Janani Ravi

Biomedical Informatics (P12-6284),
Center for Health Artificial Intelligence,
1890 N. Revere Ct. MS F600,
University of Colorado Anschutz Medical Campus,
Aurora, CO 80045

E-Mail: janani.ravi@cuanschutz.edu
Webpage: jravilab.github.io
Phone: 303-724-0343 (W)
GitHub: jananiravi | jravilab
Twitter: janani137 | jravilab

Education

2011	**Ph.D. Genetics, Bioinformatics, and Computational Biology**	**Virginia Tech**
	Dissertation: Mathematical modeling of pathways involved in cell cycle regulation and cell differentiation	Blacksburg, VA
2006	**B.Tech. Industrial Biotechnology**	**Anna University**
	Centre for Biotechnology	Chennai, India

Professional Appointments

2022–	**Assistant Professor**	**University of Colorado**
	Biomedical Informatics,	**Anschutz Medical Campus**
	Center for Health Artificial Intelligence	Aurora, CO
2021–2022	**Assistant Professor**	**Michigan State University**
	Pathobiology and Diagnostic Investigation	East Lansing, MI
	Microbiology and Molecular Genetics	
2021–2021	**Assistant Professor** (Fixed-Term)	**Michigan State University**
	Pathobiology and Diagnostic Investigation	East Lansing, MI
2018–2020	**Senior Research Associate**	**Michigan State University**
	Pathobiology and Diagnostic Investigation	East Lansing, MI
2013–2017	**Postdoctoral Research Associate**	**Rutgers University**
	Public Health Research Institute	Newark, NJ
Feb–Mar'17	**Visiting Scientist**	**National Institutes of Health**
	National Center for Biotechnology Information	Bethesda, MD
Jan–Feb'15	**Visiting Scientist**	**Broad Institute**
	Center for Cell Circuits	Boston, MA
2012–2013	**Postdoctoral Research Associate**	**Rutgers University**
	Dept. of Mathematics	Piscataway, NJ

Research Keywords

Computational biology and bioinformatics | Molecular evolution and phylogeny | Comparative genomics and transcriptomics | Drug repurposing | Infectious diseases | R education and community | Open science

Publications   [*Contributed equally] [©Corresponding author]

[JRaviLab current/past members, underlined]

Publications: jravilab.github.io/publication | Software and Data: jravilab.org, github.com/jravilab | ORCID

In preparation

- **Ravi J**©, Samart K, Zwolak J, Tyson JJ©. Modeling the START transition in the budding yeast cell cycle. [Model]
- **Ravi J***, Kaufman G*, Rey-Jurado E, Mehra S, Nikolaev EZ, Kaushal D, Sontag ED, Pine R, Tyagi S, Gennaro ML. Single-cell analysis of genes involved in lipid droplet accumulation in *Mycobacterium tuberculosis*-infected macrophages. [*in preparation*]

Preprints/Submitted manuscripts

- Burke JT*, Chen SZ*, Sosinski LM*, Johnston JB, **Ravi J**©. MolEvolvR: A webapp for characterizing proteins using molecular evolution and phylogeny. 2022 [bioRxiv] [Webapp] *Co-primary, listed alphabetically.

- Cantoria MJ✿, Alizadeh E✿, **Ravi J**, Bunnag N, Kettenbach N, Ahmed Y, Paek AL, Tyson JJ, Doubrovinski K[G], Lee E[G], Thorne CA[G]. Feedback in the β-catenin destruction complex imparts bistability and cellular memory. 2022 [*submitted*] [bioRxiv]
- Lensmire JM, Wischer M, Sosinski LM, Ensink E, Dodson JP, Shook JC, Delekta PC, Cooper C, Havlicheck Jr D, Mulks M, Lunt SY, **Ravi J**, Hammer ND. The glutathione import system satisfies the *Staphylococcus aureus* nutrient sulfur requirement and promotes interspecies competition. 2021 [*submitted*] [bioRxiv]
- **Ravi J**[G], Anantharaman V, Chen SZ, Datta, P, Aravind L[G], Gennaro ML[G]. Phage-shock-protein (PSP) Envelope Stress Response: Evolutionary History and Novel Players. 2020. [*under revision*] [bioRxiv] [Webapp]

