

ANKUR GUPTA

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EDUCATION AND TRAINING

2012-17: Massachusetts Institute of Technology (MIT)
PhD, Chemical Engineering, M.S., Chemical Engineering Practice
Thesis Adviser: Prof. Patrick S. Doyle and Prof. T. Alan Hatton

2008-12: Indian Institute of Technology (IIT) Delhi
B.Tech, Chemical Engineering, Presidents Gold Medal
Thesis Adviser: Prof. Shantanu Roy

RESEARCH AND PROFESSIONAL EXPERIENCE

2021 - Present: University of Colorado, Boulder
Assistant Professor, Chemical and Biological Engineering Department
Affiliations: Materials Science and Engineering Program
Principal Investigator: Laboratory of Interfaces, Flow and Electrokinetics (LIFE)

2017-2020: Princeton University
Postdoctoral Research Associate, Mechanical and Aerospace Engineering
Mentor: Prof. Howard A. Stone

SELECTED AWARDS & HONORS

- Invited Speaker, 15th International Symposium on Electrokinetics
- American Institute of Chemical Engineers (AIChE) 35 under 35, 2023
- Dream Chemistry Lecture, Physical Chemistry of the Polish Academy of Sciences
- Session Keynote Speaker, Emulsions, foams and surfactants, ACS Colloids 2023
- NSF CAREER Award, 2023
- Soft Matter Emerging Investigator, RSC Journals, 2023
- Outstanding Graduate Teaching Award, ChBE, CU Boulder, 2021, 2022, 2023
- Graduates of the Last Decade (GOLD), Alumni Award, IIT Delhi, 2022
- CU Next Award for Innovation in Teaching, 2022
- ACS Petroleum Research Fund, Doctoral New Investigator, 2022
- Defense Advanced Research Project Agency (DARPA) Riser, 2022
- Publons peer-review Award for placing in top 1% of reviewers, 2018
- Hugh Hampton Young Fellow, MIT, 2017
- Presidents Gold Medal, IIT Delhi, 2012

RESEARCH, MENTORING & TEACHING SUMMARY

- *Publications*: Total citations on Google Scholar >2,350, h-index 19. Author of 38 research articles and 1 book chapter. Typical journals include Science Advances, Physical Review Letters, Electrochimica Acta, Soft Matter, Langmuir, Physical Review Fluids, Journal of Electrochemical Society. Recent work highlighted in more than 40 national and international outlets like CNN, Daily Mail, Newsweek etc. Our work also selected as the top scientific discovery at CU Boulder in 2023.

- *Invited talks*: Invite speaker at 15th International Symposium on Electrokinetics, Session Keynote Speaker at ACS Colloids 2023 and Dream Chemistry Lecture in Warsaw. Delivered over 30 talks at universities and national labs in the US, Canada, Singapore, and India. Examples: Stanford University, National Renewable Energy Laboratory, Los Alamos National Laboratory, University of Florida, University of Wisconsin-Madison, University of California Davis, Colorado School of Mines, Michigan State University, Case Western University, University of Toronto, McGill University, University of Alberta, National University of Singapore, Indian Institute of Science Bangalore, IIT Delhi.

- *Conference presentations*: Contributed to over 40 talks at conferences such as annual meetings of American Institute of Chemical Engineers (AIChE), American Physical Society (APS) - Division of Fluid Dynamics (DFD), American Chemical Society (ACS) Colloids, Society of Rheology (SOR).

- *Research support*: Secured funding from NSF, ACS PRF, Research Innovation Office at CU, and Academic Innovation Office at CU.

- *PhD students*: 6 advised at CU Boulder, 1 mentored at Princeton. Students received several awards such as NSF Graduate Research Fellowship, Teets Family Fellowship, Ryland Graduate Fellowship, ARCS Foundation Scholarship, GAANN Fellowships, Mukhopadhyay Research Award, Link Energy Fellowship honorable mention, Langmuir student award finalist at ACS Colloids. Published 6 papers as corresponding author where PhD students are lead authors.

- *Undergraduate students*: 7 advised at CU Boulder, 5 advised at Princeton, and 5 advised at MIT. Multiple students published journal articles as co-authors with one student publishing three first-author papers. 3 students at CU Boulder are funded through AIChE CHER4U program that supports students from underrepresented backgrounds to gain research experience. Awards include best poster award at AIChE Student Conference, Undergraduate Research Award at CU Boulder and BSI scholarship, among others.

- *Teaching*: Instructed 4 courses at CU Boulder, 1 at Princeton, 1 at MIT. Courses include: Graduate transport phenomena, undergraduate fluid mechanics, and an elective titled "Electrokinetics for Energy and the Environment." Received outstanding graduate teaching awards for three consecutive years in a row at CU Boulder. Student comments have repeatedly mentioned "best professor I have ever had", "best course", "lectures are awesome", "best professor in all of engineering".

SYNERGISTIC ACTIVITIES

- *Peer review*: Refereed over 100 publication for more than 30 journals. Example journals: Physical Review Letters, Angewandte Chemie, Advanced Functional Materials, Nature Communications, Nature Computational Science, Langmuir, Soft Matter, ACS Applied Materials and Interfaces, Journal of Physics: Condensed Matter.

