

**Malancha Gupta, PhD**  
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## **Academic Positions**

**Professor, January 2020-present**

**Associate Professor, April 2015-January 2020**

**Assistant Professor, August 2009-April 2015**

Mork Family Department of Chemical Engineering and Materials Science  
University of Southern California

Courtesy appointment in the Department of Chemistry

Chair of the Viterbi School of Engineering WiSE Committee

**Postdoctoral Fellow, July 2007–August 2009**

Department of Chemistry and Chemical Biology

Harvard University

Advisor: *George M. Whitesides*

**Research Assistant, September 2002–July 2007**

Department of Chemical Engineering

Massachusetts Institute of Technology

Advisor: *Karen K. Gleason*

## **Education**

**PhD in Chemical Engineering, 2007**

Massachusetts Institute of Technology, Cambridge, MA

*Thesis Title:* Initiated chemical vapor deposition of fluoropolymer coatings for the surface modification of complex geometries, *Advisor:* Karen K. Gleason

**MS in Chemical Engineering, 2004**

Massachusetts Institute of Technology, Cambridge, MA

**BS in Chemical Engineering, *summa cum laude*, 2002**

The Cooper Union, New York City, NY

## **Research Interests**

- Developing polymer coatings (hydrophilic and hydrophobic)
- Studying surface properties (wettability and adhesion)
- Developing new techniques for patterning polymer growth for applications in separations, textiles, and filtration
- Patterning functional polymer coatings onto microfluidic devices
- Developing polymer coatings for biomedical shunts and implants

