Vivek Rai

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Education

2022 — **University of Michigan, Ann Arbor**
Ph.D. in *Bioinformatics*
M.A. in *Statistics*

2017 — **Indian Institute of Technology, Kharagpur**
Dual Degree (B.Tech & M.Tech), *Biotechnology* — GPA: 8.62/10

Research Experience

2018-now — **University of Michigan**, Ph.D. Student — Ann Arbor, US
Mentor: Stephen CJ Parker, Ph.D

- Integrative analysis of chromatin accessibility profiles across skeletal, pancreatic, and adipose tissues to assess the functional effects of non-coding mutations in type-II diabetes (T2D) disease susceptibility.

2016-2017 — **Indian Institute of Technology, Kharagpur**, Senior Thesis — Kharagpur, India
Mentor: Amit K. Das, Ph.D

- Characterized the roles of structural and functional patterns in the origin of knotted proteins and how they may influence the knotting mechanism. (Talk)

2016 — **Institute for Systems Biology**, Summer Intern — Seattle, US
Mentor: Gustavo Glusman, Ph.D

- Analyzed systematic autosomal sex-specific biases in sequence coverage profiles in more than 2000 individual whole-genomes and discover technical mapping biases due to segmental duplication between autosomes and sex chromosomes.

2015 — **Indian Institute of Science**, B.E.S.T Fellow — Bangalore, India
Mentor: Sandhya S. Visweswariah, Ph.D

- Studied the assembly mechanism of Cytolysin-A (ClyA), a bacterial pore-forming toxin, and demonstrated a lipid phase and C-terminal domain dependent kinetic behavior using synthetic lipid vesicles and calcein leakage assays. (Report)

2015-2016 — **Wikimedia** — Individual Engagement Grant
Team Leader: Maximilien Klein

- Quantified gender bias in Wikipedia corpus as a team member of $22,500 grant using Wikidata through statistical analysis, developed website, and assisted in research, and paper writing, editing and review.

Manuscripts

2020 — Orchard P, Manickam N, Varshney A, **Rai V**, Kaplan J, et al. *Human and rat skeletal muscle single-nuclei multi-omic integrative analyses nominate causal cell types, regulatory elements, and SNPs for complex traits.* bioRxiv.

2020	**Rai V**†, Quang DX†, Erdos MR, Cusanovich DA, Daza RM, Narisu N, et al. *Single-cell ATAC-Seq in human pancreatic islets and deep learning upscaling of rare cells reveals cell-specific type 2 diabetes regulatory signatures.* Molecular Metabolism 32: 109–121.
2019	Priyam A, Woodcroft BJ, **Rai V**, Moghul I, Munagala A, Ter F, et al. *Sequenceserver: A Modern Graphical User Interface for Custom BLAST Databases.* Mol Biol Evol.
2018	Grüning B, Dale R, Sjödin A, Chapman BA, Rowe J, Tomkins-Tinch CH, Köster J, & **The Bioconda Team**. *Bioconda: sustainable and comprehensive software distribution for the life sciences.* Nature Methods. 2018;15:475.
2017	O'Neill K, **Rai V**, Kilpatrick AM. *The International Society for Computational Biology and WikiProject Computational Biology: celebrating 10 years of collaboration towards open access.* Bioinformatics. 2017;33:2429–30.
2016	Klein M, Gupta H, **Rai V**, Konieczny P, Zhu H. *Monitoring the Gender Gap with Wikidata Human Gender Indicators.* Proceedings of the 12th International Symposium on Open Collaboration - OpenSym '16. Berlin, Germany: ACM Press; 2016 p. 1–9.

Talks & Posters

2019	(**Poster**, MIDAS Annual Symposium) — *Single cell ATAC-seq in human pancreatic islets and deep learning upscaling of rare cells reveals cell-specific type 2 diabetes regulatory signatures.*
2019	(**Poster**, Department of Computational Medicine & Bioinformatics Retreat) — *Single cell ATAC-seq in human pancreatic islets and deep learning upscaling of rare cells reveals cell-specific type 2 diabetes regulatory signatures.*
2019	(**Talk**, Midwest Islet Club 2019) — *Single-nuclei ATAC-seq in human pancreatic islets reveals cell-type specific type 2 diabetes regulatory signatures.*
2018	(**Poster**, Department of Human Genetics Retreat) — *Single-nucleus ATAC-seq reveals cell-specific diabetes regulatory signatures in human pancreatic islets.*
2018	(**Poster**, Department of Computational Medicine & Bioinformatics Retreat) — *Single-nucleus ATAC-seq reveals cell-specific diabetes regulatory signatures in human pancreatic islets.*
2015	(**Talk**, Journal Club, IIT Kharagpur) — *Protein Knots: A Tangled Story*

