

# Soumyadip Sett

Department of Mechanical Science and Engineering, University of Illinois (Urbana-Champaign)  
105 S. Mathews Ave., Urbana, IL – 61801. ssett3@illinois.edu. Ph: (650)-798-7443

## Education

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**Ph.D.**, Mechanical Engineering (GPA-3.91/4.0) Aug 2016

*Multiscale Mechanics and Nanotechnology Lab (MMNL)*, **University of Illinois at Chicago (UIC)**

**Advisor:** Dr. Alexander L. Yarin

**Thesis:** Dynamics of thin surfactant films. (*experimental*)

- Investigated effect of physical forces (gravity, Marangoni, disjoining pressure, electrokinetic) on drainage and stability of aqueous foam films on addition of surfactants, polymers, and particles.
- Reduced 16% water requirement for wallboard manufacturing (collaborator United States Gypsum Corporation).
- Additionally, developed nanofibers (biopolymers, nanoparticle suspended polymer solutions) for electronics cooling, phase change heat transfer, self-healing materials, sintering of composites, liquid filtration, and drug delivery.
- **13** international peer-reviewed articles, **1** US patent, **9+** international conference talks/workshops.

**B.E.**, Power Engineering (GPA-8.91/10.0, First Class Honors), **Jadavpur University (JU), India** Jun 2011

**Thesis:** Thermodynamic analysis of IC engine considering dissociation and residual gas dilution (numerical simulation).

## Professional Experience

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**Postdoctoral Research Associate** (PI: Nenad Miljkovic) Sep 2016 - present

*Energy Transport Research Lab (ETRL)*, **University of Illinois Urbana-Champaign (UIUC)**

- Developed scalable phase change heat transfer surfaces for dropwise condensation of low surface tension fluids.
- Investigated frost formation reduction and defrosting capabilities of surfaces for aerospace industry.
- Characterizing cyclic charging-discharging of Li-ion batteries using structured silicon anode technology (SSAT).
- Investigated coalescence induced microdroplet jumping dynamics for thermal management of electronics.
- Designed micro/nanostructured wettability patterned surfaces for water harvesting (fog and dew).
- **7** international peer-reviewed journal articles, **4** submitted, **1** US patent application, **12+** international conference talks/workshops, led to **6** successful research grants ~ \$2m in funding.

**Technical Consultant, Brush Box** (Start-up) Mar 2017 - present

- Directed a team of six students to design and fabricate a robotic arm controlled hands-free makeup technology
- Executed early stage product research and led team to construct a prototype. Design patent application under review.

**Design Engineer, Fria** (Start-up) May 2018 - present

- Developed evaporative cooling technology based jewelry (bracelets, necklaces) for instant relief during hot flashes.
- Successfully received several entrepreneur/start-up funding for novel jewelry technology.

## Leadership and Teamwork

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**Student Mentor, University of Illinois at Urbana-Champaign (UIUC)** Sep 2016 – present

- Actively supervising 6 doctoral and 3 masters students for their research thesis.
- Mentored over 16 undergraduate students with academic and research activities.
- Involved in project designing and mentoring for PURE, student organization promoting undergraduate research.
- Mentoring high school students during summer (2017 & 2018) as part of NSF funded Young Scholars Program.

**Outreach Coordinator, Center for Power Optimization of Electro-Thermal Systems (POETS)** Jan 2019 – present

- Engaged engineering graduate students of UIUC for volunteering work for outreach programs including summer hands-on technology camps, science and math Olympiads for middle school and high school students in Illinois.

**Graduate Student Association, University of Illinois at Chicago (UIC)** Aug 2014 – Jul 2015

- President, doubled intra-department graduate student organization. Secured reduction (by 50%) in additional college fees for PhD students.

**Teaching Assistant, University of Illinois at Chicago (UIC)** Jan 2012 – Dec 2014

- Taught problem-solving classes, designed and conducted laboratory experiments for ME211: Elementary Fluid Mechanics (3 semesters), and ME428 – Numerical Methods in Engineering. Average class strength of 50 students.

**Bengalis in Chicago, Chicago** Jan 2014 – Aug 2015

- President, Indian cultural organization registered in Illinois. Organized several events over the year, the most prominent being Durga Puja, attended by more than 400 people from Illinois and surrounding states.

## Awards and Fellowship

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- **Deans Fellowship 2015**, highest distinguished award from UIC in recognition of distinguished graduate students and their scholarly achievement. \$22000 and tuition waiver.
- **Chicago Consular Corps Scholarship 2015** for academic achievements as international student in UIC.
- **Faydor Litvin Award 2014** in recognition of academic achievement and service to the department.
- **Chancellor's Student Leadership Award 2014** for exceptional leadership service to the university and community.
- **GSC Travel award 2013, 2014** for presenting research work at academic conferences. \$500 towards airfare.

