Siddhartha Das, PhD

Assistant Professor
Department of Mechanical Engineering
University of Maryland, College Park
3163 Glenn L. Martin Hall, Bldg. 088
College Park, MD 20742, U.S.A.
Phone: +1-301-4056633
Email: sidd@umd.edu, siddhartha_iit@yahoo.com
Department Webpage: http://www.enme.umd.edu/faculty/das
Personal Website: http://smiel.umd.edu

RESEARCH INTERESTS

Soft Matter

Elastocapillarity; moving contact line on soft substrates; capillary-driven self-assembly of elastic structures; Electric Double Layer theory for soft interfaces; electrokinetics of cells and soft moieties; transport in polyelectrolyte-grafted nanochannels; surface tension and surface charge effects in adhesion; nanoparticle-soft-matter interactions

Capillarity and Wetting

Drops on low energy surfaces; electrocapillarity; drop impact; contact line dynamics; surface nanobubbles; evaporation; singularities.

Micro-nano fluidics

Electrokinetic transport; bio-macromolecular separation; DNA and polymer transport in nanochannels and nanopores; electrohydrodynamic in nanoscales; microfluidic bacterial streamer dynamics.

Energy Applications

Energy applications of self assembled flexible micro-nano structures; EDL-based energy applications; energy applications of ion dynamics in polymer systems; characterization of asphaltene; micro-nano-fluidics for asphaltene transport; charge dynamics of asphaltene; oil-water separation.

EDUCATION

Ph.D. – Indian Institute of Technology, Kharagpur April, 2010
Department of Mechanical Engineering

B.Tech. (Hons.) – Indian Institute of Technology, Kharagpur May, 2005
Department of Mechanical Engineering

EMPLOYMENT

Assistant Professor March, 2014 – Present
Department of Mechanical Engineering,
University of Maryland, College Park

Assistant Professor September, 2013 – February, 2014
Department of Mechanical Engineering,
University of Alberta, Canada

Banting Postdoctoral Fellow April, 2012 – August, 2013
Department of Mechanical Engineering,

University of Alberta, Canada

Postdoctoral Fellow December, 2011 – March, 2012
Department of Mechanical Engineering,
University of Alberta, Canada

Postdoctoral Researcher October, 2009 – October, 2011
Physics of Fluids Group,
University of Twente, the Netherlands

AWARDS, HONORS AND RECOGNITIONS

Selection in the International Advisory Committee 2016
Selected in the International Advisory Committee of the *Energy, Material, and Nanotechnology meeting on Microfluidics and Nanofluidics* (April 05-08, 2016, Dubai, United Arab Emirates)

Outstanding Reviewer Recognition 2015
Recognized as the *Outstanding Reviewer* for the journal *International Journal of Non-linear Mechanics*

Outstanding Mentor for PROMISE AGEP Program 2015
Nominated as the *Outstanding Mentor* for the University System of Maryland PROMISE AGEP program for STEM Education for underrepresented minorities

Honoree in 8th Annual University-Wide Celebration of Scholarship and Research (University of Maryland, College Park) 2015
This honor was bestowed on Dr. Das based on his 2014 paper streamer formation in *Scientific Reports*.

Banting Postdoctoral Fellowship (2011-2012) 2012
This fellowship is the most prestigious postodctoral fellowship offered by *Natural Sciences and Engineering Research Council* (*NSERC*)*, Canada*. Secured a rank of 4 out of 214 international applicants in the competition.

Emerald Engineering Outstanding Doctoral Research Awards 2011
This award recognizes the best PhD dissertation worldwide in the area of *Numerical Heat Transfer & Computational Fluid Dynamics*

High Value PhD Fellowship 2007
This Fellowship was used to be offered every year by the Indian Institute of Technology, Kharagpur to the topmost PhD students of the institute

National Doctoral Fellowship 2006
This fellowship is offered by All India Council of Technical Education (AICTE) to a very selected group of Engineering PhD candidates across India.

Innovative Students Project Award (Undergraduate Level) 2005
This award is offered by Indian National Academy of Engineering (INAE) to the most outstanding undergraduate research projects in India.

S.P. Sengupta Memorial Award 2005
This award is offered by Indian Institute of Technology (IIT) Kharagpur, India for the best undergraduate project on

DEPARTMENTAL SERVICES

- Served as the member of the Qualifying examination of Mr. Hajid Alsupie (February, 2016).
- Served as the member of the MS thesis defense committee of Mr. Jason Christopher Thompson (November, 2015).
- Served as the member of the Qualifying examination of Mr. Stefan Bangerth (November, 2015).
- Serving as the member of the Faculty Advisory Committee.
- Served as the member of the Qualifying examination committee of Mr. Johnny Russo (October, 2015)
- Served as the member of the Qualifying examination committee of Mr. Shyandev Sinha (October, 2015)
- Served as the member of the MS thesis defense committee of Mr. Ning Yang (June, 2015)
- Served as the member of the PhD Dissertation Proposal committee of Ms. Jaemi Herzberger (May, 2015)
- Served as the member of the Qualifying examination committee of Mr. Shing Shin (March, 2015)
- Served as the member of the Qualifying examination committee of Ms. Guang Chen (March, 2015)
- Served as the member of the PhD Dissertation committee of Mr. Ratnesh Tiwary (January, 2015)
- Served as the member of the Qualifying examination committee of Mr. Jason Robert Nixon (October, 2014)

EXTERNAL POSITIONS AND SERVICES

Conference Organization

- Chair of the Session titled “Drops, Bubbles and Interfacial Fluid Mechanics” in APS March Meeting, March 14–18, 2016, Baltimore, Maryland.
- Chair of the Session titled “Soft Electrokinetics—Applications and Fundamentals” as a part of the Symposium “Wetting and Soft Electrokinetics” in 2015 Materials Research Society Fall Meeting and Exhibit, Boston, Massachusetts, November 29 - December 4, 2015.
- Chair of the Session titled “Drops XII: Elastic Surfaces and Fibers” in 66th Annual Meeting of the APS Division of Fluid Dynamics, Pittsburgh, Pennsylvania, November 24–26, 2013.
- Co-Chair of the Special Track titled “Interfacial Tension, Capillarity, Surface Forces”, as a part of the 19th International Symposium on Surfactants in Solution (SIS2012), University of Alberta, Canada, June 24-28, 2012.

