

Saiful Islam Tamim

Personal Information

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344 Phillips Hall
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Current Position

Postdoctoral Research Associate

2022-current

Department of Mathematics

University of North Carolina at Chapel Hill

Research mentors:

- ▷ Dr. Pedro Saenz (*Physical Mathematics Lab*)
- ▷ Dr. Richard McLaughlin and Dr. Roberto Camassa (*Fluids Lab*)

Education

- **Ph.D., Mechanical Engineering** 2021
Clemson University, Clemson, SC, USA
Adviser: Dr. Joshua Bostwick
- **B.Sc., Mechanical Engineering** 2016
Bangladesh University of Engineering and Technology, Dhaka, Bangladesh

Research Interest

Soft and active matter, interfacial fluid mechanics, transport phenomena, complex fluids.

Publications

- J.H. Guan, **S.I. Tamim**, C.W. Magoon, H.A. Stone, P.J. Sáenz “The way bubbles gallop” *Phys. Rev. Fluids*, 10, 110507 (2025).
- J.H. Guan, **S.I. Tamim**, C.W. Magoon, H. A. Stone, P.J. Sáenz “Gallop bubbles” *Nat. Commun.*, 16, 1572 (2025).
- **S.I. Tamim** and J.B. Bostwick “Shaping capillary solids: from statics to dynamics” *Annu. Rev. Cond. Mat. Phys.*, 16, 173 (2025).
- **S.I. Tamim** and J.B. Bostwick “Spreading of a thin droplet on a soft substrate” *J. Fluid Mech.*, 971, A32 (2023).
- **S.I. Tamim**, T. Nichols, J.L. Hansen, T. Bohr, and J.B. Bostwick “Corner universality in polygonal hydraulic jumps” *Phys. Rev. Fluids*, 8, L032001 (2023) (*Editor’s suggestion*).
- **S.I. Tamim** and J.B. Bostwick “Oscillations of a soft viscoelastic drop” *npj Microgravity*, 7, 42 (2021).

- **S.I. Tamim** and J.B. Bostwick “Model of spontaneous droplet transport on a soft viscoelastic substrate with non-uniform thickness” *Phys. Rev. E*, 104, 034611 (2021).
- **S.I. Tamim** and J.B. Bostwick “Plateau-Rayleigh instability in a soft viscoelastic material” *Soft Matter*, 17, 4170-4179 (2021).
- **S.I. Tamim** and J.B. Bostwick “A dynamic analysis of the Rayleigh-Taylor instability in soft solids” *Extreme Mechanics Letters*, 40, 100940 (2020).
- **S.I. Tamim** and J.B. Bostwick “The elastic Rayleigh drop” *Soft Matter*, 15, 9244 – 9252 (2019).

Manuscripts in Review and Preparation

- T. Britt, R. Camassa, R. McLaughlin, **S.I. Tamim**, “Spontaneous wall suction in stratified fluid: a new phenomenon exhibiting Aristotle’s view of motion” *Research Square* 2025, <https://doi.org/10.21203/rs.3.rs-8051509/v1> (*in review with Phys. Rev. Fluids.*)
- J.H. Guan, X. Liu, **S.I. Tamim**, C.W. Magoon, P.J. Sáenz “Spontaneous self-propulsion of vibrating bubbles along a solid boundary. Part 1: Experiments” *in review with J. Fluid Mech.*
- C.W. Magoon, **S.I. Tamim**, P.J. Sáenz “Spontaneous self-propulsion of vibrating bubbles along a solid boundary. Part 2: Simulations” *in review with J. Fluid Mech.*
- **S.I. Tamim**, C.W. Magoon, P.J. Sáenz “Spontaneous self-propulsion of vibrating bubbles along a solid boundary. Part 3: Theory” *in review with J. Fluid Mech.*
- H. Ma, **S.I. Tamim**, J.H. Guan, P.J. Sáenz “Solid particles walking on a vibrating interface” *in review with Physical Review Letters.*

