SATHISH THIYAGARAJAN, Ph.D.

mail@unintegrable.com
LinkedIn • Google Scholar

Summary of Qualifications

Highly motivated, detail-oriented, challenge-driven Research Scientist with 10+ years of experience in analyzing and interpreting biological data and creating mathematical models to understand behaviour of subcellular machines.

Education & Credentials

Ph. D., Physics, 2017, Columbia University, Columbia University, New York, NY

B. Tech., Electrical Engineering, 2010, Indian Institute of Technology Madras, Chennai, IND

Career Experience

Earlham Institute, Norwich, UK **9/2021-Present**

POSTDOCTORAL SCIENTIST

Identified hotspots of genome instability by measuring replication fork movement using a combination of long-read nanopore sequencing on nucleotide analogue-incorporate DNA and mathematical modeling.

Columbia University, New York, USA **9/2010 – 1/2021**

POSTDOCTORAL RESEARCH SCIENTIST, Department of Chemical Engineering **2/2018 – 1/2021**

Uncovered novel biophysical mechanisms, at the subcellular level, by building on previously published research to create analytical mathematical models and simulations. Successfully completed five detailed studies that went on to be published.

PHD CANDIDATE, Department of Physics **9/2010 – 12/2017**

Successfully executed investigations that focused on understanding how cells divide and how neurons communicate.

TECHNICAL PROFICIENCIES

Machine Learning:	Image Classification; Linear Regression; Feature Engineering; Neural Networks
Methods:	Image Analysis; Quantitative Modeling Using Stochastic PDEs, Molecular Dynamics, Monte Carlo Methods; Statistical Inference; Hypothesis Testing
Programming Language:	Python (HOOMD-blue, SciPy, pandas); MATLAB
Software/Systems:	Image J; AWS (Kinesis, Lambda, EC2, S3); Linux; Git

PUBLICATIONS & INVITED TALKS

Selected Publications (* means equal contribution)

- **Thiyagarajan, S**., Wang, S. W., Chew, T. G., Huang, J., Kumar, L., Balasubramanian, M. K., O'Shaughnessy, B. (2022) Myosin turnover controls actomyosin contractile instability. *PNAS*. https://www.pnas.org/doi/full/10.1073/pnas.2211431119
- Shin, W.*, Arpino, G.*, **Thiyagarajan, S**.*, Su, R*., Ge, L.*, McDargh, Z., Guo, X., Wei, L., Shupliakov, O., Jin, A., O'Shaughnessy, B., Wu, L.-G. (2020) Vesicle Shrinking and Enlargement Play Opposing Roles in the Release of Exocytotic Contents. *Cell Reports*. https://www.sciencedirect.com/science/article/pii/S2211124719317012
- Wu, Z., Dharan, N., McDargh, Z.*, **Thiyagarajan, S**.*, O'Shaughnessy, B., & Karatekin, E. (2021). The neuronal calcium sensor Synaptotagmin-1 and SNARE proteins cooperate to dilate fusion pores mechanically. *Elife.* elifesciences.org/articles/68215
- Mostafavi, H.*, **Thiyagarajan, S**.*, Stratton, B. S., Karatekin, E., Warner, J. M., Rothman, J. E., O'Shaughnessy, B. (2017). Entropic forces drive self-organization and membrane fusion by SNARE proteins. *PNAS*. https://www.pnas.org/content/114/21/5455
- **Thiyagarajan, S**., Munteanu, E. L., Arasada, R., Pollard, T. D., & O'Shaughnessy, B. (2015) The Fission Yeast Cytokinetic Contractile Ring Regulates Septum Shape and Closure. *J Cell. Sci* https://jcs.biologists.org/content/128/19/3672

Selected Invited Talks

- Writhing of cytokinetic contractile rings reveals that the contractile ring is an elastoporous cable. ASCB, 2020.
- Fusion pores are cooperatively dilated by the neuronal calcium sensor Syt1 and SNARE proteins in a mechanical lever action. BPS, 2020
- Three mechanisms generate tension in the fission yeast contractile ring: sliding filament, fixed filament and unanchored myosin II. ASCB, 2018.