

## CURRICULUM VITAE

### PERSONAL INFORMATION

**Daniel K. Schwartz**

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**Department of Chemical & Biological Engineering**

University of Colorado

Boulder, CO 80309-0424

### POSITIONS HELD

September 2004- Professor, Dept. of Chemical & Biological Engineering  
University of Colorado at Boulder

April 2004- Senior Editor, *Langmuir*

January 2001 Associate Professor, Dept. of Chemical & Biological Engineering  
-August 2004 University of Colorado

July 1998 Associate Professor, Department of Chemistry, Tulane University  
-December 2000

July 1994 Assistant Professor, Department of Chemistry, Tulane University  
-June 1998

Sept. 1992 Postdoctoral Associate, Dept. of Chemistry and Biochemistry  
-July 1994 University of California, Los Angeles with Charles M. Knobler

April 1991 Postdoctoral Associate, Dept. of Chemical and Nuclear Engineering  
-Sept. 1992 University of California, Santa Barbara with Joseph A. Zasadzinski

### EDUCATION

Ph. D. in Physics, Harvard University (Advisor: Professor Peter S. Pershan) 6/91  
A.M. in Physics, Harvard University 3/87  
A.B. *summa cum laude* in Chemistry and Physics, Harvard University 6/84

### SELECTED HONORS AND AWARDS

2008 Boulder Faculty Assembly Award for Excellence in Research

1999 Camille Dreyfus Teacher-Scholar Award

1998 NSF/CAREER Award

1997-1999 Mortarboard Honor Society Salute for Excellence in Teaching (3 times)

1994 Camille & Henry Dreyfus Foundation New Faculty Award

1985-1986 Stone and Webster Fellowship, Harvard University

1981 Detur Prize (outstanding freshmen award), Harvard University

### SYNERGISTIC ACTIVITIES

Senior Editor, *Langmuir*

co-Director, NSF REU Site Program in Functional Materials

Founding Director (1998), Tulane Science Scholars Program – an on-campus Saturday morning enrichment program for talented high school students in Science & Engineering.

co-Chair, American Chemical Society Colloid and Surface Science Symposium, 2006

## **FUNDING**

### Current

- 2009 NSF Award, Surface & Analytical Chemistry Program, \$502,000  
–2012 Single-Molecule Studies of Surfactant Dynamics at the Solid/Solution Interface
- 2009 NSF Award, Solid State Chemistry Program, \$397,030  
–2012 Collaborative Research: Line-Active Amphiphiles for Nanostructure Stability
- 2008 ACS-Petroleum Research Fund, \$100,000  
–2010 Single-Molecule Studies of Surfactant Dynamics at the Oil/Water Interface
- 2007 NIH Bioeng. Research Partnership, \$2,900,000 for 7 investigators (Ted Randolph, PI)  
–2012 Aggregation of Protein Therapeutics: Mechanisms, Stability, and Interdiction
- 2009 NSF Award (PI, w/ John Falconer co-PI) \$300,000  
–2012 REU Site Program in Functional Materials
- 2008 NSF/MRSEC, \$7,200,000 (11 investigators – DKS share ~\$35k/yr direct costs)  
–2014 Liquid Crystal Materials Research Center
- 2006 DoEd GAANN Award, ~\$506,688 (Chris Bowman, PI, DKS and 3 others, co-PIs)  
–2010 A Graduate Program in Micro- and Nanostructured Materials

Past

- 2005 NSF Award, Solid State Chemistry Program, \$333,000  
–2009 Collaborative Research: Line-Active Amphiphiles for Nanostructure Stability
- 2004 NSF Award, Surface & Analytical Chemistry Program, \$485,000  
–2008 Molecular Mobility within Self-Assembled Monolayers
- 2002 2006 NSF Award (PI, w/ John Falconer co-PI) \$412,000  
2003 –2009 REU Site Program in Functional Materials
- 2004 DoEd GAANN Award, \$516,672 (C. Bowman, PI, K. Anseth and DKS, co-PIs)  
–2006 Graduate Program in Functional Materials
- 2003 DoEd GAANN Award, \$491,940 (N. Clark, PI, DKS and 3 others, co-PIs)  
–2006 Graduate Program in Liquid Crystal Science and Technology
- 2005 US Department of Agriculture, \$214,864  
–2005 Correlating the Rheology and Structure of Beta-Casein Interfacial Layers
- 2000 NSF Grant (renewal), Surface & Analytical Chemistry Program, \$309,700  
–2004 Formation mechanisms of self-assembled monolayers
- 2001 Louisiana Board of Regents, Graduate Fellows Program, \$70,000  
–2005 Recruitment of Superior Graduate Students in Chemistry
- 1999 Camille Dreyfus Teacher-Scholar Award, \$60,000  
–2004 Structural and dynamic properties of ultra-thin organic films
- 1998 NSF/CAREER Award, Interfacial, Transport, & Separation Process Program, \$200,000  
–2002 Studies of interfacial flow in surfactant monolayers.
- 1994 Camille and Henry Dreyfus New Faculty Award, \$25,000  
–1999 Structure, phase transitions, dynamics, and pattern formation in thin organic films.
- 1994 Exxon Education Foundation Grant, \$10,000  
AFM Studies of Boundary Lubrication
- 1995 PRF type G starter grant, \$20,000  
–1997 Optical and atomic force microscopy of ultrathin organic films.
- 1996 Louisiana BORSF R&D Industrial Ties Research Subprogram Grant, \$135,000  
–1999 Two-dimensional organization of aromatic components of asphaltene.
- 1996 NSF Grant, Surface & Analytical Chemistry Program, \$217,000  
–1999 Formation mechanisms of self-assembled monolayers
- 1997 NIST Grant, Biotechnology Division, \$75,000  
–1998 Atomic force microscopy of hybrid bilayer membranes
- 1998 PRF type AC grant, \$60,000  
–2000 Interfacial flow in surfactant and colloidal monolayers
- 1998 Camille & Henry Dreyfus Foundation Special Grant, \$14,400  
–2000 Tulane Science Scholars Program –outreach program for talented high school students.

