

# Guang Chen

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## EDUCATION

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03/2018-present	<b>Princeton University, Princeton, NJ (PU)</b> Postdoctoral Research Associate   Complex Fluid   Advisor: Howard A. Stone
02/2017-02/2018	<b>University of Maryland, College Park, MD (UMD)</b> Postdoctoral Researcher   3D Printing   Advisor: Siddhartha Das
09/2014-01/2017	<b>University of Maryland, College Park, MD (UMD)</b> Ph.D. in Mechanical Engineering   Soft Electrokinetics   Advisor: Siddhartha Das
09/2012-12/2013	<b>Columbia University in the City of New York (CU)</b> M.S. in Mechanical Engineering   Energy System   Advisor: Mohammad Naraghi
09/2008-06/2012	<b>Shanghai Jiao Tong University (SJTU)</b>   Advisor: Tong Wang B.S. in Mechanical Engineering   Thermal Energy Engineering B.A. in Media and Design   Advertising

## RESEARCH INTERESTS

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Fluid Mechanics | Complex Fluids | Rheology | Interface | Contact Line Dynamics | Aerosol Jet 3D Printing | CFD | Soft Matter | Polymer Physics | Electro-kinetics | Heat/Mass Transport | Energy Harvesting | Nanotechnology

## HONORS AND AWARDS

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05/2018	2017 Mechanical Engineering Best Dissertation Award, UMD
01/2016	2016 A. James Clark School's Future Faculty Fellow, UMD
11/2015	2015-16 Northrop Grumman Graduate Fellowship in Engineering Education, UMD
11/2015	2016 Finalist in Clean Energy Education Empowerment(C3E) Women in Clean Energy Symposium
2015, 2016	Jacob K. Goldhaber Travel Award, UMD
2010, 2011	Tyco Scholarship for Scientific and Technical Innovation (Top 1%), SJTU
08/2011	1 <sup>st</sup> prize in the 6 <sup>th</sup> Freescale Cup National University Students Smart Car Competition (Top 1%)
08/2011	2 <sup>nd</sup> prize in the 4 <sup>th</sup> Energy Saving & Emission Reduction Competition (Top 2%)
10/2011	3 <sup>rd</sup> prize in 2012 China International Packaging Design Competition (Top 10%)
2010, 2011	SJTU Excellent Academic Scholarship (Top 20%), SJTU

## TEACHING EXPERIENCES

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01/2016-12/2016	Teaching Assistant, UMD	[ENME331]	<b>Fluid Mechanics</b>
09/2015-12/2015	Teaching Assistant, UMD	[ENME361]	<b>Vibration</b>
01/2014-05/2014	Teaching Assistant, CU	[MECEE4314]	<b>Energy Dynamics of Green Buildings</b>
09/2013-12/2013	Teaching Assistant, CU	[MECEE6313]	<b>Advanced Heat Transfer</b>

## JOURNAL PUBLICATIONS (PUBLISHED)

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1. T. Li, ... **G. Chen**, ... S. Das, L. Hu, Cellulose ionic conductors with high differential thermal voltage for low-grade heat harvesting, *Nature Materials*, 18, 608–613, (2019)
2. **G. Chen**, H. Sachar, S. Das, Efficient electrochemomechanical energy conversion in nanochannels grafted with end-charged polyelectrolyte brushes at medium and high salt concentration, *Soft Matter*, 14 (25), 5246-5255, (2018)
3. **G. Chen**, Y. Gu, H. Tsang, D. R. Hines and S. Das, The effect of droplet sizes on overspray in aerosol jet printing,