- *Grant review*: National Science Foundation, ACS Petroleum Research Fund, New Frontiers Research Fund Canada, Israel Science Foundation, Research Foundation Flanders - Belgium.

- *Session chair and poster judging*: AIChE, ACS Colloids, APS-DFD


- *Lead organizer of symposium*: "Electrokinetics for Nano and Microfluidics" symposium at the 19th U.S. National Congress on Theoretical and Applied Mechanics, 2022; received over 25 submissions from Europe, Canada, Asia and the US.

- *Service at CU Boulder*: Thesis committee member of 10 PhD students at Chemical and Biological Engineering, member of several departmental level committees.

- *Digital education*: Led the creation of IIT-JEE Lectures YouTube channel for high school students in India, which attracted 9,000+ subscribers and 180,000+ views (2015-2018). Developed interactive teaching simulations to teach undergraduate fluid mechanics such as drop shapes on different planets ([link](#)) and Rankine tornado ([link](#)). Developed interactive blogs to make energy research accessible to undergraduates and high school students.

- *Industry experience*: Haldor Topsoe (Denmark), Corning Glass (Corning, NY and Wilmington, NC), Alcon (Fort Worth, TX and Atlanta, GA).

PUBLICATIONS

 Google Scholar profile, >2,350 citations, h index=19

Author of 38 research articles and 1 book chapter.

‡ denotes corresponding author, § denotes publications with students as first authors, * denotes equal contribution

Work from University of Colorado Boulder

13 total published, 9 as corresponding author with students as first-author

2 additional manuscript at pre-print stage (not listed below)

1. R. R Raj, A. Ganguly, C. Becker, C. W. Shields IV and **A. Gupta**^{‡,§}
Motion of an active bent-rod with an articulating hinge: Exploring mechanical and chemical modes of swimming
Frontiers in Physics, 11, 2023 (invited article) [[link](#)]
2. A. Ganguly, B. M. Alessio and **A. Gupta**^{‡,§}
Diffusiophoresis: A Novel Transport Mechanism - Fundamentals, Applications, and Future Opportunities
Frontiers in Sensors, 4, 2023 (invited article) [[link](#)]
3. B. M. Alessio, and **A. Gupta**^{‡,§}
Diffusiophoresis-enhanced biological Turing patterns

Science Advances, 9, eadj2457, 2023 [[link](#)]

Featured in over 40 national and international outlets including CNN, MSN, World Today, Newsweek, The Conversation, CU Boulder Today, Phys.org, Technology Networks, Yahoo News and Eureka Alert.

4. J. G. Lee, C.P. Thome, Z. Cruse, A. Ganguly, **A. Gupta**, and C. Wyatt Shields IV
Magnetically locked Janus particle clusters with orientation-dependent motion in AC electric fields
Nanoscale, advanced article, 2023 [[link](#)]
5. A. H. Christensen, **A. Gupta**, G. Chen, W. S. Peters, M. Knoblauch, H. A. Stone, and K. H. Jensen
Optimal geometry for surface-enhanced diffusion
Physical Review E, 108, 045101, 2023 [[link](#)]
6. N. Jarvey, F. Henrique, and **A. Gupta**^{‡,§}
Asymmetric rectified electric fields in multicomponent electrolytes with surface reactions
Soft Matter, 19, 6032, 2023 [[link](#)]
7. A. Seal, U. Tiwari, **A. Gupta**, and A. G. Rajan
Incorporating ion-specific van der Waals and soft repulsive interactions in the Poisson-Boltzmann theory of electrical double layers
accepted, Physical Chemistry Chemical Physics [[link](#)]
8. J.G. Lee, R. R. Raj, C. P. Thome, N. B. Day, P. Martinez, N. Bottenus, **A. Gupta**, and C. Wyatt Shields
Bubble-Based microrobots with rapid circular motions for epithelial pinning and drug delivery
Small, 2300409, 2023 [[link](#)]
9. A. Ganguly, and **A. Gupta**^{‡,§}
Going in circles: Slender body analysis of a self-propelling bent rod
Physical Review Fluids, 08, 014103, 2023 [[link](#)]
10. R. R. Raj, C. Wyatt Shields, and **A. Gupta**^{‡,§}
Two-dimensional diffusiophoretic colloidal banding: Optimizing the spatial and temporal design of solute sinks and sources
Soft Matter, 19, 892, 2023 [[link](#)]
Selected as a HOT article by editors of Soft Matter
11. F. Henrique, P. J. Zuk, **A. Gupta**^{‡,§}
Effects of asymmetry in valence and diffusivities on transport of a binary electrolyte in a cylindrical pore
Electrochimica Acta, 433, 141220, 2022 [[link](#)]
12. N. Jarvey, F. Henrique, **A. Gupta**^{‡,§}
Ion transport in an electrochemical cell: A theoretical framework to couple dynamics of double layers and redox reactions for multicomponent electrolyte solutions
Journal of the Electrochemical Society, 169, 093506, 2022 [[link](#)]

13. F. Henrique, P. J. Zuk, **A. Gupta**^{‡,§}
Charging dynamics of electrical double layers inside a cylindrical pore: Predicting the effects of arbitrary pore size
Soft Matter, 18, 198, 2022 [[link](#)]

