ABHISHEK DEY, Ph. D
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Education

Jawaharlal Nehru University/ CSIR-CDRI — New Delhi/Lucknow, India
Ph. D, Biochemistry and Structural Biology — December 2014

Kurukshetra University — Kurukshetra, Haryana, India
Master of Science, Biochemistry — July 2006

Kurukshetra University — Kurukshetra, Haryana, India
Bachelor of Science, Biochemistry, Zoology, Chemistry — April 2004

Professional Experience

University of North Carolina-Chapel Hill — Chapel Hill, NC, USA
Postdoctoral Research Associate — May 2020- present
PI- Dr. Alain Laederach

- Identified conformational landscape of RNA Frame Shifting Element (FSE) responsible for regulating protein translation in SARS-COV 2 virus.
- Investigating the effect of RNA secondary structure at alternatively and constitutively spliced exon-intron junctions of MAPT precursor mRNA in Alzheimer's Disease.
- Mentored a potential graduate student in RNA Structural biology.

University of North Carolina-Charlotte — Charlotte, NC, USA
Postdoctoral Research Associate — August 2017-April 2020
PI- Dr. Kausik Chakrabarti

- Analyzed and characterized folding dynamics and functional aspects of *T. brucei* telomerase RNA *in vivo*.
- Developed functional characterization assay for Telomerase ribonucleoprotein.
- Examined secondary structure of various long non-coding RNA in parasites of eukaryotic origin through RNA-SHAPE assay.
- Developed and characterized water-soluble small molecules as a novel RNA-SHAPE reagent.
- Responsible for recruitment and mentoring junior scientists and graduate students.

Carnegie Mellon University — Pittsburgh, PA, USA
Postdoctoral Research Associate — March 2017-August 2017
PI- Dr. Kausik Chakrabarti

- Determined different secondary structure domains in *in vitro* transcribed *T. brucei* telomerase RNA.

University of Connecticut health — Farmington, CT, USA

Postdoctoral Research Associate October 2015-March 2017
PI- Dr. Justin Radolf

- Explored and characterized biophysical and immunologic properties of rare outer membrane proteins in spirochetes.
- Analyzed three-dimensional model of Oligopeptide Permease Protein A (OPPA) from *Borrelia Burgdorferi* which is essential for the peptide uptake and virulence of pathogen.

PREMAS Biotech Gurugram, Haryana, India
Analytical Scientist- QC April 2014 – July 2015

- Established analytics and assay development division within the organization and trained junior personnel for same.
- Developed assays characterizing Trypsin/Chymotrypsin inhibitors for the development of oral anti-diabetic drug.
- Analyzed and examined final products before delivery.
- Quality check for the final project deliverables.
- Managed and edited Standard Operating Procedures (SOPs), Manuals, Master formats and reports while working along with Quality Assurance (QA) personnel.

CSIR-Central Drug Research Institute Lucknow, UP, India
Doctoral Student May 2009-April 2014
Thesis Title: Structural studies on transcriptional regulatory protein(s) from *Mycobacteria*.
PI- Dr. Ravishankar Ramachandran

- Characterized the overall three-dimensional structure and function for Rv2779c from *M. tuberculosis*.
- Proposed a mechanistic model of transcriptional regulation by Rv2779c in M. tuberculosis.
- Identified small molecule inhibitors against Feast famine regulatory proteins (FFRPs) which can act as novel drug targets in *M. tuberculosis*.

CSIR-Central Drug Research Institute Lucknow, UP, India
Project Assistant-II June 2007- May 2009
PI- Dr. Ravishankar Ramachandran

- Cloning, Overexpression and Purification of Feast famine regulatory proteins (FFRPs) *form M. tuberculosis*.
- Biochemical and Biophysical characterization of Rv2779c protein from *M. tuberculosis*.

CSIR-National Botanical Research Institute Lucknow, UP, India
Project Trainee July 2005- August 2005
PI- Dr. Sunita Kochhar

- Developed functional assays of superoxide dismutase enzyme present in mung beans.

Awards and Fellowships

Postdoctoral Fellowship (NIH), University of North Carolina-Chapel Hill 2020-present
Postdoctoral Fellowship (NSF), University of North Carolina-Charlotte 2017-2020
Postdoctoral Fellowship (NSF), Carnegie Mellon University 2017

Postdoctoral Fellowship (NIH), University of Connecticut Health 2015- 2017
ICMR-Senior Research Fellowship, CSIR-CDRI 2011- 2014
ICMR- Junior Research Fellowship, CSIR-CDRI 2009- 2011
David Blow Scholarship, CCP4 study weekend, UK 2010

Teaching Experience

BIOL 4000/5000 (Gene Silencing) 2020
Assistant Instructor, UNC-Charlotte
Topics: Chromatin structure, Transcription and DNA methylation, Techniques

