

## **Prateek Jain**

Department of Biology, University of North Carolina, Chapel Hill

Phone: (+1)- 919-987-7813

Email: prteek@ad.unc.edu, jain\_prateek@live.com

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### **EDUCATION**

**Ph.D.** (2013-2018), Biotechnology at National Agri Food Biotechnology Institute, Mohali, India.

**Ph.D. Thesis Title:** Experimental Identification of Heterodimerizing Basic-Leucine–Zipper (B-ZIP) Transcription Factor Involved in Seed Maturation in Arabidopsis: Use of a Designed Dominant Negative.

**Master's Degree**, Plant Biotechnology (August, 2010-August, 2012), Banaras Hindu University, Varanasi, India.

### **TECHNIQUES**

**Molecular Biology:** Cloning and sequencing of genes, Protein Expression (*E.coli*) and Purification, Chromatography (Ion Exchange and Liquid Chromatography- Mass Spectrometry (LC-MS)), qRT–PCR, Western Blotting, Artificial gene synthesis.

**Biophysical and Biochemical:** Circular Dichroism, EMSA, Electro spray Ionization using Mass Spectrometry, Protoplast isolation and Transient Transfection, Peptide Fingerprinting, Immunoprecipitation - Mass Spectrometry (IP-MS), Protein Engineering.

**Plant Tissue Culture and Transgenic preparation:** Monocots and Dicots using *Agrobacterium* and gene gun mediated transformation (Pearl millet (*Pennisetum glaucum*) and *Arabidopsis thaliana*), Screening and analysis of transgenic, micro propagation and tissue culture.

**Biosensing Application:** Nanoparticle synthesis and Metal oxide Thin Film preparation for Biosensing application.

**Histology and Imaging:** Parafilm and plastic sectioning for the plant tissue histology study, Confocal microscopy.

### **AWARDS AND FELLOWSHIPS**

National Eligibility Test (**NET-JRF**) – National Exam for financial support conducted by **CSIR/UGC**, (2013) (All India Rank–75 out of 2 lakh appeared candidates), **CSIR-NET** (2012) (All India Rank-28) conducted by CSIR/UGC, **DBT-JRF** (2012) – conducted by Department of Biotechnology for financial support, **ARS-NET** (2013) – Conducted by Agricultural Scientist Recruitment Board, Government of India. **GATE** (2011) –Conducted by Indian Institute of Technology, India, JNU Combined Biotechnology Entrance Exam (**JNU CEEB**) Scholarship for M.Sc. Biotechnology (2010), Qualified ICAR **AIEEA PG** (2010).

## Travel Award

1. **International Travel Grant** from Department of Biotechnology, Government of India to attend the Plant Biology, 2017 organized by the American Society of Plant Biology (ASPB) at Hawaii, Honolulu, U.S.A.

## WORK EXPERIENCE

1. **Post Doctoral Research Associate** under the supervision of Dr. Jason Reed at **Department of Biology, University of North Carolina, Chapel Hill, USA** (*Aug. 2018 to till*).
2. **Research Associate** under the supervision of Dr. Vikas Rishi at **National Agri Food Biotechnology Institute**, Mohali, India (*Jan. 2018 to Aug. 2018*).
3. **DBT-Senior Research Fellow** under the supervision of Dr. Vikas Rishi at **National Agri Food Biotechnology Institute**, Mohali (*Aug. 2014 to Dec. 2017*).
4. **DBT-Junior Research Fellow** under the supervision of Dr. Vikas Rishi at **National Agri Food Biotechnology Institute**, Mohali, India (*Aug. 2012 to Aug. 2014*).
5. **Project Trainee** under the supervision of Prof. Shailendra Goyal at **Department of Botany**, University of Delhi, India. *Titled- Tissue culture of Pennisetum glaucum and its Agrobacterium mediated transformation* (*Jan. 2012 to May 2012*).
6. **Project Trainee** under the supervision of Prof. Vinay Gupta at **Dept. of Physics and Astrophysics**, University of Delhi, India. *Titled- Thin film metal oxide based Biosensors* (*May 2011 to July 2011*).
7. **Project Trainee** at the **Sungro Seeds Research Limited**, India (*May 2008 to August 2008*). *Titled - "Determination of Hybrid Purity through Electrophoresis"*.