Conferences Presentations

- **S.I. Tamim**, T. Britt, R. Camassa, R. McLaughlin “Spontaneous diffusion induced suction between bodies in stratified fluid” *APS Division of Fluid Dynamics Meeting*, Houston, TX, 2025.
- **S.I. Tamim**, C.W. Magoon, J.H. Guan, P.J. Sáenz “Gallop bubbles: spontaneous self-propulsions of vibrating bubbles along solid boundaries” *APS March Meeting*, Minneapolis, MN, 2024.
- **S.I. Tamim**, C.W. Magoon, J.H. Guan, P.J. Sáenz “Dynamics and stability of a hemispherical bubble under vertical oscillation” *APS Division of Fluid Dynamics Meeting*, Washington DC, 2023.
- **S.I. Tamim**, T. Nichols, J.L. Hansen, T. Bohr, and J.B. Bostwick “Corner universality in polygonal hydraulic jumps” *APS Division of Fluid Dynamics Meeting*, Indianapolis, IN, 2022.
- **S.I. Tamim** and J.B. Bostwick “Oscillations of a soft viscoelastic drop” *APS Division of Fluid Dynamics Meeting*, Phoenix, AZ, 2021.
- **S.I. Tamim** and J.B. Bostwick “The elastic Rayleigh drop” *Droplets 2021*, Technische Universität Darmstadt (*virtual*).

- **S.I. Tamim** and J.B. Bostwick “A model of droplet durotaxis driven by the elastocapillary response of a soft viscoelastic substrate” *APS Division of Fluid Dynamics Meeting*, Seattle, WA, 2019.
- **S.I. Tamim** and J.B. Bostwick “The elastic Rayleigh drop” *APS Division of Fluid Dynamics Meeting*, Atlanta, GA, 2018.

Contributed Talks

- R. McLaughlin, T. Britt, R. Camassa, **S.I. Tamim** “Spontaneous diffusion induced suction in stratified fluid: Experiments, computation, and theory for finite time collapse of bodies in strong stratification ” *APS Division of Fluid Dynamics Meeting*, Houston, TX, 2025.
- C. Magoon, X. Liu, **S. I. Tamim**, H. A. Stone, P.J. Sáenz “Collective dynamics of galloping bubbles” *APS Division of Fluid Dynamics Meeting*, Houston, TX, 2025.
- H. Ma, **S.I. Tamim**, J.H. Guan, P.J. Sáenz “Solid particles walking on a vibrating interface” *APS Division of Fluid Dynamics Meeting*, Utah, 2024.
- R. McLaughlin, T. Britt, R. Camassa, **S.I. Tamim** “Particle attraction to walls by diffusion induced stratified flows” *APS Division of Fluid Dynamics Meeting*, Utah, 2024.
- J.H. Guan, **S.I. Tamim**, C.W. Magoon, P.J. Sáenz “Galloping bubbles” *APS Division of Fluid Dynamics Meeting*, Utah, 2024.
- C.W. Magoon, X. Liu, J.H. Guan, **S.I. Tamim**, P.J. Sáenz “Collective Dynamics of Galloping Bubbles” *APS Division of Fluid Dynamics Meeting*, Utah, 2024..
- J.H. Guan, **S.I. Tamim**, C. Magoon, P.J. Sáenz “Galloping Bubbles: spontaneous self-propulsion of vibrating bubbles along solid boundaries” *APS Division of Fluid Dynamics Meeting*, Washington DC, 2023.
- C. Magoon, J.H. Guan, **S.I. Tamim**, P.J. Sáenz “Direct Numerical Simulations of Vibrating Bubbles Self-Propelling Along Solid Boundaries” *APS Division of Fluid Dynamics Meeting*, Washington DC, 2023.
- K.F. Rabbi, **S.I. Tamim**, A.H.M. Faisal, K.M. Mukut, M.N. Hasan, “A molecular dynamics study on thin film liquid boiling characteristics under rapid linear boundary heating: effect of liquid film thickness” *7th BSME International Conference of Thermal Engineering, AIP Conf. Proc.* 1851, 020102 (2017).
- M.N. Hasan, K.F. Rabbi, K.M. Mukut, **S.I. Tamim**, A.H.M. Faisal, “Nano scale dynamics of bubble nucleation in confined liquid subjected to rapid cooling: effect of solid-liquid interfacial wettability” *7th BSME International Conference of Thermal Engineering, AIP Conf. Proc.* 1851, 020100 (2017).