BIOL 4000/5000 (Gene Silencing) 2019
Assistant Instructor, UNC-Charlotte
Topics: Structural and Functional importance of Ribozymes

BIOL 6000/8000 (Introduction to RNA Molecular Biology) 2018
Assistant Instructor, UNC-Charlotte
Topics: RNA structure, Telomerase RNP complex

Proteins: Structure and Function 2012-2014
Assistant Instructor, CSIR-CDRI
Topics: Hierarchy in Protein folding and stabilizing forces

Peer-Reviewed Publications

Sequence and tissue targeting specificity of ZFP36L2 reveals *Elavl2* as a novel target with co-regulation potential. Redmond IC, Ardizzone M, Hekimoglu H, Hatfield BM, Waldern JM, **Dey A**, Montgomery SA, Laederach A, Ramos SBV. (2022) ***Nucleic Acid Research,* 50 (7),** 4068-4082.

In vivo Architecture of the Telomerase RNA Catalytic Core in *Trypanosoma brucei*. **Dey A**, Eklund AM, Klotz K, Saha, A., Davis J, Li, B. Laederach A, Chakrabarti K. (2021) ***Nucleic Acid Research,* 49 (21),** 12445-12466.

To knot or not to knot: Multiple conformations of the SARS-CoV-2 frameshifting RNA element. Schlick T, Zhu Q, **Dey A**, Jain S, Yan S, and Laederach A. (2021) ***Journal of American Chemical Society,* 143 (30),** 11404-11422.

The RNA Structurome in the Asexual Blood Stages of Malaria Pathogen *Plasmodium falciparum*. Alvarez DR, Ospina A, Barwell T, Zheng B, **Dey A**, Li C, Basu S, Shi X, Kadri S, Chakrabarti K**.** (2021) ***RNA Biology***, **18(12),** 2480-2497.

Innately water soluble isatoic anhydrides with modulated reactivities for RNA SHAPE analysis Fessler A*****, **Dey A*,** Finis DS, Flower AJ, Chakrabarti K, Ogle C (2020). ***Bioconjugate Chemistry,* 31, (3),** *884-888*. *** Equal Contribution**

The *Non-Coding RNA* Journal Club: Highlights on Recent Papers—7. **Dey A,** Chakrabarti K, et. al. (2019), ***Non-coding RNA*, 2019, 5,** 40.

Water-soluble isatoic anhydrides: a platform for rna-shape analysis and protein bioconjugation. Fessler A, **Dey A**, Garmon CB, Finis DS, Saleh N, Fowler AJ, Jones DS, Chakrabarti K and Ogle C (2018), ***Bioconjugate Chem*istry, 29,** *3196-3202.*

Sequence variation of rare outer membrane protein β-barrel domains in clinical strains provides insights into the evolution of *Treponema pallidum* subsp. pallidum, the Syphilis Spirochete. Kumar S, Caimano M.J, Anand A, **Dey A**, Hawley K.L, et.al (2018), ***mBio***, **9**, **(3)**, *e01006-18.*

Current perspectives of telomerase structure and function in eukaryotes with emerging views on telomerase in human parasites. **Dey A,** Chakrabarti K (2018), ***International Journal of Molecular Sciences***, **19**, 333.

Peptide uptake is essential for *Borrelia burgdorferi* viability and involves structural and regulatory complexity of its oligopeptide transporter. Groshong A.M, **Dey A**, Bezsonova I, Caimano M, Radolf J.D. (2017), ***mBio*, 8, (6),** *e02047-17.*

The major outer sheath protein forms distinct conformers and multimeric complexes in the outer membrane and periplasm of *Treponema denticola.* Puthenveetil R, Kumar S, Caimano M.J*****, **Dey A***, Anand A*****, Vinogradova O, Radolf, J.D. (2017), ***Nature Scientific Reports*, 7**, **(13260),** *13550-13556.* ***Equal contribution**

Crystal Structure of *Mycobacterium tuberculosis H37Rv* AldR (rv2779c), a regulator of the ald gene: DNA-binding and identification of small-molecule inhibitors. **Dey A,** Shree, S, Pandey, S.K., Tripathi, R. P., Ramachandran, R. (2016), ***Journal of Biological Chemistry*, 291, (23),** *11967-11980.*

Cloning, Overexpression, Purification, and preliminary X-ray analysis of a feast/famine regulatory protein (Rv2779c) from *Mycobacterium* tuberculosis H37Rv. **Dey A,** Ramachandran, R**.** (2014) ***Acta Crystallographica Sect F, F70****, 97–100.* (Crystal image on cover of ActaF 2015)

Ligand-induced structural transitions, mutational analysis and 'open' quaternary structure of the *M. tuberculosis* Feast/Famine Regulatory protein (Rv3291c). Shrivastava, T, **Dey A**, Ramachandran, R (2009) ***Journal of Molecular Biology****, **392**, 1007–1019.*