- Adv. Eng. Mater.*, 20 (8), 1701084, [\(2018\)](#)
4. **G. Chen**, J. Patwary, H. Sachar, S. Das, Electrokinetics in nanochannels grafted with poly-zwitterionic brushes, *Microfluid Nanofluid*, 22: 112, [\(2018\)](#)
  5. Y. Kuang, C. Chen, **G. Chen**, ... S. Das, L. Hu, Bioinspired solar-heated carbon absorbent for rapid cleanup of highly viscous crude oil, *Adv. Funct. Mater.*, 1900162, [\(2019\)](#)
  6. N. Dalal, Y. Gu, **G. Chen**, D. R. Hines, A. Dasgupta and S. Das, Effects of gas flow rates on quality of aerosol jet printed traces with nanoparticle conducting ink, *J. Electron. Packag.*, 142(1): 011012, [\(2020\)](#)
  7. T. Li, H. Liu, X. Zhao, **G. Chen**, ... S. Das, R. Yang, L. Hu, Scalable and highly efficient mesoporous wood-based solar steam generation device: localized heat, rapid water transport, *Adv. Funct. Mater.*, 28 (16), 1707134, [\(2018\)](#)
  8. C. Wang, S. Wang, **G. Chen**, ... S. Das, L. Hu, Flexible, bio-compatible nanofluidic ion conductor, *Chem. Mater.*, 30(21), 7707-7713, [\(2018\)](#)
  9. **G. Chen** and S. Das, Massively enhanced electroosmotic transport in nanochannels grafted with end-charged polyelectrolyte brushes, *J. Phys. Chem. B*, 121 (14), 3130–314, [\(2017\)](#)
  10. H. Liu, C. Chen, **G. Chen**, ... S. Das, L. Hu, A high-performance solar steam device with layered channels: artificial tree with a reversed design, *Adv. Energy Mater.*, 8 (8), 1701616, [\(2017\)](#)
  11. C. Jia, Y. Li, Z. Yang, **G. Chen**, ... S. Das, L. Hu, Rich mesostructures derived from natural woods for solar steam generation, *Joule*, 1, 588–599, [\(2017\)](#)
  12. F. Chen, A. Gong, M. Zhu, **G. Chen**, Y. Wang, S. Das, ... L. Hu, Mesoporous, 3d wood membrane with nanoparticles for highly efficient water treatment, *ACS Nano.*, 11 (4), 4275–4282, [\(2017\)](#)
  13. M. Zhu, Y. Li, **G. Chen** (co-first), ... S. Das, ... L. Hu, Artificial tree for high-efficiency solar energy harvesting and steam generation, *Adv. Mater.*, 29 (44), 1704107, [\(2017\)](#)
  14. Y. Wang, G. Sun, J. Dai, **G. Chen**, ... S. Das, ... L. Hu, High-performanced, low tortuosity wood carbon monolith reactor, *Adv. Mater.*, 29, 2, 1604257, [\(2017\)](#)
  15. S. Sinha; V. Padia; K. Bae; **G. Chen** and S. Das, Effect of electric double layer on electro-spreading dynamics of electrolyte drops, *Colloids and Surfaces A: Physicochem. Eng. Aspects*, 514, 209-217, [\(2017\)](#)
  16. **G. Chen** and S. Das, Thermodynamics, electrostatics, and ionic current in nanochannels grafted with pH-responsive end-charged polyelectrolyte brushes, *Electrophoresis*, 38, 720-729, [\(2017\)](#)
  17. **G. Chen** and S. Das, Anomalous shrinking-swelling of nano-confined end charged polyelectrolyte brushes: interplay of confinement and electrostatic effects, *J. Phys. Chem. B*, 120, 6848-6857, [\(2017\)](#)
  18. H. Li, **G. Chen** and S. Das, Electric double layer electrostatics of pH-responsive spherical polyelectrolyte brushes in the decoupled regime, *Colloids and Surfaces B: Biointerfaces*, 147, 180-190, [\(2016\)](#)
  19. **G. Chen**, H. Li and S. Das, Scaling relationships for spherical polymer brushes revisited, *J. Phys. Chem. B*, 120 (23), 5272–5277, [\(2016\)](#)
  20. J. Patwary, **G. Chen**, S. Das, Efficient electrochemomechanical energy conversion in nanochannels grafted with polyelectrolyte layers with pH-dependent charge density, *Microfluidics and Nanofluidics*, 20, 37, [\(2016\)](#)
  21. **G. Chen** and S. Das, Scaling laws and ionic current inversion in polyelectrolyte-grafted nanochannels, *J. Phys. Chem. B*, 119, 12714-12726, [\(2015\)](#)
  22. S. Das, M. Banik, **G. Chen**, S. Sinha, and R. Mukherjee, Polyelectrolyte brushes: theory, modelling, synthesis, and applications, *Soft Matter*, 11, 8550-8583, [\(2015\)](#)
  23. **G. Chen** and S. Das, Streaming potential and electroviscous effects in soft nanochannels beyond Debye-Hückel linearization, *J. Colloid Interface Sci.*, 445, 357, [\(2015\)](#)
  24. **G. Chen** and S. Das, Electroosmotic transport in polyelectrolyte-grafted nanochannels with pH-dependent charge density, *J. Appl. Phys.* 117, 185304, [\(2015\)](#)
  25. **G. Chen** and S. Das, Electrostatics of soft charged interfaces with pH-dependent charge density: effect of consideration of appropriate hydrogen ion concentration distribution, *RSC Adv.*, 5, 4493, [\(2015\)](#)