Refereeing Role

Serving as Referee to the following journals:

1. Journal of Fluid Mechanics
2. Journal of Fluids and Structures
3. Microfluidics and Nanofluidics

4. ASME Journal of Fluid Engineering
5. International Journal of Solids and Structures
6. ASME Journal of Heat Transfer
7. Scientific Reports (Nature Publishing Group)
8. Physical Review E
9. Physics of Fluids
10. International Journal of Nonlinear Mechanics
11. ACS Applied Materials and Interfaces
12. Chemical Engineering Science
13. Colloids and Surfaces A: Physicochemical and Engineering Aspects
14. Microvascular Research
15. Journal of Magnetism and Magnetic Materials
16. Electrophoresis
17. Journal of Physical Chemistry

Adjudication Role

Served as the Judge for the presentations in Faculty of Engineering Graduate Research Symposium, University of Alberta, June, 2013.

PROFESSIONAL MEMBERSHIP

- American Physical Society
- Materials Research Society

TEACHING EXPERIENCE

University of Maryland, College Park

Course: Vibration, Controls and Optimization I (ENME 361) Fall, 2015
Number of Students: 115
Role: Instructor
Score: 3.46
Department Average: 3.254
College Average: 3.218

Course: Fluid Mechanics (ENME 331) Spring, 2015
Number of Students: 46
Role: Instructor for Studios
Score: 3.23
Department Average:
College Average:

Course: Vibration, Controls and Optimization I (ENME 361) Fall, 2014
Number of Students: 98
Role: Instructor
Score: 2.84
Department Average: 3.18
College Average: 3.238

University of Alberta, Canada

- Heat Transfer (MEC E 370) for the Fall Semester, 2012 (September, 2012 – December, 2012); *USRI Rating: 4.9/5.*
- Heat Transfer (MEC E 371) for the Winter Semester, 2014 (January, 2014 – February, 2014).

SUPERVISION OF GRADUATE STUDENTS

Current Students

PhD Students

- Shayandev Sinha (January, 2015 to Present)
- Guang Chen (August, 2014 to Present)
- Jaemi Herzberger (Advisor: Prof. Abhijit Dasgupta; co-advisor: Prof. Siddhartha Das; October, 2014 to Present)

MS Students

- Haoyuan Jing (August, 2015 to Present)
- Parth Desai (August, 2015 to Present)
- Hao Li (August, 2015 to Present)
- Joseph Andrews (August, 2015 to Present; Co-Advisor: Prof. Peter Chung)
- Jahin Patwary (August, 2014 to Present)

MENTORING/SUPERVISION OF UNDERGRADUATE STUDENTS

- Vineet Padia (Undergraduate Researcher; October 2015 to Present)
- Lucas Myers (Undergraduate Researcher; February 2015 to Present)
- Mentoring GEMSTONE Project Team BACTERIA (January 2016 to Present)

ALUMNI

Undergraduates

- Kyeong Il Bae (Undergraduate Researcher; June 2015 to August, 2015)
- Joseph Andrews (Undergraduate Researcher; July, 2014 to July, 2015)
- Kyle McDaniel (Undergraduate Researcher; June, 2014 to May, 2015)
- Fedra Valcius (Undergraduate Researcher; June, 2014 to July, 2014)

STUDENTS' AWARDS

- Shayandev Sinha (PhD student) chosen as one among 37 students for serving in the ASME's International Petroleum Technology Institute Collegiate Council (December, 2015).
- Guang Chen (PhD student) selected for the Future Faculty Program of the A. James Clark School of Engineering School of University of Maryland, College Park (December, 2015).
- Guang Chen (PhD student) received the Northrup Grumman Graduate Fellowship in Engineering Education for the 2015-2016 academic year (November, 2015).
- Guang Chen (PhD student) was selected as a finalist in the Clean Energy Education & Empowerment (C3E) Women in Clean Energy symposium (October, 2015).

PROPOSALS (FUNDED)

Title: Evaporation-triggered nanocomposite formation for aerospace applications — 10/2014 – 06/2016
Funding Source: Minta Martin Funding, A. James Clark School of Engineering, University of Maryland, College Park
Total Award Amount: $75,000
Role: PI
co-PI: None

Title: 3-D Printing for Direct-Write printed Ball Grid Arrays (BGAs) as substitution for Solder bumped BGAs — 01/2016 – 12/2016
Funding Source: Laboratory for Physical Sciences
Total Award Amount: $102,839
Role: PI
co-PI: Abhijit Dasgupta

PROPOSALS (PENDING)

Title: CDS&E: Surfing on Charged Soft Matter: Data Informed Studies
Funding Source: National Science Foundation
Total Requested Award Amount: $614,105.00
Role: PI
co-PI: Balakumar Balachandran
Date of Submission: November 02, 2015

Title: Soft electrostatics and soft electrokinetics with thermodynamically consistent representation of the charged soft interfaces
Funding Source: National Science Foundation
Total Requested Award Amount: $384,487.00
Role: PI
co-PI: Don DeVoe
Date of Submission: October 29, 2015

Title: Collaborative Research: Electrowetting on Graphene-Coated Solids: Towards On-Demand Hydrophilic Surfaces
Funding Source: National Science Foundation
Total Requested Award Amount: $331,052.00
Role: PI
co-PI: Yifei Mo
Date of Submission: October 19, 2015

Title: Collaborative Research: Nanoscale Heat Transfer Through Grafted Polyelectrolytes
Funding Source: National Science Foundation
Total Requested Award Amount: $209,265.00
Role: PI
co-PI: None
Date of Submission: October 19, 2015

