

SUNANDO DASGUPTA

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EDUCATION

Post-Doctoral Research	1992-1994	Rensselaer Polytechnic Institute, USA
PhD	1992	Rensselaer Polytechnic Institute, USA
Master of Technology, Chemical Engineering	1987	Indian Institute of Technology Kanpur
Bachelor of Engineering, Chemical Engineering	1985	Jadavpur University (University Gold Medalist)

RESEARCH HIGHLIGHTS

Broad Area: Interfacial Transport Phenomena

Specific Areas: Wetting, Evaporation, Digital Microfluidics, Microscale Heat Transfer

Publications: Journal: 162, Citations: 6259. **h-index 41, i10 index 116** (GoogleScholar)

PhD Supervision: Completed: 18, Ongoing: 10

Research Grants: DST, DIT, DBT, Intel, ISRO, MHRD & others

HONORS AND AWARDS

- Fellow of the National Academy of Engineering, India.
- Herdillia Award (2008) by the Indian Institute of Chemical Engineers (IChE) for Excellence in Basic Research in Chemical Engineering.
- Senior Associate of the International Centre for Theoretical Physics (ICTP), Italy.
- Gandhian Young Technological Innovation (GYTI) Award/Appreciation 2020 with PhD student Sri Ganesh Subramanian
- Gandhian Young Technological Innovation (GYTI) Award/ Appreciation 2019 with PhD student Manikuntala Mukhopadhyay
- Best Paper Award at the 4th ASME/JSME Thermal Engineering Joint Conference, March 1995, Hawaii, USA.
- First in the class, M. Tech at IIT Kanpur.
- University Gold Medalist for academic excellence, Jadavpur University, Calcutta, India.

POSITIONS OF RESPONSIBILITY

- Member, Board of Governors, IIT Kharagpur, 2018 – 2019.
- Head, Advanced Technology Development Centre, IIT Kharagpur, 2013 – 2019.
- Dean, Sponsored Research & Industrial Consultancy, IIT Kharagpur, 2013-16.
- Associate Dean, Sponsored Research & Industrial Consultancy, IIT Kharagpur, 2008-13.
- Expert Member, Program Advisory Committee in Chemical Engineering, Department of Science & Technology, Govt. of India 2013-2015.

PUBLICATIONS

- 1) S. G. Subramanian; S. Nair and S. DasGupta, Evaporation Mediated Translation and Encapsulation of an Aqueous Droplet atop a Viscoelastic Liquid Film, **Journal of Colloid and Interface Science**, Volume 581, Part A, 1 January 2021, Pages 334-349, <https://doi.org/10.1016/j.jcis.2020.07.123>, 2020.
- 2) M. Mukhopadhyay, R. Ray, M. Ayushman, P. Sood, M. Bhattacharyya, D. Sarkar, and S. DasGupta, Interfacial Energy Driven Distinctive Pattern Formation during the Drying of Blood Droplets, **Journal of Colloid and Interface Science**, Volume 573, 1 August 2020, Pages 307-316, <https://doi.org/10.1016/j.jcis.2020.04.008>, 2020.
- 3) V. Parihar; S. Chakraborty; S. Das; S. Chakraborty; S. DasGupta, Role of Anisotropic Pinning and Liquid Properties during Partial Rebound of Droplets on Unidirectionally Structured Hydrophobic Surfaces, **Chemical Engineering Science**, <https://doi.org/10.1016/j.ces.2020.116197>, 2020.
- 4) M. Basu; V. Parihar; A. Lincon; V. P Joshi; S. Das, S. DasGupta, Development of Graphene Oxide - PDMS Composite Dielectric for Rapid Droplet Movement in Digital Microfluidic Applications, **Chemical Engineering Science**, 10.1016/j.ces.2020.116175, 2020.
- 5) S. Mukherjee, S. DasGupta and S. Chakraborty, Temperature-gradient-induced massive augmentation of solute dispersion in viscoelastic micro-flows, **Journal of Fluid Mechanics**, DOI: <https://doi.org/10.1017/jfm.2020.369>, Volume 897, A 23, 2020.
- 6) Kumar, S., Kumar, P., DasGupta, S., & Chakraborty, S. Electrowetting of a nano-suspension on a soft solid. **Applied Physics Letters**, 114(7), 073702, 2019.

