

## MICHAEL LEWIS GREENFIELD

**INTERESTS** Applying molecular modeling, thermodynamics, and coarse-grained simulation methods to solve industrially relevant research problems in polymer science, tribology, materials, and fluids. Using science and engineering education to connect academic subjects and industrial needs.

### EDUCATION

1990–1996 **University of California, Berkeley** Berkeley, CA  
**Ph.D., Chemical Engineering**

Advisor: Professor Doros N. Theodorou  
Thesis title: “Molecular Modeling of Dilute Penetrant Gas Diffusion in a Glassy Polymer using Multidimensional Transition-State Theory”

1986–1990 **Johns Hopkins University** Baltimore, MD  
**B.S., Chemical Engineering**  
Graduated with general honors. GPA: 3.79/4.0

### EXPERIENCE

2002–present **Associate Professor** **Chemical Engineering Dept.**  
University of Rhode Island Kingston, RI

- Victor J. Baxt Chair of Polymer Engineering
- Initiated research program in polymer molecular simulation
- Developed and taught graduate-level courses “Polymer Engineering”, “Polymer Chemistry”

1996–2001 **Technical Specialist** **Ford Research Laboratory, Chemistry Dept.**  
Ford Motor Company Dearborn, MI

- Developed and implemented computer simulation methods addressing friction modifier additive mechanisms in automatic transmission fluid.
- Developed thermodynamic models and physical property computer programs for fuels and alternative refrigerants.

S/00, S/01 **Adjunct Faculty** **Chemical Eng. and Materials Sci. Dept.**  
Wayne State University Detroit, MI

- Taught undergraduate-level required course “Computational Methods in Engineering”
- Developed and taught graduate-level course “Polymer Solutions”

S/92, F/92, F/93 **Teaching Assistant** **UC Berkeley, Chem. Eng. Dept.**

1990–1996 **Research Assistant** **UC Berkeley, Chem. Eng. Dept.**

Sum/1989,90 **Summer Intern** **Xerox Corporation, Webster, NY**

1987-1990 **Undergraduate Research** **Johns Hopkins, Chem. Eng. Dept.**  
Advisor: Professor Marc D. Donohue

## FUNDED PROPOSALS

**5/03-4/05** Ford Motor Company University Research Program, *Molecular Simulation of Additives in Polymers*, \$40,000/yr

**1/04-12/04** Rhode Island Department of Transportation and URI Transportation Center, *Designing Asphalts by Molecular Simulation*, \$76,000

**7/03** 3M Non-Tenured Faculty Award, *Molecular Simulation of Polymers*, \$15,000

## INVITED PRESENTATIONS

|                      |  |   |
|----------------------|--|---|
| Department seminars: | Rhode Island (Physics, 9/27/02)            | Michigan (Applied Math, 4/7/00)           |
|                      | City College (Levich Inst., 9/3/02)        | Michigan-Dearborn (Natural Sci., 2/25/00) |
|                      | Rhode Island (Mech. Eng., 4/23/02)         | Wayne State (Chemical Eng., 2/11/00)      |
|                      | Rhode Island (Chemistry, 2/22/02)          | Toledo (Chemical Eng., 5/1/98)            |
|                      | Berkeley (Chemical Eng., 2/28/01)          |   |
| Conferences:         | NIST workshop – Fluid simul. (6/18/01)     | Gordon Conf.– Membranes (8/3/97)          |
|                      | American Chemical Soc. PHYS div. (8/22/00) |   |

## HONORS AND AWARDS

3M Nontenured Faculty Award (2003)  
Victor J. Baxt Chair of Polymer Engineering (2002)  
Ford Research Lab Operational Excellence Award (2001)  
Soc. of Automotive Engrs. Arch T. Colwell Merit Award (1999)  
Sherwin-Williams Student Award in Applied Polymer Science (1994)  
Dow Excellence in Teaching Award (1992)  
National Science Foundation Graduate Research Fellowship (1990–1993)  
Consulting Engineers Council of Maryland Scholarship (1989)  
AIChE Award for Scholastic Achievement (1989)  
Paul A.C. Cook Award (1989)  
Tau Beta Pi, Maryland Alpha Chapter (1989)

## PATENTS

Greenfield, Michael L.; Meyer, John J.; Mozurkewich Jr., George; Schneider, William F.; Stiel, Leonard I. “Cofluids for use with carbon dioxide refrigerant,” US Patent no. 6,415,614, issued July 9, 2002.

