

Debashish Sahu

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EDUCATION

- 2002 September – 2006 August Anna University (Chennai, India)
B.Tech., Industrial Biotechnology CGPA: 8.1/10
- 2006 September – 2011 August University of Texas Medical Branch (Galveston, TX)
Ph.D., Molecular Biophysics
(Supervisor: Prof. Junji Iwahara)

PROFESSIONAL EXPERIENCE

- 2011 August – 2015 May Pennsylvania State University (University Park, PA)
Postdoctoral Associate, Molecular Biophysics
(Supervisor: Prof. Scott Showalter)
- 2015 May – 2018 Jul Pennsylvania State University (University Park, PA)
Postdoctoral Associate, Molecular Biophysics
(Supervisor: Prof. David Boehr)
- 2016 Aug – 2018 Jul Pennsylvania State University (University Park, PA)
Chemistry NMR Facility Consultant/Postdoc Researcher
- 2018 Aug – present University of Michigan (Ann Arbor, MI)
Director, Bio-molecular NMR Research Lab

NMR RELATED EXPERIENCE

- Advanced Bio-Molecular NMR spectroscopy
- NMR pulse program development
- NMR data processing and analysis: 2D, 3D, 4D, real-time kinetics, R1, R2, S², relaxation dispersion, etc.
- Carbon-detect NMR for IDPs
- HRMAS/solid-state probe swap & maintenance
- Gradient Diffusion measurements
- DNA/RNA assignment and dynamics
- Slow/Fast exchange & real-time kinetics
- Training new & advanced NMR users
- Bruker NMR hardware & software troubleshooting
- Bruker prodigy and cryo-platform troubleshooting & maintenance
- Methyl ¹H-¹³C NMR assignment and sample preparation strategies
- Cryogenic N₂ & He refills of magnets
- Temperature dependent thermodynamics using NMR
- Small molecule assignment & structure

OTHER TECHNICAL AND EXPERIMENTAL SKILLS

- Simulation, global and local data fitting with Mathematica and MATLAB
- Protein structure calculation XPLOR/ENSEMBLE
- Fluorescence-based affinity measurement
- Protein purification using FPLC
- Analytical and preparative HPLC
- DNA purification
- Stopped-flow kinetics
- EMSA
- Equilibrium kinetics by NMR

Curriculum vitae (Debashish Sahu)
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- Plasmid construction for protein expression in *E. coli* • C, C++, Perl
- Advanced Linux administration experience • Network and Backup administration

AWARDS AND HONORS

1. Who's who among students in American Universities and Colleges (Randall-Reilly, 2011)
2. Finn Wold Travel Award (Protein Society, 2010)
3. Curtis W. Lambert Scholarship (University of Texas Medical Branch, 2009)
4. Robert A. Welch Award for Excellence in Graduate Research in Chemistry (University of Texas Medical Branch 2008)
5. Kishore Vaigyanik Protsahan Yojana (KVPY) fellowship (Department of Science and Technology, Government of India, 2005)
6. Summer Research Fellowship Programme (Jawaharlal Nehru Centre for Advanced Scientific Research, 2004)

PROFESSIONAL AND TEACHING EXPERIENCES

1. Taught "Frontiers in NMR methods to understand protein dynamics and function" section of Chem476 course (Pennsylvania State University, 2016)
2. Taught "Thermodynamics" section of "Biochemistry" course (University of Texas Medical Branch, 2011)
3. Teaching assistant for the "Molecular Biophysics I" course (University of Texas Medical Branch, 2009)
4. Research Assistantship (Foundation for Innovation and Technology Transfer, Delhi, 2006)

COMMUNITY SERVICES AND OUTREACH ACTIVITIES

- November 2017: Volunteer at Exploration-U, Bellefonte Area High School. Inspiring school kids to get involved in science.
- August 2007 – August 2009: Co-chair, International Student Organization, University of Texas Medical Branch (UTMB)
- August 2006 – August 2011: Student Representative, the Biological Chemistry Student Organization (BSCO), University of Texas Medical Branch (UTMB)
- August 2009 – August 2010: Student Representative, the BMB Recruitment Committee, UTMB