**JOURNAL PUBLICATIONS (SUBMITTED AND UNDER PREPARATION)**

1. **G. Chen**, A. Perazzo and H. A. Stone, Electrostatics and viscosity of semidilute polyelectrolyte solutions (submitted)
2. **G. Chen**, A. Perazzo and H. A. Stone, The influence of salt on the viscosity of polyelectrolyte solutions (submitted)
3. S. He, C. Chen, **G. Chen**, ... S. Das, L. Hu, Nature-inspired high-performance cross-flow membrane with a reversed-tree design (submitted)
4. **G. Chen**, A. Perazzo and H. A. Stone, A theoretical model for semidilute polyelectrolyte solutions in multivalent salt solution with finite ion size (under preparation)
5. **G. Chen**, A. Perazzo and H. A. Stone, A model for salt effects on semidilute polyelectrolyte solutions: equilibrium and dynamics (under preparation)
6. **G. Chen**, S. Das, Uncovering universality in the scaling laws of polymer brushes of different geometries (under preparation)

**PATENTS**

1. **G. Chen**, S. Das, Y. Gu, D. R. Hines, Method for the quantitative determination of overspray related to aerosol-jet printed lines (filed)

**CONFERENCE PUBLICATIONS**

1. **G. Chen**, M. H. Naraghi, P. Akbari, "Effects of Curvature Radii and Aspect Ratios on Cooling Channels Heat Transfer for Liquid Rocket Engines", *Thermal and Fluids Engineering Summer Conference*, NYC, 2015
2. R. Cavillon, M. H. Naraghi, **G. Chen**, "Comparison of Heat Transfer Characteristic of Rectangular and Oval Cooling Channels of Regeneratively Cooled Rocket Engines", *51st AIAA/SAE/ASEE Joint Propulsion Conf.*, 2015

**PRESENTATIONS AND POSTERS**

- 11/2019 Talk: "Electrostatics and viscosity in Semidilute Polyelectrolyte Solutions", @72<sup>nd</sup> APS DFD, Seattle
- 10/2019 Talk: "Electrostatics in Semidilute Polyelectrolyte Solutions", @91<sup>st</sup> SoR, Raleigh, NC
- 04/2019 Invited Talk: "A New theoretical Model for Semidilute Polyelectrolyte Solutions", @Polymer Physics Seminar, Pennsylvania State University, PA
- 03/2019 Talk: "A Model for Semidilute Polyelectrolyte Solutions: Equilibrium and Dynamics", @2019 APS March Meeting, Boston, MA
- 01/2019 Talk: "A Theoretical Model for Polyelectrolyte Solution with Salt Effects", @NCS10, Rutgers Univ., NJ
- 11/2018 Talk: "Salt effects on the Rheology of Semidilute Polyelectrolyte Solutions", @71<sup>st</sup> APS DFD, Atlanta, GA
- 06/2018 Poster: "Theoretical Model for Polyelectrolyte Solutions with Added Salt", @ACEE E-affiliates Retreat
- 05/2018 Talk: "Special Functionality in Nano-confined Electrokinetics by Polyelectrolyte Brushes", @ 9<sup>th</sup> Northeastern Complex Fluids & Soft Matter Workshop (NCS09), Philadelphia, PA
- 02/2018 Talk: "Special Functionality in Nano-confined Electrokinetics by Polyelectrolyte Brushes", @ 19<sup>th</sup> Mid-Atlantic Soft Matter Workshop, UMD, MD
- 12/2017 Poster: "Environmental and Curvature Responsive PE Brushes", @2017 MRS Fall Meeting, Boston, MA
- 11/2017 Talk: "Efficient Energy Conversion by Grafting Nanochannels with End-charged Stimuli-responsive Polyelectrolyte Brush", @ 2017 APS DFD, Denver, CO
- 11/2017 Poster: "Droplet Size Effects on Aerosol Jet Printing Resolution", @ 70<sup>th</sup> APS DFD, Denver, CO
- 05/2017 Session Chair @Annual joint JHU/GWU/UMD Burgers Program for Fluid Dynamics symposium, UMD
- 11/2016 Talk: "Confinement Effect on Liquid and Ion Transport in Nanochannels Coated with Environmental-stimuli-responsive Polyelectrolyte Brushes" @ 69<sup>th</sup> APS DFD, Portland, OR
- 03/2016 Talk: "Scaling Laws for Liquid and Ion Transport in Nanochannels Grafted with Polyelectrolyte Brushes", @ 2016 APS March Meeting, Baltimore, MD

