

# Urminder Singh, PhD

Senior Bioinformatics Scientist, Illumina

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## PROFESSIONAL SUMMARY

- Bioinformatician and computer scientist with over 9 years of experience working with NGS and multi-omics datasets
- Proficient knowledge in Data structures and Algorithms, Statistics, Optimization, Mathematics, and Analytics
- Experienced programmer and software engineer with experience in managing small teams
- Solid publication record with 8 first-author publications in high-impact in peer-reviewed journals
- Excellent record of inter-disciplinary collaboration with researchers from diverse fields, cultures, and nationalities
- Confident and articulate speaker with the ability to present scientific ideas to a diverse audience

## TECHNICAL SKILLS

**Bioinformatics Analysis:** RNA-Seq, scRNA-Seq, DNA-Seq, Variant analysis, Network analysis, Gene annotation

**Machine Learning and Data Analysis:** TensorFlow, Keras, NumPy, Pandas, Scikit, Tidyverse

**Software Engineering:** Object oriented design, Software testing and validation, SCRUM, CI/CD

**Programming Language:** Python, Java, R, C, C++

**Database:** Data modelling, MySQL, MongoDB

**OS:** Linux, Windows, macOS

**Reproducible Workflow Management:** NextFlow, Snakemake, Anaconda, Docker

**Miscellaneous:** VSCode, Spyder, Git, Slurm, HPC, AWS

## PROFESSIONAL EXPERIENCE

### Bioinformatics Scientist, Illumina

August 2021-Present

- Contributed to cancer biomarker research, and benchmarked and debugged Illumina's DRAGEN variant callers
- Developed a computational framework for automated end-to-end validation of clinical studies
- Designed a web platform for seamless orchestration end-to-end clinical and validation workflows
- Lead the design of a central cloud-based database with data warehousing capabilities
- Contributed to validation of Illumina's TSO 500 HRD assay pipeline
- Collaborated with the assay, software and biostats team to plan, support and execute clinical studies
- Member of hiring committee to hire Bioinformatics Scientists in the Bioinformatics oncology department

### Genetics, Developmental, and Cell Biology, ISU, Ames, IA

August 2017-August 2021

#### Bioinformatician Graduate Research Assistant

- Collaborated with international research teams COV-IRT and COVID-19 Consortium, in accelerating COVID-19 research
- Designed and executed computational workflows for automated and reproducible analysis of >30,000 bulk and single-cell RNA-Seq datasets (250 terabytes) from GTEx, TCGA, and SRA
- Formulated computational pipelines for annotating novel protein-coding biomarkers in diseases like cancer and COVID
- Developed and published efficient, open-source computational tools in python, Java, and R for big data statistical analysis and interactive visualization with emphasis on reproducibility
- Worked on a deep generative model for RNA-Seq normalization and batch-correction

### School of Computational and Integrative Sciences, JNU, New Delhi

Nov. 2015-July 2016

#### Bioinformatician Researcher

- Developed a novel machine learning method, PlncPRO, for accurate identification of long non-coding RNAs
- Contributed to multiple projects involving RNA-Seq analysis and biological database design

### School of Computational and Integrative Sciences, JNU, New Delhi

August 2013-June 2015

#### Bioinformatician Graduate Researcher

- Formulated novel machine learning, deep learning, and information theory based methods for prokaryotic whole-genome sequence analysis
- Developed ORIS, a Java tool for interactive exploratory data analysis and visualization of genomic data

## EDUCATION

Iowa State University (ISU), Ames, IA PhD Bioinformatics and Computational Biology (Minor in Statistics)	August 2016-July 2021
Jawaharlal Nehru University, New Delhi M. Tech. Computational and Systems Biology	August 2013-June 2015
South Asian University, New Delhi MS Computer Science	Sept. 2010-June 2013
University of Delhi, Delhi BS Applied Physical Sciences	August 2007-June 2010

## EXPERIENCE

### LEADERSHIP SKILLS AND SERVICE EXPERIENCE

State Science and Technology Fair of Iowa, Ames, IA Science Fair Judge, Biomedical and Health Sciences	March 2020-April 2020
• Assessed 15 biomedical and health sciences projects in terms of methodology, creativity, and presentation skills	
Substrate Games, Des Moines, IA Software Consultant	July 2019-August 2019
• Consultant on hiring decisions with Substrate Games	
• Interviewed and assessed candidates for a lead game programmer position	
Bioinformatics Graduate Student Organization, ISU, Ames, IA Executive Board Member	August 2017-July 2018
• Served as the Director of IT operations for Bioinformatics Graduate Student Organization	
• Prepared materials and taught 2 data science with python workshops to diverse audiences (>50 people per session)	

### SELECT PUBLICATIONS (2 of 15)

- Singh, Urminder et al. "MetaOmGraph: a workbench for interactive exploratory data analysis of large expression datasets." *Nucleic acids research* (2020)
- Singh, Urminder, et al. "PLncPRO for prediction of long non-coding RNAs (lncRNAs) in plants and its application for discovery of abiotic stress-responsive lncRNAs in rice and chickpea." *Nucleic acids research* (2017)

### SELECT HONORS/GRANTS (3 of 13 honors/grants)

• Awarded spot bonus award for accelerating and improving variant concordance assessment workflow, nominated by Director of Bioinformatics and approved by VP of Bioinformatics, Illumina	Nov 2021
• COVID-19 Exceptional Effort Graduate Student Research Impact Award, ISU (\$500)	Jan 2021
• Wendell Miller Trust Graduate Fellowship, ISU (\$15,000)	August 2016

### SELECT PROFESSIONAL ASSOCIATIONS

COVID-19 International Research Team - Member	2020-Present
Sigma Xi, USA - Elected Full Member	2020-Present
Society for Molecular Biology and Evolution - Member	2020-Present