Published papers

- Conner KN✿, Burke JT✿, **Ravi J**[G], Hardy JW[G]. Novel Internalin P homologs in *Listeria ivanovii londoniensis* and *Listeria seeligeri*. *Microbial Genomics*. 2022 [PubMed] [GitHub]
- Blaine HC✿, Burke JT✿, **Ravi J**[G], Stallings CL[G]. DciA helicase operators exhibit diversity across bacterial phyla. *Journal of Bacteriology*. 2022 [PubMed] [GitHub] ✿Co-primary, listed alphabetically.
- Joo R✿[G], Sánchez-Tapia A✿, Mortara S, Saibene YB, *et al.*, **Ravi J**[G]. Ten simple rules to host an inclusive conference. *PLoS Computational Biology*. 2022 [PubMed] [GitHub]
- Hsueh BY✿, Severin GB✿, Elg CA, Waldron EJ, Kant A, Wessel AJ, Dover JA, Rhoades CR, Ridenhour BJ, Parent KN, Neiditch MB, **Ravi J**, Top EM, and Waters CM. Phage defense by deaminase-mediated depletion of deoxynucleotides in bacteria. *Nature Microbiology*. 2022 [PubMed] [Data]
- Samart K✿, Tuyishime P✿, Krishnan A[G], **Ravi J**[G]. Reconciling multiple connectivity scores for drug repurposing. *Briefings in Bioinformatics*. 2021;22(6):bbab161. [PubMed] [Live doc] [GitHub]
- **Ravi J**✿[G], Fioravanti A✿[G]. S-layers: the proteinaceous multifunctional armours of Gram-positive pathogens. *Frontiers in Microbiology*. 2021;12:685. [PubMed]
- Hadi SA✿, Kolte IV✿, Brenner EP✿, Cunha EAT, Simonsen V, Ferrazoli L, Villela DAM, Santos RS, **Ravi J**, Sreevatsan S, Basta PC. Identification of a predominant genotype of *Mycobacterium tuberculosis* in Brazilian indigenous population. *Scientific Reports.* 2021;11(1):1224. [PubMed]
- Lensmire JM, Dodson JP, Hsueh BY, Wischer MR, Delekta PC, Shook JC, Ottosen EN, Kies PJ, **Ravi J**, Hammer ND. The Staphylococcus aureus cystine transporters, TcyABC and TcyP, facilitate nutrient sulfur acquisition during infection. *Infection and Immunity.* 2019;88(3):e00690-19. [PubMed]
- **Ravi J**, Anantharaman V, Aravind L, Gennaro ML. Variations on a theme: Evolution of the phage-shock-protein system in Actinobacteria. *Antonie Van Leeuwenhoek*. 2018;111(5):753-760. [PubMed] [GitHub]
- Chauhan R, **Ravi J**, Datta P, Chen T, Schnappinger D, Bassler K, Balázsi G, Gennaro ML. Reconstruction and topological characterization of the sigma factor regulatory network of *Mycobacterium tuberculosis*. *Nature communications.* 2016. 7:11062. [PubMed] [GitHub]
- Datta P, **Ravi J**, Guerrini V, Chauhan R, Hancioglu B, Igoshin O, Neiditch M, Gennaro ML. The Psp system of *Mycobacterium tuberculosis* integrates envelope stress sensing and envelope preserving functions. *Molecular Microbiology*. 2015. 97: 408-422. [PubMed] [GitHub]
- Salamon H, Bruiners N, Lakehal K, Shi L, **Ravi J**, Yamaguchi KD, Pine R, Gennaro ML. Vitamin D regulates lipid metabolism in *Mycobacterium tuberculosis* infection. *J. Immunology*. 2014 193: 30-34. [PubMed]

Grants, Awards

Research Funding/Awards   [*Also, see Mentee Accomplishments section below.*]

Ongoing support

- 2022–2024 (co-PI) NIH NIAID Data Science R21

Completed support

- 2021–2023 (PI) Sheila McMonagle Endowed Research Fund, College of Veterinary Medicine, MSU
- 2021–2022 (PI) NSF-funded BEACON Center
- 2021–2022 (co-I) Spectrum Health and MSU Alliance
- 2020–2022 (Collaborator) NIH NIAID R01 subaward