Title: Experimental and Theoretical Investigation of Microwave Initiated Manufacturing (MIM) of Carbon Nanotubes
Funding Source: National Science Foundation
Total Requested Award Amount: $204,401.00
Role: PI
co-PI: None
Date of Submission: September 14, 2015

Title: Multispecies-scale-resistive coating using charge inversion of polyelectrolyte layer has been successfully submitted.
Funding Source: Abu Dhabi National Oil Company
Total Requested Award Amount: $510,000.00
Role: PI
co-PI: None
Date of Submission: April 17, 2015

PROPOSALS (DECLINED) (Submitted within last 2 years)

Title: Multi-directional electric field mediated breaking of oil-in-water emulsions
Funding Source: Abu Dhabi National Oil Company
Total Requested Award Amount: $510,000.00
Role: PI
co-PI: None
Date of Submission: April 17, 2015

Title: Poly-zwitterion-grafted nanoparticles for unprecedented pH-dependent control of oil-in-water emulsion properties
Funding Source: Doctoral New Investigator (DNI) Grant, American Chemical Society Petroleum Research Fund
Total Requested Award Amount: $110,000.00
Role: PI
co-PI: None
Date of Submission: March 12, 2015

Title: Polyelectrolyte-Grafted nanochannels for enhanced electrochemomechanical energy conversion
Funding Source: Department of Energy
Total Requested Award Amount: $359,763.00
Role: PI
co-PI: Peter Chung

Date of Submission: February 18, 2015

Title: UNS: Electrowetting on graphene-coated solids: Towards on-demand hydrophilic surfaces
Funding Source: National Science Foundation
Total Requested Award Amount: $454,293.00
Role: PI
co-PI: Yifei Mo, Baoxia Mi

Date of Submission: November 4, 2014

Title: Soft electrostatics and soft electrokinetics with thermodynamically consistent representation of the charged soft interfaces
Funding Source: National Science Foundation
Total Requested Award Amount: $378,343.00
Role: PI
co-PI: Don DeVoe

Date of Submission: October 30, 2014

Title: CAREER: Wetting dynamics of drops on soft surfaces: Towards novel mixing, particle-assembly and nanomanufacturing techniques
Funding Source: National Science Foundation
Total Requested Award Amount: $500,000.00
Role: PI
co-PI: None

Date of Submission: July 18, 2014

Title: Molecular simulations for understanding the role of asphaltene polydispersity in aggregation, cluster formation and de-stabilization mechanism of asphaltene
Funding Source: Doctoral New Investigator (DNI) Grant, American Chemical Society Petroleum Research Fund
Total Requested Award Amount: $110,000.00
Role: PI
co-PI: None

Date of Submission: March 12, 2014

OUTREACH ACTIVITIES

- Mentoring five high school students on the project "Understanding the science of superhydrophobic surfaces" as a part of the ESTEEM/SER-Quest Summer Program of the Center for Minorities in Science and Engineering, University of Maryland, College Park (July, 2015).
- Supervision of two interns (one from Prince George's Community college and another from Howard Community College) (June-July, 2014).
- Mentoring five high school students on the project "Surface Tension and Soft Matter: Surfactant-rich drops in Cassie-Baxter state" as a part of the ESTEEM/SER-Quest Summer Program of the Center for Minorities in Science and Engineering, University of Maryland, College Park (July, 2014).
- Pedagogical Lecture on "Soft Matter: Fundamentals and Applications" in Howard Community College (October, 2014).

TALKS AND PRESENTATIONS

A. Invited Talks

1. Talk on "*Thermodynamics, Fluidics, and Transport in Soft, Micronanoscale Systems: Biophysical and Bioengineering Applications*" at the National Heart, Lung, and Blood Institute, National Institutes of Health, Bethesda, MD 20892, USA on December 17, 2015.

2. Talk on "*Thermodynamics, transport, and adhesion at soft, charged interfaces*" at 2015 Materials Research Society Fall Meeting and Exhibit, Boston, Massachusetts, November 29 - December 4, 2015.
3. Talk on "*Wetting and Electrohydrodynamics of Soft surfaces*" at Fluid Dynamics Review Seminar, University of Maryland on April 24, 2015.
4. Talk on "*Wetting and Electrohydrodynamics of Soft surfaces*" at the Department of Chemical Engineering, University of Maryland on March 31, 2015.
5. Talk on "*Micro/nano-scale transport and applications*" at the Canada-India Collaboration in Nano Science and Technology in National Institute of Nanotechnology (NINT), University of Alberta on May 10, 2013.
6. Talk on "*Soft capillarity and wetting*" at the Department of Mechanical Engineering, University of Maryland on April 25, 2013.
7. Talk on "*Fluidics in micro-nanoscales: Applications in energy and biological systems*" at the Department of Mechanical Engineering, University of Alberta, Canada on February 28, 2013.
8. Talk on "*Fluidics at micro-nanoscales: Soft capillarity, superoleophobicity and bio-electrohydrodynamics*" at the Satyendra Nath Bose National Centre for Basic Science (SNBNCBS), Kolkata, India on February 1, 2013.
9. Talk on "*Fluidics at micro-nanoscales: Soft capillarity, superoleophobicity and bio-electrohydrodynamics*" at the Engineering Mechanics Units (EMU), Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR) Bangalore, India on January 30, 2013.
10. Talk on "*Fluidics at micro-nanoscales: Soft capillarity, superoleophobicity and bio-electrohydrodynamics*" at the Department of Physics, Indian Institute of Science (IISc) Bangalore, India on January 29, 2013.
11. Talk on "*Soft wetting at micro-nanoscales*" at the Department of Mechanical Engineering, Indian Institute of Technology (IIT) Kharagpur, India on January 16, 2013.
12. Talk on "*Fluidics at micro-Nanoscales: Soft capillarity, superoleophobicity and bio-electrohydrodynamics*" at the Simon Fraser University, British Columbia, Canada, on October 19, 2012.
13. Talk on "*Fluidics at micro-Nanoscales: Soft capillarity, superoleophobicity and bio-electrohydrodynamics*" at the Department of Mechanical Engineering, University of British Columbia on October 18, 2012.
14. Talk on "*Electrohydrodynamics and elastocapillary at nanoscales*" at the Centre of Smart Interfaces, Technische Universität Darmstadt, Germany on April 6, 2011.
15. Talk on "*Some issues of electrohydrodynamics in nanoscale*" at the Chair, Physics of Fluids, University of Twente, the Netherlands on November 30, 2009.
16. Talk on "*Electroviscous effects in narrow fluidic confinements*" at the IISc Centenary International Conference on Advances in Mechanical Engineering (IC-ICAME), held at Bangalore, India (July, 2008).
17. Talk on "*Nonlinear effects in electrokinetic separation of charged macromolecules in nanochannels*" in Singapore International Chemistry Conference-5 (SICC5), held at Suntec City, Singapore. (December, 2007).
18. Talk on "*Combined pressure-driven and electroosmotic microchannel transport for enhanced DNA hybridization*" in Department of Mechanical Engineering, University of California, Irvine, USA (August, 2006).

