



biomaterials

biological physics

nonequilibrium statistical physics

soft condensed matter

## M. CRISTINA MARCHETTI

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Dr. Marchetti studies the emergent behavior of soft and biological materials that are driven out of equilibrium by an external drive, internal activity, or disorder. She uses theory and computation to investigate the rich dynamics of a broad range of systems, from vibrated granular matter to bacterial suspensions as well as the cell cytoskeleton and living tissues. Dr. Marchetti is also currently the Associate Director of the Syracuse Biomaterials Institute, a collaborative center among Syracuse University, SUNY School of Environmental Science and Forestry, and SUNY Upstate Medical University. She is also the Director of the IGERT Soft Interfaces Program, an interdisciplinary doctoral training program funded by the National Science Foundations focused on research on soft and biological interfaces and on the interaction between soft and hard materials. Marchetti also leads an interdisciplinary learning effort for graduate students from science and engineering with a focus on cross-disciplinary communication. Dr. Marchetti has sustained funding from the National Science Foundation Division of Material Research for almost twenty five years.

### Education:

1982 Ph.D. Physics, University of Florida

1978 Laurea in Physics, University of Pavia, Italy

### Recent Research Projects:

**Active and Driven Soft Matter.** National Science Foundation. PI: Marchetti, M.C.

This project studies the collective behavior of swimming microorganisms and collections of motile cells on soft elastic substrates, with the goal of understanding the interplay between physical mechanisms and biochemical or other signaling processes in regulating the large-scale organization and function of living matter. The outcomes of the project are relevant to wound healing and tissue formation.

**NSF Materials World Network: Microscopic Models of Cross-Linked Active Gels.**

National Science Foundation. PI: Marchetti, M.C., co-PI: Liverpool, T.

With collaborators in the UK and South Africa, this project focuses on the mechanical properties of networks of cytoskeletal filaments and associated motor proteins, both in vitro and in vivo. The problems studied are relevant for the understanding of force transmission in the cell cytoskeleton.

**Recent Scholarship:**

Fily, Y. and M.C. Marchetti, “**Phase separation of self-propelled particles with no alignment,**” *Physics Review Letters*, in press.

Giomi, L. and M.C. Marchetti, “**Polar patterns in active fluids,**” *Soft Matter*, vol. 8, pp. 129-139, Jan. 2012.

**Links to Affiliated Centers:**

Syracuse Biomaterials Institute, <http://biomaterials.syr.edu>

IGERT Soft Interfaces Program, <http://soft-igert@syr.edu>



Syracuse University is driven by its vision, Scholarship in Action—a commitment to forging bold, imaginative, reciprocal, and sustained engagements with partners from all sectors of the economy: public, private, and non-profit. These profiles have been developed to facilitate cross-sector connections and are supported by the SU ADVANCE project with funding from the National Science Foundation under NSF Grant No. HRD-1008643.