Janani Ravi

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Education

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

Professional Appointments

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

Research Keywords

Computational biology, Bioinformatics, Clinical informatics | Molecular evolution and phylogeny | Comparative genomics and transcriptomics | Drug repurposing | Infectious diseases | R education and community | Open science

Publications   [*Contributed equally] [ᶜCorresponding author]

[JRaviLab current/past members, underlined]

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

In preparation

- Burke JT*, Chen SZ*, Sosinski LM*, Johnston JB, **Ravi J**ᶜ. MolEvolvR: A webapp for characterizing proteins using molecular evolution and phylogeny. [Webapp] *Co-primary, listed alphabetically.
- **Ravi J**ᶜ, Samart K, Zwolak J, Tyson JJᶜ. Modeling the START transition in the budding yeast cell cycle. [Model]

Preprints

- 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 [bioRxiv]
- 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. A Broadly Conserved Deoxycytidine Deaminase Protects Bacteria from Phage Infection. 2021 [bioRxiv] [Data]

- **Ravi J**[C], Anantharaman V, <u>Chen SZ</u>, Datta, P, Aravind L[G], Gennaro ML[G]. Phage-shock-protein (PSP) Envelope Stress Response: Evolutionary History and Novel Players. 2020. [<u>bioRxiv</u>] [<u>Webapp</u>]

Published papers
- <u>Samart K</u>**✤**, <u>Tuyishime P</u>**✤**, Krishnan A[C], **Ravi J**[C]. Reconciling multiple connectivity scores for drug repurposing. *Briefings in Bioinformatics*. 2021;22(6):bbab161. [<u>PubMed</u>] [<u>Live doc</u>] [<u>GitHub</u>]
- **Ravi J**✤[C], Fioravanti A✤[C]. S-layers: the proteinaceous multifunctional armours of Gram-positive pathogens. *Frontiers in Microbiology*. 2021;12:685. [<u>PubMed</u>]
- 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. [<u>PubMed</u>]
- 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. [<u>PubMed</u>]

Pre-MSU
- **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*]
- Thorne C, **Ravi J**, Tyson JJ, Lee E. Feedback among components of the β-catenin destruction complex imparts discrete signal transduction and memory. [*submitted*]
- **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. [<u>PubMed</u>] [<u>GitHub</u>]
- 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. [<u>PubMed</u>] [<u>GitHub</u>]
- 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. [<u>PubMed</u>] [<u>GitHub</u>]
- 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. [<u>PubMed</u>]

Grants, Awards

Research Funding/Awards   [*Also, see Mentee Accomplishments section below.*]
Pending support
- 2022–2024 (PI) NIH NIAID R21: "*Cross-database integration using evolution and machine learning to identify multiscale molecular building blocks for antibiotic resistance.*"
- 2022–2027 (PI) NIH NIGMS R35 MIRA resubmission of previously scored proposal: "*Computational approaches for multiscale data integration to reveal the molecular underpinnings of microbial phenotypes and diseases.*"
- 2022–2024 (co-PI) NIH NIAID R21: "Mechanism-guided drug repurposing for host-directed therapy of infectious diseases using interpretable and integrative ML"
- 2022–2025 (co-PI) Strategic Partnership Grant, Michigan State University, Pre-proposal.
Ongoing 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
Completed support
- 2019–2020 (PI) Diversity Research Network, Launch Awards Program, Michigan State University

Conference Registration Awards
- 2021 useR!
- 2018, 2020, 2021 ISMB

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

Education and Outreach Funding
- 2019–2020 MSU Data Science Learning Community funded by the MSU Academic Advancement Network.
- 2018– Sponsorships for 25+ R-Ladies East Lansing meetups.
- 2019– Sponsorship for Women+ Data Science East Lansing @MSU symposia.

Pre-MSU

Research Awards
- 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 Awards
- 2017 ASM Tuberculosis

Teaching/Workshops, Talks, Posters

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

Research Talks
- 2021-11 *⚧University of Colorado, 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*

Posters
- 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.

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
- 2022-02 ⚧*Writing manuscripts with R. *R-Ladies Dallas (US)*.