B. Conference Presentations

# Indicates the Graduate Students of Dr. Das in UMD; $ Indicates the Undergraduate Students or Summer Interns supervised by Dr. Das in UMD**;** Presenter is Underlined

1. Andrews, J.#, Sinha, S.#, Chung, P., and **Das, S.**, Spreading of water nanodroplets on graphene, *APS March Meeting, March 14–18, 2016, Baltimore, Maryland.*
2. Chen, G.#, Sinha, S.#, and **Das, S.**, Scaling Laws for liquid and ion transport in nanochannels grafted with polyelectrolyte brushes, *APS March Meeting, March 14–18, 2016, Baltimore, Maryland.*
3. Li, H.#, Chen. G.#, and **Das, S.**, Electric Double Layer electrostatics of spherical polyelectrolyte brushes with pH-dependent charge density, *APS March Meeting, March 14–18, 2016, Baltimore, Maryland.*
4. Sinha, S.# and **Das, S.**, Surface tension mediated under-water adhesion of rigid spheres on soft, charged surfaces, *68th Annual Meeting of the APS Division of Fluid Dynamics, November 22–24, 2015, Boston, Massachusetts*.

5. Chen, G.[#] and **Das, S.**, Electrokinetic transport in nanochannels grafted with polyelectrolyte brushes with end-charging, *68th Annual Meeting of the APS Division of Fluid Dynamics, November 22–24, 2015, Boston, Massachusetts*.
6. Patwary, J.[#], Chen. G.[#], and **Das, S.**, Streaming potential and energy conversion in nanochannel grafted with poly-zwitterion brushes, *68th Annual Meeting of the APS Division of Fluid Dynamics, November 22–24, 2015, Boston, Massachusetts*.
7. Bae, K. I.[$], Sinha, S.[#], Chen. G.[#], and **Das, S.**, Spreading of electrolyte drops on charged surfaces: Electric Double Layer effects on drop dynamics, *68th Annual Meeting of the APS Division of Fluid Dynamics, November 22–24, 2015, Boston, Massachusetts*.
8. Myers, L.[$], Sinha, S., and **Das, S.**, Electroosmotic flow in rigid and soft nanochannels: effects of solvent polarization, *68th Annual Meeting of the APS Division of Fluid Dynamics, November 22–24, 2015, Boston, Massachusetts*.
9. Hassanpourfard, M., Nikakhtari, Z., Ghosh, R., **Das, S.**, Thundat, T., and Kumar, A., Bacterial floc mediated rapid streamer formation in creeping flows, *68th Annual Meeting of the APS Division of Fluid Dynamics, November 22–24, 2015, Boston, Massachusetts*.
10. **Das, S.** and Chen, G.[#], Electrokinetic transport in nanochannels grafted with polyelectrolyte with pH-dependent charge density, *International Technical Conference and Exhibition on Packaging and Integration of Electronic and Photonic Microsystems (InterPACK) and the International Conference on Nanochannels, Microchannels and Minichannels (ICNMM), July 6–9, 2015, San Fracncisco, California.*
11. Karpitschka, S., **Das, S.**, Andreotti, B., and Snoeijer, J. H., Dynamic contact angle of a soft solid, *67th Annual Meeting of the APS Division of Fluid Dynamics, November 23–25, 2014, San Francisco, California*.
12. Kumar, A., Hassanpourfard, M., and **Das, S.**, Low Reynolds number biofilm streamers form as highly viscous liquid jets, *67th Annual Meeting of the APS Division of Fluid Dynamics, (Abstract ID: E6.00001), November 23–25, 2014, San Francisco, California*.
13. **Das, S.**, Role of surface charges in drop-evaporation-triggered "coffee stain" formation, *9th International Conference on Two-Phase Systems for Ground and Space Applications, September 22–26, 2014, Baltimore, Maryland***.**
14. Mitra, S. K., Waghmare, P., and **Das, S.**, New drop deposition technique for wettability characterization of under-liquid superoleophobic surfaces, *66th Annual Meeting of the APS Division of Fluid Dynamics, November 24–26, 2013, Pittsburgh, Pennsylvania.*
15. Waghmare, P., **Das, S.**, and Mitra, S. K., Technique for needle-free drop deposition: Pathway for precise characterization of superhydrophobic surfaces, *66th Annual Meeting of the APS Division of Fluid Dynamics, November 24–26, 2013, Pittsburgh, Pennsylvania*.
16. Lubbers, L. A., Weijs, J. H., Das, S., Botto, L., Andreotti, B., and Snoeijer, J. H., Interaction of drops on a soft substrate, *66th Annual Meeting of the APS Division of Fluid Dynamics, (Abstract ID: L34.00003), November 24–26, 2013, Pittsburgh, Pennsylvania*.
17. **Das, S.**, Guha, A., and Mitra, S. K., Electroviscous effects in charged nanocapillary, *24th Canadian Congress of Applied Mechanics (CANCAM 2013), June 2–6, 2013, Saskatoon, Saskatchewan, Canada*.
18. Mitra, S. K. and **Das, S.**, Influence of solvent polarization on Electric Double Layer interactions in nanochannels, *14th Annual Meeting of the APS Northwest Section, October 18–20, 2012, Simon Fraser University, Vancouver, British Columbia, Canada*.
19. Mitra, S. K. and **Das, S.**, Coffee stain effect with liquid droplets, *65th Annual Meeting of the APS Division of Fluid Dynamics, November 18–20, 2012, San Diego, California.*
20. Snoeijer, J. H., Andreotti, B., **Das, S.**, and Marchand, A., Contact angles on a soft solid: from Young's law to Neumann's law, *65th Annual Meeting of the APS Division of Fluid Dynamics, November 18–20, 2012, San Diego, California.*