Work prior to University of Colorado Boulder

14. B. M. Alessio, S. Shim, **A. Gupta**, H. A. Stone
Diffusioosmosis-driven dispersion of colloids: a Taylor dispersion analysis with experimental validation
Journal of Fluid Mechanics, 94, A23, 2022 [[link](#)]
15. **A. Gupta**, A.R. Konicek, M.A. King, A. Iqtidar, M. Yeganeh, H.A. Stone
The effect of gravity on the shape of a droplet on a fiber: Nearly axisymmetric profiles with experimental validation
Physical Review Fluids, 6, 063602, 2021 [[link](#)]
16. B.M. Alessio, S. Shim, E. Mintah, **A. Gupta**, H.A. Stone
Diffusiophoresis and diffusioosmosis in tandem: Two-dimensional particle motion in the presence of multiple electrolytes
Physical Review Fluids, 6, 054201, 2021 [[link](#)]
17. **A. Gupta**[‡], A. Govind Rajan, Emily A. Carter, H.A. Stone[‡]
Thermodynamics of electrical double layers with electrostatic correlations
The Journal of Physical Chemistry C, 124, 26830, 2020 [[link](#)]
18. **A. Gupta**[‡], A. Govind Rajan, Emily A. Carter, H.A. Stone[‡]
Ionic layering and overcharging in a Poisson-Boltzmann model
Physical Review Letters, 125, 188004, 2020 [[link](#)]
19. **A. Gupta**[‡], P. J. Zuk [‡], H.A. Stone [‡]
Charging dynamics of overlapping double layers in a cylindrical nanopore
Physical Review Letters, 126, 076001, 2020 [[link](#)]
20. **A. Gupta**, S. Shim, H.A. Stone
Diffusiophoresis: From dilute to concentrated electrolytes
Soft Matter, 16, 6975, 2020 [[link](#)] *highlighted in inside front cover*
21. **A. Gupta**
Nanoemulsions, invited book chapter in *Nanoparticles for Biomedical Applications: Fundamental Concepts, Biological Interactions and Clinical Applications*
edited by Eun Ji Chung, Lorraine Leon and Carlos Rinaldi, Elsevier publication [[link](#)]
22. J.L. Wilson, S. Shim, E. Yu, **A. Gupta**, H.A. Stone
Diffusiophoresis in multivalent electrolytes
Langmuir, 36, 7014, 2020 [[link](#)]
23. **A. Gupta**, S. Shim, L. Issah, C. McKenzie, H.A. Stone
Diffusion of multiple electrolytes cannot be treated independently: Model predictions with

- experimental validation*
Soft Matter, 15, 9965, 2019 [[link](#)]
24. Y. Liu, B. Rallabandi, L. Zhu, **A. Gupta**, H.A. Stone
Pattern formation in oil-in-water emulsions exposed to a salt gradient
Physical Review Fluids, 4, 084307, 2019 [[link](#)]
 25. **A. Gupta**, B. Rallabandi, H.A. Stone
Diffusiophoretic and diffusioosmotic velocities for mixtures of valence-asymmetric electrolytes
Physical Review Fluids, 4, 043702, 2019 [[link](#)]
 26. K. Singh, **A. Gupta**, A. Buchner, F. Ibis, J.W. Pronk, D. Tam, H.B. Eral
A low-cost centrifugal homogenizer for emulsification & mechanical cell lysis
Journal of Colloidal and Interface Science, 547, 127, 2019 [[link](#)]
 27. **A. Gupta**, H. A. Stone
Electric double layers: Effect of asymmetry in electrolyte valence on steric effects, dielectric decrement and ion-ion correlations
Langmuir, 34, 11971, 2018 [[link](#)]
 28. **A. Gupta***, H. Lee*, P.S. Doyle
Oil recovery from micropatterned triangular troughs during a surfactant flood
Langmuir, 34, 10644, 2018 [[link](#)]
 29. A.Z.M. Badruddoza*, **A. Gupta***, B.L. Trout, A.S. Myerson, P.S. Doyle
Low energy nanoemulsions as templates for the formulation of hydrophobic drugs
Advanced Therapeutics, 1700020, 2018 [[link](#)]
 30. **A. Gupta***, H. Lee*, P.S. Doyle
Controlled liquid entrapment over patterned sidewalls in confined geometries
Physical Review Fluids, 2, 094007, 2017 [[link](#)]
 31. **A. Gupta***, A.Z.M. Badruddoza*, T.A. Hatton, P.S. Doyle
A general route for nanoemulsion synthesis using low energy methods at constant temperature
Langmuir, 33, 7118, 2017 [[link](#)]
 32. H. Lee*, **A. Gupta***, T.A. Hatton, P.S. Doyle
Controlled entrapment of liquid isolated chambers through photo-patterned obstacles
Physical Review Applied, 7, 004013, 2017 [[link](#)]
 33. **A. Gupta**, V. Narsimhan, T.A. Hatton, P.S. Doyle
Kinetics of change in droplet size during nanoemulsion formation
Langmuir, 32, 11551, 2016 [[link](#)]
 34. S.G.Lee, H. Lee, **A. Gupta**, P.S. Doyle
Site-selective in situ grown carbonate micromodels with tunable geometry, porosity, and wettability
Advanced Functional Materials 26, 4896, 2016 [[link](#)]

