Curriculum Vitae for Anurag Sethi

Contact Information

Molecular Biophysics and Biochemistry
266 Whitney Avenue, Room 426
Yale University
New Haven, 06511

Tel: (217) 778 - 8790
Email: anurag.sethi@gmail.com

Education

PhD in Chemistry, University of Illinois at Urbana-Champaign	2008
MS in Chemistry, Indian Institute of Technology at Bombay	2002

Professional Experience

August 2014- Associate Research Scientist, Molecular Biophysics and Biochemistry, Yale University. Mentor: Prof. Mark Gerstein

2013-July 2014: Post-doctoral Associate, Molecular Biophysics and Biochemistry, Yale University. Mentor: Prof. Mark Gerstein

2009-2013: Post-doctoral Fellow, Theoretical Biology and Biophysics, Los Alamos National Laboratory. Mentors: Dr. S. Gnanakaran and Dr. Byron Goldstein

2008-2009: Visiting Research Scientist, School of Chemical Sciences, University of Illinois at Urbana-Champaign. Adviser: Prof. Zaida Luthey-Schulten

2002-2008: Graduate Student, Department of Chemistry, University of Illinois at Urbana-Champaign. Adviser: Prof. Zaida Luthey-Schulten

2001-2002: Undergraduate Student, Department of Chemistry, Indian Institute of Technology at Bombay. Adviser: Prof. Anil K Lala

2001: Summer Intern, National Center of Biological Sciences, Bangalore. Adviser: Dr. Jayant Udgaonkar

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Research Interests

- Evolution of Genetic Code.
- Genomics of Gene Regulation.
- Statistical analyses of genomic datasets.
- Statistical Mechanical Modeling of Biomolecules.
- Multiscale Modeling of Biological Processes.

Honors and Awards

- *Postdoctoral fellowship from Center for Nonlinear Sciences* at Los Alamos National Lab (September 2009-December 2012).
- *Graduate Fellowship* in the Department of Chemistry, University of Illinois (2003-2004).
- The article "Identification of Minimally Interacting Modules in an Intrinsically Disordered Protein" was *highlighted* in the December 2012 issue of the Biopolymers Issue (http://onlinelibrary.wiley.com/doi/10.1002/bip.22151/full#sec1-2).
- The article "Identification of Minimally Interacting Modules in an Intrinsically Disordered Protein" was chosen as the *research highlight* in the August 2012 issue of the Biophysical Journal.
- *Press Release* on the article "Dynamical Network in tRNA:Protein Complexes" was posted on prestigious websites such as sciencedaily.com (http://www.sciencedaily.com/releases/2009/04/090414141251.htm).
- *Press Release* on the article "Molecular Signatures of the Past" was posted on prestigious websites such as sciencedaily.com (http://www.sciencedaily.com/releases/2008/08/080818184248.htm).
- *Best Poster Award*, 14th Annual Meeting on Microbial Genomics, Los Angeles (September 2006).
- The article "Evolutionary profiles from the QR factorization of multiple sequence alignments" was recommended on the *Faculty of 1000* website.

Professional Service

- Was part of a panel of postdoctoral associates in the Biophysical Society Meeting (March 2011) on the "*Transition from PhD to Postdoctoral associates*".
- Reviewer for Computational Biology and Chemistry.

Invited Talks

- "Evolution and Modeling of Information Processing Pathways" Biophysics Seminar in Northeastern University, October 2013.
- "Evolution and Modeling of Information Processing Pathways in the Cell" Seminar in the RNA Institute, State University of New York, Albany, January 2013.
- "Signaling in Biomolecular Systems" Icensa Network Analysis Seminar, Physics Department, Notre Dame University, October 2012.
- "Identification of Minimally Interacting Modules in an Intrinsically Disordered Protein" Los Alamos Institutional Computing User Group Meeting, September 2012.
- "Conformational and Spectroscopic Characterization of Intrinsically Disordered Proteins." Biophyical Conference, March 2011, Baltimore.
- "Quantifying intramolecular binding in multivalent systems." 4th Q-bio Conference, August, 2010, Santa Fe.