## Peer-Reviewed Publications

- (63) "Vapor Deposition of Functional Porous Polymer Membranes," G. Dianat, N. Movsesian, **M. Gupta**, *ACS Applied Polymer Materials*, 2020, 2, 98.
- (62) "Hydrophobicity versus Pore Size: Polymer Coatings to Improve Membrane Wetting Resistance for Membrane Distillation," A. McGaughey, P. Karandikar, **M. Gupta**, A. Childress, *ACS Applied Polymer Materials*, 2020, 2, 1256.
- (61) "Interactions Between Polymers and Liquids during Initiated Chemical Vapor Deposition onto Liquid Substrates," M. De Luna, P. Karandikar, **M. Gupta**, *Molecular Systems Design & Engineering*, 2020, 5, 15.
- (60) "Fabrication of Hydrogen-Selective Silica Membranes via Pyrolysis of Vapor Deposited Polymer Films," B. Nguyen, S. Dabir, T. Tsotsis, **M. Gupta**, *Industrial & Chemical Engineering Research*, 2019, 58, 15190.
- (59) "Effects of Standing Waves on the Growth and Stability of Vapor Deposited Polymer Films," P. Karandikar, M. M. De Luna, **M. Gupta**, *ACS Applied Polymer Materials*, 2019, 1, 1930.
- (58) "Downstream Monomer Recycling During Vapor Phase Fabrication of Porous Polymers," N. Movsesian, G. Dianat, **M. Gupta**, *Industrial & Chemical Engineering Research*, 2019, 58, 9908.
- (57) "Synthesis of Inorganic/Organic Hybrid Materials via Vapor Deposition onto Liquid Surfaces," M. De Luna, P. Karandikar, **M. Gupta**, *ACS Applied Nano Materials*, 2018, 1, 6575.
- (56) "Process-Structure-Property Relationships for Porous Membranes Formed by Polymerization of Solid Monomer by a Vapor-Phase Initiator," G. Dianat, N. Movsesian, **M. Gupta**, *Macromolecules*, 2018, 51, 10297.
- (55) "Roll-to-Roll Surface Modification of Cellulose Paper via Initiated Chemical Vapor Deposition," C. Cheng, **M. Gupta**, *Industrial & Chemical Engineering Research*, 2018, 57, 11675.
- (54) "Giant Lipid Vesicle Formation Using Vapor-Deposited Charged Porous Polymers," N. Movsesian, M. Tittensor, G. Dianat, **M. Gupta**, N. Malmstadt, *Langmuir*, 2018, 34, 9025.
- (53) "Effects of Surface Tension and Viscosity on Gold and Silver Sputtered onto Liquid Substrates," M. M. De Luna, **M. Gupta**, *Applied Physics Letters*, 2018, 112, 201605.
- (52) "Synthesis of Functional Particles by Condensation and Polymerization of Monomer Droplets in Silicone Oils," P. Karandikar, **M. Gupta**, *Langmuir*, 2017, 33, 7701.
- (51) "Surface functionalization of 3D-printed plastics via initiated chemical vapor deposition," C. Cheng, **M. Gupta**, *Beilstein Journal of Nanotechnology*, 2017, 8, 1629.
- (50) "Sequential deposition of patterned porous polymers using poly(dimethylsiloxane) masks," G. Dianat, **M. Gupta**, *Polymer*, 2017, 126, 463.
- (49) "Fabrication of ionic liquid gel beads via sequential deposition," P. Karandikar, **M. Gupta**, *Thin Solid Films*, 2017, 635, 17.
- (48) "Two-Stage Growth of Polymer Nanoparticles at the Liquid-Vapor Interface by Vapor-Phase Polymerization," R. Frank-Finney, **M. Gupta**, *Langmuir*, 2016, 32, 11014.
- (47) "Solventless grafting of functional polymer coatings onto Parylene C," M. M. De Luna, B. Chen, L. C. Bradley, R. Bhandia, **M. Gupta**, *Journal of Vacuum Science & Technology A*, 2016, 34, 041403.
- (46) "Vapor Phase Fabrication of Hydrophilic and Hydrophobic Asymmetric Polymer Membranes," G. Dianat, S. Seidel, M. M. De Luna, **M. Gupta**, *Macromolecular Materials and Engineering*, 2016, 301, 1037.
- (45) "Flow invariant droplet formation for stable parallel microreactors," C. T. Riche, E. J. Roberts, **M. Gupta**, R. L. Brutchey, N. Malmstadt, *Nature Communications*, 2016, 7, 10780.
- (44) "Formation of Porous Polymer Coatings on Complex Substrates Using Vapor Phase Precursors," S. Seidel, G. Dianat, M. Gupta, *Macromolecular Materials and Engineering*, 2016, 4, 371.
- (43) "Engineered Hydrophobicity of Discrete Microfluidic Elements for Double Emulsion Generation." B. Thompson, C. T. Riche, N. Movsesian, K. C. Bhargava, **M. Gupta**, N. Malmstadt. *Microfluidics and Nanofluidics*, 2016, 20, 78.

