

# 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: 3.97/4.00; 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, Numerical Analysis, Analysis, Abstract Algebra, Introduction to Programming: Python, C++, Introduction to 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 (Starting Jan 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 Dec 2021).

## Publications

- **Kewalin Samart**<sup>\*\*</sup>, Phoebe Tuyishime<sup>\*\*</sup>, Arjun Krishnan<sup>\*</sup>, Janani Ravi<sup>\*</sup>. Reconciling multiple connectivity scores for drug repurposing. *Briefings in Bioinformatics*(2021) doi.org/10.1093/bib/bbab161; <sup>\*\*</sup>co-primary authors; <sup>\*</sup>corresponding authors  
[GitHub: github.com/jravidlab/connectivity\\_scores](https://github.com/jravidlab/connectivity_scores); [Live doc: jravidlab.github.io/connectivity\\_scores](https://jravidlab.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

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### 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](https://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

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**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

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

## University Service/ Leadership

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### 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

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