- "Intrinsically Disordered Proteins: Conformational Characterization and Local Concentration Effects in Multivalent Systems." 2nd Nuclear Pore Complex Workshop, July, 2010, Albuquerque.
- "Development of Methods to Combine Sequence, Structure, and Network Analyses to Study Gene Annotation, Coevolution, and Allostery in RNA:Protein Complexes." Q-bio Seminar, September, 2009, Los Alamos National Lab.
- "Dynamical Networks in tRNA:Protein Complexes", American Chemical Society Meeting, September, 2008, Philadelphia.
- "Evolutionary history of Cys-tRNA^{Cys} formation", 21st tRNA Workshop, December, 2005, Indian Institute of Science, Bangalore.

Teaching Experience

- Taught the "*Basics of Molecular Dynamics and its Applications to Signaling Molecules*", q-Bio Summer School, Summers 2010-2014.
- Prepared a tutorial for using the *Molecular Operating Environment (MOE) software for performing bioinformatics research*, April 2009.
- Teaching assistant for the course *Computational Chemical Biology*, Spring 2005.
- Teaching assistant for the graduate course *Statistical Mechanics*, Fall 2003.
- Teaching assistant for the *Bioinformatics tutorial* in the Summer School for Theoretical and Computational Biophysics, Summer 2003.
- Teaching assistant for the undergraduate course *Advanced Physical Chemistry*, Spring 2003.
- Teaching assistant for the undergraduate course *General Chemistry Laboratory*, Fall 2002.

Publications:

- Cesar A. López, **Anurag Sethi,** Byron Goldstein, Bridget Wilson, and S. Gnanakaran, "Membrane-mediated regulation of the intrinsically disordered CD3ε cytoplasmic tail of the TCR", *Nature Communications,* Submitted.
- modENCODE Consortium including **Anurag Sethi**, "Comparative analysis of the transcriptome across distant species", *Nature,* In Press.
- **Anurag Sethi**, Divina Anunciado, Jianhui Tian, Dung M Vu, and S Gnanakaran, "Deducing conformational variability of intrinsically disordered proteins from infrared spectroscopy with Bayesian statistics", *Chem. Phys.,* **422:**143-155, 2013.
- Jaemyeong Jung, **Anurag Sethi**, Tiziano Gaiotto, Jason J Han, Tina Jeoh, S Gnanakaran, and Peter M Goodwin, "Binding and movement of individual Cel7A cellobiohydrolases on crystalline cellulose surfaces revealed by single-molecule fluorescence imaging", *J Biol Chem,* **288:**24164-24172, 2013.
- Dahai Gao, Shishir PS Chundawat, **Anurag Sethi**, Venkatesh Balan, S Gnanakaran, and Bruce E Dale, "Increased enzyme binding to substrates is not necessary for more efficient cellulose hydrolysis", *Proc. Natl. Acad. Sci.,* **110:**10922-10927, 2013.