## PUBLICATIONS (PEER REVIEWED)

1. Neha Batra, Monika Tomar, **Prateek Jain**, and Vinay Gupta, **Laser ablated ZnO thin film for amperometric detection of urea**, *J. Appl. Phys.* 114, 124702 (2013); DOI: 10.1063/1.4823853
2. **Prateek Jain**, Koushik Shah, Nishtha Sharma, Raminder Kaur, Jagdeep Singh, Charles Vinson and Vikas Rishi, **A-ZIP53, a dominant negative reveals the molecular mechanism of heterodimerization between bZIP53, bZIP10 and bZIP25 involved in Arabidopsis seed maturation**, *Scientific Reports*, 7: 14343 (2017), DOI:10.1038/s41598-017-14167-5
3. Pankaj Kumar, Ankita Mishra, Himanshu Sharma, Dixit Sharma, Mohammed Saba Rahim, Monica Sharma, Afsana Parveen, **Prateek Jain**, Shailender Kumar Verma, Vikas Rishi, and Joy Roy, **bZIPs revealed pivotal role in amylose biosynthesis by genome survey and transcriptome analysis in wheat (*Triticum aestivum* L.) mutants**, *Scientific Reports* 8, 17240 (2018)
4. **Prateek Jain**, Koushik Shah, and Vikas Rishi, **Potential in vitro and ex vivo targeting of bZIP53 involved in stress response and seed maturation in Arabidopsis thaliana by five designed peptide inhibitors**, *Biochim Biophys Acta Proteins Proteom.* 12, 1249-1259 (2018) doi: 10.1016/j.bbapap.2018.09.007.
5. Saurav Kumar, Amol P Bhondekar\*, **Prateek Jain**, Sudeshna Bagchi, Anupma Sharma, Ritesh Kumar, and Sunita Mishra, Artificial lipid membrane: surface modifi-

cation and effect in taste sensing, ***IOP Conf. Series: Materials Science and Engineering***, 360 (2018) 012039 doi:10.1088/1757-899X/360/1/012039

6. Nidhi Dhull, Gurpreet Kaur, **Prateek Jain**, Vinay Gupta & Monika Tomar, **Label-free amperometric biosensor for Escherichia coli O157:H7 detection**, *Applied Surface Science*, (2019) <https://doi.org/10.1016/j.apsusc.2019.143548>.
7. Anshu Alok, **Prateek Jain**, Jitesh Kumar, Kalpesh Yajnik, Purva Lohan, **Genome engineering in medicinally important plants using CRISPR/Cas9 tool** (Book Chapter) (Accepted) (ISBN- 9780128181409)
8. **Prateek Jain** and Vikas Rishi, Synergistic Regulation of B-ZIP53 and dimerizing partners results in Abnormal seed phenotype in Arabidopsis: Use of a Designed Dominant Negative Protein (*MS under preparation*)

### PATENT

A provisional Indian patent has been filed on the modified plasmid vector system with a novel N-terminal tag that manifold enhances the expression of recombinant proteins in *Escherichia coli* (Vikas Rishi, **Prateek Jain** and Koushik Shah) (Application no.- TEMP/E-1/5421/2017-DEL).

### PRODUCT DEVELOPMENT

1. Series of dominant negative (DN) proteins against B-ZIP transcription factors involved in seed formation and maturation

### PAPERS IN NATIONAL/INTERNATIONAL CONFERENCE/WORKSHOP

1. “**International Symposium on Integrated Functionalities (ISIF), 2017**”, at Shangri-La’s Eros Hotel, New Delhi (10-13 Dec, 2017). **Title:** Designed Dominant Negative Proteins: Tools for functional regulation of target genes; **Prateek Jain** and Vikas Rishi (**Speaker**).
2. “**Annual Symposium on the Indian Biophysical Society, 2017**”, at IISER Mohali, Mohali. **Title:** Designed Dominant Negative: A potent technology to study gene regulation; **Prateek Jain**, Koushik Shah, Nishtha Sharma and Vikas Rishi (**Speaker**).
3. “**CHASKON 2017**”, at 11<sup>th</sup> Chandigarh Science Congress, Chandigarh, India. **Title:** Designed Dominant Negative Protein: A novel tool to Study Seed Maturation in Arabidopsis. **Prateek Jain** and Vikas Rishi (**Speaker**).
4. “**CHASKON 2017**”, at 11<sup>th</sup> Chandigarh Science Congress, Chandigarh, India. **Title:** Identification of Bread Wheat Seed-Specific bZIP Transcription Factors Binding Sites by Genome-Wide in vitro Binding Analysis. Koushik Shah, **Prateek Jain**, Nishtha Sharma, Raminder Kaur and Vikas Rishi.
5. “**Arabidopsis 2016, Emerging challenges in Plant Biology**”, at IISER Mohali, Mohali, India **Title:** Constitutive expression of A-ZIP53, a designed dominant-negative protein against B-ZIP53, B-ZIP10 and B-ZIP25 transcription factors exhibits a retarded seed phenotype in Arabidopsis. **Prateek Jain** and Vikas Rishi (**Speaker**).
6. “**6th World Congress on Biotechnology, 2015**”, New Delhi. **Title:** Role of interacting B-ZIP transcription factors in Arabidopsis thaliana seed development: Use of a designed dominant negative protein New Delhi, India **Prateek Jain**,

