Vernita D. Gordon University of Texas at Austin
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Present Postion

University of Texas at Austin
Assistant Professor August 2010 - present
Department of Physics
Center for Nonlinear Dynamics
Institute for Cell and Molecular Biology

Education

Harvard University Cambridge, MA
A.M. Physics, June 2001
Ph.D. Physics, November 2003. Advisor: D. A. Weitz
Thesis: "Measuring and Engineering Microscale Mechanical Responses and Properties of Bio-relevant Materials"

Vanderbilt University Nashville, TN
B.Sc. Physics & Mathematics, Magna Cum Laude, May 1997
Honors in Physics, Honors in the College of Arts and Science

Postdoctoral Fellowship

Cystic Fibrosis Foundation, August 2008-August 2010

Research Experience

University of Illinois Urbana-Champaign, IL
Department of Materials Science and Engineering
Postdoctoral Research Associate, June 2006-present

Developed experiment to use multiple parallel optical trapping and microfluidics to study bacterial quorum sensing and biofilm formation in a spatially-structured system. Demonstrated optical trapping as a new way to evaluate bacterial self-cohesion determined by gene expression. Co-supervised graduate and undergraduate students in the development of high-throughput, automated algorithms for tracking bacterial motions and other behaviors. Began projects and trained undergraduates to use confocal fluorescence microscopy to image and quantitatively analyze effects of membrane-peptide interactions.

University of Edinburgh Edinburgh, Scotland
School of Physics
Postdoctoral Research Associate, November 2003-April 2006

Studied phase separation in model membranes using confocal fluorescence microscopy. Determined that the domains formed by phase-separating saturated lipid mixtures are shaped by physics analogous to that of crystal growth. Demonstrated that membrane adhesion induces phase separation and shifts free energy landscape, with possible implications for biological function.

Harvard University Cambridge, MA
Department of Physics
Graduate Research Assistant, June 1998-November 2003

Used particle tracking and rheology to quantify mechanical impact of dynamically growing and invading human brain tumor on its environment. Initiated studies in collagen I matrix to allow direct confocal imaging of tumor interactions with matrix fibers. Used micropipettes and microcantilevers to characterize mechanical and structural properties of self-assembled "polymersomes" and "colloidosomes" and determined new responses created by inflating colloidosomes with polycation osmotic pressure.

Fudan University Shanghai, China
Summer Research Student, May 1997–August 1997

Lawrence Livermore National Laboratories Livermore, CA
Summer Research Student, May 1996–August 1996

Vanderbilt University Nashville, TN
Undergraduate Research Assistant, 1994-1997

Referee

PNAS, JACS, Langmuir, Advanced Materials, Experimental Mechanics, BioMedical Engineering OnLine, Modern Physics Letters B

Teaching and mentoring

Developed and taught graduate course, "Special Topics in Biophysics: Systems Biophysics of Intercellular and Extracellular Interactions," UT Austin Fall 2010

Supervising postdoc, graduate student, and high school students studying the dynamics and mechanical changes of a developing biofilm system, UT Austin 2010-present

Supervising Ph.D. students and undergraduates using biological and biochemical techniques to study the impact of autoinducer amphiphilicity on quorum sensing signal propagation and localization, UT Austin 2010-present

Supervising Ph.D. student and undergraduate studying the role of spatial structure in evolution, UT Austin 2011-present

Supervising Ph.D. student and undergraduate studying the relationship between adhesion and formation of lipid heterogeneities in model membranes, UT Austin 2010-present

Supervising undergraduate researchers developing software to identify and quantify key steps in early biofilm formation, and developing experiments to study the role of chemotaxis in bacterial systems, UT Austin 2010-present

Supervising undergraduate researchers developing an experimental model system for cell adhesion that combines both protein-like specific adhesion and lipid-driven phase separation, UT Austin 2010-present

supervised Ph.D. student using laser trapping and microfluidics to study quorum sensing and biofilm formation in *Pseudomonas aeruginosa*, University of Illinois, 2007-2008

co-supervised undergraduate researchers developing software for automated detection and tracking of bacteria, University of Illinois, 2008-2009

supervised undergraduate researchers using confocal and fluorescence microscopy to study effects of membrane-peptide interactions and particle tracking to study bacterial motility, University of Illinois, 2006-2010

demonstration lectures to 3rd-year undergraduate thermodynamics course, University of Edinburgh, fall 2005.

supervised Ph.D. student studying pattern formation in soft matter, University of Edinburgh, 2004-2006

supervised Master's in Chemistry and Physics project on domain formation in giant lipid vesicles, University of Edinburgh, 2004-05

supervised undergraduate researchers on: development of collagen matrix for direct imaging of tumor-ECM interaction , microrheology and particle tracking investigation of gel matrix used for tumor studies, growth of nano- and micron-sized metallic rods and self-assembly into polymer structures, and measuring and modifying mechanical properties of polymer structures, Harvard University, 2002-2003

