

## CV of Rajaram Swaminathan

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**Name:** Dr. Rajaram Swaminathan  
**Designation:** Professor  
**Department/Institute/University:** Department of Biosciences and Bioengineering,  
Indian Institute of Technology Guwahati  
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### Education (degree onwards) & Professional Career

Institution Place	Degree	Year
A. M. Jain College, Chennai, Madras University	Bachelor of Science, Chemistry	1988
Indian Institute of Technology, Bombay	Master of Science, Biotechnology	1990
Tata Institute of Fundamental Research, Mumbai	Ph. D.	1996

Institution Place	Position	Year
University of California, San Francisco, USA	Postdoctoral Fellow	1995-98
National Centre for Ultrafast Processes, Chennai	Project Associate	1998-99
Indian Institute of Technology, Guwahati	Faculty	1999-

### List of Publications

**ORCID ID: 0000 0003 1294 8379**

- Swaminathan, R.**, N. Periasamy, J. B. Udgaonkar and G. Krishnamoorthy (1994). Molten globule-like conformation of barstar: a study by fluorescence dynamics. *J. Phys. Chem.* 98, 9270-9278.
- Swaminathan, R.**, G. Krishnamoorthy and N. Periasamy (1994). Similarity of fluorescence lifetime distributions in single tryptophan proteins in the random coil state. *Biophys. J.* 67, 2013-2023.
- Swaminathan, R.** and N. Periasamy (1996). Analysis of fluorescence decay by the maximum entropy method: influence of noise and analysis parameters on the width of the distribution of lifetimes. *Proc. Indian Acad. Sci. (Chem. Sci.)* 108:39-49.
- Swaminathan, R.**, U. Nath, J. B. Udgaonkar, N. Periasamy and G. Krishnamoorthy (1996). Motional dynamics of a buried tryptophan reveals the presence of partially structured forms during denaturation of barstar. *Biochemistry* 35, 9150-9157.
- Swaminathan, R.**, S. Bicknese, N. Periasamy and A. S. Verkman (1996). Cytoplasmic viscosity near cell plasma membrane: translational diffusion of a small fluorescent solute measured by total internal reflection-fluorescence photobleaching recovery. *Biophys. J.* 71, 1140-1151.
- Swaminathan, R.**, C. P. Hoang and A. S. Verkman (1997). Photobleaching recovery and anisotropy decay of green fluorescent protein GFP-S65T in solution and cells: cytoplasmic viscosity probed by GFP translational and rotational diffusion. *Biophys. J.* 72, 1900-1907.
- Partikian, A., B. P. Olveczky, **R. Swaminathan**, Y. Li, and A. S. Verkman (1998). Rapid diffusion of green fluorescent protein in the mitochondrial matrix. *J. Cell Biol.* 140, 821-829
- Homchaudhuri, L. and **Swaminathan, R.** (2001) Novel absorption and fluorescence characteristics of L-lysine *Chem. Lett.* 2001, 844-845.
- Homchaudhuri, L. and **Swaminathan, R.** (2004) Near ultraviolet absorption arising from lysine residues in close proximity: A probe to monitor protein unfolding and aggregation in lysine-rich proteins. *Bull. Chem. Soc. Japan*, 77, 765-769.