Programming Experience

2016	**Google Summer of Code**, OpenSNP — Student Developer Mentors: Bastian Greshake, Philip Bayer Project: Linking Phenotypes to Genotypes in OpenSNP (opensnp.org)
2015-2016	**Sequenceserver** — Wurm Lab, Queen Mary University of London, UK Mentors: Anurag Priyam, Yannick Wurm, Ph.D. Project: Sequenceserver: a modern graphical user interface for custom BLAST databases
2015-now	**Contributor** — Open Source Projects Afra, Bioconda, Scikit-bio, CobraPy, awesome-biology, samtools

Skills

interests	Computational Genetics & Genomics, Statistical Analysis, Data Science
languages	Python, R, Shell Scripting (BASH), Ruby, SQL
web	HTML/CSS, ReactJS, Javascript, Static-site Development
tools	Snakemake, Nextflow, Unix CLI, Conda, Slurm, Singularity/Docker
cloud	Google Cloud Platform, Amazon Web Services (AWS)

Fellowships & Grants

2019	Rackham Student Research Grant ($1,500) — University of Michigan
2017	Simons-NCBS Travel Fellowship ($100) — NCBS, Bangalore
2016	Simons Foundation Travel Fellowship ($600) — ISMB 2016, Orlando, Florida
2016	GATE Scholarship ($2,500) — University Grants Commission, MHRD, India
2012-2016	Merit-cum-means Tuition Scholarship [**4x**] ($4,000) — IIT Kharagpur
2012-2016	Sanmarg Relief Scholarship [**4x**] ($2,000) — Harsh and Payal Foundation

Honors & Awards

2016	First place ($300), Wikidata Competition — International Society for Computational Biology
2016	Third place ($200), Wikipedia Competition — International Society for Computational Biology
2012	First place ($200), Woodstock (Virtual Stock Trading Competition) — Kshitij, IIT Kharagpur
2010	Ram Avatar Pratibha Puraskar (excellence in Hindi language) — Sanmarg Pvt. Ltd.

Conferences & Workshops

2020	ComSciCon Michigan — Online
2017	5^{th} Simons-NCBS Monsoon School, Physics of Life 2017 — NCBS, Bangalore
2016	Intelligent Systems for Molecular Biology (ISMB), Orlando, Florida
2016	Workshop on Mathematical and Computational Biology (WMCB 2016) — IISER, Kolkata
2015	Winter school on Quantitative Systems Biology (QSB) 2015 — ICTS, Bangalore
2014	Short Term Course on Computational Systems Biology 2014 — IIT Kharagpur

Volunteer Activities

2019	Peer Mentor — Program in Biomedical Sciences (PIBS), Univ. of Michigan
2018-now	**[3x]** Student Host (Ph.D. interview weekend) — DCM&B, Univ. of Michigan
2018-now	Student Representative, Bioinformatics Seminar Committee — DCM&B, Univ. of Michigan
2018-2019	Girls Who Code – DCM&B, Univ. of Michigan
2018-2019	**[2x]** Juror (India), Wiki Science Competition) — Wikimedia
2018	Peer Mentor — Bioinformatics, Univ. of Michigan
2018	Contributor, Women in Science 2018 Editathon — AWIS, Univ. of Michigan
2012-2018	Contributor (40+ articles and 1800+ edits) — English Wikipedia
2016	Co-organizer and Contributor, Wikipedia Editathon — ISMB 2016
2016	Python and Git Assistant, Software Carpentry Workshop 2016 — University of Washington
2012-2014	National Service Scheme — IIT Kharagpur

Professional Activities

2018	Course (Tech) Reviewer, Python Tips, Tricks and Techniques — Packt Publishing
2015	Problem Author, Ruby and Python Challenge Section — HackerRank

Memberships

2018-now	Board Member, Michigan Argentine Tango Club (MATC) — Univ. of Michigan
2019	Fellow, AAAS/Science Program for Excellence in Science
2016	Co-founder, Co-maintainer, MetaKGP (metakgp.github.io) — IIT Kharagpur
2015-2016	Captain, Opensoft — LBS Hall, IIT Kharagpur
2015	Core Team Member, iGEM Sythetic Biology Team — iGEM IIT Kharagpur
2014	Core Team Member, Google Students Club — IIT Kharagpur
2013	English Team Member, Technology Literary Society (TLS) — IIT Kharagpur
2013	Product Design Team Member, ProDex — IIT Kharagpur