

## Work Experience

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<b>Senior Research Associate</b> Pathobiology and Diagnostic Investigation, Michigan State University, East Lansing, MI	<b>2018–Present</b>
<b>Postdoctoral Research Associate</b> Public Health Research Institute, Rutgers University, Newark, NJ	<b>2013–2017</b>
<b>Visiting Scientist</b> National Center for Biotechnology Information, National Institutes of Health, Bethesda, MD	<b>Feb–Mar ‘17</b>
<b>Visiting Scientist</b> Broad Institute, Boston, MA	<b>Jan–Feb ‘15</b>
<b>Postdoctoral Research Associate</b> Dept. of Mathematics, Rutgers University, Piscataway, NJ	<b>2012–2013</b>
<b>Graduate Research Assistant</b> Virginia Tech, Blacksburg, VA	<b>2006–2011</b>

## Education

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<b>Ph.D. Genetics, Bioinformatics and Computational Biology</b> Virginia Tech, Blacksburg, VA Dissertation: <i>Mathematical modeling of pathways involved in cell cycle regulation and cell differentiation</i>	<b>2006–2011</b>
<b>B.Tech. Industrial Biotechnology</b> Anna University, Chennai, India	<b>2002–2006</b>

## Research Interests

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- Unraveling molecular mechanisms common between genetic and infectious diseases, to guide targeted drug repurposing
- Identifying genomic signatures, functions, and mechanisms relevant to host-pathogen interactions, to enable understanding and guide diagnosis
- Developing tools and resources for seamlessly relating sequence, structure, and function of genes/proteins in poorly characterized pathogens to enable and guide better prevention, diagnostic and treatment regimen
- Mathematical/statistical modeling of signaling and regulatory networks: host-pathogen interactions, metabolic pathways, and cellular processes.

## Publications

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#Corresponding author; \*Contributed equally.

From Michigan State University

- Samart K\*, Tuyishime P\*, Krishnan A#, **Ravi J#**. Reconciling multiple connectivity scores for drug repurposing. *In preparation*. [GitHub](#)
- Chen SZ, Sosinski LM, **Ravi J#**. MolEvolVR: An molecular evolution and phylogeny web-app to characterize proteins. *In preparation*. [Web-app](#) ([molevolvr](#), [cpathogeno2019](#))

- Kolte IV, Hadi SA, Brenner EP, Gardy J, Cunha EAT, Ferrazoli L, Villela DA, Santos RS, **Ravi J**, Sreevatsan S, Basta PC. Discovery of a predominant and distinct lineage of *Mycobacterium tuberculosis* in Brazilian indigenous population. *Submitted to Scientific Reports*.
- 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.

From Rutgers University

- **Ravi J**<sup>#</sup>, Anantharaman V, Chen SZ, Datta, P, Aravind L, Gennaro ML<sup>#</sup>. Conservation and modularity in the phage shock protein stress response system. *In preparation*. [Web-app](#) (*pspevolution*, *cpathogeno2019*)
- **Ravi J**<sup>\*</sup>, Kaufman G<sup>\*</sup>, 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 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.

From Virginia Tech

- **Ravi J**<sup>#</sup>, Tyson JJ<sup>#</sup>. Modeling the START transition in the budding yeast cell cycle. *Submitted*.
- Thorne C, **Ravi J**, Tyson JJ, Lee E. Feedback among components of the  $\beta$ -catenin destruction complex imparts discrete signal transduction and memory. *Submitted*.

## Grants, Awards

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### Research Funding

- 2020 NIH R01 Sub-award. PI: Neal Hammer.
- 2019 Diversity Research Network, Launch Awards Program, Michigan State University.
- 2019 Harvey J Fiege Endowed Research Fund, College of Veterinary Medicine, 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 P.E.O. International Peace Scholarship: Graduate Research.
- *\*Also see the student scholarship 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

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Workshop & talks: [jrvilab.github.io/talk](https://jrvilab.github.io/talk) | \*upcoming; #cancelled due to COVID-19.