PUBLICATIONS

Total Citations: 1046, h-index: 17, i10-index: 29
Google Scholar Link: http://scholar.google.ca/citations?user=HPUsSB0AAAAJ

(# Indicates the Graduate Students of Dr. Das in UMD; $ Indicates the Undergraduate Students or Summer Interns supervised by Dr. Das in UMD; * Indicates corresponding authorship)

A. Articles Published/Accepted in Journals

1. Sinha, S.[#], Bae, K. I.[$], and **Das, S.*** (2016) Electric double layer effects in water separation from water-in-oil emulsions. *Colloids and Surfaces A: Physicochemical and Engineering Aspects* 489, 216-222.
2. Patwary, J.[#], Chen, G.[#], and **Das, S.*** (2016) Efficient electrochemomechanical energy conversion in nanochannels grafted with polyelectrolyte layers with pH-dependent charge density, *Microfluidics and Nanofluidics* 20, 37(1-14).
3. Sinha, S[#] and **Das, S.*** (2015) Under-water adhesion of rigid spheres on soft, charged surfaces. *Journal of Applied Physics* 118, 195306(1-13).
4. Chen, G.[#] and **Das, S.*** (2015) Scaling laws and ionic current inversion in polyelectrolyte-grafted nanochannels. *Journal of Physical Chemistry B* 119, 12714-12726.
5. Liu, J., Gaikwad, R., Hande, A., **Das, S.**, and Thundat, T. (2015) Mapping and quantifying surface charges on clay nanoparticles. *Langmuir* 31, 10469-10476.
6. Sinha, S.[#], Mahmoud, K. A., and **Das, S.*** (2015) Conditions for spontaneous oil-water separation with oil-water separators. *RSC Advances* 5, 80184-180191.
7. **Das, S.*,** Banik, M., Chen, G.[#], Sinha, S.[#], and Mukherjee, R. (2015) Polyelectrolyte brushes: Theory, modelling, synthesis and applications. *Soft Matter* 11, 8550-8583.
8. Hassanpourfard, M., Nikakhtari, Z., Ghosh, R., **Das, S.**, Thundat, T., Liu, Y., and Kumar, A. (2015) Bacterial floc mediated rapid streamer formation in creeping flows. *Scientific Reports* 5, 13070(1-12).
9. Karpitschka, S., **Das, S.**, van Gorcum, M., Perrin, H., Andreotti, B., and Snoeijer, J. H. (2015) Droplets move over viscoelastic substrates by surfing a ridge. *Nature Communications*, 4, 7891(1-7).
10. Andrews, J.[$] and **Das, S.*** (2015) Effect of finite ion sizes in electric double layer mediated interaction force between two soft charged plates. *RSC Advances*, 5, 46873-46880.
11. Chen, G.[#] and **Das, S.*** (2015) Electroosmotic transport in polyelectrolyte-grafted nanochannels with pH-dependent charge density. *Journal of Applied Physics*, 117, 185304.
12. McDaniel, K.[$], Valcius, F.[$], Andrews, J.[$], and **Das, S.*** (2015) Electrostatic potential distribution of a soft spherical particle with a charged core and pH dependent charge density. *Colloids and Surfaces B: Biointerfaces*, 127, 143-147.
    (Selected as the **Cover** of the **March 2015** issue of the journal)
13. Chen, G.[#] and **Das, S.*** (2015) Streaming potential and electroviscous effects in soft nanochannels beyond Debye-Hückel linearization. *Journal of Colloid and Interface Science*, 445, 357-363.
14. Gaikwad, R., Hande, A., **Das, S.**, Mitra, S. K., and Thundat, T (2015) Determination of charge on asphaltene nanoaggregates in air using electrostatic force microscopy. *Langmuir*, 31, 679-684.
15. Chen, G.[#] and **Das, S.*** (2015) Electrostatics of soft charged interfaces with pH-dependent charge density: Effect of consideration of appropriate hydrogen ion concentration distribution. *RSC Advances*, 5, 4493-4501.
16. **Das, S.** and Kumar, A. (2014) Formation and post-formation dynamics of bacterial biofilm streamers as highly viscous liquid jets. *Scientific Reports*, 4, 7126.
17. **Das, S.***, Chanda, S., Eijkel, J. C. T., Tas, N. R., Chakraborty, S., and Mitra, S. K. (2014) Filling of charged cylindrical capillaries. *Physical Review E*, 90, 043011.
18. **Das, S.*** (2014) Explicit interrelationship between Donnan and surface potentials and explicit quantification of capacitance of charged soft interfaces with pH-dependent charge density. *Colloids and Surfaces A: Physicochemical and Engineering Aspects*, 462, 69-74.
19. Chanda, S., Sinha, S., and **Das, S.*** (2014) Streaming potential and electroviscous effects in soft nanochannels: Towards designing more efficient nanofluidic electrochemomechanical energy converter. *Soft Matter*, 10, 7558-7568.
20. Lubbers, L. A., Weijs, J. H., Botto, L., **Das, S.**, Andreotti, B., and Snoeijer, J. H. (2014) Drop on soft solids: Free energy and double transition of contact angles. *Journal of Fluid Mechanics*, 747, R1 (1-12).
21. **Das, S.**, Thundat, T., and Mitra, S. K. (2014) Modeling of asphaltene transport and separation in presence of finite aggregation effects in combined electroosmotic-electrophoretic microchannel transport. *Colloids and Surfaces A: Physicochemical and Engineering Aspects*, 446, 23-32.
22. Chanda, S. and **Das, S.*** (2014) Effect of finite ion sizes in electrostatic potential distribution for a charged soft surface in contact with an electrolyte solution. *Physical Review E*, 89, 012307 (1-5).
23. Mehranfar, M., Gaikwad, R., **Das, S.,** Mitra, S. K., and Thundat, T. (2014) Effect of temperature on evaporation-triggered asphaltene nano-aggregates. *Langmuir*, 30, 800-804.
24. **Das, S.**, Guha, A., and Mitra, S. K. (2013) Exploring new scaling regimes for streaming potential and electroviscous effects in a nanocapillary with overlapping Electric Double Layers. *Analytica Chimica Acta*, 808, 159-166.

