Curriculum vitae

Name: Vidhyadhar Nandana, **Emai:** vidhyadharnandana@gmail.com,
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Current position: Postdoctoral Research associate, Cancer Epigenetics Institute, Fox Chase Cancer Center, Philadelphia, USA.

Research interests

Biochemical and biophysical characterization of protein-protein, protein-RNA interactions, ribonucleoprotein complexes and biomolecular condensates in eukaryotic and bacterial gene regulation processes.

Key expertise

Molecular cloning, recombinant protein purifications and labeling, ÄKTA systems, *in vitro* transcription, RNA isolation and labeling, *in vitro* and in-cell protein/RNA phase separation assays, reconstitution of ribonucleoprotein complexes, Isothermal Titration Calorimetry, Biolayer Interferometry, bacterial and yeast two hybrid systems, protein crystallography, Enzyme kinetics, live-cell time-lapse microscopy, Optogenetics, live cell FLIM-FRET, 3D holotomography, CRISPR cas9.

Education

PhD, Structural biochemistry, Freie Universität Berlin, Germany. April 2016 – September 2019.
MSc, Biotechnology, Acharya Nagarjuna University, India, 2010-2012.
BSc, Biotechnology, Sri Krishnadevaraya University, India, 2004-2008.

Research experience

Postdoctoral associate, Cancer Epigenetics Institute, Fox Chase Cancer Center. February 2025 – current
Topic: Mechanistic insights into nuclear condensate mediated stress sensing and regulation.
Postdoctoral fellow, Departments of Biology and Chemistry, Wayne State University. October 2019 – January 2025.
Topic: Biochemical and biophysical characterization of RNA related biomolecular condensates in bacteria
PhD, Institute of Chemistry and Biochemistry, Freie Universität Berlin, Germany. April 2016 – August 2019
Topic: Functional analysis of the role of RNA helicase UPF1 in human histone mRNA decay
Research associate, Center for Molecular Biology, Heidelberg University, Germany. June 2015 – March 2016
Topic: Role of protein-protein interactions among Heat shock protein 40s (HSP 40s) in Saccharomyces cerevisiae proteostasis
Research associate, Centre for Organismal Studies, Heidelberg University, Germany. June 2014 – June 2015
Topic: Role of Retinoblastoma protein and MYB transcription factors in Arabidopsis thaliana gene regulation
Junior Research Fellow, Department of Biotechnology, Indian Institute of Technology Guwahati, India. June 2012 – May 2014
Topic: Purification and characterization of a cysteine protease from plant Calotropis procera

Awards and achievements

- C. David Allis travel award (2026), Cancer Epigenetics Institute, Fox Chase Cancer Center
- Post-doctoral service award (2024) from Wayne State University Graduate School

- Post-doctoral research award (2023) from Wayne State University Graduate School
- Travel Fellowship, RNA Society and Wayne State University, RNA 2022 Conference (2022)
- The German Academic Exchange Service (DAAD) scholarship for Research Exchange, IIT Bombay, India (2017)
- Qualified GATE (Graduate Aptitude Test in Engineering) Life sciences 2012 with 97.5 percentile. All India rank - 266.

Selected Published Work

de Amorim AM, Xue G, Dittmers T, He W, Lewandowski S, Borrajero CP, Bethmann J, Mateva N, Krage C, ***Nandana V****, Hennig J, Urlaub H, Marzluff WF, Chakrabarti*. Molecular mechanisms of recruitment, function and regulation of the RNA helicase UPF1 in replication-dependent histone mRNA decay. ***Nature Communications 2026***.
Key contributions: Reconstitution of minimal histone mRNP complex, characterization of protein-protein interactions within this complex and RNA degradation assay.

Mallikaarachchi K.S., Huang J., Madras S., Cuellar R., Huang Z., Gega A., Rathnayaka-Mudiyanselage I.W., ***Nandana V****., Al-Husini N., Saldaña-Rivera N., Mai L., Ng E., Christensen K., Pendar N., Li S., Deleon N., Chen J., and Schrader J.M., Sinorhizobium meliloti* BR-bodies promote fitness during host colonization. **mBio 2025**.
Key contributions: Demonstrated S. meliloti Ribonuclease E phase separation employing recombinant protein purifications, in-vitro phase separation and RNA processing assays.