35. **A. Gupta**, H.B. Eral, T.A. Hatton, P.S. Doyle
Nanoemulsions: Formation, properties and applications
Soft Matter, 12, 2826, 2016 [[link](#)]
36. **A. Gupta**, H.B. Eral, T.A. Hatton, P.S. Doyle
Controlling and predicting droplet size of nanoemulsions: Scaling relations with experimental validation
Soft Matter, 12, 1452, 2016 [[link](#)]
37. G.C.L. Goff, J. Lee, **A. Gupta**, W.A. Hill, P.S. Doyle
High-throughput contact flow lithography
Advanced Science, 2, 10, 2015 [[link](#)]
38. H. Lee, R.L. Srinivas, **A. Gupta**, P.S. Doyle
Sensitive and multiplexed on-chip microRNA profiling in oil-isolated hydrogel chambers
Angewandte Chemie, 127, 2507, 2015 [[link](#)]
39. **A. Gupta**, S. Roy
Euler-Euler simulation of bubbly flow in a rectangular bubble column: Experimental validation with radioactive particle tracking
Chemical Engineering Journal, 225, 818, 2015 [[link](#)]

INVITED TALKS

Presentations from University of Colorado Boulder

1. Invited Speaker, 15th International Symposium on Electrokinetics, 09/18/2024
2. Brigham Young University, Chemical Engineering, 11/30/2023
3. Dream Chemistry Lecture, Physical Chemistry of the Polish Academy of Sciences, 07/13/2023
4. ACS Colloids, Keynote in Emulsions, foams and Surfactants, 06/06/2023
5. Stanford University, Fluid Mechanics Seminar 05/03/2022
6. National Renewable Energy Laboratory, 04/08/2022
7. Los Alamos National Laboratory, Physics Colloquium, 02/03/2022
8. Baylor University, Mechanical Engineering, 10/07/2021
9. University of Florida, Chemical Engineering, 10/04/2021
10. Complex Fluids Seminar Series, Carnegie Mellon University, 04/16/2021
11. Soft Matter Coffee Hour (SMATch), Princeton University, Chemical Engineering, 09/16/2020

Presentations prior to University of Colorado Boulder

12. University of Alberta, Chemical Engineering, 04/15/2019
13. National University of Singapore, Chemical Engineering, 04/01/2019
14. Case Western Reserve University, Chemical Engineering, 03/25/2019
15. Michigan State University, Chemical Engineering, 03/05/2019
16. University of Colorado Boulder, Chemical Engineering, 02/28/2019

17. Colorado School of Mines, Chemical Engineering, 02/21/2019
18. University of Oklahoma, Chemical Engineering, 02/15/2019
19. Indian Institute of Technology (IIT) Delhi, Chemical Engineering, 02/05/2019
20. Indian Institute of Science (IISc) Bangalore, Chemical Engineering, 01/30/2019
21. University of California Davis, Chemical Engineering, 01/10/2019
22. University of Wisconsin Madison, Chemical Engineering, 12/05/2018
23. University of Waterloo, Chemical Engineering, 08/31/2018
24. Ryerson University, Mechanical and Industrial Engineering, 08/29/2018
25. Ryerson University, Chemical Engineering, 08/29/2018
26. McMaster University, Chemical Engineering, 08/28/2018
27. McGill University, Chemical Engineering, 08/24/2018
28. University of Toronto, Chemical Engineering, 08/08/2018
29. University of British Columbia, Mechanical Engineering, 08/02/2018
30. Air Products, Allentown Pennsylvania, 03/03/2017
31. Complex Fluids Group, Princeton University, 12/19/2016
32. The Dow Chemical Company, Midland, Michigan, 10/25/2016
33. Indian Institute of Technology (IIT) Delhi, Chemical Engineering, 03/18/2016

CONTRIBUTED PRESENTATIONS

Presentations from University of Colorado Boulder

1. B. M. Alessio, **A. Gupta**
Diffusiophoresis as a mechanism to study human population migration patterns
76th APS- Division of Fluid Dynamics, Washington DC
2. B. M. Alessio, **A. Gupta**
Diffusiophoresis-enhanced Turing patterns
76th APS- Division of Fluid Dynamics, Washington DC
3. F. Henrique, P. J. Zuk, **A. Gupta**
Kirchhoff's Laws Based on Electrochemical Potential of Charge Dictate Double-Layer Charging in Porous Media
76th APS- Division of Fluid Dynamics, Washington DC
4. N. Jarvey, F. Henrique, **A. Gupta**
Asymmetric rectified electric and concentration fields in multicomponent electrolytes with surface reactions
76th APS- Division of Fluid Dynamics, Washington DC
5. A. Ganguly, S. Roychowdhury, **A. Gupta**
Impact of interaction potential lengthscale and surface heterogeneity on phoretic and autophoretic mobilities: Moving beyond the slip velocity approach
76th APS- Division of Fluid Dynamics, Washington DC