25. **Das, S.*** and Mitra, S. K. (2013) Electric double-layer interactions in a wedge geometry: Change in contact angle for drops and bubbles. *Physical Review E*, 88, 033021 (1-8).
26. **Das, S.** and Mitra, S. K. (2013) Different regimes in vertical capillary filling. *Physical Review E*, 87, 063005 (1-7).
27. Waghmare, P. R., **Das, S.**, and Mitra S. K. (2013) Drop deposition on under-liquid low energy surfaces. *Soft Matter*, 9, 7437-7447 (2013).
(*Selected as the **Cover Article** in 21st August, 2013 Issue of **Soft Matter***)
28. Waghmare, P. R., **Das, S.**, and Mitra S. K. (2013) Under-water superoleophobic glass: Unexplored role of surfactant-rich solvent. *Scientific Reports*, 3, 1862 (1-7).
29. **Das, S.**, Chakraborty, S., and Mitra, S. K. (2013) Contribution of interfacial electrostriction in surface tension. *Journal of Colloid and Interface Science*, 400, 130-134.
30. Misra, R. P., **Das, S.**, and Mitra, S. K. (2013) Electric Double Layer force between charged surfaces: Effect of solvent polarization. *The Journal of Chemical Physics*, 138, 114703 (1-9).
31. **Das, S.**, Thundat, T., and Mitra, S. K. (2013) Analytical model for zeta potential of asphaltene. *Fuel*, 108, 543-549.
32. **Das, S.**, Waghmare, P. R., and Mitra, S. K. (2012) Early regimes of capillary filling. *Physical Review E*, 86, 067301 (1-5).
33. Marchand A., **Das, S.**, Snoeijer, J. H., and Andreotti, B. (2012) Contact angles on a soft solid: From Young's law to Neumann's law. *Physical Review Letters*, 109, 236101 (1-5).
34. **Das, S.***, Dubsky, P. van den Berg, A., and Eijkel, J. C. T. (2012) Concentration polarization in translocation of DNA through nanopores and nanochannels. *Physical Review Letters*, 108, 138101 (1-5).
(*This paper has been highlighted in the April 9, 2012 issue of Virtual Journal of Nanoscale Science and Technology in the section "Miscellaneous".*)
35. Marchand A., **Das, S.**, Snoeijer, J. H., and Andreotti, B. (2012) Capillary pressure and contact line force on a soft solid. *Physical Review Letters*, 108, 094301 (1-5).
36. **Das, S.,** Mitra, S. K., and Chakraborty, S. (2012) Ring stains in the presence of electromagnetohydrodynamic interactions. *Physical Review E*, 86, 056317 (1-9).
37. **Das, S.**, Mitra, S. K., and Chakraborty, S. (2012) Wenzel and Cassie-Baxter states of an electrolytic drop on charged surfaces. *Physical Review E*, 86, 011603 (1-9).
38. **Das, S.**, Chakraborty, S., and Mitra, S. K. (2012) Redefining electrical double layer thickness in narrow confinements: Effect of solvent polarization. *Physical Review E*, 85, 051508 (1-6).
(*This paper has been highlighted in the June 11, 2012 issue of Virtual Journal of Nanoscale Science and Technology in the section "Microfluidics and Nanofluidics".*)
39. **Das, S.**, Chakraborty, S., and Mitra, S. K. (2012) Ring stains in presence of electrokinetic interactions. *Physical Review E*, 85, 046311 (1-8).
40. **Das, S.*** (2012) Electric-double-layer potential distribution in multiple-layer immiscible electrolytes: Effect of finite ion sizes. *Physical Review E*, *85*, 012502 (1-5).
41. **Das, S.**, Misra, R. P., Thundat, T., Chakraborty, S., and Mitra S. K. (2012) Modeling of asphaltene transport and separation in presence of finite aggregation effects in pressure-driven microchannel flow. *Energy and Fuels*, 26, 5851-5857.
42. **Das, S.**, Waghmare, P. R., Fan, M., Gunda, N. S. K., Roy, S. S., and Mitra, S. K. (2012) Dynamics of liquid droplets in an evaporating drop: Liquid droplet "Coffee Stain" effect. *RSC Advances*, 2, 8390-8401.
43. **Das, S.**, Chakraborty, S., and Mitra, S. K. (2012) Magnetohydrodynamic in narrow fluidic channels in presence of spatially non-uniform magnetic fields: Framework for combined magnetohydrodynamic and magnetophoretic particle transport. *Microfluidics and Nanofluidics*, 13, 799-807.
44. Andreotii, B., Marchand, A., **Das, S.**, and Snoeijer, J. H. (2011) Elastocapillary instability under partial wetting conditions: Bending versus buckling. *Physical Review E*, *84*, 061601 (1-11).
45. **Das, S.*** (2011). Effect of added salt on preformed surface nanobubbles: A scaling estimate. *Physical Review E*, *84*, 036303 (1-9).
(*This paper has been highlighted in the September 19, 2011 issue of Virtual Journal of Nanoscale Science and Technology in the section "Surface and Interface Properties".*)
46. **Das, S.***, and Hardt, S. (2011). Electric-Double-Layer potential distribution in multiple-layer immiscible electrolytes. *Physical Review E*, *84,* 022502 (1-5).
47. **Das, S.**, and Chakraborty, S. (2011). Steric-effect-induced enhancement of electrical-double-layer overlapping phenomena. *Physical Review E***,** *84*, 012501 (1-4).
48. **Das, S.***, (2011). Effect of impurities in description of surface nanobubbles: Role of non-idealities in the surface layer. *Physical Review E*, *83*, 066315 (1-14).
(*This paper has been highlighted in the July 4, 2011 issue of Virtual Journal of Nanoscale Science and Technology in the section "Surface and Interface Properties".*)

