Faculty Details proforma for DU Web-site

Title	Dr.	First Name	Manisha	Last Name	Goel	Photograph
Designation		Assistant Professor				
Address		Department of Biophysics Biotech Building, 3rd Floor University of Delhi, South Campus Benito Juarez Road New Delhi – 110021				
Phone No Office		011-24157364				
Residence						
Mobile		8588839751				
Email		manishagoel@south.du.ac.in, manisha.g.k@gmail.com				
Web-Page						

Educational Qualifications

Degree	Institution	Year
Ph.D.	National Institute of Immunology	1998-2003
PG	M.Sc (Biotechnology), University of Roorkee, Roorkee (U.P.)	1996-1998
UG	B.Sc (Zoology, Botany, Chemistry), HNB Garhwal University	1993-1996

Career Profile

2004-2008: Post-doctoral Research Associate at with Dr. Arcady Mushegian, Bioinformatics Centre, Stowers Institute for Medical Research, Kansas city, USA

2010-present: Assistant Professor, Dept. of Biophysics, Univ. of Delhi (South Campus).

Administrative Assignments

Resident Tutor at Geetanjali PG Women's Hostel (July 2010 – June 2012)

Warden at Geetanjali PG Women's Hostel (22 July 2012 - 15 Apr 2017)

Areas of Interest / Specialization

We aim to address the biological pathways and processes with a "systems biology" approach via high throughput data processing. My research interests include Structural Biology, Computational Biology and Bioinformatics. We are interested in understanding the relationship between protein structure, function and evolution in various biological systems, particularly extremophiles. For exploring this relationship we use various biochemical and biophysical techniques like X-ray crystallography to determine the protein structures. We often use bioinformatics analysis to predict function, properties and/or structure of either protein components alone or as part of the biochemical

pathways. The major protein systems that we are currently working on are CRISPR-Cas proteins, archaeal chaperones and intra-molecular chaperones found in various protein families.

Subjects Taught

Introduction to Bioinformatics: for M.Sc (Ist year)(Dept. of Genetics) (Jul-Dec semester)
Computational Methods in Biology: for M.Phil & Ph.D
Research Methodology: for M.Phil & Ph.D
OMICS Biology: for M.Phil & Ph.D

Research Guidance

1. *Supervision of awarded Doctoral Thesis : 3*
2. *Supervision of Doctoral Thesis, under progress : 2*
3. *Supervision of M.Phil thesis, submitted: 2*

Publications Profile

Research papers published in Refereed/Peer Reviewed Journals

1. Kaushik V, Verma VV, **Goel M.** (2018) Functional divergence and comparative in-silico study of Cas4 proteins of DUF83 class. **J Mol Recognit.** 31(5):e2694.

2. Rani S, A Sharma, **Goel M.** Navigating the structure-function-evolutionary relationship of CsaA chaperone in archaea. (2018) Critical Reviews in Microbiology, 44(3):274-289.

3. Kumari S, Pal RK, Gupta R, **Goel M.** High Resolution X-ray Diffraction Dataset for Bacillus licheniformis Gamma Glutamyl Transpeptidase-acivicin complex: SUMO-Tag Renders High Expression and Solubility. **Protein J**. 2017 Feb;36(1):7-16. PubMed PMID: 28120227.

4. Kumar S, Jain KK, Rani S, Bhardwaj KN, Goel M, et al. In-Vitro Refolding and Characterization of Recombinant Laccase (CotA) From Bacillus pumilus MK001 and Its Potential for Phenolics Degradation. (2016) **Mol Biotechnol**. Dec;58(12):789-800. PubMed PMID: 27771851.

5. Rani S, Srivastava A, Kumar M, **Goel M.** (2016) CrAgDb--a database of annotated chaperone repertoire in arachaeal genomes. FEMS Microbiol Lett. Mar; 363 (6).

6. Singh Y, Gupta N, Verma VV, **Goel M**, Gupta R. (2016) Selective disruption of disulphide bonds lowered activation energy and improved catalytic efficiency in TALipB from Trichosporon asahii MSR54: MD simulations revealed flexible lid and extended substrate binding area in the mutant. Biochem Biophys Res Commun. Mar 25;472(1):223-30.

7. Verma VV, Gupta R, **Goel M.** (2015) Phylogenetic and evolutionary analysis offunctional divergence among Gamma glutamyl transpeptidase (GGT) subfamilies. **Biol Direct.** Sep 14;10:49

8. Ranjan P, Kashyap R.S, **Goel M**, Veetil S.K, Kateriya S (2014) Cellular organelles facilitate dimerization of a newly identified Arf from*Chlamydomonas reinhardtii***. J. of Phycology**, *50(6), 1137-1145.*

9. Srivastava A, Singhal N, **GoelM**, Virdi JS, Kumar M (2014) CBMAR: a comprehensive Beta-lactamase molecular annotation resource. **Database (Oxford).** Doi: 10.1093/database/bau111. Print 2014.

10. Srivastava A, Singhal N, **GoelM**, Virdi JS, Kumar M (2014) Identification of family specific fingerprints in β-lactamase families. **Scientific World Journal.** 2014:980572.

11. Minakhin, L., **Goel, M.,** Berdygulova, Z., Ramanculov, E., Florens, L., Glazko, G., Karamychev, V.N., Slesarev, A.I., Kozyavkin, S.A., Khromov, I., Ackermann, H.W., Washburn, M., Mushegian, A., Severinov, K. (2008) Genome comparison and proteomic characterization of Thermus thermophilus bacteriophages P23-45 and P74-26: siphoviruses with triplex-forming sequences and the longest known tails. **J Mol Biol.** 378(2):468-80.