## Patents

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- AL Yarin, S Sett, MW Lee, S Sinha-Ray, "Biodegradable plant wound dressing composed of electrospun nanofibers", 2016, US2016/0219874 A1.
- N Miljkovic, S Sett, G Barac, LW Bolton, "Heat and mass transfer component comprising a lubricant-impregnated surface", 2019, US 62/836,848.

## Selected Peer Reviewed Publications (Total – 20. Google scholar citations – 234)

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- S Sett, P Sokalski, K Boyina, L Li, KF Rabbi, H Auby, T Foulkes, A Mahvi, G Barac, LW Bolton, N Miljkovic, "Stable dropwise condensation of ethanol and hexane on rationally-designed ultra-scalable nanostructured lubricant-infused surfaces", *Nano Letters*, Just accepted.
- X Yan, Z Huang, S Sett, J Oh, H Cha, L Li, L Feng, Y Wu, C Zhao, D Orejon, F Chen, N Miljkovic, "Atmospheric-mediated superhydrophobicity of rationally designed micro/nanostructured surfaces", *ACS Nano*, 2019, 13, 4160-4173.
- S Sett, X Yan, G Barac, LW Bolton, N Miljkovic, "Lubricant-infused surfaces for low surface tension fluids: promise vs reality", *ACS Applied Materials & Interfaces*, 2017, 9(41), 36400-36408.
- MW Lee, S Sett, SS Yoon, AL Yarin, "Fatigue of self-healing nanofiber-based composites: static test and subcritical crack propagation", *ACS Applied Materials & Interfaces*, 2016, 8(28), 18462-18470.
- S Sett, SI Karakashev, SK Smoukov, AL Yarin, "Ion-specific effects in foams", *Advances in Colloids and Interface Science*, 2015, 225, 98-113.
- S Sett, MW Lee, M Weith, B Pourdeyhimi, AL Yarin, "Biodegradable and biocompatible soy protein/polymer/adhesive sticky nano-textured interfacial membranes for prevention of esca fungi invasion into pruning cuts and wounds of vines", *Journal of Materials Chemistry B*, 2015, 3(10), 2147.
- RP Sahu, S Sett, AL Yarin, B Pourdeyhimi, "Impact of aqueous suspension drops onto non-wettable porous membranes: Hydrodynamic focusing and penetration of nanoparticles", *Colloids and Surfaces A: Physicochemical and Engineering Aspects*, 2015, 467, 31-45.
- S Sett, S Sinha-Ray, AL Yarin, "Gravitational drainage of foam films", *Langmuir*, 2013, 29(16), 4934-4947.

## Recent Papers/Presentations in Conference Proceedings (Total – 26)

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- S Sett, G Popovic, D Orejon, BA Jabal, MP Ho, K Boyina, N Miljkovic, "Water-energy nexus benefits of water harvesting on nanoengineered surfaces", International School for Materials for Energy and Sustainability VIII (ISMES VIII), California Institute of Technology, Pasadena, CA, July 21-27, 2019.
- S Sett, P Sokalski, K Boyina, L Li, A Mahvi, N Miljkovic, "Dropwise condensation of ethanol and hexane on lubricant-infused surfaces", Micro and Nanoscale Phase Change Heat Transfer Gordon Research Conference, *GRC 2019*, Lucca, Italy, February 3-8, 2019.
- S Sett, KF Rabbi, K Boyina, L Li, BA Jabal, J Olson, N Miljkovic, "Etched metal superhydrophobic surfaces for enhanced condensation", *2018 MRS Fall Meeting*, Boston MA, November 25-30, 2018.
- S Sett, Z Hrnjak, P Sokalski, J Oh, N Miljkovic, "Drop impact on supercooled surfaces", *APS 71<sup>st</sup> Annual Meeting of the Division of Fluid Dynamics*, Atlanta, November 18-20, 2018.

## Skills and Interests

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**Non-technical workshops on:** NSF I-Corps (Illinois), USDA SBIR, Communicating science workshop (ComSciCon)

**Judging:** Illinois Innovation Prize 2018, 2019 (UIUC student entrepreneurship), UIC Engineering Expo 2018.

**Peer-Reviewed Journal Referee:** IJHMT, ACS Applied Materials & Interfaces, Langmuir, Experiments in Fluids, Applied Nanoscience, Journal of Membrane Sci., Journal of Material Sci., 3D Printing & Additive Manufacturing.

**Programming/Software:** C/C++, Matlab, SolidWorks, LabView

**Interests:** Travelling, photography, chess.