ACADEMIC PUBLICATIONS

1. Lee J Silverberg, Carlos Pacheco, **Debashish Sahu**, Tapas Mal, Peter Scholl, Hany F Sobhi, Heather G Bradley, Omar A Cardenas, Kyanna M Gonzalez, Jasra M Islam, Emily G Kimmel, Winnie Li, Kristen C Perhonitch, Jennifer T Pothering, Michael E Potts, Melissa E Ramirez, Haley E Reppert, Kelsey N Shaffer (2020) T3P-Promoted Synthesis of a Series of Novel 2-Aryl-3-phenyl-2, 3, 5, 6-tetrahydro-4H-1, 3-thiazin-4-ones, *Tetrahedron Letters*, 151836.
2. Lee J Silverberg, Carlos Pacheco, **Debashish Sahu**, Peter Scholl, Hany F Sobhi, Joshua T Bachert, Kaitlyn Bandholz, Ryan V Bendinsky, Heather G Bradley, Baylee K Colburn, David J Coyle, Jonathon R Dahl, Megan Felty, Ryan F Fox, Kyanna M Gonzalez, Jasra M Islam, Stacy E Koperna, Quentin J Moyer, Duncan J Noble, Melissa E Ramirez, Ziwei Yang (2020) T3P-promoted synthesis of a series of novel

3-aryl-2-phenyl-2,3-dihydro-4H-1,3-benzothiazin-4-ones, *Journal of Heterocyclic Chemistry*, 57 (4), 1797-1805.

3. Kathleen F. O'Rourke*, **Debashish Sahu***, Yuliana K. Bosken, Rebecca N. D'Amico, Chien A. Chang, David D. Boehr (2019) Coordinated Network Changes across the Catalytic Cycle of Alpha Tryptophan Synthase, *Structure*, doi:10.1016/j.str.2019.05.013. * authors contributed equally
4. Erik C Cook, **Debashish Sahu**, Monique Bastidas, Scott A Showalter (2018) Solution Ensemble of the C-Terminal Domain from the Transcription Factor Pdx1 Resembles an Excluded Volume Polymer, *The Journal of Physical Chemistry B*, 123 (1), 106-116.
5. Kathleen F. O'Rourke, Jennifer M. Axe, Rebecca N. D'Amico, **Debashish Sahu**, David D. Boehr (2018) Millisecond timescale motions connect amino acid interaction networks in alpha tryptophan synthase, *Frontiers in Molecular Biosciences*, doi:10.3389/fmolb.2018.00092
6. Scott D. Gorman, **Debashish Sahu**, Kathleen F. O'Rourke, David D. Boehr (2018) Assigning methyl resonances for protein solution-state NMR studies, *Methods*, 148, 88-99.
7. **Debashish Sahu**, Junji Iwahara (2017) A Discrete-State Kinetics Model for NMR-Based Analysis of Protein Translocation on DNA at Equilibrium, *The Journal of Physical Chemistry B*, 121 (41), 9548-9556.
8. Joshua C. Kranick, Durga M. Chadalavada, **Debashish Sahu**, Scott A. Showalter (2017) Engineering double-stranded RNA binding activity into the Drosha double-stranded RNA binding domain results in a loss of MicroRNA processing function, *PLoS One*, <https://doi.org/10.1371/journal.pone.0182445>.
9. **Debashish Sahu**, Monique Bastidas, Chad W. Lawrence, William G. Noid, Scott A. Showalter (2016) Assessing Coupled Protein Folding and Binding through Temperature-Dependent Isothermal Titration Calorimetry, *Methods in Enzymology*, 567, 23-45.
10. Monique Bastidas, Eric B. Gibbs, **Debashish Sahu**, Scott A. Showalter (2015) A primer for carbon-detected NMR applications to intrinsically disordered proteins in solution. *Concepts in Magnetic Resonance Part A*, 44, 54-66. DOI: 10.1002/cmr.a.21327.
11. **Debashish Sahu**, Monique Bastidas, Scott A. Showalter (2014) Generating NMR chemical shift assignments of intrinsically disordered proteins using carbon-detected NMR methods. *Anal Biochemistry*, 449, 17-25.
12. Levani Zandarashvili, **Debashish Sahu**, Kwanbok Lee, Yong Sun Lee, Pomila Singh, Krishna Rajarathnam and Junji Iwahara (2013) Real-time Kinetics of High-mobility Group Box 1 (HMGB1) Oxidation in Extracellular Fluids Studied by in Situ Protein NMR Spectroscopy. *The Journal of Biological Chemistry*, 17, 11621-11627.
13. Kaycee A. Quarles, **Debashish Sahu**, Mallory A. Havens, Ellen R. Forsyth, Christopher Wostenberg, Michelle L. Hastings, and Scott A. Showalter, (2013) Ensemble analysis of primary microRNA structure reveals an extensive capacity to deform near the Drosha cleavage site. *Biochemistry*, 52(5):795-807.
14. Christopher Wostenberg, Jeffrey W. Lary, **Debashish Sahu**, Roderico Acevedo, Kaycee A. Quarles, James L. Cole and Scott A. Showalter, (2012) The role of human Dicer-dsRBD in processing small regulatory RNAs. *PLoS One*, 7(12):E51829.