Future Publications

Quantitative integration of RNA structure and splicing elements to explain alternative splicing of Microtubule-Associated Protein Tau gene. Kumar J, Lackey L, Waldern JM, **Dey A**, Mathews DH, Laederach A. ***eLife*** (*In Review*)

Conference/Meetings and Invited talks

Klotz K, **Dey A**, Eklund AM, Saha, A, Davis J, Li B, Laederach A, Chakrabarti K, High-resolution profiling of Telomerase RNA structure dynamics in the eukaryotic pathogen *Trypanosoma brucei*, **Rustbelt RNA meeting-2021,** Virtual meeting, **(abstract selected for podium presentation)**

Dey A, Eklund AM, Saha, A, Li B, Laederach A, Chakrabarti K, Novel features of telomerase RNA folding and interactions in *Trypanosoma brucei* telomerase ribonucleoprotein complex, **RNA Society-2020,** Virtual meeting.

Dey A, Saha, A, Eklund AM, Laederach A, Li B, Chakrabarti K, Structural and Mechanistic insight into *T. brucei* Telomerase RNA, **Kinetoplastid Molecular and Cell Biology** meeting-2019, MA, USA.

Chakrabarti K, **Dey A**, Novel aspects of Telomerase RNA regulation in Kinetoplastid pathogen, *Trypanosoma brucei*, **Telomeres and Telomerase-2019,** Cold Spring Harbor Laboratory, NY, USA.

Dey A, Fessler A, Ogle C, Chakrabarti K, Structural imprints of in vivo RNA folding in human parasites, **Rustbelt RNA meeting-2018**, OH, USA.

Dey A, Ravishankar R, Crystal Structure of the Feast-famine regulatory protein (Rv2779c) form *M. tuberculosis*, **42nd National Seminar on Crystallography- 2013**, New Delhi, India (**abstract selected for podium presentation**)

Dey A, Ravishankar R, Structural and Functional studies of transcriptional regulatory protein (Rv2779c) from form *M. tuberculosis* H37Rv, **EMBO global exchange lecture course-2012**, Hyderabad, India.

Dey A, Shrivastava T, Ravishankar R, Feast-famine regulatory protein of *M. tuberculosis* H37Rv**, Mini symposium on macromolecular cyrtsallography-2011**, Hyderabad, India (**abstract selected for podium presentation**)

Courses and Training

CCP4 study weekend- From Crystals to Structure with CCP4-2010, University of Nottingham, Nottingham, United Kingdom.

Mentoring Experience

Elizabeth Abrash, PhD student, UNC-Chapel Hill	2020
Tiffany Barwell, (NSF-REU), UNC-Charlotte	2019
Sarah Catherine Paschall (NSF-REU), UNC-Charlotte	2019
Diana Renteria Alvarez (Honors Student), UNC-Charlotte	2018-2019
Justin Davis, (NSF-REU), UNC-Charlotte	2018
Isabella Sabato, UNC-Charlotte	2017-2018
Debarati Bhanja, (NSF-REU), CMU	2017
Jyoti, (Project Assistant-II), CSIR-CDRI	2012-2013

Professional affiliation

RNA Society-Postdoc member	2020-present
American Heart Association member	2018-2021
Indian Crystallographic Association member (SM 191)	2013-present

Scientific Outreach

Guest Editor, *Journal of Visualized Experiments (JoVE)* *(RNA Biology: Current Methods and Protocols)*	2022
Reviewer, *RNA Biology*	2022
Reviewer, *RNA*	2022
Reviewer, *BioChem*	2022
Reviewer, *Healthcare*	2022
Reviewer, *Non-Coding RNA*	2021-present
Reviewer, *International Journal of Molecular Sciences (IJMS)*	2021-present
Reviewer, *Current Issues in Molecular Biology (CIMB)*	2021-present
Reviewer, *Antibiotics*	2021-present
Reviewer, *Pharmaceutics*	2021-present
Judge, North Carolina Student Academy of Sciences (NCSAS)	2021
Judge, North Carolina Science and Engineering Fair (NCSEF)	2021
Judge, ENVISION Research Competition by Women in Stem (WiSTEM)	2021-2022

References

1) **Dr. Alain Laederach**
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   University of North Carolina-Chapel Hill
   3354 Genome Sciences Building
   Chapel Hill, NC-27599
   Phone: +1- 919-962-4565
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2) **Dr. Kausik Chakrabarti**
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   Department of Biological sciences
   University of North Carolina-Charlotte
   Woodward hall 390A
   9201 University City Blvd, Charlotte, NC-28223
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3) **Dr. Ravishankar Ramachandran**
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   B.S. 10/1, Sec-10, Jankipuram Extension, Sitapur Road
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