### Teaching, Workshops

- Three lectures on Methods in phylogeny, pangenomes, genomics, *Integrated Microbial Biology course (invited)*, MSU (Sep\* '20)
- Session on Data Visualization. *DANG! symposium (invited)*, Univ of Michigan, Ann Arbor, MI (May '20#)
- Computational Approaches for Host-Pathogen Biology. *Chemistry and Biology of Pathogens course (invited)*, MSU (Feb '20)
- Best Practices for Computational Sciences: R for Reproducible Research. *Diversity Research Network Researcher's Workshop (invited)*, MSU (Jan '20)
- R for Genomics Workshop. *Indian Institute of Technology, Madras, India* (Mar '19)
- Tidyverse Workshop for Genomics. *R for Plant Genomics course (invited)*, MSU (Feb '20, '19)
- Introduction to Tidy Data with R Workshop. *R-Ladies East Lansing* (Nov '18)
- Introduction to Data Visualization with R Workshop. *R-Ladies East Lansing* (Oct '18)

### Co-organized Meetings

- Women+ Data Science Symposium at MSU, *East Lansing, MI* (Apr '20#, Apr '10)
- Conference on Computational Health. *Grand Rapids, MI* (Aug '19)
- Women in Data Science Symposium *East Lansing, @MSU* (Apr '19)
- R-Ladies East Lansing workshops, meetups, and discussions (Jul '18 – now)

### Talks

- Michigan Precollege & Youth Outreach Conference (*invited*). (Nov '20\*)
- BEACON Congress (*contributed talk*). (Aug '20\*)
- Intelligent Systems for Molecular Biology 2020, International Society for Computational Biology. (Jul '20)
- R for you! (*invited*) Diversity Research Network, MSU Inclusion. *East Lansing, MI* (Sep '19)
- Conference on Computational Health. *Grand Rapids, MI* (Aug '19) | Also, chaired one of the sessions.
- Gram-positive bacteria and bacilli meeting. *College Park, MD* (July '19)
- Chemistry and Biology of Pathogens (*invited*). *East Lansing, MI* (May '19)
- Simple rules to make an effective scientific presentation. *CMIB seminar series (invited)*, MSU (Jan '19)
- ISMB 2018, *Chicago, IL* (July '18)
- ASM Microbe 2016, *Boston, MA* (June '16)
- Institute for Mathematical Sciences, *Chennai, India* (October '14)

### Posters

- ASBMB Symposium on Evolution and Core Processes in Gene Expression. *Michigan State University, East Lansing, MI* (May '19) | Also, chaired one of the sessions.
- ASM Tuberculosis '17, *New York, NY* (April '17)
- Lipid Research Symposium at the Rutgers Center for Lipid Research, *Rutgers University, New Brunswick, NJ* (November '15)
- Computational Cell Biology Meeting. *Cold Spring Harbor Laboratories, Long Island, NY* (March '11)
- Signal Transduction and Gene Regulatory Networks Workshop. *Mathematical Biosciences Institute, OSU, Columbus, OH* (November '10)
- Gordon Research Conference on Cell Growth and Proliferation. *Colby College, Waterville, ME* (July '09)
- Computational Cell Biology Meeting. *Cold Spring Harbor Laboratories, Long Island, NY* (March '09)
- Biological Sciences Research Symposium. *Virginia Tech, Blacksburg, VA* (February '09)

## Other Scientific Meetings

- Computational Genomics workshop. *Center for Cell Circuits, Broad Institute, Boston, MA* (Sep '14)
- Biomarkers for Tuberculosis: New Questions, New Tools. *Chantilly, VA* (Sep '13)
- The Cell Cycle Meeting. *Cold Spring Harbor Laboratories, Long Island, NY* (May '10)
- Joint meeting of the National Centers of Integrative and Systems Biology 2007. *Boston, MA* (Jun '07)
- Summer Symposium on Systems Biology of Cancer. *Koch Institute for Integrative Cancer Research. MIT, Boston, MA* (Jun '07)
- ASBMB Meeting. *Washington DC* (Apr-May '07)

## Professional Memberships, Services, Education, and Outreach

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### Scientific societies

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

### Services

- 2019 — 2020 Member, CMSE Undergraduate Data Science Curriculum Committee
- 2019 — Grant Reviewer, Endowed Research Funds, College of Veterinary Medicine, MSU
- 2020 — Grant Reviewer, Diversity Research Network, MSU
- 2020 — Host, Writing Spaces for minority faculty, Diversity Research Network, MSU

### Education and Outreach

- 2006 — 2011 Member and Co-organizer, Asha for Education, Virginia Tech
- 2018 — Founder and Co-organizer, [R-Ladies East Lansing](#)  
\* 400+ members; 1 national symposium; 2 K-12 events; 15+ workshops; \$10K+ funding
- 2018 — Member, R-Ladies Global; Women in Data Science; ROpenSci
- 2019 — Member, Data Carpentry | Genomics and Open Science Education teams
- 2019 — Co-founder and Co-organizer, [MSU Data Science](#) Learning Community  
Co-founder and Co-organizer, [Women+ Data Science](#) initiative with MSU, UMich