- 2019–2021 (PI) Harvey J Fiege Endowed Research Fund, College of Veterinary Medicine, MSU
- 2019–2020 (PI) Diversity Research Network, Launch Awards Program, Michigan State University
- 2017   ORAU/ORISE Visiting Scientist Program at NCBI, NIH
- 2015   Broad Institute Visiting Scientist Program at the Center for Cell Circuits
- 2007   PEO International Peace Scholarship for Graduate Research

Conference Travel/Registration Awards
- 2021   useR!
- 2018, 2020–2022   ISMB
- 2017   ASM Tuberculosis

Education and Outreach Award
- 2020   All-University Excellence in Diversity Award, MSU (for R-Ladies East Lansing)

Education and Outreach Funding
- 2021–   Fellowship for AsiaR
- 2019–2020 MSU Data Science Learning Community funded by the MSU Academic Advancement Network
- 2018–   Sponsorships for 30+ R-Ladies East Lansing meetups
- 2019–   Sponsorship for Women+ Data Science East Lansing @MSU symposia

Teaching/Workshops, Talks, Posters

Workshop & talks: jravilab.github.io/talk | *Upcoming; ‡Invited; #cancelled due to COVID-19, etc*.

Research Talks
- 2022-07   ‡Intelligent Systems for Molecular Biology, International Society for Computational Biology
- 2021-11   ‡University of Colorado Anschutz Medical Campus, School of Medicine, Center for Health AI
- 2021-07   Intelligent Systems for Molecular Biology, International Society for Computational Biology
- 2021-07   useR! 2021, The R Conference | Also, pitched and moderated two incubators.
- 2021-05   Great Lakes Bioinformatics Conference
- 2021-03   BEACON webinar series
- 2020-08   BEACON Congress
- 2020-07   Intelligent Systems for Molecular Biology, International Society for Computational Biology
- 2019-08   Conference on Computational Health. *Grand Rapids, MI* | Also chaired one of the sessions.
- 2019-07   Gram-positive bacteria and bacilli meeting. *College Park, MD*
- 2019-05   ‡Chemistry and Biology of Pathogens. MSU, *MI*
- 2018-07   ISMB 2018, *Chicago, IL*
- 2016-06   ASM Microbe 2016, *Boston, MA*
- 2014-10   ‡Institute for Mathematical Sciences, *Chennai, India*

Posters
- 2022-08   Colorado Immunology & Microbiology Conference. *Vail, CO*
- 2022-02   Rare Disease Day, National Institutes of Health
- 2021-09   Latin American Congress of Women in Bioinformatics and Data Science
- 2021-08   BioC2021, The R Bioconductor Virtual Conference
- 2019-05   ASBMB Symposium on Evolution and Core Processes in Gene Expression. *Michigan State University, MI* | Also, chaired one of the sessions.
- 2017-07   ASM Tuberculosis, *New York, NY*
- 2015-11   Lipid Research Symposium at the Rutgers Center for Lipid Research, *Rutgers University, NJ*
- 2011-03   Computational Cell Biology Meeting. *Cold Spring Harbor Laboratories, NY*
- 2010-11   Signal Transduction and Gene Regulatory Networks Workshop. *Mathematical Biosciences Institute, OSU, OH*
- 2009-07   Gordon Research Conference on Cell Growth and Proliferation. *Colby College, ME*

- 2009-03   Computational Cell Biology Meeting. *Cold Spring Harbor Laboratories, NY*
- 2009-02   Biological Sciences Research Symposium. *Virginia Tech, VA*

Invited Panels, Talks
- 2021-11   ‡Bringing diversity to and building a strong AsiaR community. *BioC Asia 2021 (Japan/virtual).*
- 2021-09   ‡Midwest Microbial Pathogenesis Conference (MMPC), Session Chair. *East Lansing, MI*
- 2021-04   ‡R-Ladies+: Bringing diversity to the global useR! 2021 conference (P)
- 2020-11   ‡Michigan Precollege & Youth Outreach Conference (P)
- 2019-09   ‡R for you! Diversity Research Network, MSU Inclusion. *MI*
- 2019-01   ‡Simple rules to make an effective scientific presentation. *CMIB seminar series, MSU, MI*