49. **Das, S.**, Marchand, A., Andreotti, B., and Snoeijer, J. H. (2011). Elastic deformation due to tangential capillary forces. *Physics of Fluids*, *23*, 072006 (1-11).
(*This paper has been highlighted in the August 8, 2011 issue of Virtual Journal of Nanoscale Science and Technology in the section "Microfluidics and Nanofluidics".*)
50. **Das, S.**, and Chakraborty, S (2011). Probing the solvation decay length for characterizing hydrophobicity-induced bead-bead attractive interactions in polymer chain. *Journal of Molecular Modeling*, *17*, 1911-1918.
51. **Das, S.***, Snoiejer, J. H., and Lohse, D. (2010). Effect of impurities in description of surface nanobubbles. *Physical Review E*, *82*, 056310 (1-8).
(*This paper has been highlighted in the November 15, 2010 issue of Virtual Journal of Nanoscale Science and Technology in the section "Surface and Interface Properties".*)
52. **Das, S.**, and Chakraborty, S. (2010). Effect of confinement on the collapsing mechanism of a flexible polymer chain. *The Journal of Chemical Physics*, *133*, 174904 (1-15).
(*This paper has been highlighted in the November 15, 2010 issue of Virtual Journal of Biological Physics Research in the section "Fundamental Polymer Statics/Dynamics".*)
53. **Das, S.**, and Chakraborty, S. (2010). Effect of conductivity variations within the Electric Double Layer on the streaming potential estimation in narrow fluidic confinements. *Langmuir*, *26*, 11589-11596.
54. **Das, S.**, and Chakraborty, S. (2010). Augmented surface adsorption characteristics by employing patterned microfluidic substrates in conjunction with transverse electric fields. *Microfluidics and Nanofluidics*, *8*, 313-327.
55. **Das, S.**, and Chakraborty, S. (2010). Transport of flexible molecules in narrow confinements. *International Journal of Micro-Nanoscale Transport*, *1*, 97-137.
56. Das, T., **Das, S.**, and Chakraborty, S. (2009). Influences of streaming potential on cross stream migration of flexible polymer molecules in nanochannel flows. *The Journal of Chemical Physics*, *130*, 244904 (1-12).
(This paper has been highlighted for the July 1, 2009 issue of Virtual Journal of Biological Physics Research in the section "Fundamental Polymer Statics/Dynamics".)
57. **Das, S.**, and Chakraborty, S. (2009). Influence of streaming potential on the transport and separation of charged spherical solutes in nanochannels subjected to particle-wall interactions. *Langmuir*, *25*, 9863-9872.
58. Chakraborty, S., and **Das, S.** (2008) Streaming field induced convective transport and its influence on the electroviscous effects in narrow fluidic confinements beyond the Debye Hückel limits. *Physical Review E*, *77*, 037303 (1-4).
59. **Das, S.**, and Chakraborty, S. (2008). Transport and separation of charged macromolecules under nonlinear electromigration in nanochannels. *Langmuir*, *24*, 7704-7710.
60. **Das, S.**, and Chakraborty, S. (2008). Separation of charged macromolecules in nanochannels within the continuum regime: Effects of wall interactions and hydrodynamic confinements. *Electrophoresis*, *29*, 1115-1124.
61. Lambert, R. A., **Das, S.**, Madou, M. J., Chakraborty, S., and Rangel, R. H. (2008). Simulation of a moving mechanical actuator for fast biomolecular synthesis process. *International Journal of Heat and Mass Transfer*, *51*, 4367-4378.
62. **Das, S.**, Subramanian, K., and Chakraborty, S. (2007). Analytical investigations on the effects of substrate kinetics on macromolecular transport and hybridization through microfluidic channels. *Colloids and Surfaces B: Biointerfaces*, *58*, 203-217.
63. **Das, S.**, and Chakraborty, S. (2007). Transverse electrodes for improved DNA hybridization in microchannels. *AIChE Journal*, *5*, 1086-1099.
64. **Das, S.**, and Chakraborty, S. (2006). Augmentation of macromolecular adsorption rate through transverse electric fields generated across patterned walls of a microfluidic channel. *Journal of Applied Physics*, *100*, 014908 (1-8).
(*This paper has been highlighted for the July 15, 2006 issue of Virtual Journal of Biological Physics Research in the section "Instrumentation Development".*)
65. **Das, S.**, and Chakraborty, S. (2006). Analytical solutions for velocity, temperature and concentration distribution in electroosmotic microchannel flows of a non-Newtonian bio-fluid. *Analytica Chimica Acta*, *559*, 15-24.
66. **Das, S.**, Das, T., and Chakraborty, S. (2006). Analytical solutions for the rate of DNA hybridization in a microchannel in the presence of pressure-driven and electroosmotic flows. *Sensors and Actuators B*, *114*, 957-963.
67. **Das, S.**, Das, T., and Chakraborty, S. (2006). Modeling of coupled momentum, heat and solute Transport during DNA hybridization in a microchannel in presence of electro-osmotic effects and axial pressure gradients. *Microfluidics and Nanofluidics*, *2*, 37-49.

