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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

Work Experience

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
2006–2011	Graduate Research Assistant Dept. of Biology	Virginia Tech Blacksburg, VA
2005–2006	Student Researcher Bioinformatics Centre	Indian Institute of Science Bangalore, India

Research Keywords

Computational biology/bioinformatics | molecular evolution and phylogeny | comparative pathogenomics | drug repurposing | genomics/transcriptomics | infectious diseases | R for biological data science

Publications

[*Contributed equally] [®Corresponding author]

[JRaviLab *current/past members*, [underlined](#)]

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

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In preparation

- Severin GB, Hsueh BY, Elg CA, Dover JA, Rhoades CR, Wessel AJ, Top EM, **Ravi J**, Parent KN, and Waters CM. Novel Cytidine Deaminase-based Antiphage System in Bacteria. [in preparation]
- Lensmire JM, Wischer M, Ensink E, Dodson J, Shook J, Sosinski LM, Lunt S, **Ravi J**, Hammer ND. *Staphylococcus aureus* nutrient sulfur acquisition targets host-derived glutathione and promotes interspecies competition. [in preparation for *PLoS Pathogens*]

- **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 for *Journal of Lipid Research*]

Preprints and Manuscripts submitted/under revision

- **Ravi J***, Fioravanti A*. S-layers: the proteinaceous multifunctional armours of Gram-positive pathogens. [accepted at *Frontiers in Microbiology, Special Issue on "Cell Surface Proteins of Gram-positive Pathogenic Bacteria"*]
- **Chen SZ***, **Sosinski LM***, Johnston JB, **Ravi J***. MolEvolR: A web-app for characterizing proteins using molecular evolution and phylogeny. [submitted to *Nucleic Acids Research*] [[Webapp](#)]
- **Samart K***, **Tuyishime P***, Krishnan A*, **Ravi J***. Reconciling multiple connectivity scores for drug repurposing. 2020 [[arXiv](#)] [[Live doc](#)] [[GitHub](#)] [under revision at *Briefings in Bioinformatics*]
- **Ravi J***, Anantharaman V, **Chen SZ**, Datta, P, Aravind L*, Gennaro ML*. Phage-shock-protein (Psp) Envelope Stress Response: Evolutionary History & Discovery of Novel Players. 2020. [[bioRxiv](#)] [[Webapp](#)] [in preparation for *Molecular Biology and Evolution*]
- **Ravi J***, Tyson JJ*. Modeling the START transition in the budding yeast cell cycle. [submitted] [[Webapp](#)]
- Thorne C, **Ravi J**, Tyson JJ, Lee E. Feedback among components of the β -catenin destruction complex imparts discrete signal transduction and memory. [submitted]

Published papers

- 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 Jan 13;11(1):1224. PMID: 33441660.
- 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 Dec; epub. PMID: 31843961.
- **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 May;111(5):753-760. PMID: 29488183. [[GitHub](#)]
- Chauhan R, **Ravi J**, Datta P, Chen T, Schnappinger D, Bassler K, Balázs G, Gennaro ML. (2016) Reconstruction and topological characterization of the sigma factor regulatory network of *Mycobacterium tuberculosis*. *Nature communications*. 7:11062. PMID: 27029515. [[GitHub](#)]
- Datta P, **Ravi J**, Guerrini V, Chauhan R, Hancioglu B, Igoshin O, Neiditch M, Gennaro ML. (2015) The Psp system of *Mycobacterium tuberculosis* integrates envelope stress sensing and envelope preserving functions. *Molecular Microbiology*. 97: 408-422. PMID: 25899163. [[GitHub](#)]
- Salamon H, Bruiners N, Lakehal K, Shi L, **Ravi J**, Yamaguchi KD, Pine R, Gennaro ML. (2014) Cutting Edge: Vitamin D regulates lipid metabolism in *Mycobacterium tuberculosis* infection. *Journal of Immunology* 193: 30-34. PMID: 24899504.