6. R. R. Raj, J. G. Lee, **A. Gupta**, C. W. Shields
Effect of geometric design on the motion of microrobots due to acoustic streaming flows
76th APS- Division of Fluid Dynamics, Washington DC
7. B. M. Alessio, R. R. Raj, and **A. Gupta**
Diffusiophoresis-enhanced Turing patterns
2023 AIChE Annual Meeting, Orlando, FL
8. A. Ganguly, R. R. Raj, C. Baker and **A. Gupta**
Self-propelling bent rods: Exploring chemical and mechanical modes of swimming
2023 AIChE Annual Meeting, Orlando, FL
9. F. Henrique, N. Jarvey, P. J. Zuk and **A. Gupta**
Modified Kirchhoff's law for electrical-double-layer charging in porous media
2023 AIChE Annual Meeting, Orlando, FL
10. A. Ganguly, S. Roychowdhury, and **A. Gupta**
Phoretic and Self-Phoretic Motion of Microparticles With Arbitrary Interaction Potentials
97th American Chemical Society, Colloids and Interface Science, Raleigh, NC
11. A. Ganguly and **A. Gupta**
Slender body analysis of a self-propelling bent rod
97th American Chemical Society, Colloids and Interface Science, Raleigh, NC
12. R. R. Raj, J. G. Lee, **A. Gupta**, and C. W. Shields
Impact of geometry on the frequency-dependent response of acoustic microrobots
97th American Chemical Society, Colloids and Interface Science, Raleigh, NC
13. F. Henrique, P. J. Zuk, and **A. Gupta**
Effective Kirchhoff's Laws for Double-Layer Charging in Porous Media
97th American Chemical Society, Colloids and Interface Science, Raleigh, NC
14. B. M. Alessio and **A. Gupta**
Programmable colloidal assembly: Turing patterns induced via diffusiophoresis
97th American Chemical Society, Colloids and Interface Science, Raleigh, NC
15. N. Jarvey, F. Henrique and **A. Gupta**
AREFs in multicomponent electrolytes with electrochemical reactions due to imbalance in ionic strength
97th American Chemical Society, Colloids and Interface Science, Raleigh, NC
16. N. Jarvey, F. Henrique and **A. Gupta**
Coupled ionic transport due to double layers and redox reactions: Impact of multiple ions, background electrolytes, and Frumkin-Butler-Volmer Kinetics
97th American Chemical Society, Colloids and Interface Science, Raleigh, NC
17. R. R. Raj, C. W. Shields and **A. Gupta**
Diffusiophoretic colloidal highways: Optimizing the colloidal banding induced by two-dimensional solute gradients
97th American Chemical Society, Colloids and Interface Science, Raleigh, NC

18. A. Ganguly, **A. Gupta**
To turn or not to turn: Slender body analysis for a self-propelling axially asymmetric bent rod
75th APS- Division of Fluid Dynamics, Indianapolis, IN
19. R. Raj, C. Wyatt Shields, **A. Gupta**
Rational Design of Two-Dimensional Colloidal Banding
75th APS- Division of Fluid Dynamics, Indianapolis, IN
20. N. Jarvey, F. Henrique, **A. Gupta**
Dynamics of Multicomponent Electrolyte Transport Including the Effects of Electrical Double Layers and Redox Reactions
75th APS- Division of Fluid Dynamics, Indianapolis, IN
21. F. Henrique, P. J. Zuk, **A. Gupta**
Electrical-Double-Layer Charging in a Complex Network of Pores
75th APS- Division of Fluid Dynamics, Indianapolis, IN
22. A. Christensen, **A. Gupta**, G. Chen, W. Peters, M. Knoblauch, H. Stone, K. Jensen
Optimal geometry for surface-enhanced diffusion
75th APS- Division of Fluid Dynamics, Indianapolis, IN
23. R. Raj, C. Wyatt Shields **A. Gupta**
Two-Dimensional Diffusiophoretic Banding of Colloidal Particles
2022 Annual AIChE Meeting, Phoenix, AZ
24. A. Ganguly, **A. Gupta**
Control of Phoretic Self-Propulsion through Particle Geometry: Slender-Body Analysis for an Asymmetric Bent Rod
2022 Annual AIChE Meeting, Phoenix, AZ
25. F. Henrique, N. Jarvey, **A. Gupta**
Transport in Electrochemical Capacitors: Effects of Porous Geometry, Electrolyte Asymmetry, and Redox Reactions
2022 Annual AIChE Meeting, Phoenix, AZ
26. A. Ganguly, R. Raj, **A. Gupta**
Impact of Surface Heterogeneity on Diffusiophoresis of Colloids in a Mixture of Electrolytes and Non-electrolytes
96th American Chemical Society, Colloids and Interface Science, Golden, CO
27. R. Raj, C. W. Shields IV, **A. Gupta**
Programmable Two-dimensional Diffusiophoretic Banding of Colloidal Particles
American Chemical Society, Colloids and Interface Science, Golden, CO
28. A. Ganguly, **A. Gupta**
Control of Phoretic Self-Propulsion through Particle Geometry: Slender-body Analysis of an Asymmetric Bent Rod
96th American Chemical Society, Colloids and Interface Science, Golden, CO

