, D. Schwartz, B.M. Ocko, and P.S. Pershan, *Phys. Rev. A* **43**, 6815 (1991)
"X-ray Studies of the Surface and Bulk Structure of the Isotropic and Nematic Phase of a Lyotropic Liquid Crystal"

6. M.L. Schlossman, D.K. Schwartz, E.H. Kawamoto, G.J. Kellogg, P.S. Pershan, M.W. Kim, and T.C. Chung, *J. Phys. Chem.* **95**, 6628 (1991)
"X-ray Reflectivity of a Polymer Monolayer at the Water/Vapor Interface"

7. M.L. Schlossman, D.K. Schwartz, P.S. Pershan, E.H. Kawamoto, G.J. Kellogg, and S. Lee, *Phys. Rev. Lett.* **66**, 1599 (1991)
"Relaxation and the Reentrant Appearance of Phases in a Molecular Monolayer"

8. D.K. Schwartz, M.L. Schlossman, and P.S. Pershan, *J. Chem. Phys.*, **96**, 2356 (1992)
"Re-entrant Appearance of Phases in a Relaxed Langmuir Monolayer of Tetracosanoic Acid as Determined by X-ray Scattering"

9. J.T. Woodward, J.A.N. Zasadzinski, and D.K. Schwartz, *Phys. Rev. Lett.*, **68**, 2563 (1992)
"Alternative Method of Imaging Surface Topologies of Nonconducting Bulk Specimens" (comment)

10. D.K Schwartz, J. Garnaes, R. Viswanathan, and J.A.N. Zasadzinski, *Scanning*, **14**, II-3 (1992)
"Atomic Force Microscopy of the Molecular Lattice of Thin Langmuir-Blodgett Films"

11. R. Viswanathan, D.K. Schwartz, J. Garnaes, and J.A.N. Zasadzinski, *Langmuir*, **8**, 1603 (1992)
"Atomic Force Microscopy Imaging of Substrate and pH Effects on Langmuir-Blodgett Monolayers"

12. J. Garnaes, D.K. Schwartz, R. Viswanathan, and J.A.N. Zasadzinski, *Nature*, **357**, 54 (1992)
"Domain Boundaries and Buckling Superstructures in Langmuir-Blodgett Films"

13. D.K. Schwartz, J. Garnaes, R. Viswanathan, and J.A.N. Zasadzinski, *Science*, **257**, 508 (1992)
"Surface Order and Stability in Langmuir-Blodgett Films"

14. D.K. Schwartz, R. Viswanathan, and J.A.N. Zasadzinski, *J. Phys. Chem.*, **96**, 10444 (1992)
"Reorganization and Crystallite Formation in Langmuir-Blodgett Films"

15. D.K. Schwartz, S. Steinberg, J. Israelachvili, J.A.N. Zasadzinski, *Phys. Rev. Lett.*, **69**, 3354 (1992)
"Growth of a Self-Assembled Monolayer by Fractal Aggregation"

16. D.K. Schwartz, J. Garnaes, R. Viswanathan, S. Chiruvolu, and J.A.N. Zasadzinski, *Phys. Rev. E*, **47**, 452 (1993)
"Quantitative Lattice Measurement of Thin Langmuir-Blodgett Films by Atomic Force Microscopy"

17. D.K. Schwartz, R. Viswanathan, and J.A. Zasadzinski, *Phys. Rev. Lett.*, **70**, 1267 (1993)
"Commensurate Defect Superstructures in a Langmuir-Blodgett Film"

18. D.K. Schwartz, R. Viswanathan, and J.A.N. Zasadzinski, *Langmuir*, **9**, 1384 (1993)
"Coexisting Lattice Structures in a Langmuir-Blodgett Film"

19. J. Garnaes, D.K. Schwartz, R. Viswanathan, J.A.N. Zasadzinski, *J. Synth. Metals*, **57**, 3795 (1993)
"Nanoscale Defects in Langmuir-Blodgett Films Observed by Atomic Force Microscopy"

20. D.K. Schwartz, *Nature*, **362**, 593 (1993) [invited editorial]
"Pattern Formation: Instant Patterns in Thin Films"

21. R. Viswanathan, J.A.N. Zasadzinski, and D.K. Schwartz, *Science* , **261**,.449 (1993)
"Strained-Layer van der Waals Epitaxy in a Langmuir-Blodgett Film"

22. D.K. Schwartz, R. Viswanathan, J. Garnaes, J.A.N. Zasadzinski, *J. Am. Chem. Soc.*, **115**, 7374 (1993)
"Influence of Cations, Alkane Chain Length, and Substrate on Molecular Order of Langmuir-Blodgett Films"

23. D.K. Schwartz and C.M. Knobler, *J. Phys. Chem.*, **97**, 8849 (1993)
"Direct Observations of Transitions between Condensed Langmuir Monolayer Phases by Polarized Fluorescence Microscopy"

24. D.K. Schwartz, R. Viswanathan, and J.A. Zasadzinski, *Science*, **263**, 1158 (1994)
"Examining Langmuir-Blodgett Films with Atomic Force Microscopy" [technical comment]

25. D.K. Schwartz, J. Ruiz-Garcia, X. Qiu, J.V. Selinger and C.M. Knobler, *Physica A*, **204**, 606 (1994)
"Tilt Stripe Textures in Langmuir Monolayers of Fatty Acids"

26. J.A. Zasadzinski, R. Viswanathan, L. Madsen, J. Garnaes, D.K. Schwartz, *Science*, **263**, 1726 (1994)
"Langmuir-Blodgett Films"

27. R. Viswanathan, J.A.N. Zasadzinski, and D.K. Schwartz, *Nature*, **368**, 440 (1994)
"Spontaneous Chiral Symmetry-Breaking by Achiral Molecules in a Langmuir-Blodgett Film"

28. J.A. Zasadzinski, R. Viswanathan, D.K. Schwartz, J. Garnaes, L. Madsen, S. Chiruvolu, J.T. Woodward, and M.L. Longo, *Colloids and Surfaces A*, **93**, 305 (1994)
"Applications of Atomic Force Microscopy to Structural Characterization of Organic Thin Films"

29. D.K. Schwartz, R. Viswanathan, and J.A. Zasadzinski, in "Lectures on Thermodynamics and Statistical Mechanics," eds. M. Costas, R. Rodriguez, and A.L. Benavides, p. 132 (World Scientific, Singapore) 1994. "Atomic Force Microscopy of Langmuir-Blodgett Films"

30. B. Fischer, M.-W. Tsao, J. Ruiz-Garcia, T.M. Fischer, D.K. Schwartz, and C.M. Knobler, *J. Phys. Chem.*, **98**, 7430 (1994)
"Observation of a Change from Splay to Bend Orientation at a Phase Transition in a Langmuir Monolayer"

31. D.K. Schwartz, R. Viswanathan, and J.A. Zasadzinski *J. Chem. Phys.*, **101**, 7161 (1994)
"Head-Tail Competition and Modulated Structures in Planar Surfactant (Langmuir-Blodgett) Films"

32. D.K. Schwartz, M.-W. Tsao and C.M. Knobler, *J. Chem. Phys.*, **101**, 8258 (1994)
"Domain morphology in a two-dimensional anisotropic mesophase: Cusps and boojum textures in a Langmuir monolayer"

33. D.K. Schwartz, C.M. Knobler, and R. Bruinsma *Phys. Rev. Lett.*, **73**, 2841 (1994)
"Direct Observation of Langmuir Monolayer Flow through a Channel"

34. S. Riviere, S. Hénon, J. Meunier, D.K. Schwartz, M.-W. Tsao and C.M. Knobler, *J. Chem. Phys.*, **101**, 10045 (1994)
"Textures and Phase Transitions in Langmuir Monolayers of Fatty Acids: A Comparative Brewster Angle Microscope and Polarized Fluorescence Microscope Study"

35. R. Viswanathan, L.L. Madsen, J.A.N. Zasadzinski, and D.K. Schwartz, *Science* , **269**, 51 (1995)
"Liquid to Hexatic to Crystalline Transition in Langmuir-Blodgett Films"

36. B. Fischer, M.-W. Tsao, J. Ruiz-Garcia, Th.M. Fischer, D.K. Schwartz, and C.M. Knobler, *Thin Solid Flims*, **284-285**, 110 (1996)
"The Blooming Transition in Langmuir Monolayers and its Microscopic Origin"

37. H.D. Sikes, J.T. Woodward IV, and D.K. Schwartz, *J. Phys. Chem.*, **100**, 9093 (1996)
"Pattern Formation in a Substrate-Induced Phase Transition during Langmuir-Blodgett Transfer"

38. J.T. Woodward, A. Ulman, and D.K. Schwartz, *Langmuir* , **12**, 3626 (1996)
"Self-Assembled Monolayer Growth of Octadecylphosphonic Acid on Mica"

39. M.L. Kurnaz, D.K. Schwartz, *J. Phys. Chem.*, **100**, 11113 (1996)
"Morphology of Micro-Phase Separation in Arachidic Acid/Cadmium Arachidate Langmuir Blodgett Multilayers"