Invited Workshops/Teaching
- 2022-12   *‡R@IISA. *International Indian Statistical Association meeting. Bengaluru, India*
- 2022-05   ‡ISCB Academy tutorial series. *International Society for Computational Biology*
- 2022-02   ‡R@GARD. *Global Alliance for Rapid Diagnostics*
- 2022-02   ‡How I teach Life Scientists to build inclusive communities. Life Science Training Institute *(Australia)*
- 2021-05   ‡Making publication-quality tables w/ R. *R-Ladies Pune (India)*
- 2021-04   ‡Using Tidyverse for Genomics. *R-Ladies Tunis (Africa), R-Ladies Bangalore (India)*
- 2020-09   ‡Methods in phylogeny, pangenomes, genomics. *Integrated Microbial Biology, MSU, MI*
- 2020-05   ‡#Session on Data Visualization. *DANG! symposium, Univ of Michigan, MI*
- 2020-02   ‡Molecular Evolution and Phylogeny. *Chemistry and Biology of Pathogens, MSU, MI*
- 2020/19   ‡Tidyverse Workshop for Genomics. *R for Plant Genomics course, MSU, MI*
- 2019-09   ‡Best Practices for Computational Sciences: R for Reproducible Research. *Diversity Research Network Researcher's Workshop, MSU, MI*

Co-organized Meetings
- 2022–   AsiaR webinar series and panel discussions
- 2021–   Why R? Foundation webinars: R-Ladies takeover, for global URM speakers
- 2020–   Evolution and Comparative Genomics COSI, Intelligent Systems for Molecular Biology (ISMB) (flagship conference of the *International Society for Computational Biology*)
- 2020–   Women+ Data Science webinar series and panel discussions
- 2020   #Women+ Data Science Symposium at MSU, *East Lansing, MI*
- 2020   Conference on Computational Health. *Grand Rapids, MI*
- 2019   Women in Data Science Symposium *East Lansing*, @MSU
- 2018–   R-Ladies East Lansing workshops and meetups

Other Incubators (panels), Workshops
- 2021-07   Strategies to build a strong AsiaR community. *useR! 2021, The R conference* (Inc.)
- 2021-07   Stop reinventing the wheel: R package for conference/abstract management. *useR! 2021* (Inc.)
- 2019-03   R for Genomics Workshop. *Indian Institute of Technology, Madras, India*
- 2019/18   Introduction to Tidy Data with R Workshop. *R-Ladies East Lansing, MI*
- 2019/18   Introduction to Data Visualization with R Workshop. *R-Ladies East Lansing, MI*

Other Scientific Meetings
- 2014-09   Computational Genomics workshop. *Center for Cell Circuits, Broad Institute, MA*
- 2013-09   Biomarkers for Tuberculosis: New Questions, New Tools. *Chantilly, VA*
- 2010-05   The Cell Cycle Meeting. *Cold Spring Harbor Laboratories, NY*
- 2007-06   Joint meeting of the National Centers of Integrative and Systems Biology 2007. *Boston, MA*
- 2007-06   Summer Symposium on Systems Biology of Cancer. *Koch Institute. MIT, MA*
- 2007-04   ASBMB Meeting. *Washington DC*

Professional Memberships, Services, Education, and Outreach

Membership in Scientific Societies, Research/Education Communities
2019 – Data Carpentry | Genomics and Open Science Education teams | R/Bioconductor
2018 – International Society for Computational Biology
2018 – R-Ladies Global | Women in Data Science | rOpenSci
2015 – Member, American Society of Microbiology