- 7) Mukherjee, S., Dhar, J., DasGupta, S., & Chakraborty, S. Patterned surface charges coupled with thermal gradients may create giant augmentations of solute dispersion in electro-osmosis of viscoelastic fluids. **Proceedings of the Royal Society A**, 475(2221), 20180522, 2019.
- 8) Kiran Raj M, S. DasGupta and S. Chakraborty, Biomimetic pulsatile flows through flexible microfluidic conduits, **Biomicrofluidics** 13, 014103, 85 <https://doi.org/10.1063/1.5065901>, 2019.
- 9) U. U. Ghosh, S. Nair, A. Das, R. Mukherjee and S. DasGupta, Replicating and Resolving Wetting and Adhesion Characteristics of a Rose Petal, **Colloids and Surfaces A: Physicochemical and Engineering Aspects** 561, 9-17, 2019.
- 10) U. Ghosh and S. DasGupta, Field-Assisted Contact Line Motion in Thin Films, <http://dx.doi.org/10.1021/acs.langmuir.7b04322>, **Langmuir**, 34, 43, 12665-12679, 2018. **Invited Feature Article.**
- 11) S. Ganesh Subramanian, M. Chakraborty, S. Tenneti, and S. DasGupta, Electro-dewetting and Wetting of an Extended Meniscus, DOI: 10.1021/acs.langmuir.8b00967, **Langmuir**, 34 (34), 9897–9906, 2018.
- 12) V. Parihar, S. Bandyopadhyay, S. Das, R. Mukherjee, S. Chakraborty, S. DasGupta, Tailored Topography: A Novel Fabrication Technique using Elasticity Gradient, DOI: 10.1039/C8SM01054D, **Soft Matter** 14, 7034 – 7044, 2018.
- 13) M. Mukhopadhyay, U. U. Ghosh, D. Sarkar, S. DasGupta Surface Property Induced Morphological Alterations of Human Erythrocyte, DOI: 10.1039/C8SM01146J, **Soft Matter**, 14, 7335 – 7346, 2018.
- 14) V. Parihar, S. Bandyopadhyay, S. Das, S. DasGupta, Anisotropic electrowetting on wrinkled surfaces: Enhanced wetting and dependency on initial wetting state", <http://dx.doi.org/10.1021/acs.langmuir.7b03467>, **Langmuir**, 2018.
- 15) A. Sett, M. Ayushman[‡], S. Dasgupta, and S. DasGupta, Analysis of the Distinct Pattern Formation of Globular Proteins in the Presence of Micro- and Nanoparticles, DOI: 10.1021/acs.jpcc.8b05325, **J. Phys. Chem. B**, 122, 38, 8972-8984, 2018.
- 16) Kiran Raj M, J. Chakraborty, S. DasGupta, S. Chakraborty, Flow-induced deformation in a microchannel with a non-Newtonian fluid, **Biomicrofluidics** 12, 034116 (2018); <https://doi.org/10.1063/1.5036632>, 2018.

- 17) Kiran Raj M, S. DasGupta, S. Chakraborty, Collective dynamics of red blood cells on an in-vitro microfluidic platform, **Lab Chip**, 18, 3939-3948, 2018.
- 18) S. Ghosh, A. Roy, I. Chakraborty, M. Mukhopadhyay, S. DasGupta, D. Sarkar, Fractal Dimension of Erythrocyte Membranes: A Highly Useful Precursor for Rapid Morphological Assay, **Annals of Biomedical Engineering**, <https://doi.org/10.1007/s10439-018-2050-6>, 2018.
- 19) Kiran Raj M, J. Chakraborty, S. DasGupta, S. Chakraborty, Hydrodynamics of a Blood Analog Fluid in Flexible Microfluidic Channel, **Biomicrofluidics**, 12, 034116 (2018); <https://doi.org/10.1063/1.5036632>, 2018.
- 20) A. Sett, S. Dasgupta, S. DasGupta, Rapid Estimation of the β -Sheet Content of Human Serum Albumin from the Drying Patterns of HSA-Nanoparticle Droplets, **Colloids and Surfaces A: Physicochemical and Engineering Aspects**, **Colloids and Surfaces A**, DOI: <https://doi.org/10.1016/j.colsurfa.2017.12.064>, 540, 177–185 2018.
- 21) S. Tenneti, S. G. Subramanian, M. Chakraborty, G. Soni, S. DasGupta, Magnetowetting of Ferrofluidic Thin Liquid Films, **Scientific Reports**, Article number: 44738, DOI: 10.1038/srep44738, 2017.
- 22) S. Mukherjee, S. S. Das, J. Dhar, S. Chakraborty and S. DasGupta, Electroosmosis of Viscoelastic Fluids: The Role of Wall Depletion Layer, **Langmuir**, <http://dx.doi.org/10.1021/acs.langmuir.7b02895>, 33 (43), 12046–12055, 2017.
- 23) S. Mukherjee, P. Biswal, S. Chakraborty, S. DasGupta, Effects of Viscous Dissipation during Forced Convection of Power-Law Fluids in Microchannels, **International Communications in Heat and Mass Transfer**, DOI10.1016/j.icheatmasstransfer.2017.09.018, 89, 83-90, 2017.
- 24) S. Sen, S. Dasgupta, S. DasGupta, Does Surface Chirality of Gold Nanoparticles Affect Fibrillation of HSA?, **J. Phys. Chem. C**, DOI: 10.1021/acs.jpcc.7b05354. 121 (34), 18935–18946, 2017.
- 25) A. Sett, U. Bano, D. Sarkar, A. Mitra, S. Das, S. Dasgupta, S. DasGupta, Capillary Driven Flow in Wettability altered Microchannel, **AIChE**, DOI:10.1002/aic.15787, Vol. 63, No. 10, 4616-4627, 2017.