40. J.T. Woodward, and D.K. Schwartz, *J. Am. Chem. Soc.*, **118**, 7861 (1996)
"In Situ Observation of Self-Assembled Monolayer Growth"

41. M.L. Kurnaz, D.K. Schwartz, *Langmuir* , **12**, 4971 (1996)
"Skeletonization as a Probe of Interlayer Correlations in Langmuir Blodgett Films"

42. D.K. Schwartz, *Surf. Sci. Reports*, **27**, 241-334 (1997)
"Langmuir-Blodgett Film Structure" [review]

43. M.L. Kurnaz, D.K. Schwartz, *Phys. Rev. E* **56**, 3378 (1997)
"Channel Flow in a Langmuir Monolayer: Unusual Velocity Profiles in a Liquid-Crystalline Mesophase"

44. H.D. Sikes, D.K. Schwartz, *Langmuir* **13**, 4704 (1997)
"A Temperature-Dependent Two-Dimensional Condensation Transition during Langmuir-Blodgett Deposition"

45. M.L. Kurnaz, D.K. Schwartz, *Journal of Rheology* **41**, 1173 (1997)
"A Technique for Direct Observation of Particles under Shear in a Langmuir Monolayer"

46. J.T. Woodward, I. Doudevski, H.D. Sikes, D.K. Schwartz, *J. Phys. Chem. B* **101**, 7535 (1997)
"Kinetics of Self-Assembled Monolayer Growth Explored via Submonolayer Coverage of Incomplete Films"

47. H.D. Sikes, D.K. Schwartz, *Science* **278**, 1604 (1997)
"Two Dimensional Melting of an Anisotropic Crystal Observed at the Molecular Level"

48. J.T. Woodward, D.K. Schwartz, *Langmuir* **13**, 6873 (1997)
"Dewetting Modes of Surfactant Solution as a Function of the Spreading Coefficient"

49. J.T. Woodward, D.K. Schwartz, *J. Vac. Sci. Technology B* **16**, 51 (1998)
"Removing Drift from Scanning Probe Microscope Images of Periodic Samples"

50. D.Y. Takamoto, E. TerOvanesyan, D.K. Schwartz, R. Viswanathan, *et al., Acta Physica Polonica,* **93**, 373 (1998)
"Atomic Force Microscopy of Instabilities and Reorganization of Langmuir-Blodgett Films"

51. M. Breen, J.T. Woodward, A.W. Apblett, D.K. Schwartz, *Chem. of Materials* **10**, 710 (1998)
"Direct Evidence for an Ion by Ion Deposition Mechanism in Solution Growth of CdS Thin Films"

52. D.K. Schwartz, *Current Opinion in Colloid and Interface Science* **3**, 131 (1998)
"Scanning Probe Microscope Studies of Thermodynamic and Kinetic Processes in Ultrathin Organic Films" [invited review]

53. D. Gidalevitz, M.L. Kurnaz, O.Y. Mindyuk, B.M. Ocko, D.K. Schwartz, and P.A. Heiney, *Langmuir* **14**, 2910 (1998)
"Thermal Melting in Langmuir Films of Discotic Liquid-Crystalline Compounds"

54. D. Gidalevitz, O.Y. Mindyuk, M.R. Stetzer, P.A. Heiney, M.L. Kurnaz, D.K. Schwartz, B.M. Ocko , J.P. McCauley, Jr., and A.B. Smith, III *J. Phys. Chem. B* **102**, 6688 (1998)
"A Conformational Phase Transition in a Langmuir Film of an Amphiphilic Azacrown"

55. W.A. Hayes and D.K. Schwartz *Langmuir* **14**, 5913-5917 (1998).
"Two Stage Growth of Octadecyltrimethylammonium Bromide Monolayers at Mica from Aqueous Solution Below the Krafft Point"

56. I. Doudevski, W.A. Hayes and D.K. Schwartz *Phys. Rev. Lett.* **81**, 4927 (1998)
"Submonolayer Island Nucleation and Growth Kinetics during Self-assembled Monolayer Formation"

57. C.K. Park, F.J. Schmitt, L. Evert, D.K. Schwartz, J.N. Israelachvili, C. Knobler, *Langmuir* **15**, 202-206 (1999).
"Film Balance and Fluorescence Microscopic Investigation of the Effects of Ca2+ on Mixed DMPC/DMPG Monolayers"

58. C.M. Knobler and D.K. Schwartz, *Current Opinion in Colloid and Interface Science* **4**, 46-51 (1999).
"Langmuir and Self-assembled Monolayers" [invited review]

59. I. Doudevski and D.K. Schwartz *Phys. Rev. B* **60**, 14-17 (1999).
"Dynamic scaling of the submonolayer island size distribution during self-assembled monolayer growth"

60. A. Ivanova, M.L. Kurnaz, and D.K. Schwartz, *Langmuir* **15**, 4622-4624 (1999).
"Temperature and flow rate dependence of the velocity profile during channel flow of a Langmuir monolayer"

61. D.K. Schwartz and I. Doudevski, *Mat. Res. Soc. Symp. Proc.* **570**, 163-170 (1999).
"In situ observation of scaling behavior during solution-phase growth of surfactant monolayers"

62. J.T. Woodward, H. Gwin, and D.K. Schwartz, *Langmuir* , **16**, 2957-2961 (2000)
"Contact angles on surfaces with mesoscopic chemical heterogeneity"

63. I. Doudevski, W.A. Hayes, J.T. Woodward, D.K. Schwartz, *Coll. and Surf. A* **174**, 233-243 (2000).
"Atomic force microscope imaging of molecular aggregation during self-assembled monolayer growth"

64. J. Ignes-Mullol and D.K. Schwartz, *Phys. Rev. Lett.* **85**, 1476 (2000).
"Alignment of Hexatic Langmuir Monolayers under Shear"

65. A.T. Ivanova and D.K. Schwartz, *Langmuir* **16**, 9433-9438 (2000).
"Transient Behavior of the Velocity Profile in Channel Flow of a Langmuir Monolayer"

66. I. Doudevski and D.K. Schwartz, *J. Phys. Chem. B* **104**, 9044-9047 (2000).
"Evolution of a Steady State Island Size Distribution during Self-Assembled Monolayer Dissolution"

67. I. Doudevski and D.K. Schwartz, *Langmuir* **16**, 9381-9384 (2000).
"Mechanisms of Self-Assembled Monolayer Desorption Determined using In Situ Atomic Force Microscopy"

68. R.M. Enmon Jr., K.C. O'Connor, D.J. Lacks, D.K. Schwartz, and R.S. Dotson, *Biotechnol. Bioeng.*, **72**, 579-591 (2001).
"Dynamics of Spheroid Self-Assembly in Liquid-Overlay Culture of DU 145 Human Prostate Cancer Cells"

69. I. Doudevski and D.K. Schwartz, *Appl. Surface Sci.* **175-176**, 17-26 (2001).
"Self-Assembled Monolayers in the Context of Epitaxial Film Growth"

70. C. Messerschmidt and D.K. Schwartz, *Langmuir* **17**, 462-467 (2001).
"Growth mechanisms of octadecylphosphonic acid self-assembled monolayers on sapphire (corundum): Evidence for a quasi-equilibrium triple point"

71. D.K. Schwartz, *Ann. Rev. Phys. Chem.* **52**, 107-137 (2001).
"Mechanisms and Kinetics of Self-Assembled Monolayer Formation"

72. B.K. Simmons, C. Taylor, S. Li, F. Landis, V.T. John, G.L. McPherson, D.K. Schwartz and R. Moore, *J. Am. Chem. Soc.* **123**, 2414-2421 (2001)
"Microstructure Determination of AOT + Phenol Organogels Utilizing Small-Angle X-Ray Scattering and Atomic Force Microscopy"

73. J. Ignes-Mullol and D.K. Schwartz, *Nature* **410**, 348-351 (2001).
"Shear-induced Molecular Precession in a Hexatic Langmuir Monolayer."

74. I. Doudevski and D.K. Schwartz, *J. Am. Chem. Soc.* **123**, 6867-6872 (2001).
"Concentration dependence of self-assembled monolayer island nucleation and growth."

75. A.T. Ivanova, J. Ignes-Mullol, and D.K. Schwartz, *Langmuir* **17**, 3406-3411 (2001).
"Micro-rheology of a sheared Langmuir monolayer: Elastic recovery and inter-domain slippage."

76. J. Ignes-Mullol and D.K. Schwartz, *Langmuir* **17**, 3017-3029 (2001).
"Molecular Orientation in Langmuir Monolayers under Shear."