Academic Services
2022 – Grant Reviewer, NIH GVE (Genetic Variation and Evolution) Study Section
2022 – Grant Reviewer, Michigan Alliance for Animal Agriculture (M-AAA)
2021 – Review Editor, Editorial Board, Frontiers in Bioinformatics and Frontiers in Systems Biology
Reviewer, PLoS Computational Biology, PLoS One, ASM Applied and Environmental Microbiology,
Life Science Alliance, Frontiers in Bioinformatics
2020 – 2022 Grant Reviewer, Diversity Research Network, MSU
2019 – 2022 Grant Reviewer, Endowed Research Funds, College of Veterinary Medicine, MSU
2019 – Abstract Reviewer, ISMB 2019–2022; Great Lakes Bioinformatics 2021
2019 – 2020 Member, CMSE Undergraduate Data Science Curriculum Committee

Conference Committees/Leadership
2022 – 2023 Co-organizer, R@IISA (International Indian Statistical Association) Conference
2021 – 2022 EvolCompGen COSI Co-Chair, Track, and Awards Chair, ISMB 2022
2020 – 2021 Program Committee Chair, useR! 2021 (the global R conference)
2020 – 2021 Abstract Chair, Track Lead, and Awards Chair, EvolCompGen COSI, ISMB 2021
2018 – Core EvolCompGen committee member, Intelligent Systems for Molecular Biology (ISMB),
the *flagship conference of the International Society for Computational Biology*
2019 – 2020 Poster Awards Chair, EvolCompGen, ISMB 2020

Leadership in Education and Outreach
2022 – Community Advisory Board, R/Bioconductor
2021 – Co-founder and Co-organizer, AsiaR
2019 – Co-founder and Co-organizer, Women+ Data Science initiative with MSU, UMich
2019 – 2021 Co-founder and Co-organizer, MSU Data Science Learning Community
2018 – Founder and Co-organizer, R-Ladies East Lansing
* 850+ members; 1 national symposium; 2 K-12 events; 30+ workshops; $10K+ funding
* Received the 2020 All-University Excellence in Diversity Award, Michigan State University.

Other Scientific Societies, Education and Outreach/Leadership
2014 – 2015 Member, Postdoc Association, New York Academy of Sciences
2006 – 2011 Member and Co-organizer, Asha for Education, Virginia Tech

Mentoring

Mentees (2019–Present) [Initials referenced in the '*Mentee accomplishments*' section below]
Postdocs
● Cristina Zimpel, CZ Microbiology and Molecular Genetics, MSU (co-mentored with Neal Hammer, MSU)
● Evan Brenner, EB Biomedical Informatics, CU (Spring 2023)
Students [GS: graduate student; BS: bachelors student; V: visiting student]
● Kewalin Samart, KS GS: Computational Biosciences, CU
[BS: Computational Mathematics; CMSE, MSU | 2018–2022]
● Jill Bilodeaux, JBi GS: Microbiology, CU (Spring 2023 rotation)

- Sarah Stenske, SS   GS: Immunology, CU (Spring 2023 rotation)
- Ethan Wolfe, EW   BS: Biochemistry and Biotechnology; Pharmacology and Toxicology; CMSE, MSU
- Chanakarn Nasamran, CN   V: MS, Chulalongkorn University, Thailand
- Marvellous Oyebanjo, MO   V: MS, University of Ibadan, Nigeria

Information sciences professional

- Jacob Krol, JK   Biomedical Informatics, CU

Alumni: Amy Tonielli, AT; Joseph Burke, JB; Elliot Majlessi, EM; Vignesh Sridhar, VS (St. Clair College, Canada); Mary Zhang, MZ (Carleton College, MN); Samuel Chen, SC; Philip Calhoun, PC; Phoebe Tuyishime, PT; Lo Sosinski, LS; Karn Jongnarangsin, KJ; Lauryn Brooks, LB (Hampton University, VA); Larissa Ford, LF; Katherine McFerrin, KMF (Carleton College, MN); Tara Simmons, TS (Kent State University, OH). Non-MSU affiliations are marked.