Teaching Experience

Applied Math Instructor at UNC Chapel Hill

- MATH 383: Introduction to ordinary differential equations
 - Fall 2024, Spring 2024, Fall 2023, Spring 2023, Fall 2022.

- MATH 210: Mathematics for Data Science
 - Fall 2025, Spring 2025.
- MATH 130: Pre-Calculus
 - Spring 2026.
- MATH 116: Intuitive Calculus
 - Fall 2023.

Mentoring Experience

▷ Undergraduate students at UNC-Chapel Hill:

–Klass van de Groep (2025-), Tyler Britt (2024-25), Andrew Wang (2023-25), Haoyu Ma (2022-24), Colin Brockman (2022-23), Toby Aniekwensi (2022-23).

Honors and Awards

- Gallery of Fluids Video Award, APS Division of Fluid Dynamics Meeting, 2024.
- Neil and Sherry Zimmermann Postdoctoral Fellowship, UNC Chapel Hill, 2022-2023.
- ME Excellence Award for Ph.D. Students, Clemson University, 2022.
- Winner of the ME Graduate Student Poster Competition, Clemson University, 2021.

Seminar Talks

- “Spontaneous self-propulsion in inertial and viscous fluid systems”, *Applied Math Colloquium*, UNC Chapel Hill, 2025.
- “Spontaneous wall suction of symmetric bodies in stratified fluid”, *Physical Applied Math Seminar*, UNC Chapel Hill, 2025.
- “Gallopig bubbles: Theory”, *Physical Applied Math Seminar*, UNC Chapel Hill, 2023.
- “Capillary driven transport in soft solids”, *Physical Applied Math Seminar*, UNC Chapel Hill, 2022.
- “Corner singularity in polygonal hydraulic jumps”, *ME Graduate Research Seminar*, Clemson University, 2021.
- “Motion of viscous drops on soft substrates”, *ME Graduate Research Seminar*, Clemson University, 2021.
- “Dynamics of gravity and capillary driven instabilities at soft interfaces”, *ME Graduate Research Seminar*, Clemson University, 2020.
- “The elastic Rayleigh drop”, *ME Graduate Research Seminar*, Clemson University, 2018.

Voluntary Services

- Journal reviewer: Physical Review Letters, Journal of Fluid Mechanics, Soft Matter, Physical Review Fluids, Physical Review E, Journal of Engineering Mathematics, International Journal of Solids and Structures, RSC Advances, Mechanics Research Communications.
- Session chair at APS Division of Fluid Dynamics Meeting, Indianapolis, IN, 2022.
- Student volunteer at APS Division of Fluid Dynamics Meeting, Atlanta, GA, 2018.
- Science demonstrator at UNC Science Expo.
- Volunteer and demonstrator at UNC Research and Discovery Fair.
- Executive graduate committee member of Bangladesh Association Clemson, 2017-2019.

Technical Skills

- ▷ Language: C, Python, LaTeX, bash.
- ▷ Software: MATLAB, COMSOL, basilisk, OpenFOAM, LAMMPS, Mathematica, SolidWorks, Excel, DataGraph.
- ▷ Experimental: Image processing, PIV, vibration control, ultrasonic levitation, 3D printing, laser cutting, vacuum forming.