

Kewalin Samart

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Education

Michigan State University (MSU)

East Lansing, MI

B.Sc. IN COMPUTATIONAL MATHEMATICS; MINOR IN COMPUTATIONAL MATH, SCIENCE, AND ENGINEERING

May 2022 (Expected)

- Cumulative GPA: 3.98/4.00; Major GPA: 4.00/4.00
- Dean's Honor List: Fall 2018 – present
- Royal Thai Government Scholarship Recipient 2017
- Relevant Courses: Calculus I-II, Multivariable Calculus, Differential Equations, Linear Algebra, Discrete Mathematics, Numerical Analysis, Analysis, Abstract Algebra, Introduction to Programming: Python, C++, Computational Modeling and Data Analysis, Statistics for Scientists, Probability and Statistics, Cell and Molecular Biology, Organisms and Population Biology, Plant Biology

Skills

Programming Languages R, Python, C++, TeX

Computational Tools Git, vi, Terminal, Unix/Linux, High-performance/ Cluster computing, LaTeX

Research Experience

JRavi Lab; PI: Dr. Janani Ravi, Ph.D.

Dec 2019 – present

MSU DEPARTMENT OF PATHOBIOLOGY AND DIAGNOSTIC INVESTIGATION

East Lansing, MI

Undergraduate researcher in computational biology

Krishnan Lab; PI Dr. Arjun Krishnan, Ph.D.

Mar 2021 – present

MSU DEPARTMENT OF COMPUTATIONAL MATHEMATICS, SCIENCE, AND ENGINEERING

East Lansing, MI

Undergraduate researcher in computational biology

Teaching Experience

CMSE 202: Computational Modeling and Data Analysis II

Spring 2022

MSU DEPARTMENT OF COMPUTATIONAL MATHEMATICS, SCIENCE, AND ENGINEERING

East Lansing, MI

Undergraduate learning assistant (LA)

Research Projects

A computational approach to repurpose drugs against infectious diseases – NIH funded

- **Mentors:** Dr. Janani Ravi and Dr. Arjun Krishnan
- Reconciled multiple connectivity-based methods for drug repurposing and published the work in *Briefings in Bioinformatics*.
- Design and develop a computational framework for host-directed gene expression-based drug repurposing in infectious diseases.
- Write custom R scripts to programmatically obtain and uniformly process disease and drug gene expression data (for both microarray and RNA-seq data) from public gene expression databases e.g. GEO, ARCHS4, LINCS, CMap.
- Perform differential expression analyses using limma, DESeq2 packages to construct disease signatures.
- Integrate the reconciled multiple connectivity-based metrics in Samart, Tuyishime, et al. 2021. to identify efficacious drug candidates for tuberculosis.

Modeling the START transition in the budding yeast cell cycle

- **Mentor:** Dr. Janani Ravi
- Contribute to the mathematical model built on over 100 differential equations and 200 parameters to represent the critical decision point in cell division of the budding yeast cell cycle.
- Simulate about 150 mutant phenotypes using SBML (Systems Biology Markup Language) for model manipulation and PET (the Parameter Estimation Toolkit) for model simulations with our new parameter set.
- Generate all the final cartoon depictions of the cell cycle model, simulation plots, and tables and finalize the manuscript for submission (Ravi, Samart, et al.,; will be submitted to *bioRxiv* by Jan 2022).

Publications

- **Kewalin Samart**^{**}, Phoebe Tuyishime^{**}, Arjun Krishnan^{*}, Janani Ravi^{*}. Reconciling multiple connectivity scores for drug repurposing. *Briefings in Bioinformatics*(2021) doi.org/10.1093/bib/bbab161; ^{**}co-primary authors; ^{*}corresponding authors [GitHub: github.com/jravailab/connectivity_scores](https://github.com/jravailab/connectivity_scores); [Live doc: jravailab.github.io/connectivity_scores](https://jravailab.github.io/connectivity_scores)
- Janani Ravi, **Kewalin Samart**, Jason Zwolak, John Tyson. Modeling the START transition in the budding yeast cell cycle. *In preparation*. [Online simulator: http://sbmlsimulator.org/simulator/by-start](http://sbmlsimulator.org/simulator/by-start)

Presentations

Research/Technical Talks

- 2nd Latin American Congress of Women in Bioinformatics and Data Science (WBDS LA). Virtual, Sep. 23, 2021.
- 29th Conference on Intelligent Systems for Molecular Biology and the 20th European Conference on Computational Biology (ISMB/ECCB). Virtual, Jul. 25, 2021.
- R-Ladies Pune. Virtual, May. 9, 2021. Presentation material: github.com/KewalinSamart/Rladies-lightning-talk-distill