- 26) S. Sen, M. Chakraborty, S. Goley, S. Dasgupta, S. DasGupta, Fibrillar Disruption by AC Electric Field Induced Oscillation: A Case Study with Human Serum Albumin, **Biophysical Chemistry**, 226, 23–33, 2017.
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- 28) K. Raj, S. DasGupta, S. Chakraborty, Hydrodynamics in Deformable Microchannels, **Microfluidics and Nanofluidics**, 21(4), 70, DOI: 10.1007/s10404-017-1908-5, 2017.
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- 32) S. Bag, A. Sett, S. DasGupta and S. Dasgupta, Hydrophobicity: the controlling factor behind the inhibition of Ab fibrillation by graphene oxide, **RSC Adv.**, 6, 103242–103252, 2016.
- 33) S. Bag, S. Chaudhury, D. Pramanik, S. DasGupta and S. Dasgupta, Hydrophobic tail length plays a pivotal role in amyloid beta (25–35) fibril-surfactant interactions, **PROTEINS: Structure, Function, and Bioinformatics**, 84, 1213-1223, 2016.
- 34) S. Sen, S. Konar, B. Das, A. Pathak, S. Dhara, S. Dasgupta, and S. DasGupta, Inhibition of Fibrillation of Human Serum Albumin through Interaction with Chitosan-Based Biocompatible Silver Nanoparticles, **RSC Advances**, 6, 43104–43115, 2016.
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- 36) R. Dey, U. Ghosh, S. Chakraborty and S. DasGupta, Dynamics of electrically modulated colloidal droplet transport, **Langmuir**, 31 (41), pp 11269–11278, 2015.

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- 38) M. Chakraborty, R. Chatterjee, U. Ghosh, S. DasGupta, Electrowetting of Partially Wetting Thin Nanofluid Films, **Langmuir**, 31 (14), 4160–4168, 2015.
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- 40) M. Chakraborty, U. Ghosh, S. Chakraborty, S. DasGupta Thermally Enhanced Self-Propelled Droplet Motion on Gradient Surfaces, **RSC Advances**, 5, 45266–45275, 2015.
- 41) S. K Bhaumik, A. Kannan, S. DasGupta, Taylor-Aris Dispersion Induced by Axial Variation in Velocity Profile in Patterned Microchannels, **Chemical Engineering Science**, 134, 251–259, 2015.
- 42) A. Sett, S. Bag, S. Dasgupta and S. DasGupta. Interfacial Force Driven Pattern Formation During Drying of A β (25-35) Fibrils, **International Journal of Biological Macromolecules** 79 (2015) 344–352, 2015.
- 43) P. K. Kundu, S. Chakraborty, S. DasGupta, Experimental and Theoretical Evaluation of On-Chip Micro Heat Pipe" **Nanoscale and Microscale Thermophysical Engineering**, 19, 75–93, 2015.
- 44) S. Sen, S. Konar, A. Pathak, S. Dasgupta, S. DasGupta, Effect of Functionalized Magnetic MnFe₂O₄ Nanoparticles on Fibrillation of Human Serum Albumin, **The Journal of Physical Chemistry B**, 118 (40), pp 11667–11676, 2014.
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- 47) S. K. Bhaumik, R. Roy, S. Chakraborty and S. DasGupta, Low-Voltage Electrohydrodynamic Micropumping of Emulsions, **Sensors & Actuators: B.** 193, 288–293, 2014.
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- 52) S. Bhaumik, M. Chakraborty, S. Ghosh, S. Chakraborty and S. DasGupta, “Electric Field Enhanced Spreading of Partially Wetting Thin Liquid Films”, **Langmuir**, 27(21), 12951–12959, 2011.
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- 54) P. K. Kundu, S. Chakraborty, S. DasGupta, Experimental Investigation of Enhanced Spreading and Cooling from a Micro-grooved Surface, **Microfluidics and Nanofluidics**, 11, 489–499, 2011.
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- 56) P. Rai, G. C. Majumdar, S. DasGupta and S. De, Flux enhancement during ultrafiltration of depectinized mosambi (Citrus sinensis (L.) Osbeck) juice, **Journal of Food Process Engineering**, Vol 33 (3), 554-567, 2010.