- 11/2015 Talk: “Electrokinetic Transport in Nanochannels Grafted with Polyelectrolyte Brushes with End-Charging”, @ 68<sup>th</sup> APS DFD, Boston, MA
- 11/2015 Poster finalist: “Mobile Electric Energy Generator Based on Nanofluidics”, @ 2015C3E Women in Clean Energy Symposium, Boston, MA
- 07/2015 Talk: “Electrokinetic Transport in Nanochannels Grafted with Polyelectrolyte With pH-Dependent Charge Density”, @ InterPACKICNMM2015, San Francisco, CA

## **PROFESSIONAL SERVICE**

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Reviewer for journals: *J. Fluid Mech.*, *ACS Nano*, *Colloids Surf. A*, *Colloids Surf. B*, *Electrophoresis*, *Sci. Rep.*, *IEEE TBME*, *Z. Angew. Math. Phys.*, *J. Non-Newtonian Fluid Mech.*

## **WORK EXPERIENCES**

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- 04/14-06/14 **Associate Energy Engineer, Energy Technology Saving LLC, Summit, NJ, USA**
- Onsite energy auditing for multifamily commercial buildings by Local Law 84 and Local Law 87;
  - Designed program for universal building utility data based data analysis and optimization research;
  - Implemented smart building technologies to improve operations and reduce energy expenditures.
- 04/11-08/11 **Research Assistant, Shanghai Aerospace Automobile Electromechanical Co., Ltd., China**
- Constructed the experimental system; data analysis and modeling for HVAC systems *Microchannel Separate Heat Pipe Air Conditioning System for Electronic Communication Room*
- 07/10-01/12 **Physics Teacher, Shanghai Sitong Education for National Physics Olympiad, China**
- Gave lectures for class, tutored problems and helped teenagers to gain interests in physics and win prizes in national competitions

## **TECHNICAL SKILLS**

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- Proficient in **Coding** (Matlab), **3D Modeling** (AutoCAD, SolidWorks), **Fluid/Thermal Analysis** (Fluent/ANSYS)
- Experienced in **Python**, **C++**, **Machining Skills**(lathe, miller, driller), **Photoshop**, **Premiere**, **KeyShot**, **Revit**

## **EXTRACURRICULAR ACTIVITIES**

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- 06/2015-02/2018 **President** of SJTU Alumni Association @ Washington Metropolitan Area, USA
- 09/2009-07/2010 **Secretary** of Publicity Department of the Student Union, SJTU
- 09/2008-07/2010 **Amateur Player** of School Women's Basketball Team, SJTU

## **REFERENCES**

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- Howard A. Stone**                      **Donald R. Dixon '69 and Elizabeth W. Dixon Professor,**  
**Chair,** Mechanical and Aerospace Engineering, Princeton University  
 Tel: 6092589493                      Email: [hastone@princeton.edu](mailto:hastone@princeton.edu)
- Siddhartha Das**                      **Associate Professor,** Mechanical Engineering, University of Maryland  
 Tel: 3014056633                      Email: [sidd@umd.edu](mailto:sidd@umd.edu)
- Liangbing Hu**                      **Minta Martin Professor,** Materials Science and Engineering, University of Maryland  
 Tel: 3014059303                      Email: [binghu@umd.edu](mailto:binghu@umd.edu)
- Kenneth Kiger**                      **Keystone Professor,** Mechanical Engineering, University of Maryland  
 Tel: 3014055245                      Email: [kkiger@umd.edu](mailto:kkiger@umd.edu)
- Mohammad H. N. Naraghi**                      **Adjunct Professor,** Mechanical Engineering, Columbia University  
 Tel: 2128542966                      Email: [mhn22@columbia.edu](mailto:mhn22@columbia.edu)