

Sudha Chakrapani, PH.D.

Assistant Professor

Department of Physiology and Biophysics,
School of Medicine, Case Western Reserve University,
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EDUCATION

2004 PhD (Biophysics), University at Buffalo, (Advisor: Anthony Auerbach)
1999 M.Tech (Biomedical Engineering) Indian Institute of Technology, India
1997 M.Sc (Biochemistry) University of Pune, India

PROFESSIONAL APPOINTMENTS

2010- Assistant Professor, Case Western Reserve University
2008-2010 Research (Assistant Professor), University of Chicago
2006-2008 Postdoctoral Fellow, University of Chicago (with Eduardo Perozo)
2003-2006 Postdoctoral Fellow, University of Virginia (with Eduardo Perozo)

MEMBERSHIPS IN PROFESSIONAL SOCIETIES

2003- Member, Biophysical Society
2011- American Heart Association

SCHOLARSHIPS AND AWARDS

2012-2016 Scientist Development Grant, American Heart Association
2007-2008 Postdoctoral Fellowship, American Heart Association
2005-2007 Postdoctoral Fellowship, American Heart Association
2004 University at Buffalo nominee for the CGS/UMI Distinguished Dissertation award.
2004 Dean's Award for Outstanding Dissertation, First Prize. University at Buffalo, SUNY.
2004 Herbert Schuel Award for outstanding research in the field of Cell and Developmental Biology, University at Buffalo, SUNY.
1999 Selected for the Cambridge Commonwealth Trust Scholarship and Overseas Research Scholar Award.
1997-1999 Biomedical Engineering Scholarship, Indian Institute of Technology, Bombay, India
1997 Ranked second, Nationwide Graduate Aptitude Test in Engineering (GATE), Indian Institute of Technology and Indian Institute of Sciences, India
1997 Junior Research Fellowship, Council for Scientific and Industrial Research (CSIR), India.
1995-1997 National Chemical Laboratory Scholarship, Ranked second in nationwide examination conducted by National Chemical Laboratory, India.
1995 Silver Medal and Balaraman Memorial award, University of Madras, India.
1991 National Talent Search Contest in mathematics.

PROFESSIONAL SERVICE

National/International Committees

- 2005- Early Career Committee, Biophysical Society
- 2012 Panelist, Early Career Development Committee, Biophysical Society
- 2013 Panelist, Early Career Development Committee, Biophysical Society
- 2013 Session Co-Chair, Ligand-gated ion channels, Biophysical Society

National/International Review Panels

Manuscript Reviewer: *BBA-biomembrane*, *Biochemistry*, *Biophysical Journal*; *International Journal of Molecular Sciences*, *Journal of Biological Chemistry*; *Journal of General Physiology*; *Plos computational biology*; *Structure*

Medical School and Departmental services

- 2012 Retreat Committee member, Annual Retreat for Physiology and Biophysics
- 2013 Retreat Committee member, Annual Retreat for Physiology and Biophysics
- 2013 Member, Graduate Education Task Force for student recruitment, Department of Physiology and Biophysics
- 2013 Co-Director, Seminar Series, Department of Physiology and Biophysics

Thesis and Pre-Thesis Committee

- 2010- Quentin Jamieson, Thesis Committee Member, Physiology and Biophysics
- 2011- Mathew Cohen, Thesis Committee Member, Physiology and Biophysics
- 2013- Sam Chai, Thesis Committee Member, Physiology and Biophysics
- 2013- Malcolm Hoshi, Thesis Committee Member, Physiology and Biophysics
- 2013- Nicolaus Schmandt, Advisor, Neuroscience
- 2013- Soumili Chatterjee, Advisor, Physiology and Biophysics

TEACHING ACTIVITIES

- 1997-1999 Teaching Assistant, Indian Institute of Technology
- 1999-2003 Graduate Assistant, Department of Physiology and Biophysics, University at Buffalo
- 2003-2006 Graduate and Undergraduate course participation, Department of Molecular Physiology and Biological Physics, University of Virginia
- 2006-2010 Graduate and Undergraduate course participation, Department of Biochemistry, University of Chicago
- 2011 PHOL530-Advanced techniques in physiological and biophysical sciences course- X-ray crystallography (Graduate level, 5 students, 6 hours)
- 2012 Block 2-School of Medicine
Signal Transduction Cell Physiology
Medium Size Group (14 students, 2 contact hours)
- 2012 Block 1-Masters in Medical Physiology

- Physiology of cells and Molecule- Synaptic transmission and the Neuromuscular Junction
(75 students, 3 contact hours)
- 2012 C3MB-Cell and Molecular Biology-Membrane Unit
(Graduate Level, 55 students, 10 contact hours)
- 2012 PHOL468-Membrane Physiology:
Single-Channel Kinetics (Graduate Level, 5 students, 3 hours)
- 2012 PHOL530-Advanced techniques in physiological and biophysical sciences course- X-
ray crystallography (Graduate level, 5 students, 6 hours)
- 2013 Block 2-School of Medicine
Signal Transduction Cell Physiology
Medium Size Group (14 students, 2 contact hours)
- 2013 PHOL 475 Advanced Protein Biophysics
Membrane Proteins, Protein-lipid interactions (Graduate Level, 5 students, 5 hours)
- 2013 Block 4-School of Medicine
Homeostasis-Cardiovascular Cell Physiology
Medium Size Group (16 students, 6 contact hours)
- 2013 Block 2-School of Medicine
Signal Transduction Cell Physiology
Medium Size Group (14 students, 2 contact hours)