Ortiz-Rodríguez, L.A., Yassine H., Hatami A., ***Nandana V****., Azaldegui C.A., Cheng J., Zhu Y., Schrader J.M., Biteen J.S*. Stress Changes the Material State of a Bacterial Biomolecular Condensate and Shifts its Function from mRNA Decay to Storage. ***Nature Communications 2025***. *Editor's Highlight article.
Key contributions: Demonstrated C. crescentus Ribonuclease E condensate solidification and inhibition of its enzymatic activity through in-vitro assays.

Nandana, V*., Al-Husini, N., Vaishnav, A., Dilrangi, K.H., and Schrader, J.M. Caulobacter crescentus* RNase E condensation contributes to autoregulation and fitness. ***Molecular Biology of the Cell 2024***.
Key contributions: Demonstration of C. crescentus Ribonuclease E autoregulation and its contribution to RNA processing through in-cell, in-vitro phase separation, RNA processing assays and RNA secondary structure modeling.

Rathnayaka-Mudiyanselage, I.W, ***Nandana V****, Schrader, J.M*. Proteomic comparison of eukaryotic and bacterial RNA decay condensates suggests convergent evolution. ***Current Opinion in Microbiology 2024***.
Key contributions: Review article discussing the convergent evolution of RNA processing and decay factors in bacteria and eukaryotes.

Nandana, V*., Rathnayaka-Mudiyanselage, I.W., Muthunayake, N.S., Hatami, A. Mousseau, C.B., Ortiz-Rodríguez, L.A., Vaishnav, J., Collins, M., Gega, A., Mallikaarachchi, K.S., Yassine, H., Ghosh,A., Biteen, J.S., Zhu, Y., Champion, M.M., Childers, W.S., Schrader, J.M*. The BR-body proteome contains a complex network of protein-protein and protein-RNA interactions. ***Cell Reports 2023***.
**Co-first author*
Key contributions: First proteomic study of bacterial biomolecular condensate. Protein purifications, in-vitro phase separation and condensate recruitment assays, in vivo phase separation assays, fluorescence microscopy.

Collins M, Tomares D, ***Nandana V,*** *Schrader J.M, Childers S.W*. RNase E biomolecular condensates stimulate PNPase activity. ***Scientific Reports 2023***.
Key contributions: In-cell Phosphate assay and in-vitro phase separation assays

Ghosh A, Bharmal M.H, Ghaleb A, ***Nandana V,*** *Schrader J.M*. Initiator AUGs are discriminated from elongator AUGs predominantly through mRNA accessibility in *C. crescentus*. ***Journal of Bacteriology 2023***.
Key contributions: Start codon selection in *C. crescentus* is impacted by not only Shine-Dalgarno sequence but also mRNA structure content. *Editors pick.

Nandana V, *Schrader J.M*. Roles of liquid–liquid phase separation in bacterial RNA metabolism. ***Current Opinion in Microbiology 2021***.
Key contributions: Review article discussing Bacterial RNP condensates facilitating spatial coordination of multi-step RNA processing pathways.

Chityala S,* ***Nandana V*****, Jayachandran D, Prabhu A, and Dasu V*. Biotechnology of Commercial Microbial Products. ***Springer 2017***. **Co-first author, book chapter.*

Nandana V, *Singh S, Singh AN, Dubey VK*. Procerain B, a cysteine protease from *Calotropis procera*, requires N-terminus pro-region for activity: cDNA cloning and expression with pro-Sequence. ***Protein Expression and Purification 2014***.
Key contributions: First full-length recombinant cysteine protease isolated from the mRNA of latex of Calotropis procera

Manuscripts as preprints/in preparation

Nandana V, *Hoopman J, Brown E, Morris A, Su B, Efimov A, Chen L*. Optogenetic reconstitution of Cajal body reveals mechanisms of nuclear condensate biogenesis (2026). *In preparation*.

