

Jagpreet S Nanda, Ph.D.
Scientific Review Officer, Grade-Step: 14 - 4
***Eunice Kennedy Shriver* National Institute of Health and Human Development (NICHD)**
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EDUCATION

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| 2005 | PhD, Protein Biochemistry,
Institute of Microbial Technology,
Department of Biotechnology Jawaharlal
Nehru University,
New Delhi, India
<i>Dissertation: Mechanistic Studies on Plasminogen activation by clot-dissolving
protein Streptokinase</i> |
| 1999 | MS Biotechnology,
Guru Nanak Dev University,
Amritsar, India |
| 1997 | BS (Hons.), Biochemistry and Molecular Biology
Guru Nanak Dev University,
Amritsar, India |

WORK EXPERIENCE

- A. Detail Appointment, 20%** **10/2023 - present**
NIH Guide, Office of Extramural Research (OER), Immediate Office of Director (IMOD)
Supervisor: Laura Roman
- Duties and Related Experience:**
- Review Policy Subject Matter Expert (RPR SME) – Assist in development of new Notices of Funding Opportunities (NOFOs).
 - Assist on incorporation of new simplified peer-review criterion for different research projects and grant applications.
- B. Health Scientist Administrator** **03/2021 - present**
Scientific Review Officer, Scientific Review Branch,
Eunice Kennedy Shriver National Institute of Child Health and Human Development,
National Institutes of Health
- Duties and Related Experience:**
- Manage and lead CHHD R Study Section on Reproduction, Andrology, and Gynecology (2022-present)
 - Organized special emphasis panel (SEP): *Development of Novel Non-steroidal Contraceptive Methods (R61/R33 mechanism)* (2023)
 - Led Contract Review: *International & Domestic Pediatric and Maternal HIV and Other High Priority Infectious Diseases Data Coordinating Center Contract* (2023)

- Managed Peer-Review of P50 center applications through SEP on *Contraception Development Research Center* (2023)
- Managed SEP on multi-component P50 center applications: *National Center for Translational Research on Reproduction and Infertility (NCTRI)* (2022)
- Led Peer-Review of P01 Center applications: *Impact of Technological Devices and Digital Media on Child and Adolescent Health* (2022)
- Led Peer-Review: *Community Engaged Research on Pregnancy-Related and Associated Infections and Sepsis Morbidity and Mortality (PRAMM)* - UG3/UH3 mechanism (2022)
- Co-conducted SEP on NICHD Institutional Training Grants T32 review meeting (2021, 2022)

Committees:

- **NICHD Representative: Common Fund Program on Complementary Animal Research in Experimentation (COMPLEMENT-ARIE) Working Group:** NIH Common Fund Program aimed at development, standardization, validation, and use of new approach methodologies (2023-present)
- **NICHD Scientific Review Branch Representative: Review Users Group (RUG)** subgroup of NIH Review Policy Committee (2022- present)
- **Member, NIH-wide Diversity Catalyst Group,** Chief Officer for Scientific Workforce and Diversity (COSWD), (2022- present)

C. Staff Scientist

10/2013 - 03/2021

Laboratory on Mechanisms and Regulations of Protein Synthesis,
NICHD, NIH

Research Duties and Related Experience:

- Investigated mechanisms of eukaryotic gene regulation and protein synthesis employing biochemical, biophysical, yeast genetics, and structural biology approaches.
- Led three-member team on two independent scientific research projects: 1.) understanding the role of N-terminal tails of eIF1 and eIF5 in start codon recognition; and 2) role of initiator tRNA modifications in start codon recognition.
- Initiated three interdisciplinary collaborations with NICHD Laboratory of Gene Regulation, extramural Structural Biology Laboratory at Medical Research Council (MRC) Cambridge, UK. Published three manuscripts in high impact peer-reviewed journals *Elife* and *Journal of Biochemistry*.
- Resolved high resolution (3.0 Å) cryoEM structure of functional states of eukaryotic translational initiation complex in collaboration with the Structural Biology Laboratory at (MRC), Cambridge, UK.
- Established correlation between uveal melanoma (UM) and protein synthesis by understanding the effect of mutations in translation initiation protein eIF1A, shown to stabilize UM in vivo.
- Developed strategies to label purified proteins with small molecules (fluorophores) using various protein chemistry approaches.
- Initiated three new research projects on understanding the role of N-terminal tail of initiation factors eIF1 and eIF5, and initiator tRNA modifications in start codon recognition. Developed new protocols for labeling of proteins and nucleic acids with small molecules using protein chemistry approaches.