B. Contribution to Book Chapters

1. **Das, S.**, Das, T., and Chakraborty, S. (2012) Chapter "Micfrofluidics based DNA hybridization" in *Microfluidics and Microscale Transport Processes* Ed. Chakraborty S., Taylor and Francis.
2. **Das, S.**, Chakraborty, J., and Chakraborty, S. (2012) Chapter "Electrokinetics in narrow confinements", in *Microfluidics and Microscale Transport Processes* Ed. Chakraborty S., Taylor and Francis.
3. **Das, S.**, and Chakraborty, S. (2011). Chapter "Polymer transport in nanochannels", in *Microfluidics and Nanofluidics Handbook: Fabrication, Implementation and Applications-Vol II*. Eds. Mitra, S., and Chakraborty, S., Taylor and Francis.

C. Articles Submitted to Journals

1. Karpitschka, S., Pandey, A., Lubbers, L. A., Weijs, J. H., Botto, L., **Das, S.**, Andreotti, B., and Snoeijer, J. H., Inverted Cheerios effect: Liquid drops attract or repel by elasto-capillarity. (Submitted to *Proceedings of the National Academy of Sciences of the United States of America*; Date of Submission: January 26, 2016).
2. Sinha, S.[#], Myers, L.[$], and **Das, S***, Effect of solvent polarization on electroosmotic transport in a nanofluidic channel. (Submitted to *Microfluidics and Nanofluidics*; Date of Submission: January 25, 2016).
3. Sinha, S.[#], Myers, L.[$], and **Das, S***, Effect of solvent polarization on electric double layer electrostatics in a charged, soft nanochannel. (Submitted to *Colloids and Surfaces A: Physicochemical and Engineering Aspects*; Date of Submission: January 20, 2016).
4. Liu, Z., Wang, Y., Fu, K., Wang, Z., Yao, Y., Wan, J., Dai, J., **Das, S.***, and Hu, L.*, Solvo-thermal microwave-powered two-dimensional materials exfoliation. (Submitted to *ChemComm*; Date of Submission: December 24, 2015).
5. Sinha, S.[#], Padia, V.[$], Bae, K. I.[$], Chen, G.[#], and **Das, S.***, Spreading of electrolyte drops on charged surfaces. (Submitted to *Journal of Fluid Mechanics*; Date of Submission: December 22, 2015).
6. Chen, G. and **Das, S.*,** Shrinking and swelling of nano-confined end-charged polyelectrolyte brushes. (Submitted to *Physical Chemistry Chemical Physics*; Date of Submission: December 03, 2015).
7. Sinha, S. and **Das, S.***, Role of the Shuttleworth effect in adhesion on elastic surfaces. (Submitted to *MRS Advances*; Date of Submission: November 16, 2015).
8. Liu, Z., Zhang, L., Wang, R., Poyraz, S., Cook, J., Bozack, M., **Das, S.**, Hu, L., and Zhang, X., Ultrafast microwave nano-manufacturing of fullerene-like metal chalcogenides. (Submitted to *Scientific Reports*; Date of Submission: October 28, 2015).

MEDIA COVERAGE

Selection of Shayandev Sinha to ASME's International Petroleum Technology Institute Collegiate Council 2016
http://www.enme.umd.edu/news/news_story.php?id=9500
http://eng.umd.edu/html/news/news_story.php?id=9500

Receipt of Guang Chen's Northrup Grumman Graduate Fellowship in Engineering Education 2015
http://enme.umd.edu/news/news_story.php?id=9418
http://eng.umd.edu/html/news/news_story.php?id=9418

Paper on bacterial floc streamer published in Scientific Reports 2015
https://uofa.ualberta.ca/news-and-events/newsarticles/2015/september/researchers-observe-bacteria-behaving-badly

Paper on soft wetting dynamics published in Nature Communications 2015
http://enme.umd.edu/news/news_story.php?id=9187
http://eng.umd.edu/html/news/news_story.php?id=9187

http://www.utwente.nl/en/news/!/2015/8/412911/surfing-droplets-in-nature-communications
http://phys.org/news/2015-08-movement-droplets-soft-surfaces.html
http://www.nanowerk.com/nanotechnology-news/newsid=40979.php

Cover Article on Soft Particle Electrostatics in Colloids and Surfaces B: Biointerfaces 2015
http://www.enme.umd.edu/news/news_story.php?id=8958
http://eng.umd.edu/html/news/news_story.php?id=8958

Paper on Bacterial Biofilm Streamers published in Scientific Reports 2014
http://www.enme.umd.edu/news/news_story.php?id=8709

Cover Article on Drop Deposition published in Soft Matter 2013
http://phys.org/news/2013-06-discovery-oil.html
http://www.redorbit.com/news/science/1112880889/glass-may-help-one-day-clean-up-oil-spills-062213/
http://www.mece.engineering.ualberta.ca/en/Research/Research/2013/August/UnderwaterDropDepositionCoverArticleinSoftMatter.aspx

Paper on Underwater Superoleophobicity published in Scientific Reports 2013
http://phys.org/news/2013-06-discovery-oil.html
http://www.redorbit.com/news/science/1112880889/glass-may-help-one-day-clean-up-oil-spills-062213/

Coverage on Banting Postdoctoral Fellowship 2012
http://www.engineering.ualberta.ca/en/NewsEvents/Engineering%20News/2012/September/BantingFellowshipbolstersresearchprojects.aspx