## PUBLICATIONS

- [1] Michael L. Greenfield Simulation Methods for Polymers: Sorption and Diffusion of Small Molecules using Transition State Theory, to appear in *Simulation Methods for Modeling Polymers*, Michael J. Kotelyanskii and Doros N. Theodorou, editors; New York: Marcel Dekker.
- [2] Yingxi Zhu, Hiroko Ohtani, Marina Ruths, Michael L. Greenfield, and Steve Granick Modification of Boundary Lubrication by Oil Soluble Friction Modifying Additives, *Tribo. Lett.*, in press.
- [3] George Mozurkewich, Michael L. Greenfield, William F. Schneider, David C. Zietlow, and John J. Meyer, Simulated performance and cofluid dependence of a CO<sub>2</sub>–cofluid refrigeration cycle with wet compression, *Int. J. Refrig.*, in press.

- [4] Michael L. Greenfield and Doros N. Theodorou, Coarse-grained molecular simulation of penetrant diffusion in a glassy polymer using reverse and kinetic Monte Carlo, *Macromolecules*, **34**:8541–8553 (2001).
- [5] Hiroko Ohtani, Yingxi Zhu, Michael L. Greenfield, Marina Ruths, and Steve Granick, Nanorheological study of automotive lubricants, *Proc. of the 2000 International Tribology Conference*, Nagasaki (2000).
- [6] Michael L. Greenfield, Ronald P. Cooper, and Mark S. Ciechanowski, Industry–community educational interaction through the Ford High School Science and Technology Program, *Proc. of the Educational Topical Conference of the AIChE Annual Meeting* (2000).
- [7] Michael L. Greenfield and Hiroko Ohtani, Structure and sliding friction of adsorbed friction modifier additives, *Proceedings of the FOMMS Conference*, paper A26 (2000).
- [8] William F. Schneider, Kenneth C. Hass, Michael L. Greenfield, Chris Wolverton, Alex Bogicevic, David J. Mann, and Ellen B. Stechel, Chemical and materials simulation at Ford Motor Company, *Proceedings of the FOMMS Conference*, paper I04 (2000).
- [9] George Mozurkewich, Russ Roberts, Michael L. Greenfield, William F. Schneider, and John J. Meyer, Cycle model assessment of working fluids for a low pressure CO<sub>2</sub> refrigeration system, *SAE paper 2000-01-0578*, (2000).
- [10] Michael L. Greenfield and Hiroko Ohtani, Molecular dynamics simulation study of model friction modifier additives between two surfaces, *Tribo. Lett.*, **7**:137–145 (1999).
- [11] Marina Ruths, Hiroko Ohtani, Michael L. Greenfield, and Steve Granick, Exploring the “friction modifier” phenomenon: Nanorheology of alkane chains with polar terminus dissolved in n-alkane solvent, *Tribo. Lett.*, **6**:207–214 (1999).
- [12] Michael L. Greenfield, George Mozurkewich, William F. Schneider, Gary D. Bramos, and David C. Zietlow, Thermodynamic and cycle models for a low-pressure CO<sub>2</sub> refrigeration cycle, *SAE paper 1999-01-0869*, (1999).
- [13] Michael L. Greenfield and Giuseppe Rossi, Vapor and liquid composition differences resulting from fuel evaporation, *SAE paper 1999-01-0377*, (1999).
- [14] Michael L. Greenfield, George A. Lavoie, Carol S. Smith, and Eric W. Curtis, Macroscopic model of the D86 fuel volatility procedure, *SAE paper 982724*, (1998).
- [15] Michael L. Greenfield and Doros N. Theodorou, Molecular modeling of methane diffusion in glassy atactic polypropylene via multidimensional transition-state theory, *Macromolecules*, **31**:7068–7090 (1998).
- [16] Michael L. Greenfield and Doros N. Theodorou, Coupling of penetrant and polymer motions during small-molecule diffusion in a glassy polymer, *Mol. Simul.*, **19**:329–361 (1997).
- [17] Angus A. Gray-Weale, Richard H. Henchman, Robert G. Gilbert, Michael L. Greenfield, and Doros N. Theodorou, Transition-state theory model for the diffusion coefficients of small penetrants in glassy polymers, *Macromolecules*, **30**:7296–7306 (1997).
- [18] Michael L. Greenfield and Doros N. Theodorou, Geometric analysis of diffusion pathways in glassy and melt atactic polypropylene, *Macromolecules*, **26**:5461–5472 (1993).

- [19] John T. Reilly, John M. Walsh, Michael L. Greenfield, and Marc D. Donohue, Analysis of FTIR spectroscopic data – the voigt profile, *Spectrochim. Acta A – Molec. Spectr.*, **48**:1459–1479 (1992).
- [20] John M. Walsh, Michael L. Greenfield, George D. Ikonou, and Marc D. Donohue, An FTIR spectroscopic study of hydrogen bonding in entrainer cosolvent mixtures, *Intl. J. of Thermophys.*, **11**:119–132 (1990).
- [21] John M. Walsh, Michael L. Greenfield, George D. Ikonou, and Marc D. Donohue, Hydrogen bonding competition in entrainer cosolvent mixtures, *Chem. Eng. Comm.*, **86**:125–144 (1989).