Morris A, Hoopman J*,* ***Nandana V,*** *Lian C, Pochet E, Ruiz M, Su B, Efimov A, Tao Y, Lu G, Pellizzoni L, Chen L*. Intranucleolar Invasion of Cajal Body Remnants Suppresses Ribosomal Biogenesis in cis and Telomerase Functions in trans. bioRxiv 2026.
Key contributions: Live-cell protein dynamics within condensates by FRAP, fluorescence microscopy and 3D holotomography.

Rapiejko A, Zhou Y, ***Nandana V,*** *Xiao J, Schrader J.M, Shell S.S.* Defining the role of RNase E in the mycobacterial degradosome-like network (2025). Preprint PMID 41497663 (in-review).
Key contribution: In vitro reconstitution of Mycobacterium RNase E condensates.

Ghosh A, Mallikarachchi K.S, Dzurik K, ***Nandana V,*** *Nunez N.R, Childers W.S, Schrader J.M*. Bacterial IF2's N-terminal IDR drives cold-induced phase separation and fitness during cold shock (2025) Preprint PMID 39975289.
Key contributions: Discovered phase separation of bacterial translation initiation factor (IF2) and in vitro phase separation and enzymatic assays.

Mallikaarachchi K.S, Kim T, Alakavuklar M, ***Nandana V,*** *Fiebig A, Schrader J.M, Crosson S. BR-bodies link RNA homeostasis to stress tolerance and intracellular fitness in Brucella*. bioRxiv 2026.
Key contributions: In vitro reconstitution of Brucella ovis RNase E condensates.

Teaching and Mentoring experience

Fox Chase Cancer Center, Philadelphia (2025 - current)

- Mentored Downingtown STEM Academy high school student, 2025-2026.
- Volunteered as a Judge for Science Fair at John Moffet School, Philadelphia 2026.

Departments of Biology and Chemistry, Wayne State University (2020 – 2024)

- Mentored high school student as part of Biomedical Career Advancement program (BCAP), 2023.
- Mentored high school student as part of American Chemical Society Project SEED Program, 2024.
- Volunteered as a Judge for Science and Engineering fair of Metro Detroit, 2023 & 2024.

Institute of Chemistry and Biochemistry, Freie Universität Berlin (2016 – 2019)

- Mentored ERASMUS exchange student, 2017.
- Mentored three Masters students' rotation projects.

Selected conference and seminar presentations

- Mechanistic insights into nuclear condensate mediate stress sensing. NDC meeting 2026, Fox Chase Cancer Center (Oral presentation).
- Bacterial Ribonucleoprotein bodies organize mRNA decay and coordinate other steps of RNA metabolism. Rustbelt RNA meeting 2024 (Oral presentation).
- Bacterial RNP bodies organize the pathway of mRNA degradation. Michigan Branch of the American Society for Microbiology 2024 (Oral presentation).
- Mesoscale compartments organize bacterial RNA metabolism. Wayne State University Biology Seminar Series April 22, 2024 (invited talk).
- Bacterial Ribonucleoprotein Body Condensation is Regulated by a Complex Network of Protein-Protein/RNA Interactions. 2023 Molecular Genetics of Bacteria and Phages Meeting, University of Wisconsin-Madison (Oral presentation).
- The Bacterial Ribonucleoprotein-body (BR-body) proteome contains a complex network of proteins that interfaces with other RNP condensates. The 27th annual meeting of the RNA society 2022, University of Colorado Boulder (Oral presentation).
- Structural and Biochemical analysis of UPF1 assisted histone mRNA decay. 20th Heart of Europe Bio- Crystallography Meeting 2017, Poland (Oral presentation).

Peer-reviewing and Professional activities

- Early career reviewer for *Nature communications*
- Early career reviewer for *Journal of Biological Chemistry*
- Reviewer for *STAR protocols* (Cell Press)
- Reviewer for *PLOS ONE*
- Guest editor and reviewer - *Frontiers in Molecular Biosciences journal*
- Senior Member, IEEE
- Sigma Xi Full Member
- Spotlight writer for the RNA Society
- Session chair for the 1st UCSF-Berlin Integrative Structural Biology Meeting (ISB Meeting), 2019, Berlin, Germany.