29. F. Henrique, P. J. Zuk, **A. Gupta**
Transport of Binary Electrolytes in a Cylindrical Pore: Effects of Overlapping Double Layers and Asymmetry in Ion Valences and Diffusivities
 96th American Chemical Society, Colloids and Interface Science, Golden, CO
30. N. Jarvey, F. Henrique, **A. Gupta**
Charging of an Electrochemical Cell: Theoretical Framework to Simulate Coupled Dynamics of Double Layers and Redox Reactions for Arbitrary Number of Ions
 96th American Chemical Society, Colloids and Interface Science, Golden, CO
31. J. G. Lee, R. R. Raj, C. Thome, **A. Gupta**, C. W. Shields
Bubble-based Acoustic Propellers for Sustained Corticosteroid Delivery in the Bladder
 96th American Chemical Society, Colloids and Interface Science, Golden, CO
32. C. Thome, J. Bendorf, J. G. Lee, **A. Gupta**, C. W. Shields
Don't Go Breaking My Charge: Induced Charge Electrophoresis of Surface-Modified Janus Particles
 American Chemical Society, Colloids and Interface Science, Golden, CO
33. N. Jarvey, F. Henrique, **A. Gupta**
Charging of an Electrochemical Cell: Theoretical Framework to Simulate Coupled Dynamics of Double Layers and Redox Reactions for Arbitrary Number of Ions
 19th U.S. National Congress on Theoretical and Applied Mechanics, Austin, TX
34. F. Henrique, P. J. Zuk, **A. Gupta**
Charging Dynamics of Electrochemical Capacitors
 19th U.S. National Congress on Theoretical and Applied Mechanics, Austin, TX
35. N. Jarvey, F. Henrique, **A. Gupta**
Impact of Faradaic Reactions on the Charging Dynamics of the Electrical Double Layers
 74th APS - Division of Fluid Dynamics, Phoenix, AZ
36. F. Henrique, P. J. Zuk, **A. Gupta**
Influence of Relative Debye Length on Electric-Double-Layer Charging Inside a Nanopore
 74th APS - Division of Fluid Dynamics, Phoenix, AZ
37. F. Henrique, **A. Gupta**
Charging and Discharging Dynamics of Electrical Double Layers inside Nanopores: From Thin to Overlapping Double Layers
 2021 Annual AIChE Meeting, Boston, MA

Presentations prior to University of Colorado Boulder

38. **A. Gupta**, A.R. Konicek, M.A. King, A. Iqtidar, M. Yeganeh, H.A. Stone
The Effect of Gravity on the Shape of a Droplet on a Fiber: Nearly Axisymmetric Profiles with Experimental Validation
 2021 Annual AIChE Meeting, Boston, MA

39. **A. Gupta**, P. J. Zuk, S. Shim, H. A. Stone
Thick Double Layers: From Energy Storage to Diffusiophoresis
73rd APS - Division of Fluid Dynamics, Chicago, IL
40. **A. Gupta**, A. G. Rajan, E. Carter, H. A. Stone
Electrical Double Layers: Predicting Overcharging and Layering of Ions using Continuum Model
72nd APS - Division of Fluid Dynamics, Seattle, WA
41. **A. Gupta**, B. Rallabandi, J. L. Wilson, S. Shim, H. A. Stone
Diffusiophoretic Velocity for Mixture of Electrolytes with Asymmetric Ion Valences
2019 Annual AIChE Meeting, Orlando, FL
42. **A. Gupta**, H. A. Stone
Electric Double Layers: Effect of Asymmetry in Electrolyte Valence on Finite Ion Size Effects, Dielectric Decrement and Ion-Ion Correlations
2018 Annual AIChE Meeting, Pittsburgh, PA
43. **A. Gupta**, A. Z. M. Badruddoza, P. S. Doyle
A General Route for Nanoemulsion Synthesis Using Low Energy Methods at Constant Temperature
2017 Annual AIChE Meeting, Minneapolis, MN
44. **A. Gupta**, T. A. Hatton, P. S. Doyle
Nanoemulsion Formation: Controlling and Predicting Droplet Size
2017 Annual AIChE Meeting, Minneapolis, MN
45. **A. Gupta**, H. Lee, T. A. Hatton, P. S. Doyle
Controlled Liquid Entrapment through Photo-Patterned Obstacles and Patterned Surfaces
2017 Annual AIChE Meeting, Minneapolis, MN
46. **A. Gupta**, T. A. Hatton, P. S. Doyle
Nanoemulsion Formation: Controlling and Predicting Droplet Size
2016 Annual AIChE Meeting, San Francisco, CA
47. **A. Gupta**, H. Lee, T. A. Hatton, P. S. Doyle
Controlled Oil Entrapment through Photo-Patterned Obstacles
2016 Annual AIChE Meeting, San Francisco, CA
48. **A. Gupta**, T. A. Hatton, P. S. Doyle
Nanoemulsion Formation: Controlling and Predicting Droplet Size
90th ACS Colloids Meeting, Cambridge, MA
49. **A. Gupta**, T. A. Hatton, P. S. Doyle
Nanoemulsion Formation: Controlling and Predicting Droplet Size
90th ACS Colloids Meeting, Cambridge, MA
50. **A. Gupta**, H. B. Eral, T. A. Hatton, P. S. Doyle
Controlling and Predicting droplet Size of Nanoemulsions
10th Annual European Rheology Conference, Nantes, France