12. Roux, M.M., Radeke, M.J., **Goel, M.,** Mushegian, A., Foltz, K.R. (2008) 2DE identification of proteins exhibiting turnover and phosphorylation dynamics during sea urchin egg activation. **Dev. Biol.** 313(2):630-47.

13. Savalia, D., Westblade, L., **Goel, M.,** Florens, L., Kemp, P., Akulenko, N., Pavlova, O., Ian Molineux, I., Washburn, M., Ackermann, H.W., Mushegian, A., Gabisonia, T., Severinov, K. (2008) Genomic and Proteomic Analysis of Phi32, a Novel Phage of E. coli **J. Mol. Biol.** 377(3):774-89.

14. Sea Urchin Genome Sequencing Consortium; Mushegian, A., **Goel, M.,** (2006) The genome of the sea urchin Strongylocentrotus purpuratus. **Science.** 314(5801):941-52.

15. **Goel, M.,** Mushegian, A. (2006) Intermediary metabolism in sea urchin: the first inferences from the genome sequence. **Dev Biol.** 300(1):282-92.

16. Bradham, C.A., Foltz, K.R., Beane, W.S., Arnone, M.I., Rizzo, F., Coffman, J.A., Mushegian, A., **Goel M.,** Morales, J., Geneviere, A.M., Lapraz, F., Robertson, A.J., Kelkar, H., Loza-Coll, M., Townley, I.K., Raisch, M., Roux, M.M., Lepage, T., Gache, C., McClay, D.R., Manning, G. (2006) The sea urchin kinome: a first look. **Dev Biol.** 300(1):180-93.

17. **Goel, M**., Damai, R.S., Sethi, D.K., Kaur, K.J., Maiya, B.G., Swamy, M.J. and Salunke D.M. (2005) Crystal Structures of the PNA-Porphyrin Complex in the Presence and Absence of Lactose: Mapping the Conformational Changes on Lactose Binding, Interacting Surfaces, and Supramolecular Aggregations. **Biochemistry** 44(15):5588-96.

18. **Goel, M.*,** Krishnan, L.*, Kaur, S., Kaur, K.J. and Salunke, D.M. (2004) Plasticity within the Antigen-Combining Site May Manifest as Molecular Mimicry in the Humoral Immune Response. **J Immunol.** 173(12):7358-67. (* Equal contribution).

19. **Goel, M.,** Anuradha P., Kaur, K.J., Maiya B.G., Swamy, M.J. and Salunke, D.M. (2004) Porphyrin binding to jacalin is facilitated by the inherent plasticity of the carbohydrate-binding site: novel mode of lectin-ligand interaction. **Acta Crystallogr D Biol Crystallogr.** 60(Pt 2):281-8.

20. **Goel, M.,** Jain, D., Kaur, K.J., Kenoth, R., Maiya, B.G., Swamy, M.J., Salunke, D.M. (2001) Functional equality in the absence of structural similarity: An added dimension to molecular mimicry. **J. Biol. Chem** 276:39277-39281.

21. Kaur, K., Jain, D., **Goel, M.** and Salunke, D.M. (2001) Immunological Implications of Structural Mimicry between a Dodecapeptide and a Carbohydrate moiety **Vaccine.**

19:3124-3130.

22. Jain, D., Kaur, K., **Goel, M.** and Salunke, D.M. (2000) Structural Basis of Functional Mimicry between Carbohydrate and Peptide Ligands of ConA. **Biochem. Biophys. Res. Commun.** 272:843-849

Conference Organization/ Presentations

Summer school for Bioinformatics (a two week intensive course for under-graduate students of DU, any branch of life science) in May-June 2012, 2013 and 2014.

Research Projects (Major Grants/Research Collaboration)

Ongoing:

1. **ICMR (July 2017- June 2020)** Exploring the role of HSP70 (DnaK, DnaJ & GrpE) in protein folding diseases: Using archaea as model systems

Completed:

2. **RGYI (2012- Dec 2016)(Rapid grant for Young Investigator) from DBT:** Crystallographic structure determination of archaeal CRISPR-CAs proteins
3. **UGC (2012-2015):**Computational analysis of Cas proteins in *Picrophilus torridus* in comparison to other thermoacidophiles and mesophiles and their role in driving CRISPR function.
4. **ICMR (2012-2015):** Comparative genomics of B-lactamase genes including in-silico analysis to identify sequences for B-lactamase inhibitors. (With Dr. JS Virdi, Microbiology & Dr. Manish Kumar, Biophysics).
5. **CSIR (2011-2014):**Crystal structure determination and functional analysis of Gamma Glutamyl transpeptidase (GGT) from *Bacillus Licheniformis* ER-15. (With Dr. Rani Gupta, Microbiology).
6. **DU-DST (2011-2012):** Biodiversity of Environmental Virus Microbiome by Comparative Metagenomics. (With Dr. Rajeev Kaul, Microbiology).

Awards and Distinctions

1. CSIR-JRF NET (1998) JRF
2. GATE 1998 All India rank 50, 95.44 percentile
3. University of Roorkee (1998) **Chancellor's Gold medal** for Best student in M.Sc/M.Tech (Sciences)
4. University of Roorkee (1998) **University medal** for First in class in M.Sc (Biotech)

Association With Professional Bodies

1. ***Editing: Associate Editor, Frontiers in Genetics.***
2. *Reviewing:*
3. *Advisory:*

Other Activities

Signature of Faculty Member