Harvard University Cambridge, MA
freshman academic advisor, 1998-2002

Harvard University Cambridge, MA
Teaching Fellow, September 1997–June 1998

Park Street Church Cambridge, MA
volunteer tutor, high school science and math, 1999-2000
volunteer instructor, English as a second language, 2002-2003

Fudan University Shanghai, China
problem-solving recitation lecture, May 1997

Vanderbilt University Nashville, TN
Teaching Assistant, January 1997-May 1997

Vanderbilt Student Volunteers for Science, 1993-1995
Executive Board, 1994-1995

Invited Publications

Making Giant Unilamellar Vesicles via Hydration of a Lipid Film
S. Manley and V. D. Gordon
2008 Current Protocols in Cell Biology 24.3.1-24.3.13

Shiver me timbers: Pulsatile contractility in model tissues. Vernita D. Gordon. 2011 PNAS 108: 13363-13364

Publications

Flagella and pili-mediated near-surface single-cell motility mechanisms in P. aeruginosa. J. C. Conrad, M. L. Gibiansky, F. Jin, V. D. Gordon, D. A. Motto, M. A. Mathewson, W. G. Stopka, D. C. Zelasko, J. D. Shrout, G. C. L. Wong. 2011 Biophysical Journal 100:1608-1616

The PEL polysaccharide can serve a structural and protective role in the biofilm matrix of Pseudomonas aeruginosa. Colvin, K. M., Gordon, V. D., Murakami, K., Wozniak, D. J., Wong, G. C. L., Parsek, M. R. 2011 PLOS Pathogens 7:e1001264

Bacteria use type IV pili to walk upright and detach from surfaces. Gibiansky, M. L., Conrad, J. C., Jin, F., Gordon, V. D., Motto, D.A., Mathewson, M. A., Stopka, W. G., Zelasko, D. C., Shrout, J. D., Wong. G. C. L. 2010 Science 330:197

Mechanism of a prototypical synthetic membrane-active antimicrobial: Efficient hole-punching by targeting lipids with negative spontaneous curvature
L. Yang, V. D. Gordon, D. R. Trinkle, M. A. Davis, C. DeVries, A. Som, J. E. Cronan, Jr., G. N. Tew, G. C. L. Wong
2008 Proceedings of the National Academy of Sciences of the USA 105:20595-20600

Adhesion promotes phase separation in mixed-lipid membranes
V. D. Gordon, M. Deserno, S. U. Egelhaaf, W. C. K. Poon
2008 Europhysics Letters 84:48003

HIV TAT perforates membranes by inducing negative Gaussian curvature: Potential role of bitentate hydrogen bonding
A. Mishra, V. D. Gordon, L. Yang, R. Coridan, G. C. L. Wong
2008 Angewandte Chemie – Int Ed 47:2986-2989

Synthetic antimicrobial oligomers induce composition-dependent topological transition in membranes

L. Yang, V. D. Gordon, A. Mishra, A. Som, K. Purdy, M. A. Davis, G. N. Tew, and G. C. L. Wong
2007 Journal of the American Chemical Society 129:12141-12147

Phase behavior in unilamellar and multilamellar model binary lipid membranes
V. D. Gordon, P. A. Beales, G. C. Shearman, Z. Zhao, J. M. Seddon, S. U. Egelhaaf, W. C. K. Poon
Manuscript in Preparation.

Non-Equilibrium Growth of Solid-like Domains in Giant Lipid Vesicles
P. A. Beales, V. D. Gordon, P. D. Olmsted, S. U. Egelhaaf, W. C. K. Poon.
Manuscript in preparation.

Lipid organization and the morphology of solid-like domains in phase-separating binary lipid membranes
V. D. Gordon, P. A. Beales, Z. Zhao, C. Blake, F. C. MacKintosh, P. D. Olmsted, M. E. Cates, S. U. Egelhaaf, W. C. K. Poon.
2006 Journal of Physics: Condensed Matter 18:L415-L420

Solid-like Domains in Fluid Membranes
P. A. Beales, V. D. Gordon, Z. Zhao, S. U. Egelhaaf, W. C. K. Poon.
2005 Journal of Physics: Condensed Matter 17:S3341-S3346

Glioma Expansion in Collagen I Matrices: Analyzing Collagen Concentration-Dependent Growth and Motility Patterns
L. J. Kaufman, C. P. Brangwynne, K. E. Kasza, E. Filippidi, V. D. Gordon, T. S. Deisboeck, and D. A. Weitz.
2005 Biophysical Journal 89:635-650

Fabrication and Characterization of Self-Assembled Shells Composed of Polystyrene Particles
M. F. Hsu, M. G. Nikolaides, A. D. Dinsmore, A. R. Bausch, V. D. Gordon, X. Chen. J. W. Hutchinson, and D. A. Weitz.
2005 Langmuir 21:2963-2970

