

Maulik Nariya

Postdoctoral fellow

Harvard Medical School
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Experience

2018–present	Postdoctoral fellow Department of Systems Biology, Laboratory of Systems Pharmacology Harvard Medical School Advisor: Peter Sorger
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Skills

Proficient with data mining and machine learning in Python
Experience with other languages Fortran, C++
Proficient with Linux-based research computing (SLURM)
Capable of software development and version control using GitHub
Experience with containerizing software tools using Docker

Research projects

2019–present	Improved estimate of machine learning predictor performance in presence of known confounders In this project we highlight useful properties of leave-pair-out cross-validation method for biological datasets (RNA-seq data for breast cancer cells and Alzheimer's patient data), in particular we propose a method that helps improve the estimate of predictor performance.
2018–present	Predicting drug response from baseline omics profiles of breast cancer cells

NIH LINCS funded project at the Laboratory of Systems Pharmacology, Harvard Medical School. In this work we used baseline datasets, RNA-seq, proteomics and phosphoproteomics, of breast cancer cells to build predictive models using a Random Forest Regressor to predict drug response across a variety of breast cancer drugs.

2014–2018

Mathematical modeling for length control in type III secretion system

Ph.D. dissertation defended at Department of Physics and Astronomy in collaboration with Center for Computational Biology, University of Kansas. This work involves making mathematical models and performing stochastic simulation of biochemical reactions involved in the growth of the type II secretion injectisome.

2016–2018

Comparative characterization and biosimilarity assessment of drug samples using data mining and machine learning techniques

FDA funded project at the Macromolecule and Vaccine Stabilization Center and Center for Computational Biology, University of Kansas. The goal of this project was to model the assessment of biosimilar drugs based on the data available from biological, chemical and physical assays.

Publications

1. **Nariya M.K.**, Sorger P.K., Sokolov A., Leave-pair-out cross-validation allows for a robust evaluation of model performance in presence of outliers and known confounders (manuscript in preparation)
2. Subramanian K., Mills C.E., **Nariya M.K.**, Chen C., Hafner M., Sokolov A., Boswell S., Everley R.A., Berberich M.J., Kalocsay M., Gaudio B., Victor C., Chung M., Bradshaw G., Sorger P.K., Predicting drivers of drug response from baseline omics data across breast cancer cells and models (manuscript in preparation)
3. Schapiro, D., Sokolov, A., Yapp, C., Muhlich, J. L., Hess, J., Lin, J.R., Chen, Y.A., **Nariya, M.K.**, Baker, G.J., Ruukonen, J., Maliga Z., Jacobson C.A., Farhi S.L.,

- Abbondanza, D., McKinley, E.T., Betts, C. Regev A., Coffey R.J., Lisa M., Coussens, L.M., Santagata, S., and Sorger P.K., MCMICRO: A scalable, modular image-processing pipeline for multiplexed tissue imaging (*preprint*)
4. Kalocsay M., Berberich M.J., Everley R.A., **Nariya M.K.**, Chung M., Gaudio B., Victor C., Bradshaw G.A., Hafner M., Sorger P.K., Mills C.E., Subramanian K. Data Descriptor: Proteomic profiling across breast cancer cells and models (in review with *Scientific Data*)
 5. **Nariya M.K.**, Shi J.J., Mallela A., and Deeds E.J., Robustness and Evolution of Length Control Strategies in the Type III Secretion System and Flagellar Hook (in review at *Biophysical Journal*)
 6. Mallela A., **Nariya M. K.**, and Deeds E. J. Crosstalk and Ultra-sensitivity in Protein Degradation Pathways, *PLoS Comp Biol* 16(12):e1008492.
 7. **Nariya M.K.**, Israeli J., Shi J. J., and Deeds E. J. Mathematical Model for Length Control by the Timing of Substrate Switching in the Type III Secretion System, *PLoS Comp Biol* 12(4): e1004851.
 8. **Nariya M.K.**, Kim J. H., Xiong J., Kleindl P. A., Hewarathna A. N., Joshi S. B., Schöneich C., Forrest M. L., Middaugh C. R., Volkin D. B., and Deeds E. J. Comparative Characterization of Crofelemer Samples Using Data Mining and Machine Learning Approaches with Analytical Stability Data Sets, *J Pharm Sci*, 106(11): 3270–3279
 9. Hewarathna A., Mozziconacci O., **Nariya M. K.**, Kleindl P. A., Xiong J., Fisher A., Joshi S. B., Middaugh C. R., Forrest M. L., Volkin D. B., and Deeds E. J. Chemical Stability of the Botanical Drug Substance Crofelemer: A Model System for Comparative Characterization of Complex Mixture Drugs, *J Pharm Sci*, 106(11): 3257–3269
 10. Kleindl P. A., Xiong J., Hewarathna A., Mozziconacci O., **Nariya M. K.**, Fisher A., Deeds E. J., Joshi S. B., Middaugh R. C., Volkin D. B., and Forrest M. L. The Botanical Drug Substance as a Model System for Comparative Characterization of Complex Mixture Drug, *J Pharm Sci*, 106(11): 3242–3256

Conference presentations

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| 2018 | Predicting drug response from baseline omics profile of breast cancer cells. Poster presentation at HiTS Annual Symposium, Boston, MA |
| 2017 | Mathematical Modeling of Ruler Mechanism for Length Control in Type III Secretion System. Poster presentation at 11 th Annual q-bio Conference, Rutgers University, New Brunswick, NJ |

2016 Mathematical Modeling for Type III Secretion System. Poster presentation
at 10th Annual q-bio Conference, Vanderbilt University, Nashville TN

Teaching Experience

Statistical Physics — University of Kansas

Lead discussion, graded homework assignments, and designed exams for undergraduate level course on Statistical Physics

General Physics Laboratory — University of Kansas

Taught several general physics laboratory course (including one honors course), delivered instructions for conducting the laboratory experiment, graded laboratory reports and conducted final exams

Awards

2018 NIH LINCS fellowship — Harvard Medical School

2017 Graduate Scholarly Presentation Travel Fund — University of Kansas

2014 E. E. Slossen Award for Outstanding Graduate Teaching Assistants —
University of Kansas

Education

2012–2018	Ph.D. Physics University of Kansas, Lawrence Dissertation: Mathematical Model of Length Control in the Type III Secretion System Advisors: Eric Deeds and Jack Shi
2007–2010	M.S. Physics University of Pune, Pune Thesis: Review of Neutrino Oscillations Advisor: S. Uma Sankar
2004–2007	B.S. Physics St. Xavier's College, Mumbai