77. D.Y. Takamoto, E. Aydil, J.A. Zasadzinski , A. T. Ivanova, D.K. Schwartz, T. Yang, P.S. Cremer, *Science* **293**, 1292-1295 (2001).
"Stable ordering in Langmuir-Blodgett films"

78. D.K. Schwartz, in *Encyclopedia of Materials: Science and Technology,* K.H.J. Buschow *et al*. eds. Elsevier, Oxford (2001) pp. 4392-4399.
"Langmuir-Blodgett Films: Formation and Structure"

79. J. Ding, H.E. Warriner, J.A. Zasadzinski, D.K. Schwartz, *Langmuir* **18**, 2800-2806 (2002).
"A Magnetic Needle Viscometer For Langmuir Monolayers"

80. R.M.Enmon Jr., K.C.O 'Connor, H. Song, D.J. Lacks, D.K. Schwartz, *Biotechnol. Bioeng.* **80**, 580-588 (2002).
"Aggregation Kinetics of Well and Poorly Differentiated Human Prostate Cancer Cells"

81. B.M. Ocko, M. Kelly, A.T. Nikova, D.K. Schwartz, *Langmuir* **18**, 9810-9815 (2002).
"Structure and phase behavior of mixed monolayers of saturated and unsaturated fatty acids"

82. B. Simmons, S. Li, V.T. John, G.L. McPherson, C. Taylor, D.K. Schwartz and K. Maskos, *Nanoletters* **2**, 1037-1042 (2002).
"Spatial compartmentalization of nanoparticles into strands of a self-assembled organogel".

83. G.B. Bantchev and D.K. Schwartz *Langmuir* **19**, 2673-2682 (2003).
"Surface rheology of β-casein layers at the air/solution interface: Formation of a two-dimensional physical gel"

84. C.E. Taylor and D.K. Schwartz, *Langmuir* **19**, 2665-2672 (2003).
"Octadecanoic acid self-assembled monolayer growth at sapphire surfaces"

85. D.M. Walba,, C.A. Liberko, E. Körblova, M. Farrow, T.E. Furtak, B.C. Chow, D.K. Schwartz, A.S. Freeman, K. Douglas, S.D. Williams, A.F. Klittnick, and N.A. Clark, *Liquid Crystals*, **31**, 481-489 (2004)
"Self-Assembled Monolayers for Liquid Crystal Alignment: Simple Preparation on Glass Using Alkyltrialkoxysilanes."

86. J.M. Mellott, W.A. Hayes, and D.K. Schwartz, *Langmuir* **20**, 2341-2348 (2004).
"Kinetics of Otcadecyltrimethylammonium Bromide Self-Assembled Monolayer Growth at Mica from Aqueous Solution"

87. J.M. Mellott and D.K. Schwartz, *J. Am. Chem. Soc.*, **126**, 9369-9373 (2004)
"Supercritical Self-Assembled Monolayer Growth"

88. G.B. Bantchev and D.K. Schwartz, *Langmuir*, **20**, 11692-11697 (2004)
"Structure of β-casein layers at the air/solution interface: Atomic Force Microscopy studies of transferred layers."

89. C.R. Vessely, J.F. Carpenter, and D.K. Schwartz, *Biomacromolecules,* **6**, 3334-3344 (2005)
"Calcium-Induced Changes to Molecular Conformation and Aggregate Structure of □eta-Casein at the Air-Water Interface"

90. Mark Nelson, Nicholas Cain, Chad E. Taylor, Benjamin M. Ocko, Douglas L. Gin, Scott R. Hammond, Daniel K. Schwartz, *Langmuir* **21**, 9799-9802 (2005)
"Periodic Arrays of Interfacial Cylindrical Reverse Micelles"

91. Andrew D. Price, and Daniel K. Schwartz, *Langmuir*, **22**, 9753-9759 (2006)
"Anchoring of a Nematic Liquid Crystal on a Wettability Gradient"

92. Nicholas Cain, Josh Van Bogaert, Douglas L. Gin, Scott R. Hammond, Daniel K. Schwartz, *Langmuir* **23**, 482487 (2007)
"Self-Organization of a Wedge-Shaped Surfactant in Monolayers and Multilayers"

93. Andrew D. Price, and Daniel K. Schwartz, *J. Phys. Chem. B*, **111**, 1007-1015 (2007)
"Fatty Acid Monolayers at the Nematic/Water Interface: Phases and Liquid Crystal Alignment"

94. Keith Forward, Amanda Moster, Daniel K. Schwartz, and Daniel J. Lacks, *Langmuir,* **23**, 5255-5258 (2007)
"Contact angles of sub-millimeter particles: Connecting wettability to nanoscale surface topography"

95. Eric Karp, Cory S. Pecinovsky, Michael J. McNevin, Douglas L. Gin, and Daniel K. Schwartz, *Langmuir,* **23**, 7923-7927 (2007)
"Langmuir Monolayers of a Photo-isomerizable Macrocycle Surfactant"

96. Siwar Trabelsi, Shishan Zhang, T. Randall Lee, Daniel K. Schwartz, *Soft Matter,* **2**, 1518-1524 (2007)
"Swelling of a Cluster Phase in Langmuir Monolayers Containing Semi-Fluorinated Phosphonic Acids"

97. Siwar Trabelsi, Shishan Zhang, T. Randall Lee, Daniel K. Schwartz, *Phys. Rev. Lett.,* **100**, 037802 (2008)
"Linactants: Surfactant Analogues in Two Dimensions"

98. Andrei Honciuc, Adam Harant, and Daniel K. Schwartz, *Langmuir*, **24**, 6562-6566 (2008)
"Single-Molecule Observations of Surfactant Diffusion at the Solution-Solid Interface"

99. Andrew D. Price, and Daniel K. Schwartz, *J. Am. Chem. Soc.,* **130**, 8188-8194 (2008)
"DNA Hybridization-Induced Reorientation of Liquid Crystal Anchoring at the Nematic Liquid Crystal/Aqueous Interface"
(Highlighted in *Chemistry World*, 6/262008, "Liquid crystals stand up for DNA detection")

100. Stephanie M. Malone and Daniel K. Schwartz. *Langmuir*, **24**, 9790-9794 (2008)
"Polar and Azimuthal Alignment of a Nematic Liquid Crystal by Alkylsilane Self-Assembled Monolayers: Effects of Chain-Length and Mechanical Rubbing"

101. Shishan Zhang, Andrew C. Jamison, Daniel K. Schwartz, and T. Randall Lee, *Langmuir*, **24**, 10204-10208 (2008)
"Self-Assembled Monolayers Derived from a Double-Chained Monothiol Having Chemically Dissimilar Chains"

102. Andrei Honciuc, Alexander L. Howard, Daniel K. Schwartz, *J Phys Chem C* **113**, 2078-2081 (2009)
"Single Molecule Observations of Fatty Acid Adsorption at the Silica/Water Interface: Activation Energy of Attachment"

103. Siwar Trabelsi, Shishan Zhang, Zhongcheng Zhang, T. Randall Lee, Daniel K. Schwartz, *Soft Matter* **5**, 750-758 (2009)
"Semi-fluorinated Phosphonic Acids Form Stable Nanoscale Clusters in Langmuir-Blodgett and Self-Assembled Monolayers"

104. Steve T. Marshall, Daniel K. Schwartz, J. William Medlin, *Sensors and Actuators B: Chemical* **136**, 315-319 (2009)
"Selective Acetylene Detection Through Surface Modification of Metal-Insulator-Semiconductor Sensors with Alkanethiolate Monolayers"

105. Andrei Honciuc, Denver Jn. Baptiste, Daniel K. Schwartz, *Langmuir* **25**, 4339-4342 (2009)
"Hydrophobic Interaction Microscopy: Mapping the Solid/ Liquid Interface using Amphiphilic Probe Molecules"

106. Andrei Honciuc, Daniel K. Schwartz, *J. Am. Chem. Soc.* **131**, 5973-5979 (2009)
"Probing Hydrophobic Interactions using Trajectories of Amphiphilic Molecules at a Hydrophobic/Water Interface"

107. Andrew D. Price, Jordi Ignés-Mullol, Thomas E. Furtak, Yu-an Lo, Stephanie M. Malone, and Daniel K. Schwartz, *Soft Matter*, **5**, 2252-2260 (2009)
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215. David S. Bull, Daniel F. Kienle, Andres F. Chaparro Sosa, Nathan Nelson, Shambojit Roy, Jennifer N. Cha, Daniel K. Schwartz, Joel L. Kaar, and Andrew P. Goodwin *J. Phys. Chem. Lett.*, **10**, 2541-2647 (2019). doi:10.1021/acs.jpclett.9b00806
"Surface-Templated Nanobubbles Protect Proteins from Denaturation on Hydrophobically-Modified Glass Surfaces"

216. Jeremiah C. Traeger, Zachary Lamberty, and Daniel K. Schwartz, *ACS Nano*, **13**, 7850-7859 (2019). doi:10.1021/acsnano.9b02157
"Influence of Oligonucleotide Grafting Density on Surface-Mediated DNA Transport and Hybridization"

217. Connor J. Thompson, Deborah E. Leckband, and Vu Vinh, and Daniel K. Schwartz, *J. Phys. Chem. Lett.,* **10**, 4528-4534 (2019): doi:10.1021/acs.jpclett.9b01500
"Cadherin Extracellular Domain Clustering in the Absence of Trans-Interactions"

