

# Pulkit Kanodia

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## Summary

- Highly motivated researcher with expertise in molecular biology and microbiology with specialty in RNA biology and plant virology techniques.
  - Substantial experience in NGS library preparation and data analysis.
  - Proficient in idea-generation, creative problem-solving, troubleshooting, and developing assays.
  - Experienced working in independent and collaborative environments.
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## Research Experience

- **Iowa State University (ISU), Ames, IA, USA** | Dr. W. Allen Miller lab | Ph.D Student **2014 – 2021 (anticipated)**
    - Established and standardized a complex molecular biology technique, called ribosome profiling, in the Miller lab, the only lab at ISU now an expert in this technique to assess the translational control of gene expression.
    - Used ribosome profiling, in collaboration with Dr. S.H. Howell, to assess how protein synthesis is regulated during unfolded protein response in maize roots.
    - Used ribosome profiling to assess how a plant virus infection affects virus and Arabidopsis' protein synthesis control at an early and a later stage during infection.
    - Conducted RNAseq experiment and analysis to determine how gene expression is regulated in tobacco plants during virus infection with a virus that can or cannot produce a viral noncoding subgenomic RNA.
    - Developed a PCR-based assay, I call DeSCo-PCR, for quantitative detection of viral co-terminal subgenomic RNAs. Compared to the traditionally used northern blotting for this purpose, this method is significantly cost-effective and reduces the hands-on and total time for the experiment, among other advantages. Demonstrated the utility of this method using a plant virus (red clover necrotic mosaic virus) and a human virus (Zika virus).
    - Gained expertise in molecular biology, microbiology and plant virology skills in addition to some computational skills such as working on command-line tools with shell scripting and R software.
  - **Birla Institute of Technology, MESRA, Ranchi, JH, India** | Undergraduate student **2010 – 2014**
    - Analyzed the expression of some least studied transcription factor genes of rice using stress susceptible and tolerant cultivars in Dr. D. M. Pandey's lab.
    - Conducted computational Identification of microRNAs from SAGE data in *Triticum aestivum* in Dr. Kunal Mukhopadhyay's lab.
    - Discovered a new application of Binomial and Multinomial expansion and subsequently, developed a singular equation to describe the multiplication of an n-digit number to itself m-number of times.
  - **CSIR Inst. of Genomics & Integrative Biology, New Delhi, India** | Dr. Sridhar Sivasubbu lab | Internship **Summer 2013**
    - Assisted Ph.D students in their project involving insertional mutagenesis using transposon-based gene trap in Zebra fish (*Danio rerio*).
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## Technical skills

Ribosome profiling • RNA-sequencing • Polysome profiling • Northern blot hybridization • Western blot hybridization • SUnSET Assay • Protein purification • Molecular cloning • qRT-PCR • *In vitro* transcription • *In vitro* translation • Virus purifications • Plant protoplast preparations from cell cultures or leaves and their transfections (Oats, Arabidopsis, MM2D cells) • Agroinoculations • DNA, RNA, and protein extraction • R software • Unix • Microsoft office

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## Publications

- **Kanodia P.** & Miller WA. Effects of the noncoding subgenomic RNA of red clover necrotic mosaic virus in virus infection. (*Manuscript submitted | August 2021 | Journal of Virology*)
  - **Kanodia P.**, Vijayapalani P., Srivastava R., Bi R., Liu P., Miller WA. & Howell SH. Control of translation during the unfolded protein response in maize seedlings: Life without PERKs. *Plant Direct* 4, 1-17 (**2020**).
  - **Kanodia P.**, Prasanth KR., Roa-Linares VC., Bradrick SS., Garcia-Blanco MA. & Miller WA. A rapid and simple quantitative method for specific Detection of Smaller of Smaller Co-terminal RNA by PCR (DeSCo-PCR): Application to the detection of viral subgenomic RNAs. *RNA* 26 (7), 888-901 (**2020**).
  - Miller WA., Shen R., Staplin W. & **Kanodia P.** Noncoding RNAs of Plant Viruses and Viroids: Sponges of Host Translation and RNA Interference Machinery. *Mol. Plant-Microbe Interact.* 29, 156-164 (**2016**).
  - Kumar D., Singh D., **Kanodia P.**, Prabhu KV., Kumar M. & Mukhopadhyay K. Discovery of Novel Leaf Rust Responsive microRNAs in Wheat and Prediction of Their Target Genes. *J. Nucleic Acids*, 1-12 (**2014**).
  - **Kanodia P.** & Chakraborty S. A Note on Parallel Binomial Expansion and its Multinomial Extension. *Int. J. Math. Arch.* 2, 1672-1678 (**2011**).
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## Awards

- Research Excellence Award from Graduate College at ISU 2021
  - Professional Advancement Grant (PAG) from Graduate professional student senate (GPSS) at ISU and American Society for Virology (ASV) Student Travel Award to attend the 38<sup>th</sup> ASV Annual Meeting 2019
  - Brown Graduate Fellowship from the office of the Vice President for Research at ISU 2019
  - Print and Grace Powers Hudson Scholarship in Agriculture from College of Agriculture and Life Sciences (CAL) at ISU 2017
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## Teaching & Leadership Experience

- Teaching Assistant (TA) | Micro 408 Virology | ISU | Gave lectures, performed grading, wrote exam and homework questions, and assisted students. Fall 2020
  - GPSS Student senator representing the Dept. of Plant Pathology and Microbiology at ISU 2016 – 2017
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## Oral & Poster Presentations

- Oral presentation | ASV Annual Meeting 2019
  - Poster | Tenth Biennial All Iowa Virology Symposium (AIVS) 2019
  - Poster | Translation Control Meeting at Cold Spring Harbor Laboratory 2018
  - Poster | American Society of Plant Biologist (ASPB)-mid-west regional meeting 2018
  - Poster | Graduate Professional Student Research Conference 2016
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## Education

- **Iowa State University** August 2014 – December 2021 (*anticipated*)
    - Ph. D in Genetics and Genomics (*Major*) with Plant Pathology (*Minor*) Ames, IA, USA
    - Dr. W. Allen Miller Lab, Dept. of Plant Pathology and Microbiology
  - **Birla Institute of Technology, MESRA** August 2010 – May 2014
    - Bachelor of Engineering (B.E.) in Biotechnology (*Major*) Ranchi, JH, India
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