D. Postdoctoral fellow**06/2006 – 10/2013**

Department of Biophysics & Biophysical Chemistry,
Johns Hopkins University School of Medicine, Baltimore, MD

Research Activities:

- Investigated mechanism of eukaryotic translation initiation in yeast. Reconstituted yeast translation system in vitro by optimizing the purification of proteins, yeast ribosomes, and RNA to gain mechanistic insights into this complex phenomenon using various biochemical and biophysical approaches.
- Highlighted the role of GTPase Activating Protein eIF5 in mediating start codon recognition by studying intragenic suppressors of eIF5.
- Established model of communication between eukaryotic initiation factors eIF1, eIF1A, and eIF5 using enzyme kinetics and yeast genetics approaches.
- Generated mechanistic insights into the role of eukaryotic initiation factors eIF1A and eIF1 in start codon recognition.
- Developed fluorescence-based in vitro assays to probe conformational changes, protein-protein, and protein-RNA interactions in ribosomal macromolecular translation initiation complex.
- Generated mechanistic insights into the role of proteins eIF1, eIF1A, and eIF5 in mediating start codon recognition in translation initiation.
- Fostered multiple interdisciplinary collaborations with Structural Biology Laboratory, MRC, University of Cambridge, UK; NMR Laboratory, Harvard Medical School; and Laboratory of Gene Regulation, NICHD, NIH.
- Mentored three summer students and two graduate students on their scientific projects.

E. Postdoctoral fellow**12/2005 – 06/2006**

Center for Pulmonary Infection and Disease Control,
University of Texas Health Center, Tyler, TX

Research Activities:

- Designed and conducted experiments to identify ligand for natural killer cell receptor (NK46) on human macrophages involved in the pathogenesis of *Mycobacterium tuberculosis*.
- Developed biochemical and immunological assays to understand receptor-ligand interactions important for mycobacterium infection.

PUBLICATIONS

- **Nanda JS***, Ll acer JL*, Hussain T*, Saini AK*, Kaur S, Gordiyenko Y, Kumar R, Hinnebusch AG, Lorsch JR and Ramakrishnan V. A domain of translational initiation factor eIF5 replaces eIF1 on the 40S ribosomal subunit to promote the positioning of initiator tRNA and start-codon recognition. *Elife* 2018 Nov 30; 7
- Martin-Marcos P, Zhou F, Karunasiri C, Zhang F, Dong J, **Nanda JS***, Kulkarni SD, Sen ND, Tamame M, Zeschnigk M, Lorsch JR, Hinnebusch AG. eIF1A residues implicated in cancer stabilize translation preinitiation complexes and favor suboptimal initiation sites in yeast. *Elife*. 2017 Dec 5;6