- 57) C. Das, S. DasGupta, Y. T. Hung and S. De, Quantification of transient flux decline during membrane separation of tanning effluent from tannery, **International Journal of Environmental Engineering**, 2 (1/2/3), 31 – 42, 2010.
- 58) C. Das, S. DasGupta and S. De, "Treatment of dyeing effluent from tannery using membrane separation processes", **Int. J. Environ. Waste Manage**, 5(3-4), 354-367, 2010.
- 59) N. Saxena, C. Prabhavathy, S. De, S. DasGupta, Flux enhancement by argon - oxygen plasma treatment of polyethersulfone membranes, **Separation and Purification Technology**, 70, 160–165, 2009.
- 60) B. Sarkar, S. DasGupta and S. De, Flux decline during electric field assisted cross flow ultrafiltration of mosambi (*Citrus sinensis* (L.) Osbeck) juice, **Journal of Membrane Science**, 331 (1-2), 75-83, 2009.
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- 62) A. Aggarwal, S. Agarwal, S. DasGupta and S. De, Performance prediction of membrane modules incorporating the effects of suction in the mass transfer coefficient under laminar and turbulent flow conditions for non-Newtonian fluids, **Journal of Food Process Engineering**, 32 (5), 752 – 774, 2009.
- 63) V. K. Jayanti, P. Rai, S. DasGupta and S. De, Quantification of flux decline and design of ultrafiltration system for clarification of tender coconut water, **Journal of Food Process Engineering**, 33 (1), 128-143, 2009.
- 64) M. K. Purkait, S. DasGupta and S. De, Determination of thermodynamic parameters for the cloud point extraction of different dyes using TX-100 and TX-114, **Desalination**, 244, 130-138, 2009.
- 65) S. Pal, S. Ghatak, S. De and S. DasGupta, “Evaluation of surface roughness of a plasma treated polymeric membrane by wavelet analysis and quantification of its enhanced performance” **Applied Surface Science**, 255, 2504-2511, 2008.
- 66) B. Sarkar, A. Sengupta, S. De and S. DasGupta, “Prediction of permeate flux during electric field enhanced cross-flow ultrafiltration—A neural network approach, *Separ. Purif. Technol.* 65, 260-268, 2009.

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- 83) C. Das, S. DasGupta and S. De, "Simultaneous separation of mixture of metal ions and aromatic alcohol using cross flow micellar enhanced ultrafiltration and recovery of surfactant", **Separation Science and Technology**, 43, 71-92, 2008.
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Recent Invited Talks

1. From Droplets to Thin films: Field-assisted Contact Line Motion, Gordon Research Conference on Micro & Nanoscale Phase Change Heat Transfer, Galveston, TX, USA, January 8-13, 2017.
2. Role of Contact Line Dynamics in Microfluidic Applications, Indo-UK workshop Microfluidics for Affordable Healthcare at the Power Engineering Department of Jadavpur University, Calcutta, January 20, 2017.
3. Self Propelled Enhanced Microflows, National Symposium on Multiphase Flow, NIT Durgapur, February 22-24, 2016.