218. Dapeng Wang, Lijun Liu, Haichao Wu, Jizhong Chen, and Daniel K. Schwartz, *Phys Rev Lett* **123**, 118002 (2019); doi:10.1103/PhysRevLett.123.118002
"Diffusive Escape of a Nanoparticle from a Porous Cavity"

219. David Faulón Marruecos, Leila Saleh, Hye Hyun Kim, Ben Coscia, Stephanie J. Bryant, Daniel K. Schwartz, Joel L. Kaar, *ACS Applied Bio Materials* **2**, 4698-4702 (2019); doi:10.1021/acsabm.9b00815
"Stabilization of Fibronectin by Random Copolymer Brushes Inhibits Macrophage Activation"

220. Benjamin Greydanus, Daniel K. Schwartz, and J. Will Medlin, *ACS Applied Matls & Interfaces* **12**, 2338-2345(2020); doi:10.1021/acsami.9b16957
"Controlling Catalyst Phase Selectivity in Complex Mixtures with Amphiphilic Janus Particles

221. Raphael Sarfati and Daniel K. Schwartz, *ACS Nano*, **14**, 3041-3047 (2020); doi:10.1021/acsnano.9b07910
"Temporally anticorrelated subdiffusion in water nanofilms on silica suggests near surface viscoelasticity"

222. Jeremiah C. Traeger, and Daniel K. Schwartz, *Journal of Colloid and Interface Science,* **566**, 369-374 (2020); doi:10.1016/j.jcis.2020.01.070
"Interplay of Electrostatic Repulsion and Surface Grafting Density on Surface-Mediated DNA Hybridization"

223. James S. Weltz, Daniel F. Kienle, Daniel K. Schwartz, and Joel L. Kaar, *J .Am. Chem. Soc.* **142**, 3463-3471 (2020); doi:10.1021/jacs.9b11707
"Reduced Enzyme Dynamics upon Multipoint Covalent Immobilization Leads to Stability-Activity Tradeoff"

224. Haichao Wu, Raphaël Sarfati, Dapeng Wang, Daniel K. Schwartz *J. Am. Chem. Soc.* **142**, 4696-4704 (2020); doi:10.1021/jacs.9b12096
"Electrostatic Barriers to Nanoparticle Accessibility of a Porous Matrix"

225. Jordan S. Lum, Verya Daeichin, Daniel F. Kienle, Daniel K. Schwartz, Todd W. Murray, and Mark A. Borden, *Applied Physics Letters*, **116**, 123703 (2020); doi:10.1063/1.5135017
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226. Daniel F. Kienle, Andres F. Chaparro Sosa, Joel L. Kaar, and Daniel K. Schwartz, *ACS Applied Materials and Interfaces*, **12**, 4110-4120 (2020); doi:10.1021/acsami.0c04964
"Polyelectrolyte Multilayers Enhance the pH Stability and Dry Storage of Physically Encapsulated Enzymes"

227. Gregory T. Morrin, Daniel F. Kienle, James S. Weltz, Jeremiah C. Traeger, and Daniel K. Schwartz *Macromolecules,***53**, 22640-22649 (2020); doi:10.1021/acs.macromol.9b02365
"Polyelectrolyte surface diffusion in a nanoslit geometry: Effects of height and surface chemistry"

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"Particle Remobilization in Filtration Membranes during Flow Interruption"

229. Andres F. Chaparro Sosa, Kenneth J. Black, Daniel F. Kienle, Joel L. Kaar, and Daniel K. Schwartz, *Advanced Materials Interfaces*, **7**, 2000533 (2020); doi:10.1002/admi.202000533
"Engineering the Composition of Heterogeneous Lipid Bilayers to Stabilize Tethered Enzymes"

230. Dapeng Wang and Daniel K. Schwartz, *J. Phys Chem C*, **124**, 19880-19891 (2020); doi:10.1021/acs.jpcc.0c05834
"Non-Brownian Interfacial Diffusion: Flying, Hopping, and Crawling"
[Invited Perspective, Cover Article]

231. Haichao Wu and Daniel K. Schwartz, *Accounts of Chemical Research*, **53**, 2130-2139 (2020); doi:10.1021/acs.accounts.0c00408
"Nanoparticle Tracking to Probe Transport in Porous Media"
[Invited Focused Review, Cover Article]
[Highlighted on X-Mol: https://www.x-mol.com/news/505250]

232. Andres F. Chaparro Sosa, Sabrina Matos de Oliveira da Silva, Daniel K. Schwartz, and Joel L. Kaar, *J Phys Chem Lett*, **11**, 7417-7422 (2020); doi:10.1021/acs.jpclett.0c02074
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"Connecting Hindered Transport in Porous Media Across Length Scales: From Single-Pore to Macroscopic"

235. Marcelo H. Gehlen, Larissa S. Foltran, Daniel F. Kienle and Daniel K. Schwartz, *J Phys Chem Lett*, **11**, 9714-9724 (2020); doi:10.1021/acs.jpclett.0c03030
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236. Nathaniel Nelson, Belita OPene, Robert K. Ernst, and Daniel K. Schwartz, *PLoS ONE*, **15**, e0242907 (2020); doi:10.1371/journal.pone.0242907
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"Single molecule characterization of anomalous transport in a thin, anisotropic film"

238. Connor J. Thompson, Vinh H. Vu, Deborah E. Leckband, and Daniel K. Schwartz, *Proceedings of the National Academy of Sciences*, **118**, e2019845118 (2021): doi:10.1073/pnas.2019845118.
"Cadherin Cis- and Trans-Interactions are Mutually Cooperative"

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"Enhanced Diffusive Transport in Fluctuating Porous Media"

240. Héctor Sánchez-Morán, James S. Weltz, Daniel K. Schwartz, and Joel L. Kaar, *ACS Applied Materials and Interfaces*, **13**, 26694-26703 (2021); doi:10.1021/acsami.1c02443
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241. Andres F. Chaparro Sosa, Riley M. Bednar, Ryan A. Mehl, Daniel K. Schwartz, and Joel L. Kaar, *J. Am. Chem. Soc.*, **143**, 7154-7163 (2021); doi:10.1021/jacs.1c02375
"Faster Surface Ligation Reactions Improve Immobilized Enzyme Structure and Activity"
[Highlighted in Science Translational Medicine:
https://blogs.sciencemag.org/pipeline/archives/2021/05/13/tie-me-proteins-all-down-sport]

242. Haichao Wu, Benjamin Greydanus, and Daniel K. Schwartz, *Proceedings of the National Academy of Sciences*, **118**, e2101801118 (2021); doi:10.1073/pnas.2101807118
"Mechanisms of Transport Enhancement for Self-Propelled Nanoswimmers in a Porous Matrix"

243. Gregory T. Morrin and Daniel K. Schwartz. *ACS Macro Letters,* **10**, 1191-1195 (2021); 10.1021/acsmacrolett.1c00470
"Diffusion of Short Semi-Flexible DNA in Strong and Moderate Confinement"

244. Albert Velasco Abadia, Katie M. Herbert, Valentina M. Matavulj, Timothy J. White, Daniel K. Schwartz, and Joel L. Kaar, *J. Am. Chem. Soc.,* **143**, 16740–16749 (2021); doi:10.1021/jacs.1c08216
"Chemically Triggered Changes in Mechanical Properties of Liquid Crystal Polymer Networks with Immobilized Urease"

245. Haichao Wu and Daniel K. Schwartz, *Journal of Membrane Science,* **641**, 119878 (2022); doi:10.1016/j.memsci.2021.119878
"Fouling of Microfiltration Membranes by Bidisperse Particle Solutions"

246. Benjamin Greydanus, Mohammad Saleheen, Haichao Wu, Andreas Heyden, J Will Medlin, Daniel K Schwartz, *J. Colloid Interface Sci,* **614**, 425-435 (2022); doi:10.1016/j.jcis.2022.01.053
"Probing Surface-Adsorbate Interactions through Active Particle Dynamics"

247. Zachary Blanchette, Jing Zhang, Sadegh Yazdi, Michael Griffin, Daniel K. Schwartz, and J. William Medlin *Catalysis Science and Technology*, **12**, 2306 (2022); doi:10.1039/d1cy02131a
"Investigating deposition sequence during synthesis of Pd/Al2O3 catalysts modified with organic monolayers"

248. Connor J. Thompson, Daniel F. Kienle, and Daniel K. Schwartz, *J. Phys. Chem. Lett.,* **13**, 2901-2907 (2022); doi:10.1021/acs.jpclett.2c00227
"Enhanced Facilitated Diffusion of Membrane-Associating Proteins Under Symmetric Confinement"

249. Albert Velasco Abadia, Katie M. Herbert, Timothy J. White, Daniel K. Schwartz, and Joel L. Kaar, *ACS Appl. Mater. Interfaces*, 14, 26480–26488 (2022); doi:10.1021/acsami.2c05802
"Biocatalytic 3D Actuation in Liquid Crystal Elastomers via Enzyme Patterning"