- Munoz AM, Yourik P, Rajagopal V, **Nanda JS***, Lorsch JR, Walker SE. Active yeast ribosome preparation using monolithic anion exchange chromatography. *RNA Biol.* 2017 Feb;14(2):188-196
- Tang L, Morris J, Wan J, Moore C, Fujita Y, Gillaspie S, Aube E, **Nanda J**, Marques M, Jangal M, Anderson A, Cox C, Hiraishi H, Dong L, Saito H, Singh CR, Witcher M, Topisirovic I, Qian SB, Asano K. Competition between translation initiation factor eIF5 and its mimic protein 5MP determines non-AUG initiation rate genome wide. *Nucleic Acids Res.* 2017 Nov 16;45(20):11941-11953
- Saini AK, **Nanda JS***, Martin-Marcos P, Dong J, Zhang F, Bhardwaj M, Lorsch JR, Hinnebusch AG. Eukaryotic translation initiation factor eIF5 promotes the accuracy of start codon recognition by regulating Pi release and conformational transitions of the preinitiation complex. *Nucleic Acids Res.* 2015 Jun 23;43(11):5673-4
- Martin-Marcos P, **Nanda JS**, Luna RE, Zhang F, Saini AK, Cherkasova VA, Wagner G, Lorsch JR, Hinnebusch AG. Enhanced eIF1 binding to the 40S ribosome impedes conformational rearrangements of the preinitiation complex and elevates initiation accuracy. *RNA.* 2014 Feb;20(2):150-67
- Martin-Marcos P, **Nanda JS**, Luna RE, Wagner G, Lorsch JR, Hinnebusch AG. β -Hairpin loop of eukaryotic initiation factor 1 (eIF1) mediates 40 S ribosome binding to regulate initiator tRNA (Met) recruitment and accuracy of AUG selection in vivo. *J Biol Chem.* 2013 Sep 20;288(38):27546-62
- **Nanda JS***, Saini AK, Muñoz AM, Hinnebusch AG, Lorsch JR. Coordinated movements of eukaryotic translation initiation factors eIF1, eIF1A, and eIF5 trigger phosphate release from eIF2 in response to start codon recognition by the ribosomal preinitiation complex. *J Biol Chem.* 2013 Feb 22;288(8):5316-29
- Luna RE, Arthanari H, Hiraishi H, **Nanda JS**, Pilar MM, Markus M, Akabayov B, Milbradt A, Hyberts S, Luna LE, Reibarkh M, Farny A, Seo HC, Marintchev A, Hinnebusch AG, Lorsch JR, Asano K, and Wagner G. The C-terminal domain of eIF5 promotes start codon recognition by its dynamic interplay with eIF1 and eIF2. *Cell Reports.* 2012 June 28 (1), 1-14.
- Saini AK*, **Nanda JS***, Lorsch JR, Hinnebusch AG. Regulatory elements in eIF1A control the fidelity of start codon selection by modulating tRNA(i)(Met) binding to the ribosome. *Genes Dev.* 2010 Jan 1;24(1):97-110
- **Nanda JS**, Cheung YN, Takacs JE, Martin-Marcos P, Saini AK, Hinnebusch AG, Lorsch JR. eIF1 controls multiple steps in start codon recognition during eukaryotic translation initiation. *J Mol Biol.* 2009 Nov 27;394(2):268-85.
- Acker MG, Shin BS, **Nanda JS**, Saini AK, Dever TE, Lorsch JR. Kinetic analysis of late steps of eukaryotic translation initiation. *J Mol Biol.* 2009 Jan 16;385(2):491-506.
- Dong J, **Nanda JS**, Rahman H, Pruitt MR, Shin BS, Wong CM, Lorsch JR, Hinnebusch AG. Genetic identification of yeast 18S rRNA residues required for efficient recruitment of initiator tRNA (Met) and AUG selection. *Genes Dev.* 2008 Aug 15;22(16):2242-55.
- Acker MG, Koltz SE, Mitchell SF, **Nanda JS**, Lorsch JR. Reconstitution of yeast translation initiation. *Methods Enzymol.* 2007; 430:111-45.
- Garg A, Barnes PF, Porgador A, Roy S, Wu S, **Nanda JS**, Griffith DE, Girard WM, Rawal N, Shetty S, Vankayalapati R. Vimentin expressed on Mycobacterium tuberculosis-infected human monocytes is involved in binding to the NKp46 receptor. *J Immunol.* 2006 Nov 1;177(9):6192-8. *Erratum in: J Immunol.* 2008 Dec 15;181(12):8797.
- Joshi KK, **Nanda JS***, Kumar P, Sahni, G. Substrate kringle-mediated catalysis by streptokinase-plasmin activator complex: Critical contributions of kringle 4 revealed by mutagenesis approaches. *BBA.* 2011.

- Raje CI, Kumar S, Harle A, **Nanda JS**, Raje M. The macrophage cell surface glyceraldehyde-3-phosphate dehydrogenase is a novel transferrin receptor. *J Biol Chem.* 2007 Feb 2;282(5):3252-61.
- **Nanda JS**, Sundram V, Rajagopal K, Dhar J, Chaudhary A, Sahni G. Domain truncation studies reveal that the streptokinase-plasmin activator complex utilizes long-range protein-protein interactions with the macromolecular substrate to maximize catalytic turnover. *J Biol Chem.* 2003 Aug 15;278(33):30569-77.
- Dhar J*, Pande AH*, Sundram V, **Nanda JS**, Mande SC, Sahni G. Involvement of a nine-residue loop of streptokinase in the generation of macromolecular substrate specificity by the activator complex through interaction with substrate kringle domains. *J Biol Chem.* 2002 Apr 12;277(15):13257-67.