51. **A. Gupta**, H. B. Eral, T. A. Hatton, P. S. Doyle
Understanding the Physics of Nanoemulsion Formation
The Society of Rheology 86th Annual Meeting, Philadelphia, PA

MENTORING EXPERIENCE

1. Graduate Students Advisees

Bryce Rives, University of Colorado Boulder, graduate research, 2023 - present
Peter Romero, University of Colorado Boulder, graduate research, 2023 - present
Arkava Ganguly, University of Colorado Boulder, graduate research, 2022 - present
Ritu Raj (co-advised), University of Colorado Boulder, graduate research, 2022 - present
Nathan Jarvey, University of Colorado Boulder, graduate research, 2021 - present
Filipe Henrique, University of Colorado Boulder, graduate research, 2021 - present
Jessica Wilson, Princeton University, graduate research, 2019-2020

2. Undergraduate Students Advisees

Lucas Bayer, University of Colorado Boulder, undergraduate research, 2023-present
Cora Becker, University of Colorado Boulder, undergraduate research, 2023-present
Grace Origer, University of Colorado Boulder, undergraduate research, 2023-present
Benjamin M. Alessio, University of Colorado Boulder, undergraduate research, 2023 - present
Eliot Rusley, University of Colorado Boulder, undergraduate research, 2022 - present
Zoe Cruse, University of Colorado Boulder, undergraduate research, 2022 - present
Sajan Williams, University of Colorado Boulder, undergraduate research, 2022 - present
Rosby Robinson, University of Colorado Boulder, undergraduate research, 2023
William Steinfort, University of Colorado Boulder, undergraduate research, 2022
Alex Jimenez, University of Colorado Boulder, undergraduate research, 2021
Jackson Shropshire, University of Colorado Boulder, undergraduate research, 2020
Benjamin M. Alessio, Princeton University, undergraduate research, 2020 - 2021
Azmaine Iqtidar, Princeton University, undergraduate research, 2020
Comsin Andrei, Princeton University, undergraduate research, 2019
Cameron McKensize, Princeton University, undergraduate thesis, 2018-19
Connor H. Matthews, Princeton University, undergraduate research, 2018-19
Lisa E. Archibald, MIT, undergraduate research, 2016-17
Mohammad Alsobay, MIT, undergraduate course project, 2015
Galym Saparbaiuly, MIT, undergraduate course project, 2015
Elezhan Zhakiya, MIT, undergraduate course project, 2015
Robbie Shaw, MIT, undergraduate research, 2014-15

3. Awards/Honors to Advisees

December 2023: Arkava Ganguly, Teets Family Endowed Doctoral Fellowship
November 2023: Zoe Cruse, Poster Award in Material Science, AIChE
October 2023: Zoe Cruse, Gulf Coast Undergraduate Research Symposium
September 2023: Nathan Jarvey, GAANN Fellowship

June 2023: Filipe Henrique, Outstanding Department Teaching Award
June 2023: Nathan Jarvey, Link Energy Fellowship Honorable Mention
June 2023: Nathan Jarvey, GAANN Fellowship
April 2023: Ritu Raj, NSF Graduate Research Fellowship
April 2023: Ben Alessio, NSF Graduate Research Fellowship
April 2023: Zoe Cruse, Undergraduate Research Award
January 2023: Ritu Raj, GAANN Fellowship
July 2022: Filipe Henrique, Langmuir Student Finalist, ACS Colloids
April 2022: Arkava Ganguly, Mukopadhyay Graduate Fellowship
January 2022: Nathan Jarvey, GAANN Fellowship
September 2021: Filipe Henrique, Ryland Graduate Fellowship

TEACHING EXPERIENCE

1. Instructor, Fluid Mechanics (CHEN3200)

University of Colorado Boulder, Spring 2023

Course level: undergraduate, class strength: 67

Evaluated as "teaching style to be phenomenal", "lectures are very informational, concise, and delivered really well on behalf of Prof Gupta", " Professor truly knows what he's doing and how to teach, utilizing the perfect mix of lecturing and example problems."

2. Instructor, Transport Phenomena (CHEN5210)

University of Colorado Boulder, Fall 2022

Course level: graduate, class strength: 29

Received the outstanding graduate teaching award from the Department of Chemical and Biological Engineering, CU Boulder, 2023

Evaluated as "One of the best teachers I have had", "This course was taught at what I believe is an impeccable level", "Ankur's teaching style is just fantastic." "I wish every CHEN graduate course could be taught by Ankur." "Honestly the best taught course I've taken in a few years. I can't think of a single thing in the course that I wish was better."