- (42) "Fabricating Polymer Canopies onto Structured Surfaces Using Liquid Scaffolds," B. Chen, R. Frank-Finney, **M. Gupta**, *ACS Applied Materials & Interfaces*, 2015, 7, 23056.
- (41) "Microstructured Films Formed on Liquid Substrates via Initiated Chemical Vapor Deposition of Cross-Linked Polymers," L. Bradley, **M. Gupta**, *Langmuir*, 2015, 31, 7999.
- (40) "All-Dry Fabrication of Poly(methacrylic acid)-Based Membranes with Controlled Dissolution Behavior," S. Seidel, P. Kwong, **M. Gupta**, *Macromolecular Materials and Engineering*, 2015, 300, 1079.
- (39) "Effect of Transition Metal Salts on the Initiated Chemical Vapor Deposition of Polymer Thin Films," P. Kwong, S. Seidel, **M. Gupta**, *Journal of Vacuum Science & Technology A*, 2015, 33, 031504.
- (38) "Copolymerization of 1-Ethyl-3-vinylimidazolium bis(trifluoromethylsulfonyl)imide via Initiated Chemical Vapor Deposition," L. C. Bradley, **M. Gupta**, *Macromolecules*, 2014, 47, 6657.
- (37) "Synthesis of Polymer Nanoparticles via Vapor Phase Deposition onto Liquid Substrates," P. D. Haller, **M. Gupta**, *Macromolecular Rapid Communications*, 2014, 35, 2000.
- (36) "Systematic Study of the Growth and Morphology of Vapor Deposited Porous Polymer Membranes," S. Seidel, **M. Gupta**, *Journal of Vacuum Science & Technology A*, 2014, 32, 041514.
- (35) "Fluoropolymer surface coatings to control droplets in microfluidic devices," C. T. Riche, C. Zhang, **M. Gupta**, N. Malmstadt, *Lab on a Chip*, 2014, 14, 1834-1841.
- (34) "Formation of Three-Dimensional Parylene C Structures via Thermoforming" B.J. Kim, B. Chen, **M. Gupta**, E. Meng, *Journal of Micromechanics and Microengineering*, 2014, 24, 065003.
- (33) "Patterned Fluoropolymer Barriers for Containment of Organic Solvents within Paper-Based Microfluidic Devices," B. Chen, P. Kwong, **M. Gupta**, *ACS Applied Materials & Interfaces*, 2013, 5, 12701-12707.
- (32) "Solventless Fabrication of Porous-on-Porous Materials," P. Kwong, S. Seidel, **M. Gupta**, *ACS Applied Materials & Interfaces*, 2013, 5, 9714-9718.
- (31) "Effect of Surface Tension, Viscosity, and Process Conditions on Polymer Morphology Deposited at the Liquid-Vapor Interface," P. Haller, L. Bradley, **M. Gupta**, *Langmuir*, 2013, 29, 11640-11645.
- (30) "Formation of Polymer-Ionic Liquid Gels Using Vapor Phase Precursors," R. Frank-Finney, L. Bradley, **M. Gupta**, *Macromolecules*, 2013, 46, 6852-6857.
- (29) "Formation of Heterogeneous Polymer Films via Simultaneous or Sequential Depositions of Soluble and Insoluble Monomers onto Ionic Liquids," L. Bradley, **M. Gupta**, *Langmuir*, 2013, 29, 10448-10454.
- (28) "Hybrid Microcavity Humidity Sensor," S. Mehrabani, P. Kwong, **M. Gupta**, A.M. Armani, *Applied Physics Letters*, 2013, 102, 241101.
- (27) "Simultaneous Polymerization and Solid Monomer Deposition for the Fabrication of Polymer Membranes with Dual-Scale Porosity," S. Seidel, P. Kwong, **M. Gupta**, *Macromolecules*, 2013, 46, 2976-2983.
- (26) "Responsive Polymer Welds via Solution Casting for Stabilized Self-Assembly," B. Chen\*, C. T. Riche\*, M. Lehmann\*, **M. Gupta**, *ACS Applied Materials & Interfaces*, 2012, 4, 6911-6916.
- (25) "Vapor Phase Deposition of Functional Polymers onto Paper-Based Microfluidic Devices for Advanced Unit Operations," P. Kwong, **M. Gupta**, *Analytical Chemistry*, 2012, 84, 10129-10135.
- (24) "Encapsulation of Ionic Liquids within Polymer Shells via Vapor Phase Deposition," L.C. Bradley, **M. Gupta**, *Langmuir*, 2012, 28, 10276-10280.
- (23) "Two-Phase Microfluidic Droplet Flows of Ionic Liquids for the Synthesis of Gold and Silver Nanoparticles," L. L. Lazarus, C. T. Riche, B.C. Marin, **M. Gupta**, N. Malmstadt, R. L. Brutchey, *ACS Applied Materials & Interfaces*, 2012, 4, 3077-3083.
- (22) "Ultrathin Free-Standing Polymer Films Deposited onto Patterned Ionic Liquids and Silicone Oil," R. J. Frank-Finney, P. D. Haller, **M. Gupta**, *Macromolecules*, 2012, 45, 165-170.
- (21) "Self-Assembly of Pillars Modified with Vapor Deposited Polymer Coatings," B. Chen, S. Seidel, H. Hori, **M. Gupta**, *ACS Applied Materials & Interfaces*, 2011, 3, 4201-4205.
- (20) "Directed Deposition of Functional Polymers onto Porous Substrates Using Metal Salt Inhibitors," P. Kwong, C. A. Flowers, **M. Gupta**, *Langmuir*, 2011, 27, 10634-10641.