TRAINEES

Graduate Students

- 2013- Nicolaus Schmandt, Department of Neuroscience
2013- Soumili Chatterjee, Department of Physiology and Biophysics

Post-doctoral Fellows

- 2010- Phanindra Velisetty, Ph.D., University of Hamburg, Germany

Rotations Students

- 2012 Amrita Samanta, Department of Physiology and Biophysics

Masters StudentS

- 2013- Omowaleola Omosebi, Department of Physiology and Biophysics

Undergraduate Summer Students

- 2011 Zachary Urbach, Carnegie Mellon University
2012 Ross Bonner, University of Alabama
2013 Annie Clark, Southern University

INVITED PRESENTATIONS

- 2013 Invited Seminar Speaker, Ligand-gated ion channel Session, 57th Annual Biophysical Society meeting, Philadelphia.
- 2012 Invited Seminar Speaker, Department of Biochemistry, University at Buffalo.
- 2011 Invited Seminar Speaker, Department of Pharmacology, Case Western Reserve University
- 2011 Invited Seminar Speaker, Rammelkamp Center, MetroHealth, Medical Center.
- 2011 Invited Seminar Speaker, Voltage-gated K⁺ channel Session, 55th Annual meeting of the Biophysical Society, Baltimore.
- 2010 Invited Seminar Speaker, Department of Physiology, University of California, Davis
- 2010 Invited Seminar Speaker, Department of Physiology, University of Texas, San Antonio
- 2010 Invited Seminar Speaker, Department of Biochemistry, and Department of Anesthesiology Washington University, St. Louis.
- 2009 Invited Seminar Speaker, Department of Physiology and Biophysics, Case Western Reserve University.
- 2007 Invited Seminar Speaker, *Progress in ab initio modelling of biomolecules: towards computational spectroscopy*, University "La Sapienza", Rome (2007).
- 2007 Invited Seminar Speaker, Voltage-gated Na⁺ channel Session 51th Annual meeting of the Biophysical Society, Baltimore.
- 2005 Invited Seminar Invited Speaker, *Annual meeting of the Association for Research in Otolaryngology*

PUBLICATIONS

- Chakrapani, S.**, T.D. Bailey, and A. Auerbach. (2003). The role of loop 5 in acetylcholine receptor channel gating. *J Gen Physiol*. 122:521-539.
- Chakrapani, S.**, T.D. Bailey, and A. Auerbach. (2004). Gating Dynamics of the Acetylcholine Receptor Extracellular Domain. *J Gen Physiol*. 123: 341-356. (Featured on the Cover).
- Chakrapani, S.**, and A. Auerbach. (2005). A speed limit for conformational change of an allosteric membrane protein. *Proc Natl Acad Sci U S A*, 2005. 102(1): p. 87-92.
- Chakrapani, S.**, and Perozo, E. (2007). How to gate an ion channel: lessons from MthK. *Nat Struct Mol Biol* 14, 180-182.
- Chakrapani, S.**, Cordero-Morales, J. F., and Perozo, E. (2007a). A quantitative description of KcsA gating I: macroscopic currents. *J Gen Physiol* 130, 465-478.
- Chakrapani, S.**, Cordero-Morales, J. F., and Perozo, E. (2007b). A quantitative description of KcsA gating II: single-channel currents. *J Gen Physiol* 130, 479-496.
- Chakrapani, S.**, Cuello, L.G., Cortes, D.M., and Perozo, E. (2008). Structural dynamics of an isolated-voltage sensor domain in lipid bilayer. *Structure* 16, 398-409

Chakrapani, S., Sompornpisut, P., Intharathep, P., Roux, B. & Perozo, E. (2010). The activated state of a sodium channel voltage sensor in a membrane environment. *Proc Natl Acad Sci U S A* **107**, 5435-40.

Cuello, L.G., Jogini, V., Cortes, D.M., Pan, A. C., Gagnon, D. H., Dalmas, O., Cordero-Morales, J. F., **Chakrapani, S.**, Roux, B., and Perozo, E. (2010). Structural basis for the coupling between activation and inactivation gates in K(+) channels. *Nature* **466**, 272-5.

Chakrapani, S.*, Cordero-Morales, J. F.*, Jogini, V., Pan, A. C., Cortes, D. M., Roux, R., and Perozo, E. (2011) On the structural basis for modal gating in K⁺ channels *Nature Structure & Molecular Biology* **18** (1), 67-74.

Cordero-Morales, J. F., Jogini, V., **Chakrapani, S.** and Perozo, E. (2011). A Multipoint Hydrogen Bond Network Driving Potassium Channel C-type Inactivation *Biophys J*, 2011. 100(10): p. 2387-93.

Manuscripts as a Principal Investigator.

Velisetty, P., and **Chakrapani, S.** (2012) Desensitization gating mechanisms in prokaryotic ligand-gated ion channel. *J Biol Chem*, **287**, 18467-18477.

Velisetty, P., Chalamalasetti, S. V., and **Chakrapani, S.** (2012) Conformational transition underlying pore opening and desensitization mechanism in membrane-embedded GLIC. *J Biol Chem* **287**(44), 36864-36872 (Article Recommended by Faculty 1000)

Ostmeyer, J., **Chakrapani, S.**, Perozo, E., and Roux, B. Recovery from Slow Inactivation in K⁺ Channels Controlled by Water Molecules. (2013). *Nature* (In press)

RESEARCH SUPPORT.

Current Funding

NCRP Scientist Development Grant 12SDG12070069 Chakrapani (PI) 07/01/12 – 06/30/16

American Heart Association

Title: “Structural dynamics of gating and selectivity in Voltage-gated sodium channels.” Role: PI