Mentee Accomplishments

- *Publications*   [indicated in the <u>Publications</u> section above; mentees underlined]
- *Funding/Scholarships*
    - **TS**   2022: NSURP BIPOC Summer research program for microbiology.
    - **EW**   2022: College of Natural Science summer scholarship
              2021: Professorial Assistantship Program, Honors College, MSU (given to the Top200 students)
    - **JB**   2022: Microbiology and Molecular Genetics Undergraduate Award, MSU
    - **KS**   2022: (for PhD) College of Engineering Distinguished Scholarship, MSU
              2022: (for PhD) Rasmussen Doctoral Recruitment Award, MSU
              2022: McCartney Math Award, MSU
              2021: Engineering Summer Undergraduate Research Experience (EnSURE), MSU
              2020–2021: College of Natural Science scholarships for Spring, Summer, Fall '20; Spring, Fall '21.
    - **AT**   2021: Professorial Assistantship Program, Honors College, MSU (given to the Top200 students)
    - **EM**   2021: NIH R25-funded BRUSH Summer scholarship
    - **KJ, SC**   2020: NSF-funded REU/ACRES Summer scholarship.
    - **PC**   2020: NIH BRUSH Summer scholarship; 2019: SROP and NSF-funded BEACON fellowships.
    - **LB**   2020: NSURP BIPOC Summer research program for microbiology.
    - **PT**   2019: Contributed to the now funded DRN Launch Awards Program grant proposal.
- *Presentations*   [*honorable mention; $best poster award+cash prize; ¥best talk; #canceled due to COVID-19]
    <u>International/National meetings</u>
    - **KS**. 2022: Colorado Immunology & Microbiology Conference
    - **KS, EW**. 2022: ISMB (International Society for Computational Biology conference)
    - **JB, EM, VS, KC** [co-mentored student]. 2021: Midwest Microbial Pathogenesis Conference (MMPC)
    - **KS** [TALK]. 2021: Latin American Congress of Women in Bioinformatics and Data Science
    - **JB, EM, VS**. 2021: BEACON Congress
    - **EM**. 2021: National Veterinary Scholars Symposium, AAVMC
    - **KS** [TALK]**, VS$, EM***. 2021: ISMB (International Society for Computational Biology conference)
    - **KS** [TALK]. 2021: R-Ladies Pune
    - **SC, KS**. 2021: Great Lakes Bioinformatics Conference (GLBIO)
    - **SC, KJ**. [TALKS]. 2020: BEACON Congress
    - **PC**. 2020: National Veterinary Scholars Symposium, AAVMC
    - **SC*, KJ*, PT, PC**. 2020: ISMB (International Society for Computational Biology conference)
    - **SC, PT, KJ, PC, LS**. 2020#: Women+ Data Science at MSU, *East Lansing, MI*
    - **LS**. 2019: Women in Data Science Symposium East Lansing @MSU; UURAF, *East Lansing, MI*
    <u>Regional/University-wide symposia</u>
    - **EW**. 2022: Mid-Michigan Symposium for Undergraduate Research Experience
    - **EW, KS**. 2022: Undergraduate Research and Arts Forum (UURAF), *East Lansing, MI*
    - **KS, EM**. 2021: Mid-Michigan Symposium for Undergraduate Research Experience
    - **SC** [TALK]**, PC, EM, KS**. 2021: Undergraduate Research and Arts Forum (UURAF), *East Lansing, MI*

- **SC, JR**. [TALK]. 2021: BEACON Spring 2021 seminar series
- **EM, PC$^¥$**. [TALKS]. 2020: Phi Zeta Research Symposium
- **SC, KJ, KS, PC, EM, LS**. 2020: Mid-Michigan Symposium for Undergraduate Research Experience
- **PC**. 2019: Phi Zeta Research Symposium, College of Veterinary Medicine, Michigan State University; Mid-Michigan Symposium for Undergraduate Research Experiences, *East Lansing, MI*
- *Alumni career next steps (outgoing achievements)*
  - 2022: **KS**: Received admits to 5 fully-funded PhD programs. **JB**: CRISPR therapeutics.
  - 2021: **VS**: Now Asst. Vice President at BNP Paribas, Montreal, Canada. **SC**: Now at Amazon Inc. **PC**: Now pursuing a medical degree at MSU College of Human Medicine. Received 4 other admits.
  - 2020: **LS**: Now pursuing PhD at MSU (BMS/BMB program). **PT**: (2020) Now a Mastercard Foundation Scholar for MS in Public Health, Univ of British Columbia, Canada. Received admits to 3 fully-funded PhD programs.