Mahesh C. Gandikota

Contact Information

H108, Academic Block, ICTS
Shivakote, Hesaraghatta Hobli
Bengaluru - 560089.

Email: mahesh.gandikota@icts.res.in
Website: mcgandikota.github.io

Research Interests

Broad interests in soft matter physics and statistical mechanics.

Specifically, at zero temperature, I have worked on strain-induced rigidity transitions in spring networks. At finite temperature, I have investigated the shape of thermally equilibrated ribbons and membranes. In nonequilibrium systems, particularly active matter, I am studying the jammed phase of dense systems, the crumpling transition in tethered membranes and entropy production. I am also working on other classes of nonequilibrium such as non-reciprocal interactions and approach to equilibrium. I have modeled biological phenomena such as compression-stiffening of the cytoskeleton, morphogenesis in cerebellum and martensitic transition in the tail-sheath of T4 bacteriophage.

Education

Ph.D., Physics, Syracuse University, Syracuse, NY, USA **2021**

Thesis Title: Interplay of Geometry and Mechanics:
Disordered Spring Networks and Shape-Changing Cerebella

Thesis Advisor: Prof. J. M. Schwarz

Integrated M.Sc., Physics, National Institute of Science Education and Research, Odisha, India **2015**

Thesis Title: Martensitic phase transition of bacteriophage T4's tail sheath

Thesis Advisor: Prof. Somendra Bhattacharjee

G.P.A.: 8.2

Twelfth grade board exam, National College, Bangalore, India **2010**

Score obtained: 81%

Tenth grade board exam, HJKP, Bangalore, India **2008**

Score obtained: 97.4%

Employment

Postdoc, International Centre for Theoretical Sciences, Karnataka, India **2024–Present**

Postdoc, Department of Chemistry, Columbia University, NY, USA **2021–2024**

Research Assistant, Department of Physics, Syracuse University, NY, USA **2016–2021**

Teaching Assistant, Department of Physics, Syracuse University, NY, USA **2015–2020**

Publications

9. A.D. Chen, M. C. Gandikota, and A. Cacciuto, "The shape of cleaved tethered membranes", s Soft Matter, 21.6 (2025).
8. M. C. Gandikota, Shibananda Das and A. Cacciuto, "Spontaneous crumpling of active spherical shells", Soft Matter, 20.17 (2024).
7. M. C. Gandikota and A. Cacciuto, "The crumpling transition of active tethered membranes", Soft Matter, 19.28 (2023).

6. M. C. Gandikota and A. Cacciuto, "Rectification of confined soft vesicles containing active particles", Soft Matter, 19.2 (2023).
5. M. C. Gandikota and A. Cacciuto, "Effective forces between active polymers", Physical Review E, 105, 034503 (2022).
4. M. C. Gandikota, Amanda Parker and J. M. Schwarz, "Rigidity transitions in zero-temperature polygons", Physical Review E, 106, 055003 (2022).
3. M. C. Gandikota and J. M. Schwarz, "Buckling without bending morphogenesis: Nonlinearities, spatial confinement, and branching hierarchies", New Journal of Physics, 23, 063060 (2021).
2. M. C. Gandikota, Katarzyna Pogoda, Anne van Oosten, T. A. Engstrom, A . E. Patteson, P. A. Janmey, J. M. Schwarz, "Loops versus lines and the compression stiffening of cells", Soft Matter, 16(18), 4389-4406 (2020).
1. S. Paul, M. C. Gandikota, "Fourier Transform of Electric Signal using Kundt's Tube", Student Journal of Physics, 6(2), 95-100 (2016).

Manuscripts under review

1. *The shape of ideal and self-avoiding ribbons: From polymers to surfaces*
   A. D. Chen, M. C. Gandikota and A. Cacciuto
   Under review in Soft Matter published by the Royal Society of Chemistry
2. *Self-avoiding tethered surfaces are always flat*
   A. D. Chen, M. C. Gandikota, M.J. Kim and A. Cacciuto
   Under review in Physical Review Letters published by the American Physical Society

Manuscripts in preparation

1. *The jammed phase of infinitely persistent active matter*
   M. C. Gandikota, Rituparno Mandal, Pinaki Chaudhuri, Bulbul Chakraborty and Chandan Dasgupta
2. *Entropy production gradients in active matter systems*
   M. Kim, M. C. Gandikota, and A. Cacciuto