Recent Conference Proceedings

1. Ghosh, U. U., Nair,S., DasGupta, S., Evaporation of colloidal droplets on strongly adhesive hydrophobic substrates, International Colloid Conference, 2017, Barcelona, Spain.
2. Ghosh, U. U., Bakshi, J., Dey, R., Chakraborty, S., and DasGupta, S., Effect of electric field on crack formation in colloidal films, 30th Conference of the European Colloid and Interface Society, 2016, Rome.
3. Ghosh, U. U., Ringania.U.,Chakraborty, S., and DasGupta, S., Evaporation of Bi-dispersed Colloidal Droplets on Elastomeric Hydrophobic Substrates, EMBL Conference: Microfluidics 2016, Germany.
4. Sett A, Bano U, DasGupta S , Capillary Flow Driven Lattice Formation Of Microbeads Under Micro-Confinement, EMBL Microfluidics 2016.
5. Chakraborty, M.,Ghosh, A.,Ghosh, U U.,DasGupta, S. Enhanced Cooling By an Oscillating Droplet on DMF Platform, AIChE 2015, Salt Lake City, Utah, USA.

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7. Sen, S., Chakraborty, M., Goley, S., DasGupta, S., DasGupta, S. Effect of Oscillating Electric Field on Preformed Human Serum Albumin Fibrils, AIChE 2015, Salt Lake City, Utah, USA.
8. Chakraborty, M., Chowdhury, A., DasGupta, S. Molecular Dynamic Simulation Of A Moving Nano-Droplet On Gradient Surfaces, Chemical Engineering Congress 2014, Chandigarh, India
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Patents

1. "Detection of Thalassaemia Carriers by Automated Feature Extraction of Dried Blood Drops" Application number TEMP/E- 1/14704/2019- KOL. **2019**
2. "Sorting of red blood cells and spherocytes in microchannels" Application number 201831040321, **2018**
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7. “Development of High Capacity and Cost Effective Arsenic Adsorbent using Modified Laterite”, Applied for Indian Patent (614/KOL/2009).
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SPONSORED RESEARCH PROJECTS

“Targeted Evaporative Cooling of Hot Spots using Patterned Surfaces” Sponsored by ISRO, 2017-2020.

“Centre of Excellence for Training and Research in Microfluidics”, IIT Kharagpur 2013-2018 (PI).

“Direct to Home (DTH) SWAYAM PRABHA: Channel 11 (Chemical Engineering & Science)”, Sponsored by MHRD 2016-2018.

“Droplet-based Cooling of Electronic Hot-Spots” Sponsored by ISRO 2014-2018 (PI).

“Droplet based screening of Amyloid β -peptide aggregation”, Sponsored by Department of Biotechnology, 2011-2013. (PI)

“Theoretical and experimental analysis of evaporation in the grooves of a micro heat pipe”, ISRO, 2011-2014. (PI)

“Droplet based microfluidics for electronics cooling”, Sponsored by Intel Corporation, 2009-2011. (Co-PI)

“Indo-US Centre on Fabronics”, Sponsored by Indo-US Science and Technology Forum, New Delhi, 2008-2011. (Co-PI)

“Foam-gel formation in thin layer with flow complexities affecting the placement:”, Sponsored by DST, 2010-2013. (Co-PI)

“Tuning the morphology of a porous carbon electrode for use with hydrogel electrolyte in electric double layer capacitor”, DST, 2012-2014. (Co-PI)

“Rapid DNA hybridization in microfluidic channels” Sponsored by Department of Biotechnology, 2008-2011. (Co-PI)

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“Quantification and reduction of fouling by change in hydrodynamics and membrane surface modification”, Sponsored by DST, Govt. of India, 2009-2012. (PI)

“Development of low cost household filter for arsenic and other pollutant free drinking water using modified laterite”, Sponsored by DST, Govt. of India, 2008-2010. (Co-PI)

“Flux enhancement and fouling reduction during effluent (leather & dye) treatment using membrane separation”, Sponsored by DST, 2006-2008. (PI)

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“Computational fluid dynamics modeling and flow visualization of a gas liquid mixture through a nozzle and subsequent spray”, sponsored by MHRD, 2003-2005. (PI)

“Removal of toxic dyes from industrial effluent using a combination of adsorption and membrane separations”, sponsored by MHRD, 2001-2003. (Co-PI)

“Development of micro grooved heat pipes: Performance modeling and experimental validation”, sponsored by Bhabha Atomic Research Center, Mumbai, 2001-2004. (PI)