- (19) "Vapor Deposition of Cross-linked Fluoropolymer Barrier Coatings onto Pre-assembled Microfluidic Devices," C. T. Riche, B. C. Marin, N. Malmstadt, **M. Gupta**, *Lab on a Chip*, 2011, 11, 3049-3052.
- (18) "Vapor-Phase Free Radical Polymerization in the Presence of an Ionic Liquid," P. D. Haller, R. J. Frank-Finney, **M. Gupta**, *Macromolecules*, 2011, 44, 2653-2659.
- (17) "Three-dimensional patterning of porous materials using vapor phase polymerization," P. D. Haller, C. A. Flowers, **M. Gupta**, *Soft Matter*, 2011, 7, 2428-2432.
- (16) "Patterned Paper as a Template for the Delivery of Reactants in the Fabrication of Planar Materials," P. J. Bracher, **M. Gupta**, G. M. Whitesides, *Soft Matter*, 2010, 6, 4303-4309.
- (15) "Patterning Precipitates of Reactions In Paper," P. J. Bracher, **M. Gupta**, G. M. Whitesides, *Journal of Materials Chemistry*, 2010, 20, 5117-5122.
- (14) "Heterogeneous Films of Iontropic Hydrogels Fabricated from Delivery Templates of Patterned Paper," P. J. Bracher, **M. Gupta**, E. T. Mack, G. M. Whitesides, *ACS Applied Materials & Interfaces*, 2009, 1, 1807-1812.
- (13) "Measuring Densities of Solids and Liquids Using Magnetic Levitation: Fundamentals," K. A. Mirica, S. S. Shevkoplyas, S. T. Phillips, **M. Gupta**, G. M. Whitesides, *Journal of the American Chemical Society*, 2009, 131, 10049-10058.
- (12) "Shaped Films of Iontropic Hydrogels Fabricated Using Templates of Patterned Paper," P. J. Bracher, **M. Gupta**, G. M. Whitesides, *Advanced Materials*, 2009, 21, 445-450.
- (11) "Surface Modification of High Aspect Ratio Structures with Fluoropolymer Coatings Using Chemical Vapor Deposition," **M. Gupta**, K. K. Gleason, *Thin Solid Films*, 2009, 517, 3547-3550.
- (10) "Egg Beater as Centrifuge: Isolating Human Plasma from Whole Blood in Resource-poor Settings," A. P. Wong, **M. Gupta**, S. S. Shevkoplyas, G. M. Whitesides, *Lab on a Chip*, 2008, 8, 2032-2037.
- (9) "FLASH: A Rapid Method for Prototyping Paper-Based Microfluidic Devices," A. W. Martinez, S. T. Phillips, B. J. Wiley, **M. Gupta**, G. M. Whitesides, *Lab on a Chip*, 2008, 8, 2146-2150, also featured in *Nature Chemistry*.
- (8) "Initiated Chemical Vapor Deposition (iCVD) of Conformal Polymeric Nanocoatings for the Surface Modification of High-Aspect-Ratio Pores," **M. Gupta**, V. Kapur, N. M. Pinkerton, K. K. Gleason, *Chemistry of Materials*, 2008, 20, 1646-1651.
- (7) "Decorated Electrospun Fibers Exhibiting Superhydrophobicity," M. Ma, **M. Gupta**, Z. Li, L. Zhai, K. K. Gleason, R. E. Cohen, M. F. Rubner, G. C. Rutledge, *Advanced Materials*, 2007, 19, 255-259.
- (6) "Initiated Chemical Vapor Deposition of Poly(Furfuryl Methacrylate)," G. Chen, **M. Gupta**, K. Chan, K. K. Gleason, *Macromolecular Rapid Communications*, 2007, 28, 2205-2209.
- (5) "Initiated Chemical Vapor Deposition (iCVD) of Polymeric Nanocoatings," T. P. Martin, K. K. S. Lau, K. Chan, Y. Mao, **M. Gupta**, W. S. O'Shaughnessy, K. K. Gleason, *Surface and Coatings Technology*, 2007, 201, 9400-9405.
- (4) "Mechanistic Study of the Initiated Chemical Vapor Deposition (iCVD) of Poly(1H,1H,2H,2H-Perfluorodecyl Acrylate) (PPFDA) Thin Films," **M. Gupta**, K. K. Gleason, *Langmuir*, 2006, 22, 10047-10052.
- (3) "Large Scale Initiated Chemical Vapor Deposition of Poly(glycidyl methacrylate) Thin Films," **M. Gupta**, K. K. Gleason, *Thin Solid Films*, 2006, 515, 1579-1584.
- (2) "Superhydrophobic Fabrics Produced by Electrospinning and Chemical Vapor Deposition," M. Ma, Y. Mao, **M. Gupta**, K.K. Gleason, G.C. Rutledge, *Macromolecules*, 2005, 38, 9742-9748.
- (1) "Conformation and Dynamics of Single DNA in Parallel-Plate Slit Microchannels," Y.-L. Chen, M. D. Graham, J. J. de Pablo, G. C. Randall, **M. Gupta**, P. S. Doyle, *Physical Review E*, 2004, 70, 060901.