Ongoing projects

1. *Approach to equilibrium in the Riesz gas* with Anupam Kundu and Abhishek Dhar
2. *The jammed phase of systems with non-reciprocal interactions* with Shaon Chakraborty and Rituparno Mandal

Teaching

Recitations/Substitute Lecturer

PHY 216, General Physics II for honors and majors	**Spring & Fall 2017, Spring 2018**
PHY 212, General Physics II	**Spring & Fall 2016**
PHY 211, General Physics I	**Fall 2015**

Labs

AST 101, Our Place in the Universe	**Fall 2020**
PHY 102, Major Concepts of Physics II	**Spring 2019, 2020**

Grading/Substitute Lecturer

PHY 635, Physical Cell Biology	**Fall 2018**
PHY 360, Vibrations, Waves and Optics	**Fall 2018**

Guest Lecturer

CHEM G4221, Statistical Thermodynamics	**Fall 2022**

Mentoring

Undergraduate Students
Alexandra Brown (REU program) **Summer 2016**

Languages

Human: English, Telugu (mother tongue), Kannada (native), Hindi.

Programming: Bash, C++, Python, Mathematica.

Markup: LaTeX, Markdown.

Operating System: Linux, Windows.

Awards

Summer Graduate Fellowship, Soft Matter Program, Syracuse University **2017**

Henry Levinstein Fellowship, Physics Department, Syracuse University **2016**

All India Rank 24, Graduate Aptitude Test in Engineering (GATE) **2015**

Summer research fellow, Indian Academies of Sciences **2012**

INSPIRE fellowship, Department of Science and Technology, Government of India **2010-15**

Conference/ Workshop

Invited Talks
Discussion meeting on glassy, disordered and non-equilibrium soft matter
IMSc, Chennai, India **2025**

Azim Premji University, Bengaluru, India **2025**

ICTS-TIFR, Bengaluru, India **2024**

Eindhoven University of Technology, Eindhoven, Netherlands. **2021**

IMSc, Chennai, India **2021**

Fibrous Networks in Biology, University of Pennsylvania, Pennsylvania, USA. **2018**

Contributed Talks and Posters
10th Indian Statistical Physics Community Meeting, ICTS-TIFR, Bengaluru, India. **2025**

Gordon Research Seminar & Conference, New Hampshire, USA. **2023**

Northeast Complex Fluids and Soft Matter workshop, New York, USA. **2023**

APS March Meetings. **2017, 2018, 2019, 2020**

Soft Matter School, University of Massachusetts, Massachusetts, USA **2017**

Service to profession

Science outreach, eclipse event for residents of Shivakote, ICTS-TIFR. **2025**

Lecturer & Tutor, Summer School for Women in Physics, ICTS-TIFR. **2024**

Experiment Leader, Girls Science Day, Columbia University. **April, Nov 2023**

Manuscript reviewer for Physical Review E

Organizer, Soft Matter Journal Club, Syracuse University. **2019-2020**

Moderator, APS Conference for Undergraduate Women in Physics, Syracuse University. **2016**

Volunteer & Photographer, Active and Smart Matter conference, Syracuse University. **2016**

Volunteer, Science Day, annual joint outreach program to high school students, NISER, IOP, Bhubaneswar. **2011, 2012, 2014**

Non-Academic

President, Argentine Tango Club, Syracuse University. **Fall 2017 - Fall 2020**

Editorial Board, Jignasa, annual magazine of NISER, Bhubaneswar. **2014**

References

J. M. Schwarz
Professor
Department of Physics
Syracuse University
229A Physics Building
Syracuse, NY 13244, USA
email: jmschw02@syr.edu

A. Cacciuto
Professor
Department of Chemistry
Columbia University in the City of New York
Havemeyer Hall
3000 Broadway, New York, NY 10027, USA
email: ac2822@columbia.edu

Chandan Dasgupta
Professor
Department of Physics
Indian Institute of Science
CV Raman Rd, Bengaluru
Karnataka, 560012, India
email: cdgupta@iisc.ac.in

Somendra M. Bhattacharjee
Professor
Department of Physics
Ashoka University
Plot No. 2, Rajiv Gandhi Education City
National Capital Region P.O. Rai
Sonepat, Haryana 131029, India
email: somendra.bhattacharjee@ashoka.edu.in