## **COURSES TAUGHT**

### University of Colorado

CHEN 1211 – General Chemistry for Engineers, Spring '01, '03, '04, '07, Fall '05, CU

CHEN 1000 – Creative Technology, F2001, S2002, F2006, S2008, S2009 Univ. of Colorado

CHEN 4130 – Chemical Engineering Lab 2, Fall 2003, 2004, and 2005, Univ. of Colorado

CHEN 5370 – Intermediate Thermodynamics, Fall 2007, Univ. of Colorado

CHEN 5838 – Interfacial and Colloid Phenomena, Fall 2004, Univ. of Colorado

### Tulane University

Introduction to Quantum Chemistry (graduate level), Fall '94, '95, and '96, Tulane University

Physical Chemistry of Surfaces, Spring '95, '99 Tulane University

General Chemistry I (Honors), Fall 2000 Tulane University

General Chemistry II, Spring 1996, 2000 Tulane University

Physical Chemistry II – Thermodynamics, Spring 1997, Tulane University

Physical Chemistry I – Quantum Chemistry, Fall 1997, 1998, Tulane University

## 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 8<sup>th</sup> 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. 2<sup>nd</sup> 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. 10<sup>th</sup> 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. 3<sup>rd</sup> 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. 4<sup>th</sup> 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. Hougén 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”

## **CONFERENCE ORGANIZING AND SESSIONS CHAIRED**

1. Session chair: APS Annual March Meeting, 3/94, "Organic Films and Monolayers"
2. Co-organizer, ACS national meeting, Fall '97, "Molecular Organization in Self-Assembly"
3. Co-organizer, Workshop on the Flow of Surfactants at Interfaces, UC Irvine, 4/29/00
4. Organizer, ACS National meeting, Spring '02, "Colloid or Surface Chemistry Award Symposium Honoring Charles Knobler,"
5. Co-organizer, AIChE National meeting, Spring '02, "Prediction and Correlation of Transport Properties."
6. Organizer, 4<sup>th</sup> International Workshop on Complex Fluids, January '05, Merida, Mexico
7. Co-Chair, 80<sup>th</sup> ACS Colloid and Surface Science Symposium, June '06, Boulder, CO

## 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, Department 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

## PERSONNEL DIRECTED

<b>Name</b>	<b>Dates</b>	<b>Current position</b>
<i>Graduate students</i>		
Ivo Doudevski	1995-2000 (Ph.D. 12/00)	Postdoc, Yale
Ani Ivanova	1996-2000 (Ph.D. 12/00)	Cabot Corp.
Grigor Bantchev	1996-2003 (Ph.D. 5/03)	Staff Scientist, USDA, Peoria, IL
James Mellott	1998-2004 (Ph.D. 4/04)	
Chris Vessely (co-advised)	2003-2005 (Ph.D. 11/05)	Scientist, Insmed
Andrew Price	2003-2007 (Ph.D. 9/07)	Postdoc, Univ. Melbourne
Nicholas Cain	Spring 2003 –Spring 2004	Qimonda
Stephanie Malone	Spring 2007 –	
<i>Postdoctoral fellows</i>		
John Woodward	1994-97	N.I.S.T. Gaithersburg
M. Levent Kurnaz	1995-97	Bogazici University, Turkey
William Hayes	1997-98	PMC/Biogenix
Jordi Ignés-Mullol	1998-2000	University of Barcelona
Christian Messerschmidt	2000	Infinion Corp.
Chad Taylor	1999-2001	Komag Corp.
Chad Braun	2004-2005	Array BioPharma
Adam Harant	2004-2006	Displaytech
Xiaoling Li	2006-2007	
Siwar Trabelsi	2006-2009	University of Paris
Andrei Honciuc	2006-2009	Univ. Erlangen-Nürnberg
Robert Walder	2008-	
Mark Kastantin	2009-	
<i>Undergraduate students</i>		
Hadley Sikes	1994-97 (Sr. Thesis)	Postdoc, CalTech
Deborah Simon	1996-97	Tulane Medical School
Timothy Kerwin	1997-98	Tulane Medical School
Holly Gwin	1998-99	
Roman Raju	1999	
Adam Freeman	Summer 2001	
Mark Nelson	Summer 2002-	Univ. of CO Med School
Eszther Horanyi	Fall 2002	Univ. of Colorado 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)	U Washington PhD student
Ami Patel	Spring 2007	
Alex Howard	Summer 2008	CU undergrad
Denver Jn. Baptiste	Summer 2008	CUNY undergrad
<i>Undergraduate students (continued)</i>		

Kevin Daly  
Erin Chang  
Amit Shavit

Summer 2008  
Summer 2009  
Summer 2009

Rice undergrad  
UPenn undergrad  
UMass undergrad

*Other*  
Rich Fox

Summer 2002 (RET)

Science teacher, Las Vegas, NV

## LIST OF 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. 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, M.L. Schlossman"
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) [technical comment]  
"Alternative Method of Imaging Surface Topologies of Nonconducting Bulk Specimens"
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, and 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, and 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, and 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 Films*, **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]
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**PATENTS**

1. *Methods and Devices for Detecting Nucleic Acid Hybridization*, U.S. Patent pending.

2. *Method of Preparing Immunologically-Active Adjuvant-Bound Dried Vaccine Composition*, U.S. Patent pending.