3. Instructor, Transport Phenomena (CHEN5210)

University of Colorado Boulder, Fall 2021

Course level: graduate, class strength: 18

Received the outstanding graduate teaching award from the Department of Chemical and Biological Engineering, CU Boulder, 2022

Evaluated as "Professor Gupta's teaching style was very engaging", "Dr Gupta gives highly effective lectures which engage students", "Ankur is the best professor I have ever had"

4. Instructor, Transport Phenomena (CHEN5210)

University of Colorado Boulder, Spring 2021

Course level: graduate, class strength: 34

Received the outstanding graduate teaching award from the Department of Chemical and Biological Engineering, CU Boulder, 2021

Evaluated as "Ankur Gupta is a phenomenal instructor", "Ankur was the best professor I have ever had", "Professor Gupta is the best example I have seen of teaching effectively in both virtual and hybrid modes."

5. Guest Lecturer, Advanced Heat and Mass Transfer (CBE505)

Princeton University, Spring 2020

Course level: graduate, class strength: 25

Responsibility: developed and delivered 3 lectures on electrokinetics (*delivered remotely due to COVID-19*)

6. Instructor, Electrokinetics for Energy and the Environment (MAE 559)

Princeton University, Fall 2018

Evaluation: 3.75/5 (lectures), 4.0/5 (course content)

Course level: graduate, class strength: 20 (including audit, listeners)

Responsibility: developed and delivered 75% of lectures

7. Graduate Instructor, Fluid Mechanics (10.301)

MIT, Spring 2017

Evaluation: 6.2/7 (lectures), 6.9/7 (recitations)

Course level: undergraduate, class strength: 58

Responsibility: 40% lectures, 50% recitations

designed and recorded a supplementary video lecture series (web link: <http://bit.ly/2tN87UX>)

8. Teaching Assistant, Transport Processes (10.302)

MIT, Fall 2014

Evaluation: 6.5/7

Course level: undergraduate, class strength: 71

9. Teaching Assistant, Junior Design Course (CHL471)

IIT Delhi, Spring 2012

Course level: undergraduate, class strength: 120

10. Instructor of Mathematics and Physics, Vidyamandir Classes

Delhi, 2009-11

Course level: high school, class strength: 400 (40 × 10)

PROFESSIONAL SERVICE

1. Referee for journals

Nature Communications, Nature Physics, Angewandte Chemie, Physical Review Letters, Journal of Fluid Mechanics, Advanced Functional Materials, ACS Applied Materials & Interfaces, Langmuir, Soft Matter, Food and Bioproducts Processing, AIChE Journal, Physical Review Fluids, Physical Review E, Physical Review Applied, Chemical Engineering & Processing: Process Intensification, Industrial & Engineering Chemistry Research, Food & Function, Journal of Physics: Condensed Matter, Journal of Dispersion Science and

Technology, Colloids and Surfaces A: Physicochemical and Engineering Aspect, Food Hydrocolloids, International Journal of Multiphase Flows, Food Research International, Journal of Agricultural and Food Chemistry, Fluid Dynamics & Materials Processing, Carbohydrate Polymers, European Journal of Lipid Science & Technology, Journal of Colloid & Interface Science, Food Chemistry, Comprehensive Reviews in Food Science and Food Safety, International Journal of Heat & Mass Transfer, The European Physical Journal E, Journal of Micromechanics & Microengineering, Comprehensive Reviews in Food Science & Food Safety, Physica A: Statistical Mechanics and Its Applications

2. Grant Proposal Reviewer

Foundation of Scientific Research - Flanders

ACS Petroleum Research Fund

National Frontiers in Research Fund, Canada

National Science Foundation

Israel Science Foundation

3. Organizer or chair of sessions at scientific meetings

Electrokinetic Transport III, APS DFD, 2023

Micro/Nano scale Flows: Electrokinetics, APS DFD, 2023 *Interfacial and Nonlinear Flows: Multiphase and Fields*, AIChE Annual Meeting, 2023

Microfluidic and Microscale Flows: Multiphase and Fields, AIChE Annual Meeting, 2022

Electrokinetics for Nano- and Microfluidics, USNCTAM, 2022

General Aspects for Colloids and Interface, ACS Colloids, 2022

Interfacial and Nonlinear Flows: Multiphase and Fields, AIChE Annual Meeting, 2021

SERVICE AT UNIVERSITY OF COLORADO BOULDER

1. Departmental committees and service

Teaching Quality Framework Committee, 2021-present

Graduate Committee 2021-present

Preliminary Exam Committee 2021-present

2. Thesis committees

Gesse Roure, 2021 - 2023

Paige Brimley, 2021 - present

Cooper Thome, 2021 - present

Nate Schwindt, 2022 - present

Katarina Odak, 2022 - present

Talaial Alina, 2022 - present

Luis Kitsu, 2022 - present

Yifeng Mao, 2022 - present

Benjamin Rich, 2023 - present

Owen Asaro Lee, 2023 - present

Julie Nguyen, 2023 - present

OUTREACH ACTIVITIES

1. Digital simulations for teaching

- Droplet shape on different planets ([link](#))
- Digital rheometer ([link](#))
- Direction of shear force between parallel plates ([link](#))
- Magnitude of force for an impinging jet ([link](#))
- Rankine tornado ([link](#))
- Archimedes principle ([link](#))
- When to open parachute while skydiving ([link](#))
- Flow visualization and continuity equation ([link](#))
- Bernoulli's pipe flow network ([link](#))

2. Digital simulations for research outreach Charging into a porous sphere ([link](#))