## **Book Chapters and Review Articles**

- (1) "Modular Microfluidics for Double Emulsion Formation" B. Thompson, N. Movsesian, C. Cheng, P. Karandikar, **M. Gupta**, N. Malmstadt, book chapter in "Methods in Cell Biology, Microfluidics in Cell Biology, Part C: Microfluidics for Cellular and Subcellular Analysis" published by Elsevier, 2018.
- (2) "Deposition of Polymers onto New Substrates," **M. Gupta**, book chapter in "CVD Polymers" published by Wiley and edited by Karen Gleason, 2015.
- (3) "Initiated Chemical Vapor Deposition of Polymers Onto Liquid Substrates," L. C. Bradley, **M. Gupta**, *Nanoscience and Nanotechnology Letters*, 2015, 7, 2015.
- (4) "Chemical Vapor Deposition of Polymer Films," S. Seidel, C.T. Riche, **M. Gupta**, Encyclopedia of Polymer Science and Technology, published by John Wiley & Sons, 2011, pp.1-26.

## **Patents**

- (3) "Porous Polymer Structures and Methods and Articles Relating Thereto," **Gupta, M.**; Seidel, S.S.; Kwong, P., US Patent # 9,376,516
- (2) "Density-Based Methods for Separation of Materials, Monitoring of Solid Supported Reactions and Measuring Densities of Small Liquid Volumes and Solids," Phillips, S.T.; Whitesides, G.M.; Mirica, K.A.; Carrilho, E.; Martinez, A. W.; Shevkopylas, S. S.; Snyder, P.W.; Perez-Castillejos, R.; **Gupta, M.**; Winkleman, A.; Gudiksen, K.L., Patent Application EP2167216 A2
- (1) "Superhydrophobic Fibers Produced By Electrospinning and Chemical Vapor Deposition," Gleason, K.K.; Rutledge, G.C.; **Gupta, M.**; Ma, M.; Mao, Y., United States Patent 7651760 B2

## **Awards and Honors**

- Invited Article for *Molecular Systems Design & Engineering 2020 Emerging Investigators*
- Invited Article for *Industrial & Engineering Chemistry 2019 Class of Influential Researchers*
- Jack Munushian Early Career Chair, 2013-2020
- USC Viterbi School of Engineering Junior Faculty Award, 2014
- National Science Foundation CAREER Award, 2013-2018
- American Chemical Society Petroleum Research Fund Doctoral New Investigator, 2012-2014
- Selected Participant in NAE Frontiers of Engineering Education (FOEE) symposium, 2012