Urminder Singh, PhD

Sr 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 data.
- Product development experience in a fast-paced, rapidly evolving industry, showcasing agility and adaptability.
- 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 fostering cross-functional collaborations among diverse teams with varied expertise.
- Confident and articulate speaker adept at presenting scientific ideas to diverse audiences.

PROFESSIONAL EXPERIENCE

Sr. Bioinformatics Scientist, Illumina   Oct 2022-Present

- Bioinformatics Lead on Illumina's TruSight Oncology (TSO) NGS panels product development. Led a small team of bioinformatics scientists and collaborated with cross-functional teams ensuring the improved quality and accuracy of Illumina's oncology NGS panels and bioinformatics analysis software, aligned with customer needs and industry standards.
- Bioinformatics Lead and Subject Matter Expert (SME) for Illumina's DRAGEN HLA Genotyper. Spearheaded the development, enhancement, and implementation of HLA calling algorithm in C++ and python. Collaborated closely with a team of software engineers to ensure the incorporation of best practices in testing and deployment.
- Led research collaborations with external partners to showcase innovative bioinformatics concepts with implications for advancing clinical applications in oncology. Conducted an extensive study into the application liquid biopsy to significantly expand actionable neo-antigen prediction for cancer immunotherapy. Built an end-to-end data processing and analysis pipeline, disseminated research finding across multiple teams and published scientific discoveries.
- Participated in strategic external research collaborations with pharma partners to assess feasibility, and advance the development of companion diagnostic (CDx) assays.
- Engaged in collaborator- and customer-facing interactions as bioinformatics expert for clients seeking support, guidance, or clarification on product features and functionalities. Maintained a proactive approach in fostering positive relationships with customers and collaborators.

Bioinformatics Scientist, Illumina   August 2021-Sept 2022

- Contributed to cancer biomarker research, and benchmarked and debugged Illumina's DRAGEN DNA and RNA variant callers.
- Developed computational infrastructure to automate data processing and analysis and report generations for DVT (Design Verification Testing) studies, utilizing technologies such as Python, Streamlit, Jenkins, and Nextflow.
- Contributed to validation studies for Illumina's TSO 500 HRD assay pipeline.
- Supported the assay, software and biostats team to plan, support and execute clinical and internal studies
- Member of hiring committee to hire Bioinformatics Scientists in the Bioinformatics 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

School of Computational and Integrative Sciences, JNU, New Delhi   August 2013-June 2015
Bioinformatician Graduate Student 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

TEECHNICAL SKILLS
Bioinformatics Analysis: NGS assay development, DNA/RNA Variant analysis, Network analysis, Algorithm development, Neoantigen prediction
Machine Learning and Data Analysis: TensorFlow, Keras, NumPy, Pandas, Scikit, Tidyverse
Software Engineering: Object oriented design, Software testing and validation, SCRUM, CI/CD, Git
Programming Language: Python, Java, R, C, C++
Database: Data modelling, MySql, MongoDB
Workflow Management and Scaling: NextFlow, Snakemake, Anaconda, Docker, HPC, AWS

EDUCATION

Iowa State University (ISU), Ames, IA   August 2016-July 2021
PhD Bioinformatics and Computational Biology (Minor in Statistics)

Jawaharlal Nehru University, New Delhi   August 2013-June 2015
M. Tech. Computational and Systems Biology

South Asian University, New Delhi   Sept. 2010-June 2013
MS Computer Science

University of Delhi, Delhi   August 2007-June 2010
BS Applied Physical Sciences

SELECT PUBLICATIONS
● **Singh, Urminder et al.** "Tumor neoantigen prioritization from liquid biopsy whole exome sequencing for selected tumor-infiltrating lymphocyte therapy." ***BMJ Specialist Journals* (2023)**
● **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)
● Illumina spot bonus award nominated by the Director of Bioinformatics   **Nov 2021**
● COVID-19 Exceptional Effort Graduate Student Research Impact Award, ISU   **Jan 2021**
● Wendell Miller Trust Graduate Fellowship, ISU   **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**