Poster Presentations

- 2nd Latin American Congress of Women in Bioinformatics and Data Science (WBDS LA). Virtual, Sep. 22 – 24, 2021.
- 2021 Mid-Michigan Symposium for Undergraduate Research Experiences (Mid-SURE). Virtual, Jul. 28, 2021.
- 29th Conference on Intelligent Systems for Molecular Biology and the 20th European Conference on Computational Biology (ISMB/ECCB). Virtual, Jul. 25 – 30, 2021.
- 2021 Great Lakes Bioinformatics Conference (GLBIO). Virtual, May 10 – 13, 2021.
- 2021 University Undergraduate Research and Arts Forum (UURAF). Virtual, Apr. 15 – 19, 2021.
- 2020 Mid-Michigan Symposium for Undergraduate Research Experiences (Mid-SURE). Virtual, Aug. 10, 2020.

Podcast Interview

- Repurposing drugs for diseases. The Sci-Files on Impact 89FM Episode 11 Season 6, Aug. 1, 2021.
Podcast: <https://impact89fm.org/101365/podcasts/the-sci-files-08-01-2021-kewalin-samart-repurposing-drugs-for-diseases/>

Relevant Coursework Projects

Modeling oxygen repopulation in the body Python; Built an agent-based model to simulate how blood cells repopulate oxygen in the body focusing on modeling blood moving through veins/arteries.

Electricity generation and climate change in the United States Python; Conducted regression analysis to determine the relationship between electricity generation and average temperature in the U.S. and the relationship between electricity generation and annual precipitation in the U.S. during 1949 – 2019.

Honors/ Awards/ Scholarships

Oct 2021	Fall 2021 CNS Undergraduate Research Scholarship , MSU College of Natural Science	<i>East Lansing, MI</i>
May 2021	Summer Research Scholarship , EnSURE program – MSU College of Engineering	<i>East Lansing, MI</i>
Jan 2021	Spring 2021 CNS Undergraduate Research Scholarship , MSU College of Natural Science	<i>East Lansing, MI</i>
Oct 2020	Fall 2020 CNS Undergraduate Research Scholarship , MSU College of Natural Science	<i>East Lansing, MI</i>
May 2020	Summer 2020 CNS Undergraduate Research Scholarship , MSU College of Natural Science	<i>East Lansing, MI</i>
Apr 2020	L.C. Plant Mathematics Award Scholarship , MSU Department of Mathematics	<i>East Lansing, MI</i>
Jan 2020	Spring 2020 CNS Undergraduate Research Scholarship , MSU College of Natural Science	<i>East Lansing, MI</i>
Mar 2018	Academic Excellence Award (High Honor) , Lawrence Academy	<i>Groton, MA</i>
Dec 2017	Academic Excellence Award (Honor) , Lawrence Academy	<i>Groton, MA</i>
May 2017	Full-Ride Scholarship , BIOTEC, Royal Thai Government	<i>Bangkok, Thailand</i>

University Service/ Leadership

Committee Member

East Lansing, MI

A REPRESENTATIVE ON BEHALF OF MSU COLLEGE OF NATURAL SCIENCE FOR

Fall 2021 – Spring 2022

- the University Academic Grievance Hearing Board
- the University Academic Integrity Hearing Board
- the University Academic Appeal Board

Extracurricular/ Volunteer Activities

Jul 2021	MaRmot at useR! 2021 The R Conference , Helped provide program information to participants	<i>Virtual</i>
2021–	International Society for Computational Biology (ISCB) , Member	<i>Leesburg, VA</i>
2021–	Association for Women in Mathematics (AWM) , Member	<i>Providence, RI</i>
2021–	MSU Women in STEM , Member	<i>East Lansing, MI</i>
2020–	Women + Data Science , Member	<i>East Lansing, MI</i>
2019–	R-Ladies East Lansing , Member	<i>East Lansing, MI</i>
2018–	MSU Thai Student Association (ThaiSA) , Member	<i>East Lansing, MI</i>
Jul 2018	Burirum Pitthayakhom School , Assisted in the educational guidance seminar for K-12 students	<i>Burirum, Thailand</i>
Mar 2018	The Arc of Opportunity in North Central Massachusetts , Cared for people with disabilities	<i>Fitchburg, MA</i>
2017–2018	Math Club , Member	<i>Groton, MA</i>
Nov 2017	Rise Against Hungers , Assisted in cooking foods/desserts and organized fundraising tables	<i>Groton, MA</i>