250. Ezra A Baghdady, Daniel K. Schwartz, and J. William Medlin, *ACS Applied Materials and Interfaces*, **14**, 33457–33462 (2022); doi:10.1021/acsami.2c11732
"Effects of Surface Hydrophobicity on Catalytic Transfer Hydrogenation of Styrene with Formic Acid in a Biphasic Mixture"

251. Ohad Vilka, Erez Aghion, Carsten Beta, Oliver Nagel, Matthias Weiss, Adal Sabri, Diego Krapff, Raphael Sarfati, Daniel K. Schwartz, Ralf Metzler, Ran Nathan, Michael Assafa, *Phys. Rev. Research*, **4**, 033055 (2022) doi:10.1103/PhysRevResearch.4.033055
"Unravelling the Origins of Anomalous Diffusion: from Molecules to Migrating Storks"

252. Kaixuan Lyu, Hongbo Chen, Jing Gao, Jing Jin, Hengchong Shi, Xiangling Ji, Daniel K. Schwartz, Dapeng Wang (in revision)
“Protein Desorption Kinetics Depends on the Timescale of Observation”

253. Victoria Reichelderfer, Andres Chaparro Sosa, Joel L. Kaar, Daniel K. Schwartz (in revision)
“Tuning the Surface Charge of Phospholipid Bilayers Inhibits Insulin Fibrilization”

254. Benjamin Greydanus, J Will Medlin, Daniel K Schwartz (in review)
“Elucidating the influence of metal surface composition on organic adsorbate binding using active particle dynamics”

255. Zachary Blanchette, Daniel K. Schwartz, and J. William Medlin (in preparation)
“Directing reaction pathways on supported metal catalysts with low-density self-assembled monolayers”

256. Albert Velasco Abadia, Grant E. Bauman, Timothy J. White, Daniel K. Schwartz, Joel L. Kaar (in preparation)
"4D Printing of Biocatalytic Liquid Crystal Elastomers as Multifunctional Biomolecular-Responsive Actuators"

PATENTS AND APPLICATIONS

1. *Methods and Devices for Detecting Nucleic Acid Hybridization*, US Patent No 7,947,510 (US Patent Application 2009/0061527).

2. *Method of Preparing Immunologically-Active Adjuvant-Bound Dried Vaccine Composition*, US Patent No. 8,444,991 (U.S. Patent Application 2010/0158951; 2013/0315966 A1).

3. *Materials and Methods for Improving Selectivity in Heterogeneous Catalysts and Products Thereof,* U.S. Patent Application 2012/023520.

4. *Mixed Alkylsilane Functionalized Surfaces for Simultaneous Wetting and Homeotropic Anchoring of Liquid Crystals*, US Provisional Patent Application #61/537,943.

5. *Binding Detection Using Liquid Crystal*. US Patent No 10,422,791 (US Patent Application 2015/121,750)

6. *Mixed Phospholipid Bilayers Catalytically Promote Protein Refolding, Inhibit and Reverse Aggregate Formation and Methods of Treating Neurodegenerative Diseases Using the Same*, US Patent Application PCT/US2021/046022.

7. *Stability and Activity of Enzymes by Immobilization,* US Patent Application PCT/US2021/072409.

FUNDING (PI unless otherwise noted)

Current

2021 DOE BES (DE-SC0001854), Separations Science Program, $600,000
–2024 Single-molecule Dynamics in Complex and Interface-rich Separations Environments

2022 DOE BES (DE-SC0023449) Catalysis Science Program, $450,000
–2024 Biocatalytic Nanoparticles that Enable Supra-biological Cascade Reactions

2020 NSF CBET (2103647) $391,499 (Joel Kaar, PI)
–2023 Mechanisms of Catalytic Enhancement of Immobilized Lipases by Tunable Polymer Materials

2021 ACS Petroleum Research Fund (62507-ND7), $110,000 (Ryan Hayward, PI)
–2023 Monitoring Dynamics During Polymer Crystallization by Single Molecule FRET.

2022 DOE BES (DE-SC0005239), Catalysis Science Program, $475,000 (Will Medlin, PI)
–2024 Selectivity Control through Modification of Metal Catalysts with Organic Monolayers

2020 NSF CBET (2004090) $698,235 (Will Medlin, PI)
–2023 Catalytic Selectivity Control in Electrochemical Systems using Self-Assembled Monolayers

2019 US Army Research Office (W911NF-19-1-0349), $600,000 (Joel Kaar, PI)
–2022 Chemically Responsive Liquid Crystal Polymers with Immobilized Enzymes

2021 MAST Center (NSF I/UCRC, #20–xx), $90,000
–2022 Nanoparticle Tracking in Virus Filtration

Previous

2018 DOE BES (DE-SC0001854), Separations Science Program, $600,000
–2021 Single-molecule Dynamics in Interface-rich Separations Environments

2019 NIH NIA (1R21AG06297901), ~$189k to DKS (Joel Kaar, PI)
-2021 Inhibition of Amyloid Formation by Heterogeneous Nanoparticles with Chaperone-like Activity

2017 NIH NIGMS (1R01GM117104), ~$500k to DKS (Deborah Leckband, PI)
-2021 Multiscale investigation of the impact of 2D confinement on adhesion protein function

2016 Defense Threat Reduction Agency (HDTRA1-16-1-0045), $1,365,392
–2021 Determining the Mechanistic Basis for Surface Interactions and Effects on Catalytic Efficiency in Tethered Enzyme Systems

2018 NIH NIAMS (1R21AR071550), ~$195k to DKS (Joel Kaar, PI)
-2021 Single-molecule resolution of DAMPs and their impact on the FBR

2016 US Army Research Office, Microbiology Program (W911NF-16-1-0151), $381,859
–2020 Single molecule resolution of peptide-lipopolysaccharide interactions

2017 MAST Center (NSF I/UCRC, #17–12), $201,284
–2020 Mapping Membrane Tortuosity using High-Throughput 3D Nanoparticle Tracking

2019 Pall Corp., $117,502
–2020 Characterizing Functional Properties of Structurally Ordered Membranes using Nanoparticle Tracking

2014 NSF/MRSEC (DMR 1420736), $12M (co-PI, DKS share ~$50k/yr)
-2020 Soft Materials Research Center

2016 DOE BES (DE-SC0005239), Catalysis Program, $575,000 (Will Medlin, PI)
–2019 Selectivity Control through Modification of Metal Catalysts with Organic Monolayers

2015 DoEd GAANN Award (Training grant), ~$600k (Stephanie Bryant, PI)
-2018 A Graduate Program in Biomaterials

2015 US Army Research Office (66686-CH), $360,000 (Joel Kaar, PI)
–2018 Single Molecule Resolution of Immobilized Enzyme Function

2013 NIH BRP (2R01EB006006-06), $4.5M for 7 investigators (Ted Randolph, PI)
–2018 Aggregation of Therapeutic Proteins

2015 DOE BES (DE-SC0001854), Separations Science Program, $720,000
–2018 Mapping Surface Functionality and Reactivity using Single-Molecule Probes

2013 DOE BES (DE-SC0005239), Catalysis Program, $510,000 (Will Medlin, PI)
–2016 Selectivity Control through Modification of Metal Catalysts with Organic Monolayers

2013 NSF, Chemical Measurement and Imaging (CHE-1306108), $493,000
–2016 Single-Molecule Methods for Interfacial Dynamics

2012 NSF Engineering (CBET-1160202), $340,000
–2016 Methods for Detecting Nucleic Acid Hybridization Using Liquid Crystals

Previous Funding (continued)

2012 –2015 DOE BES (DE-SC0001854), Separations and Analysis Program, $690,000
Mapping Surface Functionality and Reactivity using Single-Molecule Probes

2012 –2015 NIH NIBIB (5R21EB015532), $386,825
Tools to Connect Protein Conformations, Dynamics, and Associations"

2012 –2015 NIH NIBIB (5R21EB015061), $397,721
Effects of Vicinal Surface Chemistry on DNA Base-Pairing using Single-Molecule RET

2012 –2014 Dow Corning Corporation, $1,466,194 (Christine Hrenya, PI, DKS share ~$50k)
Cohesive Particle Fluidization

2011 –2014 NSF Engineering (CBET-1133871), $338,991 (Ted Randolph, PI)
Mechanisms of Damage to Pharmaceutical Proteins at Oil-Water Interfaces

2008 -2014 NSF/MRSEC (DMR 0820579), $7.2M (co-PI, DKS share ~$35k/yr direct costs)
Liquid Crystal Materials Research Center

2013 –2014 Pall Corporation, $97,275
Single-Molecule Resolution of Protein Layer Formation on Polymer Surfaces

2010 –2013 DOE BES (DE-SC0005239), Catalysis Program, $580,000 (Will Medlin, PI)
Selectivity Control through Modification of Metal Catalysts with Organic Monolayers

