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Gareth H. McKinley

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Associate Head for Research*

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Curriculum Vitae

Administrative Contact:

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Education:

Ph.D. in Chemical Engineering, Massachusetts Inst. of Technology, Cambridge, MA. 1991
M. Eng. in Chemical Engineering, University of Cambridge, Cambridge, England. 1986
B.A. in Natural Sciences/Chemical Engineering, University of Cambridge, Cambridge, England, 1985.

MIT Service:

2008 Associate Head of Department
2006 School of Engineering Professor of Teaching Innovation
2005-2008 Member of Mechanical Engineering Council & Area Head (Area 1; MMEC)
2004-2009 Director, MIT Program in Polymer Science and Technology (PPST)
2001-2008 Head, Hatsopoulos Microfluids Laboratory
2001-2005 Professor of Mechanical Engineering
1997-2001 Lord Associate Professor of Mechanical Engineering

Other Related Experience

2002 (Jan. – July) Visiting Professor, Monash University & Distinguished Miegunyah Fellow, University of Melbourne, Melbourne Australia
1995-1997 Harvard University, John L. Loeb Associate Professor of the Natural Sciences
1996 Paul & Gabriella Rosenbaum Visiting Fellow, Isaac Newton Institute, Univ. Cambridge UK
1991-1995 Harvard University, Gordon McKay Assistant Professor of Engineering Sciences



People

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TEACHING STAFF
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RESEARCH STAFF
TECHNICAL STAFF
SUPPORT STAFF
POSTDOCS
VISITORS
FACULTY CLOUD

Consulting & Patents

Consultant for Bridgestone/Firestone, W.R. Grace & Co., PPG Fiberglass, GE Research & Development, Procter & Gamble, Nestlé S.A., ExtrudeHone Corp., Saltime Inc., Minerals Technologies Inc., Instrumentation Laboratories, Cabot Corp., Schick Wilkinson Sword, T.A. Instruments, Warner-Lambert (now Pfizer). US Patent # 5,588,509 Splined Vibration Device Using ER Fluids (w/ Bridgestone Corp.)

US Patent # 6,711,941 Braithwaite G, McKinley G.H., Spiegelberg S.H., Apparatus and Methods for Measuring Extensional Rheological Properties of a Material (w/ Cambridge Polymer Group).

U.S. Patent #6, 852,772 Muratoglu, Orhun; Spiegelberg Stephen H.; McKinley, Gareth H.; A High Modulus Crosslinked Polyethylene with Reduced Residual Free Radical Concentration Prepared Below the Melt; (w/ Cambridge Polymer Group).

Jan. 1997-2001 Co-Founder and minority share-holder, Pressure Profile Systems

July 1997 – present Co-Founder and minority share-holder, Cambridge Polymer Group

Professional Registration:

None

Selected Principal Publications for last five years (selected from over 140 papers. See <http://web.mit.edu/nmf/publications/>)

1. Lau, K.S.K., Bico, J., Teo, K.B.K., Chhowalla, M., Amaratunga, G.A.J., Milne, W., McKinley, G.H., Gleason, K. K., Superhydrophobic Carbon Nanotube Forests†, *Nanoletters*, 3(12), (2003), 1701-1705. †Featured in *Science News* Nov 1, 2003: <http://www.sciencenews.org/20031101/fob8ref.asp>
2. Kojic, N., Kojic, M., Gaudlavalleti, S. and McKinley, G.H., Solvent Removal during Synthetic and Nephila Silk Spinning, *Biomacromol.*, (2004), 5(5), 1698-1707
3. Sentmanat, M.L., Wang, B. and McKinley, G.H., Measuring the Extensional Rheology of a LDPE Melt Using the SER Universal Testing Platform, *J. Rheol.*, 49(2), (2005), 585-606.
4. Rodd, L.E., Scott, T.P., Cooper-White, J.J. and McKinley, G.H., Capillary Breakup Rheometry of Low-Viscosity Elastic Fluids, *Appl. Rheol.*, (2005), 15(1) 12-27.
5. Kopesky, E., Cohen, R.E. and McKinley, G.H., Miscibility and Viscoelastic Properties of Acrylic Polyhedral Oligomeric Silsesquioxanes (POSS)-Poly (Methyl Methacrylate) Blends, *Polymer*, 46 (2005), 4743-4752.
6. Oliveira, M.S.N. and McKinley, G.H., Iterated Stretching and Multiple Beads-on-a-String Phenomena in Dilute Solutions of highly-Extensible Flexible Polymers, *Phys Fluids (Letters)*, (2005), 17, DOI 071794.
Rodd, L.E., Scott, T.P., Boger, D.V., Cooper-White, J.J. and McKinley, G.H., Planar Entry Flow of Low Viscosity Elastic Fluids in Micro-Fabricated Geometries, *J. Non-Newt. Fluid Mech.*, (2005), 129, 1-22.
7. Agrawal, A., Park, J., Ryu, D.Y., Hammond, P.T., Russell, T.P. and McKinley, G.H., Controlling the Location and Spatial Extent of Nanobubbles using Hydrophobically Nanopatterned Surfaces, *Nanoletters.*, (2005), 5(9), 1751-1756.
8. Kopesky, E., McKinley, G.H. and Cohen, R.E., Toughened Poly (Methyl Methacrylate) Nanocomposites by Incorporating Polyhedral Oligomeric Silsesquioxane, *Polymer*, (2006), 47(1), 299-309.
9. Yesilata, B., Clasen, C. and McKinley, G.H., Nonlinear Shear and Extensional Flow Dynamics of Wormlike Surfactant Solutions, *J. Non-Newt.*