- Koushik Shah and Vikas Rishi. (**presentation-proceedings published in J Biotechnol Biomater 2015**, DOI: 10.4172/2155-952X.C1.043) (**Speaker**).
7. **“Plant Biology, 2017”**, organized by the American Society of Plant Biology (ASPB) at Honolulu, Hawaii, U.S.A. Title: Identification and characterization of heterodimerizing partners of B-ZIP53 involved in seed maturation: Use of a designed Dominant Negative Protein. **Prateek Jain**, Koushik Shah, Nistha Sharma and Vikas Rishi.
  8. **“CHASKON 2017”**, at 11<sup>th</sup> Chandigarh Science Congress, Chandigarh, India. Title: Direct delivery of designed dominant-negative proteins against C/EBP family of basic leucine zipper transcription factors into 3T3-L1 cell lines for studying preadipocytes differentiation. Nishtha Sharma, **Prateek Jain**, Koushik Shah, Raminder Kaur and Vikas Rishi.
  9. **“International Conference on Plant Biotechnology, Molecular Medicine & Human Health-2013”**, University of Delhi South Campus, Dept. of Genetics, 7th Annual Convention of ABAP. Title - Role of B-ZIP transcription factors in seed development in *Arabidopsis thaliana*. Use of a designed dominant negative protein; **Prateek Jain** and Vikas Rishi.
  10. **“Indraprastha International Conference on Biotechnology, 2013”**, Indraprastha University, New Delhi, India. Title: Study seed development in *Arabidopsis thaliana* by designing dominant negative A-ZIP transcription factor inhibiting DNA binding activity of 10 different B-ZIP transcription factors; **Prateek Jain** and Vikas Rishi.
  11. **Har Gobind Khorana memorial International symposium**, NABI, India (3 – 5 Dec, 2017) (Attended).
  12. **11th Biennial Carolina Biophysics Symposium**, at University of North Carolina, Chapel Hill, USA (October 25 -26, 2018) (Attended).
  13. **Har Gobind Khorana memorial International symposium**, NABI, India (3 – 5 Dec, 2017). Title: An insight into Adipogenesis: Use of designed bZIP transcription factor inhibitors to study preadipocyte differentiation by direct delivery of the proteins into 3T3-L1 cells. Nishtha Sharma, **Prateek Jain**, Koushik Shah, Raminder Kaur and Vikas Rishi.
  14. **33rd Annual Plant Molecular Biology Retreat**, North Carolina, USA (September 13 to September 15, 2019), Title: **Loss of Function of the Polycomb-group protein SIMS1 produces the parthenocarpic fruit phenotype**, **Prateek Jain**, Matan Levy, Alon Israeli, Naomi Ori, Jason W. Reed (Chalk Talk).

#### WORKSHOP

1. Workshop attended on the **“Fundamentals of Mass Spectrometry based Proteomics (2014)”** at the **Institute of Bioinformatics (IOB)**, Bangalore, India.
2. Workshop on the **“Computational Biology (2018)”** at the National Agri Food Biotechnology Institute (NABI), Mohali, India.
3. Coursework and training for the **“Responsible Conduct for Research (2019)”** at the “University of North Carolina (UNC), Chapel Hill”, USA.
4. Workshop on the R programming (2019) at the “University of North Carolina (UNC), Chapel Hill”, USA

### Other activities

1. Member of winning team in the Inter Hostel Cricket Tournament (University level).
2. Second Prize in Speech Competition at the University level.
3. First Prize in elocution at the College level.
4. First Prize in Power Point Presentation at the College level.

### PROFESSIONAL MEMBERSHIP AND VOLUNTEER EXPERIENCE

1. Indian Biophysical Society (Lifetime Member).
2. elife Ambassador (2017 onwards).
3. Member of Slack channel for the consultative group of the Principal of Scientific advisor, Ministry of science of technology, Government of India (2019).
4. Postdoc mentor for the “Carolina ADMIRE program (2019-2020) at the “University of North Carolina, Chapel Hill”, USA.
5. Member of the UNC Postdoctoral Advisory Board as a College of Arts & Sciences/Biology Postdoc Representative (2019) at the “University of North Carolina, Chapel Hill”, USA.
6. Organizing team member of several International conferences including a) **International Symposium on Integrated Functionalities 2017** (ISIF-2017), New Delhi, India, b) **Arabidopsis-2016** at IISER, Mohali, India, and c) **The Har Gobind Khorana Memorial Symposium on Genes, Genomes and Membrane Biology** at NABI, Mohali, India.

### REFERENCE(S)

**Dr. Jason Reed** (Associate Professor) (Postdoc Mentor)

Department of Biology,

University of North Carolina, Chapel Hill, USA

Email: [jreed@email.unc.edu](mailto:jreed@email.unc.edu), Contact Number : (919) 962-5640

**Dr. Vikas Rishi** (Scientist F) (PhD Supervisor)

National Agri-Food Biotechnology Institute (NABI) Sector-81 (Knowledge City), S.A.S. Nagar, Mohali-140306, Punjab, India.

E-mail: [vikasrishi@nabi.res.in](mailto:vikasrishi@nabi.res.in); Contact Number: +91-8566889663.

**Prof. Vinay Gupta** (Professor),

Department. of Physics and Astrophysics,

University of Delhi (110007), India

E-mail: [vgupta@physics.du.ac.in](mailto:vgupta@physics.du.ac.in); Contact Number: +91-9811563101

**Dr. Monika Tomar** (Assistant Professor)

Department of Physics, Miranda House, University of Delhi, Delhi, India

E- mail: [monikatomar@gmail.com](mailto:monikatomar@gmail.com)