Self-Assembled Polymer Membrane Capsules Inflated by Osmotic Pressure
V. D. Gordon, X. Chen, J. W. Hutchinson, A. R. Bausch, M. Marquez, and D. A. Weitz.
2004 Journal of the American Chemical Society 126:14117-14122

Swollen vesicles and multiple emulsions from block copolymers
A. Nikova, V. D. Gordon, G. Cristobal, M. R. Talingting, D. C. Bell, C. Evans, M. Joanicot, J. A. Zasadzinski and D. A. Weitz. 2004
Macromolecules 37:2215-2218

Measuring the Mechanical Stress Induced by an Expanding Multicellular Tumor System: A Case Study
V. D. Gordon, M. T. Valentine, M. L. Gardel, D. Andor-Ardó, S. Dennison, A. A. Bogdanov, D. A. Weitz, T. S. Deisbock. 2003 Experimental Cell Research 289:58-66

Rotational Spectra of the Nitrogen-Sulfur Carbon Chains NC_nS, n=1-7
M. C. McCarthy, A. L. Cooksy, S. Mohamed, V. D. Gordon, P. Thaddeus. 2003 Astrophysical Journal Supplement, Volume 144, p. 287

Rotational Spectra of Sulfur Carbon Chains II: HC_5S, HC_6S, HC_7S, & HC_8S, and H_2C_4S, H_2C_5S, H_2C_6S, & H_2C_7S
V. D. Gordon, M. C. McCarthy, A. J. Apponi, P. Thaddeus. 2002 Astrophysical Journal Supplement, Volume 138, p. 297

Rotational Spectra of Sulfur Carbon Chains I: The Radicals C_4S, C_5S, C_6S, C_7S, C_8S, and C_9S
V. D. Gordon, M. C. McCarthy, A. J. Apponi, P. Thaddeus. 2001 Astrophysical Journal Supplement, Volume 134, p. 311

Structures of Two Linear Silicon-Carbides, SiC_4 and SiC_6: Isotopic Substitution and Ab Initio Theory
V. D. Gordon, E. S. Nathan, A. J. Apponi, M. C. McCarthy, P. Thaddeus, P. Botschwina. 2000 Journal of Chemical Physics, Volume 113, p. 5311

Laboratory Detection of HC_6N, a Carbon Chain with a Triplet Electronic Ground State
V. D. Gordon, M. C. McCarthy, A. J. Apponi, P. Thaddeus. 2000 Astrophysical Journal, Volume 540, p. 286

Rotational spectrum and theoretical structure of the carbene HC_4N
M. C. McCarthy, A. J. Apponi, V. D. Gordon, C. A. Gottlieb, P. Thaddeus, T. D. Crawford, J. F. Stanton. 1999 Journal of Chemical Physics, Volume 111, p. 6750

Laboratory detection of two new C_5H_2 isomers
C. A. Gottlieb, M. C. McCarthy, V. D. Gordon, J. M. Chakan, A. J. Apponi, P. Thaddeus. 1998 Astrophysical Journal, Volume 509, p. L141

In-plane magnetic anisotropy of bcc Co on GaAs(001)
Y. Z. Wu, H. F. Ding, C. Jing, D. Wu, G. L. Liu, V. Gordon, G. S. Dong, X. F. Jin, S. Zhu, K. Sun. 1998 Physical Review B, Volume 57, p. 11935

New molecular collisional interaction effect in low-energy sputtering

Y. Yao, Z. Hargitai, M. Albert, R. G. Albridge, A. V. Barnes, J. M. Gilligan, B. Ferguson, G. Lupke, V. D. Gordon, N. H. Tolk, J. C. Tully, G. Betz, W. Husinsky. 1998 Physical Review Letters, Volume 81, p. 550

Molecular effects in sputtering yields measured on gold at near-threshold energies
N. H. Tolk, Z. Hargitai, Y. Yao, B. Pratt-Ferguson, M. M. Albert, R. G. Albridge, A. V. Barnes, J. M. Gilligan, V. D. Gordon, G. Lupke, A. Puckett, J. Tully, G. Betz, W. Husinsky. 1998 Izvestiya Rossiiskoi Akademii Nauk. Seriya Fizicheskaya (Bulletin of the Russian Academy of Sciences. Physics), Volume 62, p. 676

Applications of free-electron lasers
N. H. Tolk, R. G. Albridge, A. V. Barnes, B. M. Barnes, J. L. Davidson, V. D. Gordon, G. Margaritondo, J. T. Mckinley, G. A. Mensing, J. Sturmann. 1997 China Cent. Adv. Sci. Technol. (World Lab.) Symp./Workshop Proc., Volume 12, p. 49

Free-electron laser wavelength-selective materials alteration and photoexcitation spectroscopy
N. H. Tolk, R. G. Albridge, A. V. Barnes, B. M. Barnes, J. L. Davidson, V. D. Gordon, G. Margaritondo, J. T. McKinley, G. A. Mensing, J. Sturmann. 1996 Applied Surface Science, Volume 106, p. 205