### Mentoring

#### Undergraduate Researchers (2019 – Present)

- Samuel Chen<sup>1,2</sup> (Computer Science Engineering; Honors College)
- Lauren Sosinski<sup>1</sup> (Biochemistry & Biotechnology; Genomics and Molecular Genetics; CMSE; 2020 graduate)
- Karn Jongnarangsin<sup>2</sup> (Human Biology (completed); Data Science; CSE)
- Philip Calhoun<sup>3</sup> (Human Biology; Drew Scholar; Honors College)
- Phoebe Tuyishime<sup>4,5</sup> (Nutritional Sciences; Global Public Health & Epidemiology  
Mastercard Foundation Scholar; Justin S. Morrill Leadership Fellow; 2020 graduate)
- Kewalin Samart<sup>4-6</sup> (Computational Mathematics; CMSE; Scholarship from BIOTEC, Thailand)
- Elliot Majlessi (Biochemistry & Biotechnology)
- Laurn Brooks<sup>7</sup> (Microbiology, Hampton University)

*Funding/Umbrella programs: <sup>1</sup>Endowed Research Fund; <sup>2</sup>REU-ACRES fellowship; <sup>3</sup>SROP/BEACON/BRUSH fellowship; <sup>4</sup>DRN Launch Awards; <sup>5</sup>Co-mentor: Dr. Arjun Krishnan; <sup>6</sup>College of Natural Science scholarship; <sup>7</sup>NSURP for Microbiology.*

#### Graduate Research (co-mentor)

- Joshua Lensmire (PI: Dr. Neal Hammer; 2018—Present); Alex Corron (PI: Dr. Brad Day; 2018—19)

## Student accomplishments

- *Upcoming publications*
  - KS & PT:** Samart K\*, Tuyishime P\*, Krishnan A, Ravi J. Reconciling multiple connectivity scores for drug repurposing. *In preparation*. [GitHub](#)
  - SC & LS:** Chen SZ, Sosinski LM, Ravi J. MolEvolVR: An molecular evolution and phylogeny web-app to characterize proteins. *In preparation*. [Web-app](#) (*molevolvr*, *cpathogeno2019*)
  - SC:** Ravi J, Anantharaman V, Chen SZ, Datta, P, Aravind L, Gennaro ML. Conservation and modularity in the phage shock protein stress response system. *In preparation*. [Web-app](#) (*pspevolution*, *cpathogeno2019*)
- *Funding/Scholarships*
  - Karn Jongnarangsins & Samuel Chen: REU/ACRES (NSF-funded) summer scholarship, 2020.
  - Philip Calhoun: BRUSH/NIH summer scholarship, 2020; SROP summer fellowship, 2019; BEACON fellowship, 2019.
  - Kewalin Samart: College of Natural Science scholarship for Spring and Summer 2020.
  - Lauryn Brooks: NSURP BIPOC summer research program for microbiology, 2020.
  - Phoebe Tuyishime: Contributed to now funded DRN Launch Awards Program grant proposal, 2019.
- *Student posters/talks*

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

  - SC, KJ: Talks at BEACON Congress (Aug '20)
  - PC: National Veterinary Scholars Symposium, AAVMC (Aug '20)
  - SC, KJ, KS, PC, EM, LS: Mid-Michigan Symposium for Undergraduate Research Experience (Aug '20)
  - SC\*, KJ\*, PT, PC: ISMB 2020 (International Society for Computational Biology flagship conference), Virtual (Jul '20)
  - SC, PT, KJ, PC, LS: Women+ Data Science at MSU, East Lansing, MI (Apr '20#)
  - PC: Phi Zeta Research Day, College of Veterinary Medicine, Michigan State University (Oct '19)
  - PC: Mid-Michigan Symposium for Undergraduate Research Experiences (Jul '19)
  - LS: Women in Data Science Symposium East Lansing @ Michigan State University (Apr '19); University Undergraduate Research and Arts Forum (UURAF) (Mar '19)
- *Career next steps*
  - Phoebe Tuyishime: 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.
  - Lauren Sosinski: Post-baccalaureate program with Biochemistry, Michigan State University.