10. Homchaudhuri, L., Kumar, S. and **R. Swaminathan** (2006). Slow aggregation of lysozyme in alkaline pH monitored in real time employing the fluorescence anisotropy of covalently labelled dansyl probe., *FEBS Lett.*, 580, 2097-2101.
11. Homchaudhuri, L., Sarma, N. and **R. Swaminathan** (2006). Effect of crowding by dextrans and Ficolls on the rate of alkaline phosphatase-catalysed hydrolysis: A size dependent investigation, *Biopolymers*, 83, 477-486.
12. Kumar, S. and **R. Swaminathan** (2007) Employing the fluorescence anisotropy and quenching kinetics of tryptophan to hunt for residual structures in denatured proteins. *J. Chem. Sci.*, 119, 141-145.
13. Agrawal, M., S. B. Santra, Rajat Anand and **R. Swaminathan** (2008) Effect of macromolecular crowding on the rate of diffusion-limited enzymatic reaction, *Pramana-J. Phys.* 71, 359-368.
14. Kumar, S., Atul K. Singh, G. Krishnamoorthy and **R. Swaminathan** (2008) Thioflavin T displays enhanced fluorescence selectively inside anionic micelles and mammalian cells, *J. Fluoresc.* 18, 1199-1205.
15. Kumar, S., Vijay K. Ravi and **R. Swaminathan** (2008) How do surfactants and DTT affect the size, dynamics, activity and growth of soluble lysozyme aggregates? *Biochem. J.* 415, 275-288.
16. Dash, N., F. A. S. Chipem, **R. Swaminathan**, and G. Krishnamoorthy (2008) Hydrogen bond induced twisted intramolecular charge transfer in 2-(4'-N,N-dimethylaminophenyl)imidazo [4,5-b]pyridine, *Chem. Phys. Lett.* 460, 119-124.
17. Kumar, S., Vijay K. Ravi and **R. Swaminathan** (2009) Suppression of lysozyme aggregation at alkaline pH by tri-N-acetylchitotriose. *Biochim. Biophys. Acta* 1794, 913-920.
18. Kumar, M. V. S. and **R. Swaminathan** (2010) A novel approach to segregate and identify functional loop regions in protein structures using their Ramachandran maps. *Proteins* 78, 900-916.
19. **Swaminathan, R.**, V. K. Ravi, S. Kumar, M. V. S. Kumar and N. Chandra (2011) Lysozyme: A model protein for amyloid research. *In Adv. Protein Chem. Struct. Biol.* Vol. 84 R. M. Donev (editor), Academic Press, 2011, pp. 63-111. ISBN: 978-0-12-386483-3 (**book chapter**)
20. Prasad, S. and **R. Swaminathan** (2013) Measuring the diffusion of fluorescent dye or protein inside living cells. *Curr. Sci.* 105, 1549-1561.
21. Ravi, V. K., T. Swain, N. Chandra and **R. Swaminathan** (2014) On the characterization of intermediates in the isodesmic aggregation pathway of hen lysozyme at alkaline pH. *PLoS ONE* 9(1): e87256 doi 10.1371/journal.pone.0087256
22. Ravi, V. K., M. Goel, H. C. Kotamarthi, S. R. K. Ainaravapu and **R. Swaminathan** (2014) Preventing Disulfide Bond Formation Weakens Non-covalent Forces Among Lysozyme Aggregates. *PLoS One* 9(2): e87012 doi 10.1371/journal.pone.0087012
23. Iyer, A., A. Chandra and **R. Swaminathan** (2014) Hydrolytic enzymes conjugated to quantum dots mostly retain whole catalytic activity. *Biochim. Biophys. Acta* 1840, 2935–2943
24. Thokchom, A. K., **R. Swaminathan** and A. Singh (2014) Fluid Flow and Particle Dynamics Inside an Evaporating Droplet Containing Live Bacteria Displaying Chemotaxis. *Langmuir* 30,12144-12153
25. Somaiah C, A. Kumar, D. Mawrie, A. Sharma, S. D. Patil, J. Bhattacharyya, **R. Swaminathan**, B. G. Jaganathan (2015) Collagen Promotes Higher Adhesion, Survival and Proliferation of Mesenchymal Stem Cells. *PLoS ONE* 10(12): e0145068. doi:10.1371/journal.pone.0145068
26. Chhabra G, N. Chandra, **R. Swaminathan** (2017) Osmolytes: Key players in regulating protein aggregation in *Cellular Osmolytes: From Chaperoning Protein Folding to Clinical Perspectives*, L. Rajendrakumar Singh and T. A. Das (eds.), pp97—119 Springer Singapore 2017. eBook ISBN 978-981-10-3707-8; Hardcover ISBN 978-981-10-3706-1 (**book chapter**)
27. Prasad, S., I. Mandal, S. Singh, A. Paul, B. Mandal, R. Venkatramani, **R. Swaminathan** (2017) Near UV-Visible electronic absorption originating from charged amino acids in a monomeric protein. *Chem. Sci.*, 8, 5416—5433
28. Ansari, Mohd. Z., A. Kumar, D. Ahari, A. Priyadarshi, L. Padmavathi, R. Bhandari, **R. Swaminathan** (2018) Protein charge transfer absorption spectra: An intrinsic probe to monitor structural and oligomeric transitions in proteins. *Faraday Discuss.*, 207, 91—113. DOI: 10.1039/C7FD00194K
29. Anand, R., Agrawal, M., Mattaparthi, V. K. S., **Swaminathan, R.**, Santra, S. B. (2019) Consequences of heterogeneous crowding on an enzymatic reaction: A residence time Monte Carlo approach. *ACS Omega*, 4, 727—736.

30. Ansari, Mohd. Z., **R. Swaminathan** (2020) Structure and dynamics at N- and C-terminal regions of intrinsically disordered human c-Myc PEST degron reveal a pH-induced transition. *Proteins* doi:10.1002/prot.25880
31. Kumar, Amrendra, D. Ahari, A. Priyadarshi, Mohd. Z. Ansari and **R. Swaminathan** (2020) Weak Intrinsic Luminescence in Monomeric Proteins Arising from Charge Recombination. *J. Phys. Chem. B* 124, 2731-2746.

## Patents

Title: COST EFFECTIVE, PORTABLE OPTOELECTRONIC INSTRUMENT TO MEASURE STEADY STATE FLUORESCENCE AND ITS SET UP METHOD

Inventors: Kulkarni Alark Shripad, Harshal B. Nemade and Rajaram Swaminathan

Patent Number: 310875

Patent application number: 1136/KOL/2015

Date of filing: 7 Nov 2015

Title: TRANSFORMING PROTEIN INTO A PRIME NUMBER SEQUENCE: ASSIGNING UNIQUE PRIME INTEGER TO EACH AMINO ACID

Inventors: Saumya Prasad and Rajaram Swaminathan

Ref. No.: 201831038890

App. No.: TEMP/E-1/42209/2018-KOL

Provisional Patent filed: 12 Oct 2018

## Current Research Interests:

- Biophotonics, Fluorescence Spectroscopy; Protein Charge Transfer Spectra;
- Protein Aggregation; Intrinsically Disordered Proteins
- Influence of Macromolecular Crowding on enzymatic reaction rates & equilibria,
- Big Data analysis of the Proteomes

## Professional Activities

Member, Biophysical Society, USA

Member of the Royal Society of Chemistry, UK

Life Member, Indian Biophysical Society

Reviewer: *Journal of Fluorescence*, *Biotechnology Progress*, *Biochemistry (USA)*, *Biopolymers*, *Biochimica et Biophysica Acta*, *Analytical Chemistry*