Grants, Awards

Research Funding

Pending support

- 2021–2026 National Institutes of Health, National Institute of General Medicine Sciences, R35 MIRA (PI)

Current funding

- 2021–2023 Harvey J Fiege Endowed Research Fund, College of Veterinary Medicine, MSU (PI)
- 2021–2022 NSF-funded BEACON (PI)
- 2021–2022 Spectrum Health and MSU Alliance (PI: Jeremy Prokop, Nicholas Hartog)
- 2020–2021 NIH R01 sub-award for summer support. (PI: Neal Hammer)

- 2019–2021 Harvey J Fiege Endowed Research Fund, College of Veterinary Medicine, MSU (PI)

Past funding

- 2019–2020 Diversity Research Network, Launch Awards Program, Michigan State University (PI)
- 2017 ORAU/ORISE Visiting Scientist Program at NCBI, NIH.
- 2015 Broad Institute Visiting Scientist Program at the Center for Cell Circuits.
- 2007 P.E.O. International Peace Scholarship for Graduate Research.

*Also, see *Team Member Accomplishments* section below.

Conference

- 2018, 2020 ISMB: Conference registration grant award.
- 2017 ASM Tuberculosis: Travel grant award.

Teaching, Education, and Outreach

- All-University Excellence in Diversity Award, Michigan State University (for R-Ladies East Lansing).
- MSU Data Science Learning Community funded by the MSU Academic Advancement Network.
- Sponsorships for 15+ R-Ladies East Lansing meetups.
- Sponsorship for Women+ Data Science East Lansing @MSU symposia (2019, 2020).

Teaching/Workshops, Oral Presentations, Posters

Workshop & talks: jrautilab.github.io/talk | *Upcoming; [Ⓜ]Invited; [Ⓥ]Virtual; [#]cancelled due to COVID-19.

Teaching, Workshops


- 2021-04 ^{Ⓜ*}Using Tidyverse for Genomics. R-Ladies Tunis (Africa) and 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*
- 2019-09 [Ⓜ]Best Practices for Computational Sciences: R for Reproducible Research. *Diversity Research Network Researcher's Workshop, MSU, MI*
- 2019-03 R for Genomics Workshop. *Indian Institute of Technology, Madras, India*
- 2019/20 [Ⓜ]Tidyverse Workshop for Genomics. *R for Plant Genomics course, MSU, MI*
- 2018/19 Introduction to Tidy Data with R Workshop. *R-Ladies East Lansing, MI*
- 2018/19 Introduction to Data Visualization with R Workshop. *R-Ladies East Lansing, MI*

Co-organized Meetings

- 2020– Women+ Data Science webinar series and panel discussions[Ⓥ]
- 2020-04 [#]Women+ Data Science Symposium at MSU, *East Lansing, MI*
- 2020-08 Conference on Computational Health. *Grand Rapids, MI*
- 2019-04 Women in Data Science Symposium *East Lansing, @MSU*
- 2018– R-Ladies East Lansing workshops, meetups, and discussions, *MI*

Talks

- 2020-11 ^{*Ⓜ}Michigan Precollege & Youth Outreach Conference[Ⓥ]
- 2020-08 BEACON Congress[Ⓥ]
- 2020-07 Intelligent Systems for Molecular Biology, International Society for Computational Biology[Ⓥ]
- 2019-09 [Ⓜ]R for you! Diversity Research Network, MSU Inclusion. *MI*
- 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*
- 2019-01 [Ⓜ]Simple rules to make an effective scientific presentation. *CMIB seminar series, MSU, MI*
- 2018-07 ISMB 2018, *Chicago, IL*

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

Posters

- 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*

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 for Integrative Cancer Research. MIT, MA*
- 2007-04 ASBMB Meeting. *Washington DC*

Professional Memberships, Services, Education, and Outreach

Scientific Societies

- 2018 – Member, International Society for Computational Biology; EvolCompGen COSI committee
- 2015 – Member, American Society of Microbiology
- 2014 – 2015 Member, Postdoc Association, New York Academy of Sciences

University/Academic Services

- 2020 – Grant Reviewer, Diversity Research Network, MSU
- 2019 – Grant Reviewer, Endowed Research Funds, College of Veterinary Medicine, MSU
- 2019 – 2020 Member, CMSE Undergraduate Data Science Curriculum Committee

Conference committees

- 2020 – Program and Content Chair, [useR! 2021](#) (the global R conference)
- 2020 – Abstract Area Chair, EvolCompGen, [ISMB 2021](#)
- 2018 – Intelligent Systems for Molecular Biology, EvolCompGen COSI committee
flagship conference of International Society for Computational Biology
- 2019 – 2020 Poster Awards Chair, EvolCompGen, ISMB 2020