- 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
- 2021– Why R? Foundation webinars: R-Ladies takeover, for global URM speakers
- 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, meetups, and discussions, *MI*

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*

Pre-MSU

Research Talks
- 2016-06 ASM Microbe 2016, *Boston, MA*
- 2014-10 ‡Institute for Mathematical Sciences, *Chennai, India*

Posters
- 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*

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 for Integrative Cancer Research. 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

| 2018 – | International Society for Computational Biology |
| 2018 – | R-Ladies Global \| Women in Data Science \| rOpenSci |

Academic Services

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 –	Grant Reviewer, Diversity Research Network, MSU
2019 –	Grant Reviewer, Endowed Research Funds, College of Veterinary Medicine, MSU
2019 –	Abstract Reviewer, ISMB 2019–2021; Great Lakes Bioinformatics 2021
2019 – 2020	Member, CMSE Undergraduate Data Science Curriculum Committee

Conference Committees/Leadership

2021 – 2022	COSI Co-Chair and Awards Chair, EvolCompGen COSI, 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

2019 –	Co-founder and Co-organizer, MSU Data Science Learning Community
2019 –	Co-founder and Co-organizer, Women+ Data Science initiative with MSU, UMich
2018 –	Founder and Co-organizer, R-Ladies East Lansing
	* 650+ members; 1 national symposium; 2 K-12 events; 25+ workshops; $10K+ funding
	* Received the 2020 All-University Excellence in Diversity Award, Michigan State University.

Pre-MSU

Scientific Societies, Education and Outreach/Leadership

2015 –	Member, American Society of Microbiology
2014 – 2015	Member, Postdoc Association, New York Academy of Sciences
2006 – 2011	Member and Co-organizer, Asha for Education, Virginia Tech

Mentoring (at MSU)

Mentees (2019–Present) [Student initials referenced in the '*Mentee accomplishments*' section below]
- Samuel Chen, SC — Computer Science Engineering, MSU
- Kewalin Samart, KS — Computational Mathematics; CMSE, MSU; Scholarship from BIOTEC, Thailand
- Elliot Majlessi, EM — Biochemistry & Biotechnology, MSU
- Vignesh Sridhar, VS — Data Science and Analytics, St. Clair College, Ontario, Canada
- Joseph Burke, JB — Genomics and Molecular Genetics; Computer Science, MSU
- Ethan Wolfe, EW — Biochemistry & Molecular Biology; Pharmacology & Toxicology; CMSE, MSU
- Amy Tonielli, AT — Biomedical Laboratory Sciences, MSU
- Mary Zhang, MZ — Biology, Carleton College, MN

Alumni
- Philip Calhoun, PC — Human Biology, MSU; Drew Scholar; Honors College
- Phoebe Tuyishime, PT — Nutritional Sciences; Global Public Health & Epidemiology, MSU; Mastercard Foundation Scholar; Justin S. Morrill Leadership Fellow
- Lauren Sosinski, LS — Biochem. & Biotech.; Genomics & Mol Genetics; CMSE, MSU
- Karn Jongnarangsin, KJ — Human Biology ('19); Data Science; CSE, MSU
- Lauryn Brooks, LB — Microbiology, Hampton University, VA
- Larissa Ford, LF — Biochemistry & Biotechnology; CMSE, MSU

Mentee Accomplishments
- *Publications*   [indicated in the Publications section above; mentees underlined]
- *Funding/Scholarships*
    - **EW, AT**   2021: Professorial Assistantship Program, Honors College, MSU (given to the Top200 students)
    - **KS**   2021: Engineering Summer Undergraduate Research Experience (EnSURE), MSU
                   2020–2021: College of Natural Science scholarships for Spring, Summer, Fall '20; Spring, Fall '21.
    - **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; $best poster award+cash prize; ¥best talk; #canceled due to COVID-19]
    <u>International/National meetings</u>
    - **JB, EM, VS, KC** [co-mentored student]. 2021: Midwest Microbial Pathogenesis Conference (MMPC)
    - **KS** [TALK]. 2021: Latin American Congress of Women in Bioinformatics and Data Science
    - **JB, EM, VS**. 2021: BEACON Congress
    - **EM**. 2021: National Veterinary Scholars Symposium, AAVMC
    - **KS** [TALK]**, VS$, 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>
    - **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 outgoing achievements (career next steps)*
    - **VS**: (2021) Now Asst. Vice President at BNP Paribas, Montreal, Canada.
    - **SC**: (2021) Joining Amazon Inc. in 2022.
    - **PC**: (2021) Now joined the medical school at MSU College of Human Medicine. Received 4 other admits.
    - **LS**: (2020) Now pursuing PhD at MSU (BMS program).
    - **PT**: (2020) Now a Mastercard Foundation Scholar for MS in Public Health, Univ of British Columbia, Canada. Received admits to 3 other fully-funded PhD programs.