

# Janani Ravi

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## Education

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

## Professional Appointments

2021–	<b>Assistant Professor</b> (Tenure-Track) Pathobiology and Diagnostic Investigation Microbiology and Molecular Genetics	<b>Michigan State University</b> East Lansing, MI
2021–2021	<b>Assistant Professor</b> (Fixed-Term) Pathobiology and Diagnostic Investigation	<b>Michigan State University</b> East Lansing, MI
2018–2020	<b>Senior Research Associate</b> Pathobiology and Diagnostic Investigation	<b>Michigan State University</b> East Lansing, MI
2013–2017	<b>Postdoctoral Research Associate</b> Public Health Research Institute	<b>Rutgers University</b> Newark, NJ
Feb–Mar'17	<b>Visiting Scientist</b> National Center for Biotechnology Information	<b>National Institutes of Health</b> Bethesda, MD
Jan–Feb'15	<b>Visiting Scientist</b> Center for Cell Circuits	<b>Broad Institute</b> Boston, MA
2012–2013	<b>Postdoctoral Research Associate</b> Dept. of Mathematics	<b>Rutgers University</b> 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: [jrvilab.github.io/publication/](https://jrvilab.github.io/publication/) | Software and Data: [jrvilab.org](https://jrvilab.org), [github.com/jrvilab](https://github.com/jrvilab) | [ORCID](https://orcid.org/)

*In preparation*

- **Ravi J<sup>©</sup>**, Samart K, Zwolak J, Tyson JJ<sup>©</sup>. Modeling the START transition in the budding yeast cell cycle. [Model]

*Preprints/Submitted manuscripts*

- Burke JT<sup>\*</sup>, Chen SZ<sup>\*</sup>, Sosinski LM<sup>\*</sup>, Johnston JB, **Ravi J<sup>©</sup>**. MolEvolvR: A webapp for characterizing proteins using molecular evolution and phylogeny. [Webapp] \*Co-primary, listed alphabetically.
- Joo R<sup>\*</sup>, Sánchez-Tapia A<sup>\*</sup>, ..., **Ravi J**. Ten simple rules to host an inclusive conference. 2022 [submitted] [GitHub]
- Conner KN<sup>\*</sup>, Burke JT<sup>\*</sup>, **Ravi J<sup>©</sup>**, Hardy JW<sup>©</sup>. Novel Internalin P homologs in *Listeria ivanovii londoniensis* and *Listeria seeligeri*. 2022 [under revision at Microbial Genomics] [bioRxiv] [GitHub]
- Blaine HC<sup>\*</sup>, Burke JT<sup>\*</sup>, **Ravi J<sup>©</sup>**, Stallings CL<sup>©</sup>. DciA helicase operators exhibit diversity across bacterial phyla. 2022 [submitted] [bioRxiv] [GitHub]

- Cantoria MJ\*, Alizadeh E\*, **Ravi J**, Bunnag N, Kettenbach N, Ahmed Y, Paek AL, Tyson JJ, Doubrovinski K<sup>c</sup>, Lee E<sup>c</sup>, Thorne CA<sup>c</sup>. Feedback in the  $\beta$ -catenin destruction complex imparts bistability and cellular memory. 2022 [submitted] [bioRxiv]
- Lensmire JM, Wischer M, Sosinski LM, ..., **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\*, ..., **Ravi J**, Top EM, and Waters CM. A Broadly Conserved Deoxycytidine Deaminase Protects Bacteria from Phage Infection. 2021 [submitted] [bioRxiv] [Data]
- **Ravi J**<sup>c</sup>, Anantharaman V, Chen SZ, Datta, P, Aravind L<sup>c</sup>, Gennaro ML<sup>c</sup>. Phage-shock-protein (PSP) Envelope Stress Response: Evolutionary History and Novel Players. 2020. [submitted] [bioRxiv] [Webapp]

#### Published papers

- Samart K\*, Tuyishime P\*, Krishnan A<sup>c</sup>, **Ravi J**<sup>c</sup>. Reconciling multiple connectivity scores for drug repurposing. *Briefings in Bioinformatics*. 2021;22(6):bbab161. [PubMed] [Live doc] [GitHub]
- **Ravi J**<sup>c</sup>, Fioravanti A<sup>c</sup>. 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]

#### 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]
- **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, Balázs 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.]

##### Pending support

- 2022–2024 (co-PI) NIH NIAID R21: “Mechanism-guided drug repurposing for host-directed therapy of infectious diseases using interpretable and integrative ML”

##### 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 30+ 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: [jrautilab.github.io/talk](https://jrautilab.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

- 2022-05 \*\*Writing manuscripts with R. *R-Ladies Dallas (US)*.

- 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– 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

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### 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

### 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 2019–2022; Great Lakes Bioinformatics 2021
- 2019 – 2020 Member, CMSE Undergraduate Data Science Curriculum Committee

### Conference Committees/Leadership

- 2021 – 2022 COSI Co-Chair, Track, 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

- 2021 – Co-founder, [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](#)  
*\* 800+ members; 1 national symposium; 2 K-12 events; 30+ 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)

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#### Mentees (2019–Present)

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| <ul style="list-style-type: none"> <li>• Kewalin Samart, KS</li> <li>• Elliot Majlessi, EM</li> <li>• Vignesh Sridhar, VS</li> <li>• Joseph Burke, JB</li> <li>• Ethan Wolfe, EW</li> <li>• Amy Tonielli, AT</li> <li>• Mary Zhang, MZ</li> </ul> | <p>[Student initials referenced in the 'Mentee accomplishments' section below]</p> <p>Computational Mathematics; CMSE, MSU; Scholarship from BIOTEC, Thailand</p> <p>Biochemistry &amp; Biotechnology, MSU</p> <p>Data Science and Analytics, St. Clair College, Ontario, Canada</p> <p>Genomics and Molecular Genetics; Computer Science, MSU</p> <p>Biochemistry &amp; Molecular Biology; Pharmacology &amp; Toxicology; CMSE, MSU</p> <p>Biomedical Laboratory Sciences, MSU</p> <p>Biology, Carleton College, MN</p> |
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*Alumni*

- Samuel Chen, SC Computer Science Engineering, MSU
- 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
- Lo 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]  
International/National meetings
  - **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*Regional/University-wide symposia
  - **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) Now at Amazon Inc. in 2022.
  - **PC:** (2021) Now pursuing a medical degree at MSU College of Human Medicine. Received 4 other admits.
  - **LS:** (2020) 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 other fully-funded PhD programs.