Education and Outreach

- 2019 – Co-founder and Co-organizer, [MSU Data Science](#) Learning Community
- Co-founder and Co-organizer, [Women+ Data Science](#) initiative with MSU, UMich
- 2019 – Member, Data Carpentry | Genomics and Open Science Education teams
- 2018 – Member, R-Ladies Global; Women in Data Science; rOpenSci
- 2018 – Founder and Co-organizer, [R-Ladies East Lansing](#)
** 500+ members; 1 national symposium; 2 K-12 events; 25+ workshops; \$10K+ funding*
- 2006 – 2011 Member and Co-organizer, Asha for Education, Virginia Tech

Mentoring

Team Members (Current & Past)

Undergraduate Researchers (2019 – Present)

[Student initials referenced in the 'accomplishments' section below]

- Samuel Chen, SC Computer Science Engineering, MSU; Honors College
- Karn Jongnarangsin, KJ Human Biology (completed); Data Science; CSE, MSU
- Philip Calhoun, PC Human Biology, MSU; Drew Scholar; Honors College
- Kewalin Samart, KS Computational Mathematics; CMSE, MSU; Scholarship from BIOTEC, Thailand
- Elliot Majlessi, EM Biochemistry & Biotechnology, MSU
- Mary Zhang, MZ Biology, Carleton College, MN
- Larissa Ford, LF Biochemistry & Biotechnology; CMSE, MSU

Alumni

- Lauryn Brooks, LB Microbiology, Hampton University, VA
- Lauren Sosinski, LS Biochemistry & Biotechnology; Genomics & Molecular Genetics; CMSE, MSU
- Phoebe Tuyishime, PT Nutritional Sciences; Global Public Health & Epidemiology, MSU; Mastercard Foundation Scholar; Justin S. Morrill Leadership Fellow

Team Member Accomplishments

- *Undergraduate publications* [indicated in the Publications section above]
- *Funding/Scholarships*
 - **KJ & SC** 2020: REU/ACRES (NSF-funded) Summer scholarship.
 - **PC** 2020: BRUSH/NIH Summer scholarship; 2019: SROP Summer and BEACON fellowships.
 - **KS** 2020–2021: College of Natural Science scholarships for Spring, Summer, Fall '20; Spring '21.
 - **LB** 2020: NSURP BIPOC Summer research program for microbiology, 2020.
 - **PT** 2019: Contributed to now funded DRN Launch Awards Program grant proposal.
- *Student posters/talks*

[^VVirtual; *received honorary mention for their posters; #cancelled due to COVID-19]

 - **SC, LS.** [TALKS] 2021: BEACON Spring 2021 seminar series^V
 - **EM, PC.** [TALKS] 2020: Phi Zeta Research Symposium^V
 - **SC, KJ.** [TALKS] 2020: Talks at BEACON Congress^V
 - **PC.** 2020: National Veterinary Scholars Symposium, AAVMC^V
 - **SC, KJ, KS, PC, EM, LS.** Mid-Michigan Symposium for Undergraduate Research Experience^V
 - **SC*, KJ*, PT, PC.** 2020: ISMB (International Society for Computational Biology conference)^V
 - **SC, PT, KJ, PC, LS.** 2020#: Women+ Data Science at MSU, *East Lansing, MI*
 - **PC.** 2019: Phi Zeta Research Symposium, College of Veterinary Medicine, Michigan State University; Mid-Michigan Symposium for Undergraduate Research Experiences, *East Lansing, MI*
 - **LS.** 2019: Women in Data Science Symposium East Lansing @ Michigan State University; University Undergraduate Research and Arts Forum (UURAF), *East Lansing, MI*
- *Career next steps*
 - **PT:** Mastercard Foundation Scholarship for Masters in Public Health, University of British Columbia, Canada. Also accepted to fully-funded PhD programs at Purdue University, Emory University, UC Davis.
 - **LS:** Post-baccalaureate program with Biochemistry, MSU. Accepted to MSU PhD program (2021).
 - **PC:** Accepted to medical schools, Loyola College, MSU College of Human Medicine (2021).