- Fluid Mech., (2006), 133(2), 73-90.
10. Tripathi, A., Tam, K.C. and McKinley, G.H., Rheology and Dynamics of Associate Polymer Solutions in Shear and Extension: Theory and Experiments, *Macromol.*, (2006), 39(5), 1981-1999.
 11. Tirtaatmadja, V., McKinley, G.H. and Boger, D.V., Drop Formation and Breakup of Low Viscosity Elastic Fluids: Effects of Concentration and Molecular Weight¹, *Phys. Fluids*, 18 (2006), DOI 043101.
¹Featured in the May 1, 2006 issue of *Virtual Journal of Biological Physics Research*; <http://www.vjbio.org>.
 12. Clasen, C., Eggers, J., Fontelos, M., Li, J. and McKinley, G.H., The "Beads on a String" Structure of Polymeric Jets, *J. Fluid Mech.*, 556 (2006), 283-308.
 13. Rossi, L.F., McKinley, G.H. and Cook, L.P., Slippage and Migration in Taylor-Couette Flow of a Model for Dilute Wormlike Micellar Solutions, *J. Non-Newton. Fluid Mech.*, (2006), 136(2-3), 79-92.
 14. Kopesky E, Boyes S G, Treat N, Cohen R E and McKinley G H, "Thermorheological Properties Near the Glass Transition of Oligomeric Poly (Methyl Methacrylate) Blended with Acrylic Polyhedral Oligomeric Silsequioxane Nanocages", *Rheol. Acta*, (2006) , 45, 971-982..
 15. Buckley P R, McKinley G H, Wilson T S, Small IV W, Bennett W J, Beringer J, McElfresh M W and Maitland D J, "Inductively-Heated Shape Memory Polymer for the Actuation of Medical Devices", *IEEE Trans. Biomed. Eng.*,(2006), 53, 2075-2083.
 16. Clasen, C., Plog, J.P., Kulicke, W.-M., Macosko, C., Owens, M., Macosko, C., Scriven, L.E., Verani, M. and McKinley, G.H., How Dilute are Dilute Solutions in Extensional Flow?, *J. Fluid Mech.*, (2006), 556, 283-308.

Scientific & Professional Societies

Fellow, American Physical Society Division of Fluid Dynamics

Member, Society of Rheology (1991 – present)

Member, British Society of Rheology (1991 – present)

Associate Member, American Institute of Chemical Engineers (1991 – present)

Honors & Awards

Journal of Rheology Publication Award, 2007

Class of 1960 Fellow, Office of the Provost, MIT, May 2005

Frenkiel Award, APS Division of Fluid Dynamics, Nov. 2002

Miegunyah Distinguished Fellow, University of Melbourne, Jan.– June 2002

Department & Institute Committees

2006 (Spring) Chair, Bose Award Selection Committee, School of Engineering

2005-2008 Member of Mechanical Engineering Council & Area Head (MMEC)

2005 (Fall) Member of MacVicar Faculty Fellows Selection Committee

2003-2005 Co-Chair, Ad Hoc Committee on Faculty Quality of Life (FQL)

2003-present Program Coordinator for Mechanical Engineering, Cambridge-MIT Exchange (CME)

2002-2004 Chair, Undergraduate Curriculum Committee, ME Dept.

2002-2005 Department Representative to E-CUE (Engineering Council for Undergraduate Education)

1998-1999 Chairman, Mechanics Search Committee

1998– 2002 Designated Professor for Thermal-Fluids Sciences

2/98 – 5/98 Ad hoc committee on Engineering Sciences

4/01 – 6/01 Ad hoc search committee for ME Dept. Head

Professional Service

2008-present Member at Large USNC/TAM

2006 Member of Advisory Board, Advanced Rheology Institute, Shanghai Jiatong

Technical University

2006 Chair, Bingham Award Committee, Society of Rheology

2006 Honors & Awards Committee, Society for Engineering Science (SES).

2005-present Member of Technical Advisory Board for EPSRC Portfolio

Partnership in Complex Fluids; Univ. of Wales, U.K.

2004-2007 Chair, Fluids Programming Committee (Area 01j-AIChE)

2/2001 Co-Chair, Technical Prog. Committee, 72nd Annual Meeting, Society of Rheology, Hilton Head

8/00-12/09 Executive Editor, J. Non-Newt Fluid Mech.

6/2000 Panelist: Industry Exchange Program on "Gels, Foams & Complex Fluids", ASME Fluids Engineering Division, Annual Meeting, Boston

11/99 Fluid Mechanics Program Coordinator, Area 1j , A.I.Ch.E. Annual Meeting, Dallas TX.

3/97 – 8/00 Associate Editor, J. Non-Newt. Fluid Mech.

Ongoing Editorial Boards; Applied Rheology; Rheologica Acta, J. Rheology.

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