2010 –2013 MAST Center (NSF I/UCRC, #10–1), $127,500
Real-time Single Molecule Imaging of Proteins on Polymer Surfaces

2009 –2013 NSF, Surface & Analytical Chemistry (CHE-0841116), $502,000
Single-molecule studies of surfactant mobility at the solid/solution interface

2009 –2013 NSF, Solid State Chemistry (DMR-0906735), $397,030
Collaborative Research: Line-Active Amphiphiles for Nanostructure Stability

2007 –2012 NIH BRP (5R01EB006006-04), $2.9M for 7 investigators (Ted Randolph, PI)
Aggregation of Protein Therapeutics: Mechanisms, Stability, and Interdiction

2009 -2012 NSF, Engineering Education Program (Training grant), $300,000
REU Site Program in Functional Materials

2009 –2012 DOE SISGR (DE-SC0001854), Chemical Imaging Program, $660,000
Mapping Non-Covalent Surface Functionality using Single-Molecule Probes

2009 –2011 NIH (1RC2HG005598-01, subcontract to Helicos Biosciences), $124,000
Providing the $1000 Genome via Improved Single Molecule Sequencing

2009 –2011 Colorado State Bioscience Proof-of-Concept Grant (09BGF13), $90,000
Liquid Crystal Read-out for DNA Microarrays

2008 –2010 ACS-Petroleum Research Fund (47917-AC5), $100,000
Single-Molecule Studies of Surfactant Dynamics at the Oil/Water Interface

2006 -2010 DoEd GAANN Award (Training grant), $506,688 (Chris Bowman)
A Graduate Program in Micro- and Nanostructured Materials

Previous Funding (continued)

2005 –2009 NSF Award, Solid State Chemistry Program, $333,000
Collaborative Research: Line-Active Amphiphiles for Nanostructure Stability

2004 –2008 NSF Award, Surface & Analytical Chemistry Program, $485,000
Molecular Mobility within Self-Assembled Monolayers

2006 -2009 NSF EEF (Training grant), $412,000
REU Site Program in Functional Materials

2002 -2006 DoEd GAANN Award (Training grant), $516,672 (C. Bowman, PI)
Graduate Program in Functional Materials

2003 -2006 DoEd GAANN Award, $491,940 (N. Clark, PI, DKS and 3 others, co-PIs)
Graduate Program in Liquid Crystal Science and Technology

2003 -2005 US Department of Agriculture, $214,864
Correlating the Rheology and Structure of Beta-Casein Interfacial Layers

2001 –2005 Louisiana Board of Regents, Graduate Fellows Program, $70,000
Recruitment of Superior Graduate Students in Chemistry

2000 –2004 NSF, Surface & Analytical Chemistry Program, $309,700
Formation mechanisms of self-assembled monolayers

1999 -2004 Camille Dreyfus Teacher-Scholar Award, $60,000
Structural and dynamic properties of ultra-thin organic films

1998 -2002 NSF/CAREER Award, Interfacial, Transport, & Separation Process Program, $200,000
Studies of interfacial flow in surfactant monolayers.

1998 –2000 PRF type AC grant, $60,000
Interfacial flow in surfactant and colloidal monolayers

1998 –2000 Camille & Henry Dreyfus Foundation Special Grant, $14,400
Tulane Science Scholars Program –outreach program for talented high school students.

1996 –1999 NSF, Surface & Analytical Chemistry Program, $217,000
Formation mechanisms of self-assembled monolayers

1996 –1999 Louisiana BORSF R&D Industrial Ties Research Subprogram Grant, $135,000
Two-dimensional organization of aromatic components of asphaltene.

1994 -1999 Camille and Henry Dreyfus New Faculty Award, $25,000
Structure, phase transitions, dynamics, and pattern formation in thin organic films.

1997 –1998 NIST, Biotechnology Division, $75,000
Atomic force microscopy of hybrid bilayer membranes

1995 –1997 PRF type G starter grant, $20,000
Optical and atomic force microscopy of ultrathin organic films.

1994 Exxon Education Foundation Grant, $10,000
AFM Studies of Boundary Lubrication

INVITED PRESENTATIONS AT CONFERENCES

1. Scanning '92, 11/92
   "Atomic Force Microscopy of Thin Langmuir-Blodgett Films"
2. American Chemical Society National Meeting, 3/93
   "Surface Structure of Langmuir-Blodgett Films Determined by Atomic Force Microscopy"
3. Materials Research Society, 12/93
   "Frustrated Molecular Packing and Modulated Structures in Langmuir-Blodgett Films"
4. Annual Winter Meeting on Statistical Physics (Cuernavaca, Mexico), 1/94
   "Atomic Force Microscopy of Ultrathin Organic Films"
5. APS Annual March Meeting, 3/94, "Atomic Force Microscopy of Ultrathin Organic Films"
6. NATO ARW, 5/94, "Scanning Near-Field Microscopies and Molecular Materials"
   "Modulated Structures in LB Films: Surface Crystallography and Molecular Packing"
7. Harvard University, Symposium in Honor of Peter Pershan's 60th Birthday, 11/94
   "Textures, Phase Transitions, and Hydrodynamics of Langmuir Monolayers"
8. LB8–The 8th International Meeting on Organized Molecular Films, 8/97
   "Rheology of Langmuir Monolayers: Interfacial and Liquid-Crystal Influences"
9. ACS National Meeting, 8/26/98, "Growth Mechanisms of Self-assembled Monolayers"
10. Workshop: Computational Studies of Interfacial Phenomena: Nanoscale to Mesoscale
    Pacific Northwest National Laboratory, 9/25/98, "Surfactant Adsorption on Mineral Surfaces"
11. 2nd Intl. Workshop on Current Problems in Complex Fluids: Thin Interfacial Films
    Oaxaca, Mexico, 1/5/99, "Watching molecular monolayers grow on surfaces."
12. Workshop on the Flow of Surfactants at Interfaces, UC Irvine, 4/29/00
    "Coupling of Monolayer Structure to Shear: Molecular to Micrometer Length Scales."
13. 10th Intl. Conf. on Solid Films and Surfaces, Princeton Univ., 7/10/00
    "Self-assembled monolayers in the context of epitaxial film growth."
14. 75th Colloid and Surface Science Symposium, Pittsburgh, 6/10/01
    Keynote address: "How do self-assembled monolayers form?"
15. 3rd Intl. Workshop on Current Problems in Complex Fluids: Self assembling systems
    Oaxaca, Mexico, 7/11/01, "Coupling of structure to shear flow in Langmuir monolayers."
16. ACS National Meeting, Orlando, 4/10/02, "Thermodynamic Perspective on Self-assembled Monolayer Formation"
17. American Vacuum Society, Denver, 11/8/02, "A Thermodynamic Perspective on Self-Assembled Monolayer Growth"
18. American Physical Society National Meeting, Montreal, 3/04, "70 Years of Built-Up Films: Katharine Blodgett's Scientific Legacy"
19. American Chemical Society National Meeting, Anaheim, 3/31/04, "Protein Interactions at the Air-Water Interface"

20. 4th International Workshop on Complex Fluids, Merida Mexico, 1/6/05, "Self-organized Molecular Nanostructures on Surfaces"
21. Symposium in Honor of Charles M. Knobler, Los Angeles, 5/2/05, "A Thermodynamic Perspective on Self-assembled Monolayer Growth"
22. Hougen Symposium on the Frontiers of Liquid Crystals, 4/4/09, "Liquid Crystal DNA Microarrays"
23. Gordon Research Conference on Liquid Crystals, 6/18/09, "Detecting DNA Hybridization Using Changes in Liquid Crystal Anchoring"
24. Dynamics of Soft Matter Summer Workshop, Corsica, 8/2/10, "Dynamics in Insoluble Surfactant Monolayers"
25. David G. Whitten Symposium, Albuquerque, 8/19/10, "Exploiting Interactions between DNA and Liquid Crystals for Biosensing"
26. Materials Research Society National Meeting, 11/29/10, "Using Liquid Crystal Anchoring to Distinguish Single-stranded and Double-stranded DNA"
27. AIChE National Meeting, 10/29/12, Plenary Presentation, "Single Molecule Tracking at Wet Interfaces"
28. Soft-interfaces Mini-symposium - Physical Chemistry and Characterization of Soft-interfaces, Fukuoka, Japan, 3/14/13, "Single-Molecule Tracking at Soft Interfaces: Diffusion, Desorption, Aggregation, and Conformation"
29. Search and Exploration International Workshop, Cargese, Corsica, 6/5/13, "Single-Molecule Tracking at Wet Interfaces: Crawling, Flying, and Intermittent Walking"
30. Colorado Single Molecule and Membranes Meeting, 1/6/14, "Proteins at Interfaces - 1, 2, 3"
31. American Chemical Society National Meeting, Dallas, 3/18/14, "Single-molecule Resolution of Interfacial Protein Dynamics"
32. American Chemical Society National Meeting, San Francisco, 8/14/14, "Mapping surface heterogeneity with accumulated molecular trajectories"
33. Workshop: Light-Driven Processes for Bio-Inspired Materials, Rice University, 12/15/14, "Interfacial Molecular Foraging"
34. Colorado Single Molecule and Membranes Meeting, University of Denver, 1/17/15, "Interfacial Molecular Foraging"
35. PittCon, New Orleans, 3/10/15, "Single Molecule Resolution of Surface Heterogeneity"
36. Liquid Crystals Gordon Research Conference, 6/23/15, "Responsive Anchoring and Dynamics at Nematic Interfaces"
37. Colorado Protein Stability Conference, 7/23/15, "Single Molecule Resolution of Surface-Mediated Protein Unfolding and Association"
38. American Chemical Society National Meeting, Boston, 8/17/15, "Single-molecule resolution of interfacial biomacromolecule dynamics"
39. Pacifichem, 12/17/15, "Molecular Transport at Wet Interfaces"