PROFESSIONAL DEVELOPMENT ACTIVITIES

- **Artificial Intelligence Strategy Certificate Program**, Cornell University (2023-2024)
- **Diversity, Inclusion, Equity, and Accessibility (DEIA) Certificate**, Cornell University, New York, (2023)
- **Selected as NICHD scholar for 21st Century Scholar's Program** initiated by the Chief Office of Scientific Workforce and Diversity (COSWD) to promote NIH's effort to increase the diversity in national research workforce and encourage recruitment from diverse backgrounds (March 2022-September 2022).
- **Nominated for NIH-OD Mid-Level Leadership Program** (2020 - 2021)
- Participated in Stanford University Human-centered Artificial Intelligence (HAI) Conference on Policy and Artificial Intelligence: Four radical proposals for a better society (2021)
- NIH Gallup training on *Clifton strengths: discover what you do best* (2019)
- The Foundation for Advanced Education in Sciences (FAES) course on Bioinformatics for beginners (2020)
- NIH Center for Information Technology (CIT) training on advanced use of MS office suite, and MS EXCEL, (2014)
- NIH Center for Information Technology (CIT) training on Statistical Package for Social Science (SPSS) for data analysis (2014)

PEER REVIEW ACTIVITIES

- Guest editor for special issue: *Non-Coding RNA and Associated Diseases*, BIOCELL; Tech Science Press (2021)
- Certified Publons Academy Mentor (2020-present)
- Lead Judge, NIH Research Festival (2014-2020)
- Reviewer, Fellows Awards for Research Excellence (FARE) Award (2019, 2020)
- Peer-reviewed, *RNA biology, Nucleic Acid Research, and Protein Expression and Purification* (2010-2016)

MENTORING ACTIVITIES

- Mentored two high school High School Scientific Training and Enrichment Program (HiSTEP) students and three Intramural Research Training Award (IRTA) postbaccalaureate fellows from NIH programs aimed at promoting workplace diversity and encouraging representation from underrepresented communities (2014-2021)
- Conducted hands-on workshops for summer students, pre-doctoral fellows, and high-school kids on microbiology, biochemistry, and molecular biology approaches (2014-2019)
- Advised one research fellow in the laboratory on successful *K99/R00 - Pathway to Independence* grant application resulting in her appointment as assistant professor, University at Buffalo (2013-2014)

AWARDS

- **NICHD Director's Special Act Award (2023) for leading Contract Review: *International & Domestic Pediatric and Maternal HIV and Other High Priority Infectious Diseases Data Coordinating Center***
- **NICHD Director's Award for Best Mentor (2019)**
- **NIH Summer Mentor Award (2018, 2020)**
- Graduate Research Fellowship, Council for Scientific Industrial Research (CSIR), Government of India (1999-2005)
- Department of Biotechnology Fellowship, Government of India (1997-1999)

SCIENTIFIC PRESENTATIONS

- **Invited Speaker** - Connecting the Community for Maternal Health (CCMH) Challenge webinar as a part of NIH initiative: *Implementing a Maternal health and Pregnancy Outcomes Vision for Everyone (IMPROVE)*, NICHD, Bethesda, Maryland (2023)
- **Represented NICHD** at International Conference on Science of Science and Innovation (ICSSI) - Academia - Industry partnership organized by Kellogg School of Management, Northwestern University, Evanston, IL (2023)
- **Invited Speaker** - *Role of Scientific Review Officer in NIH Peer-Review*, Career Day, University of Buffalo Biological Sciences Graduate School (2023)
- **Invited Speaker** - *Webinar on Interdisciplinary Approaches to Understand Eukaryotic Protein Synthesis*, UNESCO - Regional Center for Biotechnology, Government of India (2021)
- **Invited Speaker** - *New insights in eukaryotic protein translation initiation*, Shoolni University, India (2020)
- **Speaker** - *Role of eukaryotic translation initiation factor eIF5 in start codon recognition*, European Molecular Biological Laboratory (EMBL) meeting, Heidelberg, Germany (2017)
- **Invited Speaker** - *Understanding the role of CLOUD computing in genomics*, Washington DC, USA (2015)
- **Speaker** – *Coordinated movement of proteins mediate response to start codon recognition*, Washington Area Yeast Club, Bethesda, MD (2013)
- **Speaker** – RNA Club, Johns Hopkins University, Baltimore, Maryland, USA (2012)
- **Speaker** - *Coordinated movement of eukaryotic translation initiation factors mediate start codon recognition*, Translational Control, Cold Spring Harbor Laboratory, New York, USA (2009)