- **Anurag Sethi**, Jianhui Tian, Cynthia Derdeyn, Bette Korber, and S Gnanakaran, "A mechanistic understanding of allosteric immune escape pathways in the HIV-1 envelope protein", *PLoS Comp. Biol.,* **9:**e1003046, 2013.
- Meghan K Murphy, Ling Yue, Ruimin Yue, Saikat Boliar, **Anurag Sethi,** Jianhui Tian, Katja Pfafferot, Etienne Karita, Susan A Allen, Emmanuel Cormier, Paul A Goepfert, Persephone Borrow, James E Robinson, S Gnanakaran, Eric Hunter, Xiang-Peng Kong, and Cynthia A Derdeyn, "Viral escape from neutralizing antibodies in early subtype A HIV-1 infection drives an increase in autologous neutralization breadth", *PLoS Pathogens,* **9:**e1003173, 2013.
- Jianhui Tian, **Anurag Sethi**, Byron Goldstein, and S. Gnanakaran, "Taste of sugar at the membrane: Thermodynamics and kinetics of the interaction of a disaccharide with lipid bilayers", *Biophys. J.,* **104:**622-632, 2013.
- Andrea Asztalos, Marcus Daniels, **Anurag Sethi**, Tongye Shen, Paul Langan, Antonio Redondo, and S. Gnanakaran, "A coarse-grained model for synergistic action of multiple enzymes on cellulose", *Biotech. for Biofuels,* **5:**55, 2012.
- **Anurag Sethi**, Jianhui Tian, Dung M Vu, and S Gnanakaran, "Identification of Minimally Interacting Modules in an Intrinsically Disordered Protein", *Biophys. J.*, **103:**748-757, 2012.
- Jianhui Tian, **Anurag Sethi**, Dung M Vu, and S Gnanakaran, "Characterization of a disordered protein during micellation: Interactions of α-synuclein with sodium dodecyl sulfate", *J. Phys. Chem. B*, **116:**4417-4424, 2012.
- **Anurag Sethi**, Byron Goldstein, and S Gnanakaran, "Quantifying intramolecular binding in multivalent interactions: a structure-based synergestic study on Grb2-Sos1 complex", *PLoS Comp. Biol.,* **10:**e1002192, 2011.
- Rebecca M Lynch, Rong Rong, Saikat Boliar, **Anurag Sethi**, Bing Li, Joseph Mulenga, Susan Allen, James E Robinson, S Gnanakaran, and Cynthia A Derdeyn, "The B cell response is redundant and highly focused on V1/V2 during early subtype C infection in a Zambian seroconvertor", *J. Virol.,* **85:**905-915, 2011.
- S Gnanakaran, Marcus G Daniels, Tanmoy Bhattacharya, Alan S Lapedes, **Anurag Sethi**, Ming Li, Haili Tang, Kelli Greene, Hongmei Gao, Barton F Haynes, Myron S Cohen, George M Shaw, Michael S Seaman, Amit Kumar, Feng Go, David C Montefiori, and Bette Korber, "Genetic signatures in the envelope proteins of HIV-1 that associate with broadly neutralizing antibodies", *PLoS Comp. Biol.*, **6**(10): e1000955, 2010.
- Alexis Black Pyrkosz, John Eargle, **Anurag Sethi**, and Zaida Luthey-Schulten, "Exit strategies for charged tRNA from GluRS"*, J. Mol. Biol.,* **397:**1350-1371, 2010.
- Krishnarjun Sarkar, Konrad Meister, **Anurag Sethi**[1], Martin Gruebele[1], "Folding of an RNA tetraloop on a rugged energy landscape using a stacking-sensitive probe", *Biophys. J.*, **97:**1418-1427, 2009.
- **Anurag Sethi**[2], John Eargle[2] , Alexis Black, and Zaida Luthey-Schulten, "Dynamical networks in tRNA:protein complexes", *Proc. Natl. Acad. Sci.*, **106:** 6620-6625, 2009.
- Elijah Roberts, **Anurag Sethi**, Jonathan Montoya, Carl R Woese, and Zaida Luthey-Schulten. "Molecular signatures of the past", *Proc. Natl. Acad. Sci.,* **105:**13953–13958, 2008.

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[1] Corresponding Author

[2] Equal contribution from authors

- John Eargle, Alexis Black, **Anurag Sethi**, Leonardo Trabuco, and Zaida Luthey-Schulten. "Dynamics of Recognition between tRNA and Elongation Factor Tu", *J. Mol. Biol.,* **377:**382–405, 2008.
- Rommie Amaro[2] , **Anurag Sethi[2]** , Rebecca Myers, Jo V Davisson, and Zaida Luthey-Schulten. "A network of conserved interactions regulates the allosteric signal in a glutamine amidotransferase." *Biochem.*, **46:**2156–2173, 2007.
- Patrick O'Donoghue[2] , **Anurag Sethi[2]** , Carl R Woese, and Zaida Luthey-Schulten. "Evolutionary history of Cys-tRNA^{Cys} formation." *Proc. Natl. Acad. Sci.*, **102:** 19003–19008, 2005.
- **Anurag Sethi**, Patrick O'Donoghue, and Zaida Luthey-Schulten. "Evolutionary profiles from the QR factorization of multiple sequence alignments." *Proc. Natl. Acad. Sci.,* **102:**4045–4050, 2005.
- Abhishek Mathur, **Anurag Sethi**, Vishwanath Jogini, Yogesh Bhargava, BL Tembe, and Anil K Lala. "Energetics of insertion of soluble proteins into membrane." *Current Science*, **87:**181-189, 2004.
- Ritu D Dhawan, Simon Joseph, **Anurag Sethi**, and Anil K Lala. "Purification and characterization of a short insect toxin from the venom of the scorpion *Buthus tamulus*." *Febbs Letters*, **528:**261-266, 2002.