40. American Chemical Society National Meeting, San Diego, 3/15/16, “Liquid crystal interfaces that respond to nucleic acid recognition events”
41. Workshop on Fluctuations in Small Complex Systems III, Venice, Italy, 10/4/16, “Intermittent Motion of Adsorbed Molecules and Confined Nanoparticles”
42. ICAS-UNSAM Workshop on Stochastic Dynamics, Buenos Aires, Argentina, 3/20/17, “Confined Transport of Molecules and Nanoparticles”
43. American Chemical Society National Meeting, San Francisco, 4/2/17, “Probing nano-environments with high-throughput single-molecule tracking.”
44. Defense Threat Reduction Agency Life Science Review Springfield, VA, 6/20/17, “Determining the Mechanistic Basis for Surface Interactions and Effects on Catalytic Efficiency in Tethered Enzyme Systems”
45. Army Research Office Life Science Workshop, Cocoa Beach, FL, 1/9/18, “Single-Molecular Resolution of Peptides at Model Micobial Membranes”
46. Colorado Single Molecule and Membranes Meeting, Denver, 1/12/18, “Molecular Transport in Confined Environments.”
47. DOE Separations Science PI Meeting, Gaithersburg MD, 2/6/18, “Confined Transport of Molecules and Nanoparticles”
48. Pittcon, Orlando, 2/27/18, “Probing Local Polymer Environments using Single Molecule Dynamics”
49. American Chemical Society National Meeting, Boston, 8/20/18, “Tracking Molecules and Nanoparticles to Probe Confined Environments.”
50. Pittcon, Philadephia, 3/18/19, “Molecular Diffusion Near Silica Surfaces”
51. American Chemical Society National Meeting, San Diego, 8/25/19, “Correlating Structure and Molecular Transport at Wet and Semi-Wet Interfaces.”
52. Colorado Single Molecule and Membranes Meeting, 1/10/20, “Interactions of Antimicrobial Peptides with Supported Lipid Bilayer Mimics of Bacterial Outer Membranes”
53. Double Helix Optics Webinar, 3/17/2021, “Advanced Techniques with DHO: 3D Tracking in Interface-Rich Environments”
54. ACS Colloid and Surface Science Symposium, 6/14/2021, “Nanoparticle Tracking to Probe Transport in Porous Media” (Keynote Address)
55. Pittcon, Philadelphia, 3/6/22, “Transport Near Surfaces and in Surface-rich Environments” (canceled)
56. Army Research Office Workshop on Environmental Surface Films, May 25, 2022, “Single Molecule Characterization of Dynamic and Structural Heterogeneity at Thin Film Surfaces”
57. Gordon Research Conference on Bioanalytical Sensors, Newport RI, June 2022, “Surface Mediated Molecular Recognition”
58. Gordon Research Conference on Complex Active and Adaptive Material Systems, Ventura CA, February 2023, “Enhanced Transport of Confined Nanoswimmers”

INVITED LECTURES AND SEMINARS

1. AT&T Bell Laboratories, 5/93
2. Exxon Research Laboratories, 11/93
3. Princeton University, Dept. of Physics, 11/93
4. Tulane University, Department of Chemical Engineering, 3/95
5. University of Texas–Austin, Dept. of Chemistry, 11/96
6. Loyola University, Dept. of Chemistry, 3/97
7. Stanford University, Depts. of Chemistry and Chemical Engineering, 10/8/97
8. University of Virginia, Dept. of Chemistry, 1/23/98
9. Auburn University, Dept. of Chemistry, 4/22/98
10. University of Georgia, Dept. of Chemistry, 4/23/98
11. National Institute of Standards and Technology, 6/5/98
12. University of New Orleans, Dept. of Chemistry, 9/18/98
13. University of Illinois at Urbana-Champaign, Dept. of Chemistry, 10/9/98
14. Harvard University, Dept. of Applied Physics, 11/6/98
15. Emory University, Dept. of Physics, 9/10/99
16. Cornell University, Dept. of Chemistry, 12/13/99
17. Stanford University, Dept. of Chemical Engineering, 1/25/00
18. UC Berkeley, Dept. of Chemical Engineering, 1/26/00
19. University of Delaware, Dept. of Chemical Engineering, 2/15/00
20. University of Colorado, Boulder, Dept. of Chemical Engineering, 3/9/00
21. University of Colorado, Boulder, Dept. of Chemistry, 4/8/00
22. University of Florida, Gainesville, Dept. of Chemical Engineering, 9/11/00
23. Colorado State University, Dept. of Chemical Engineering, 4/13/01
24. University of California, Los Angeles, Dept. of Chemistry, 10/8/01
25. Sandia National Lab (Livermore, CA), Microelectronics Seminar 11/13/02
26. Brookhaven National Lab, Dept. of Chemistry, 11/27/02
27. Colorado School of Mines, Dept. of Chemical Engineering, 2/28/03
28. Cornell University, Dept. of Chemical Engineering, 11/3/03
29. Northwestern University, Depart of Physics Colloquium, 5/27/05
30. Case-Western Reserve University, Dept. of Chemical Engineering, 11/16/05
31. University of California, Santa Barbara, Dept. of Chemical Engineering, 11/2/2006
32. School of Pharmacy, University of Colorado Health Sciences Center, 1/25/2007
33. Department of Chemistry, University of Miami, 10/24/08
34. PittCon Lectures, Department of Chemistry, Duquesne University, 11/20/08
35. Department of Chemistry, Lehigh University, 2/4/2010
36. Department of Chemistry, University of Kentucky, 4/9/2010
37. Department of Chemical Engineering, Rice University, 2/17/2011
38. Department of Chemical Engineering, Tulane University, 11/11/2011
39. Center for Integrated Nanotechnologies, Sandia National Lab, 12/12/2011
40. Department of Physical Chemistry, University of Barcelona, 7/5/12
41. Pall Corporation, 8/9/12
42. Millipore Corporation, 12/12/12
43. Department of Chemical Engineering, Johns Hopkins University, 2/14/13
44. Department of Chemistry, University of Akron, 2/20/13
45. Department of Chemistry, University of Massachusetts Amherst, 9/19/13

INVITED LECTURES AND SEMINARS (continued)

46. Department of Chemical Engineering, Arizona State University, 9/30/13
47. Department of Chemical Engineering, Georgia Tech University, 10/9/13
48. Department of Chemical Engineering, University of Michigan, 12/3/13
49. Department of Chemical Engineering, Northeastern University, 4/2/14
50. Biomedical Engineering Program, University of New Mexico, 8/27/14
51. Keynote address, Graduate Student Research Symposium, Department of Chemical Engineering, University of Buffalo, 10/3/14
52. Zurich University of Applied Sciences, 11/24/14
53. Department of Chemical Engineering, CCNY, 3/30/15
54. Dept. of Chemical Eng. & Materials Sci., Univ. of Minnesota, 9/15/15
55. Department of Chemical Engineering, North Carolina State University, 10/23/15
56. Furman University Jean Dreyfus Boissevain Lectureship, 2/18/16
57. Dept. of Chemical Engineering, Purdue University, 3/30/16
58. Dept. of Chemical Engineering, UC Davis, 5/26/16
59. Dept. of Chemical Engineering, Univ. of Houston, 4/21/17
60. MilliporeSigma Corporation, Bedford, MA, 8/8/17
61. 3M Corporation Research Forum, St. Paul MN, 10/17/19
62. Dept. of Chemistry, Univ. Illinois Urbana Champaign, 11/15/19
63. Dept. of Chemistry, Rice University, 12/5/19
64. School of Biomedical Engineering, Colorado State University, 4/25/22
65. Quantitative Biosciences and Engineering Seminar, Colorado School of Mines, 11/2/22 (planned)

