

D. Harley Klein

Department of Chemical Engineering
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Research Interests Computational science and engineering; computational fluid dynamics; non-Newtonian fluid mechanics.

Education **University of Texas at Austin**

B.S.E. Chemical Engineering

May 2000

Thesis topic: Microstructure formation via adsorption of tethered nanoparticles. Advisor: Roger Bonnecaze.

Simulated the formation of two-dimensional films of nanoparticles via a numerical study of two-dimensional random sequential adsorption of tethered hard disks.

Elective coursework included: Microelectronics, Numerical methods, Programming.

University of California, Santa Barbara

Doctoral Candidate, Chemical Engineering
with Computational Science and Engineering emphasis

September 2000–present

Thesis topic: Flow behavior of a model liquid crystalline polymer. Primary advisors: L. Gary Leal from Chemical Engineering and Carlos J. Garcia-Cervera and Hector D. Ceniceros from Mathematics.

Developed and analyzed numerical algorithms for modeling of Liquid Crystalline Polymer processing. Used computational and analytical techniques to analyze flow-induced structural modifications of molecular orientation and predictive capabilities of the molecular-based Doi-Marrucci-Greco model.

Elective coursework included: Complex fluids (surfactants, colloids, liquid crystals), Macromolecular structure and dynamics, Numerical methods, High performance (parallel) computing.

Experience **UCSB Chemical Engineering Department**

Santa Barbara, CA

Fall quarter, 2001

Teaching assistant for graduate-level fluid dynamics course *Advanced Transport Processes-Laminar Flow and Convective Transport Processes*.

Motorola

Austin, TX

November 1995–December 1998

Device engineering technician.

Awards University Co-Op Undergraduate Intellectual Achievement Award

1999

National Science Foundation IGERT (Integrative Graduate Education and Research Traineeship) Fellowship

2003–2005

Publications

J. J. Gray, D. H. Klein, R. T. Bonnecaze, and B. A. Korgel. Non-equilibrium phase behavior during the random sequential adsorption of tethered hard disks. *Physical Review Letters*, 85(21):4430–4433, 2000.

J. J. Gray, D. H. Klein, B. A. Korgel, and R. T. Bonnecaze. Microstructure formation and kinetics in the random sequential adsorption of polydisperse tethered nanoparticles modeled as hard disks. *Langmuir*, 17(8):2317–2328, 2001.

D. H. Klein, C. J. Garcia-Cervera, H. D. Cenicerros, and L. G. Leal. Computational studies of the shear flow behaviour of a model for nematic liquid crystalline polymers. In Rob May and A. J. Roberts, editors, *Proc. of 12th Computational Techniques and Applications Conference CTAC-2004*, volume 46, pages C210–C244, April 2005.

<http://anziamj.austms.org.au/V46/CTAC2004/Klei> [April 26, 2005].

D. H. Klein, C. J. Garcia-Cervera, H. D. Cenicerros, and L. G. Leal. Ericksen number and Deborah number cascade predictions of a model for liquid crystalline polymers in a simple shear device. *In preparation*.

- Presentations** Poster: D. H. Klein, J. J. Gray, B. A. Korgel, and R. T. Bonnecaze. Creation of surface nanostructures by adsorption of tethered nanoparticles. *American Institute of Chemical Engineers 2000 Annual Meeting*, Dallas, TX, November 1999.
- Contributed talk: D. H. Klein and L. G. Leal. Simulation of shear flow of a nematic liquid crystalline polymer. *American Institute of Chemical Engineers 2003 Annual Meeting*, San Francisco, CA, November 2003.
- Contributed talk: D. H. Klein, C. Garcia-Cervera, H. D. Cenicerros, and L. G. Leal. Computational studies of the shear flow behavior of a model for liquid crystalline polymers. *American Institute of Mathematical Sciences Fifth International Conference on Dynamical Systems and Differential Equations*, Pomona, CA, June 2004.
- Poster: D. H. Klein, C. Garcia-Cervera, H. D. Cenicerros, and L. G. Leal. Simple shear dynamics of a model for nematic liquid crystalline polymers: the Ericksen and Deborah number cascades. *National Science Foundation 2005 IGERT Project Meeting*, Washington D. C., May 2005.
- Computing Skills** Extensive experience with Fortran 77/90, C/C++, Mathematica, Matlab programming and OS X and Linux operating systems. Also familiar with the extension of Fortran and C to parallel computing environment using MPI libraries.
- Memberships** American Institute of Chemical Engineers
- References** Available upon request.