15. Levani Zandarashvili, Dana Vuzman, Alexandre Esadze, Yuki Takayama, **Debashish Sahu**, Yaakov Levy and Junji Iwahara, (2012) Asymmetrical roles of zinc fingers in dynamic DNA-scanning process by the inducible transcription factor Egr-1. *The Proceedings of the National Academy of Sciences U S A*, 109(26):E1724-32.
16. Yuki Takayama, **Debashish Sahu**, and Junji Iwahara (2010) NMR studies of translocation of the Zif268 protein between its target DNA sites. *Biochemistry*, 49, 7998-8005.
17. **Debashish Sahu**, Priyanka Debnath, Yuki Takayama, and Junji Iwahara (2008) Redox properties of the A-domain of the HMGB1 protein. *FEBS Letters*, 582, 3973-3978.
18. Yuki Takayama, **Debashish Sahu**, and Junji Iwahara (2008) Observing in-phase single-quantum ^{15}N multiplets for $\text{NH}_2/\text{NH}_3^+$ groups with two-dimensional heteronuclear correlation spectroscopy. *Journal of Magnetic Resonance*, 194, 313-316.
19. **Debashish Sahu**, G. Marius Clore, and Junji Iwahara (2007) TROSY-based z-Exchange Spectroscopy: Application to the determination of the activation energy for intermolecular protein translocation between specific sites on different DNA molecules. *Journal of the American Chemical Society*, 129, 13232-13237.
20. B. Jayaram, Kumkum Bhushan, Sandhya R. Shenoy, Pooja Narang, Surojit Bose, Praveen Agrawal, **Debashish Sahu**, and Vidhu Pandey (2006) Bhageerath: an energy based web enabled computer software suite for limiting the search space of tertiary structures of small globular proteins, *Nucleic Acids Research*, 34, 6195–6204.

INVITED TALKS AND NATIONAL CONFERENCES (SELECTED)

- **Debashish Sahu**, “Evolving, coordinated amino acid interaction networks across the catalytic cycle of α tryptophan synthase”, Chemical Biology Seminar Series (University Park, February 2018)
- **Debashish Sahu**, Monique Bastidas, Eric Gibbs and Scott Showalter, “A Primer for Carbon Detected NMR Applications to Intrinsically Disordered Proteins in Solution”, 57th ENC (Pittsburgh, April 2016)
- **Debashish Sahu**, “NMR as a tool to study protein-RNA interactions and intrinsically disordered proteins (IDPs)”, PSU Center for RNA Molecular Biology workshop (University Park, June 2014)
- **Debashish Sahu**, “Deciphering structural features of IDPs using carbon-detect NMR”, 2014 NEPA NMR / MS Conference (Wilkes-Barre, May 2014)
- **Debashish Sahu**, Kaycee A. Quarles and Scott A. Showalter, “Dynamic nature of pri-miRNA revealed by molecular dynamics simulations and biochemical methods” 17th RNA Society Symposium (Ann Arbor, May 2012)
- **Debashish Sahu** and Junji Iwahara, “Kinetics of protein translocation between two DNA duplexes at equilibrium: Validation of NMR studies,” 24th Protein Society Symposium (San Diego, August 2010)
- **Debashish Sahu** and Junji Iwahara, “Theoretical consideration on NMR approach to analyze kinetics of intermolecular protein translocation between nonspecific DNA molecules”, Keystone Symposium: Frontiers of NMR in Biology (Santa Fe, February 2009).

- **Debashish Sahu** and Junji Iwahara, “Determination of the Activation Energy for Intermolecular Protein Translocation between Specific Sites on Different DNA Molecules”, 22nd Protein Society Symposium (San Diego, July 2008).