CONFERENCE ORGANIZING AND SESSIONS CHAIRED

1. Session chair: APS Annual March Meeting, 3/1994, "Organic Films and Monolayers"
2. Co-organizer, ACS national meeting, Fall 1997, “Molecular Organization in Self-Assembly”
3. Co-organizer, Workshop on the Flow of Surfactants at Interfaces, UC Irvine, 4/29/2000
4. Organizer, ACS National meeting, Spring 2002, “Colloid or Surface Chemistry Award Symposium Honoring Charles Knobler,”
5. Co-organizer, AIChE National meeting, Spring 2002, “Prediction and Correlation of Transport Properties.”
6. Organizer, 4th International Workshop on Complex Fluids, January 2005, Merida, Mexico
7. Co-Chair, 80th ACS Colloid and Surface Science Symposium, June 2006, Boulder, CO
8. Co-organizer, ACS national meeting, March 2014, “Single Molecules at Interfaces: Experiments and Simulations”
9. Co-organizer, ACS national meeting, August 2019, “Confined dynamics of molecules and particles at interfaces, in pores, and under crowded conditions”

COURSES TAUGHT

University of Colorado

CHEN 1211 – General Chemistry for Engineers, S01, S03, S04, F05, S07

CHEN 1000 – Creative Technology, F01, S02, F06, S08, S09, F10

CHEN 3200 – Fluid Mechanics, S21, S22

CHEN 4130 – Chemical Engineering Lab 2, F03, F04, F05

CHEN 5370 – Graduate Thermodynamics, F07, F09, F10, F14, F16, F17, F18, F19, F20, F21, F22

CHEN 4838/5835 – Colloids and Interfaces, F04, S10, F11, S23

Tulane University

Introduction to Quantum Chemistry (graduate level), F94, F95, F96

Physical Chemistry of Surfaces, S95, S99

General Chemistry I (Honors), F00

General Chemistry II, S96, S00

Physical Chemistry II – Thermodynamics, S97

Physical Chemistry I – Quantum Chemistry, F97, F98

PERSONNEL DIRECTED

Name	**Dates**	
Graduate students		
Ivo Doudevski	1995 – 2000 (Ph.D. 12/00)	NYU Langone Medical Center
Ani Ivanova	1996 – 2000 (Ph.D. 12/00)	Cabot Corp.
Grigor Bantchev	1996 – 2003 (Ph.D. 5/03)	Staff Scientist, USDA
James Mellott	1998 – 2004 (Ph.D. 4/04)	Patent Attorney
Andrew Price	2003 – 2007 (Ph.D. 9/07)	10X Genomics
Nicholas Cain	2003 – 2004 (M.S. 5/04)	Qimonda
Stephanie Malone	2007 – 2011 (Ph.D. 12/11)	Genia/Roche
Keith Britt*	2010 – 2011 (M.S. 1/11)	Amgen
Daniel Kienle	2010 – 2011 (M.S. 5/11)	UC Davis
Patrick Noonan	2010 – 2013 (Ph.D. 12/13)	Soma Logic
Carolyn Schoenbaum*	2010 – 2014 (Ph.D. 5/14)	Intel
Blake Langdon	2010 – 2014 (Ph.D. 12/14)	Roche
Jon Monserud	2010 – 2015 (Ph.D. 1/15)	Soma Logic
Nathan Nelson	2010 – 2015 (Ph.D. 1/15)	DaVita
Aaron McUmber	2010 – 2015 (Ph.D. 5/15)	Northrop Grumman
Rudy Kahsar*	2011 – 2014 (Ph.D. 5/14)	Rocky Mountain Institute
Joshua Mabry	2011 – 2015 (Ph.D. 5/15)	Bain & Co.
Xun (Chauncy) Yin	2014 – 2015	OSIsoft
Huai-Ying (Heidi) Chin	2014 – 2015 (M.S. 5/15)	WaferTech
Rebecca Falatach*	2016 – 2017	Dharmacon
Kate Macri	2013 – 2019 (Ph.D. 5/19)	KBI Biopharma
Pengxiao Hao*	2014 – 2018 (Ph.D. 8/18)	Northwestern Univ.
Lucas Ellis*	2014 – 2018 (Ph.D. 8/18)	Oregon State University
James Weltz*	2014 – 2019 (Ph.D., 8/19)	Rigid Biotech LLC
Jeremiah Traeger	2015 – 2019 (Ph.D., 12/19)	PNNL
Yu Cai	2015 – 2018 (Ph.D. 9/18)	Pall Corp.
David Faulon Marruecos*	2015 – 2018 (Ph.D. 9/18)	University of Barcelona
Andres Chaparro Sosa*	2016 – 2021 (Ph.D. 3/21)	Infinome Biosciences
Gregory Morrin	2017 – 2020 (Ph.D. 12/20)	Alexion
Haichao Wu	2017 – 2021 (Ph.D. 6/21)	Harvard University
Connor Thompson	2018 – 2021 (Ph.D. 6/21)	Element Biosciences
Benjamin Greydanus*	2018 – 2022 (Ph.D. 8/22)	Global Thermostat
Evan Bisirri*	2019 –	
Hector Sanchez-Moran*	2020 –	
Ezra Baghdady*	2020 –	
Albert Velasco Abadia*	2020 –	
Zachary Blanchette*	2020 –	
Victoria Reichelderfer*	2021 –	
Alexander Kanora	2021 –	
Holly Coleman*	2021 –	
Samuel Kennedy*	2022 –	

* co-advised

PERSONNEL DIRECTED (continued)

Postdoctoral fellows

John Woodward	1994-97	NIST Gaithersburg
M. Levent Kurnaz	1995-97	Bogazici University, Turkey
William Hayes	1997-98	PMC Group
Jordi Ignés-Mullol	1998-2000	University of Barcelona
Christian Messerschmidt	2000	ams AG
Chad Taylor	1999-2001	Western Digital
Chad Braun	2004-2005	Array BioPharma
Adam Harant	2004-2006	Qura
Xiaoling Li	2006-2007	
Siwar Trabelsi	2006-2009	CESI Chemical / Flotek
Andrei Honciuc	2006-2009	Inst. of Macromolecular Chem., Romania
Robert Walder	2008–2012	NIST / CU-Boulder
Indira Sriram	2010–2013	NIST Boulder
Mark Kastantin	2009–2013	Serán Bioscience
Xiang Wang	2012–2013	NIST-JILA
Michael Skaug	2011–2014	Aurora Insight
Patrick Noonan	2013–2014	SomaLogic
Saonti Chakraborty	2013–2016	Front Range CC
Dapeng Wang	2013–2017	Changchun Inst. of Appl. Chem.
Nathan Nelson	2016–2018	DaVita
Raphael Sarfati	2017–2019	CU-Boulder
Ellen Knapp	2019–2020	Pfizer
Daniel Kienle	2016–2021	Ametek
Anni Shi	2022–	

PERSONNEL DIRECTED (continued)

Name	**Dates**	**Position at the time**
Undergraduate students		
Hadley Sikes	1994-97 (Sr. Thesis)	Tulane undergrad
Deborah Simon	1996-97	Tulane undergrad
Timothy Kerwin	1997-98	Tulane undergrad
Holly Gwin	1998-99	Tulane undergrad
Roman Raju	1999	Tulane undergrad
Adam Freeman	Summer 2001	Univ of Florida undergrad
Mark Nelson	Summer 2002	CU undergrad
Eszther Horanyi	Fall 2002	CU undergrad
Josh van Bogaert	Summer 2003	Vanderbilt undergrad
Ana Oquendo	Summer 2004	Univ. of Puerto Rico undergrad
David Hutson	Fall 2004	CU undergrad
Keith Beers	Fall 2004	CU undergrad
Robert Mattson	Summer 2005	UT-Austin undergrad
Eric Karp	2006-2007 (Sr. Thesis)	CU undergrad
Ami Patel	Spring 2007	CU undergrad
Alex Howard	Summer 2008	CU undergrad
Denver Jn. Baptiste	Summer 2008	CUNY undergrad
Kevin Daly	Summer 2008	Rice undergrad
Erin Chang	Summer 2009	UPenn undergrad
Amit Shavit	Summer 2009	UMass undergrad
Chris Marbury	Fall 2009	CU Undergrad
Florencia Paredes	Summer 2010	Cornell undergrad
Cherrelle Thomas	Summer 2011	Howard Univ. undergrad
Richard (Rusty) Roberts	Summer 2012	Whitman College undergrad
Brennan Coffey	2012-2015 (Sr. Thesis)	CU undergrad
Roya Mirhossaini	2013-2015 (Sr. Thesis)	CU undergrad
Nora Schweitz	2013-2014	CU undergrad
Alan Bromwell	2013-2014	CU undergrad
Cheyenne Lynsky	Summer 2014	Northwestern undergrad
Stephanie Hart	Summer 2015	Univ. of Minnesota undergrad
Zack Lamberty	Summer 2017	Swarthmore College undergrad
Alexandra Davis	Summer 2018	NC State Undergrad
Michael Durkin	Summer 2018	University of Michigan undergrad
Kiersten Johnson	Fall 2018 – Fall 2019	CU undergrad
Julie Nguyen	Summer 2019	Washington Univ. St Louis ugrad
Other		
Rich Fox	Summer 2002	Science teacher, Las Vegas, NV