

# Narathip (Nick) Reamaroon

*Last Updated: May 25, 2020*

PhD candidate in data science, machine learning, and clinical informatics with 2+ years of industry experience. Graduating in December 2020. Interested in AI for healthcare.

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## Education

2016-Present **Ph.D., Computational Medicine & Bioinformatics.**

*University of Michigan, Ann Arbor, MI*

Dissertation: Label Uncertainty and Deep Feature Extraction for Clinical Decision Making: Applications to Analysis in Acute Respiratory Distress Syndrome

2013 **B.S., Computational Neuroscience.**

*University of California - San Diego, La Jolla, CA*

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## Experience

2016-Present **Graduate Researcher, University of Michigan, Ann Arbor, MI.**

Experiment design for analysis, prediction, and forecasting in clinical decision making on multiple projects in collaboration with critical care physicians. Independently developed several software packages in Python and MATLAB for biomedical data analyses using stochastic models, Bayesian inference, machine learning, deep learning, and computer vision techniques. Published in several journals and presented work at multiple academic conferences.

Projects:

- Developed computer vision methods for accurate lung segmentation and detection of acute respiratory distress syndrome from noisy chest radiographs. Technical innovations include a stacked active contour model, total variation denoising to remove medical equipment from lung fields, and clinical meaningful features from directional blur.
- Designed deep feature extraction and transfer learning models with tensor decomposition methods to reduce spatial dimensionality while preserving informative features from a large tensor.
- Built novel methods to account for label uncertainty from clinical annotations and quantify diagnostic ambiguity from medical datasets.
- Created the "*Thresholded Correlation Decay*" time-series sampling method based on mixing conditions in stochastic models to address local dependency while maintaining high temporal resolution in longitudinal clinical data.
- Help established the "*Learning Using Partially Available Privileged Information*" algorithm for better knowledge representation of unreliable feature spaces during model training.
- Implementation and optimization of deep neural networks, reinforcement learning, and long short-term memory models in pharmacogenomics, including identification of novel regulatory variants located in noncoding domains of the genome, patient stratification from medical records, and mechanistic prediction of drug response, targets, and interactions.

- 2014-2016 **Research Associate**, *Dart NeuroScience*, San Diego, CA.  
Investigated biological & structure-activity relationship datasets to assist drug discovery efforts and anomaly detection via Bayesian inference and ablation experiments. Mentored by senior scientists and bioinformaticians as part of a fast-paced, diverse, and integrated team.
- 2011-2013 **Undergraduate Researcher**, *University of California - San Diego*, La Jolla, CA.  
Developed computational models of neural systems and neural plasticity for spinal cord injury. Help build automated methods to analyze large-scale data obtained from confocal microscopy. Advised by Professor Mark Tuszynski. Contributed to papers published in *Neuron*.
- 2010-2011 **Undergraduate Researcher**, *University of California - San Diego*, La Jolla, CA.  
Investigated the unconscious perception of biological motion, social cognition, and artificial agents. Assisted graduate students by writing testing scripts in Python. Advised by Professor Ayse Saygin. Contributed to papers published in *Cognition*.
- Summer 2009 **Intern**, *California NanoSystem Institute*, Los Angeles, CA.  
Helped develop computational methods to simulate in-vivo drug delivery with ferrofluids and performed statistical data quality analysis.

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## Technical Proficiency

- languages Python, MATLAB, R
- technologies Scikit-Learn, Pandas, Numpy, TensorFlow, Keras, PyTorch, CUDA, Amazon Web Services, High Performance Computing, SQLite, Shell Scripting, Slurm, Git, Vim, L<sup>A</sup>T<sub>E</sub>X, Tableau, Epic EHR, Windows, Ubuntu & Red Hat Linux, macOS

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## Relevant Coursework

- bioinformatics Deep Learning in Bioinformatics, Programming Laboratory in Bioinformatics, Bioinformatics & Computational Biology, Computational Neuroscience
- computer science Introduction to Machine Learning, Machine Learning, Signal Processing and Machine Learning in Biomedical Sciences, Applied Data Science in Health, Digital Image Processing
- math & statistics Linear Algebra, Linear Spaces & Matrix Theory, Probabilistic Modeling in Bioinformatics, Probability & Distribution Theory, Applied Biostatistics, Mathematics of Biological Networks

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## Awards & Fellowships

- 2016-Present Gates Millennium Scholarship - Bill & Melinda Gates Foundation
- 2016-Present Rackham Merit Fellowship - Rackham Graduate School
- 2013 Provost Honors - University of California
- 2009-2013 Gates Millennium Scholarship - Bill & Melinda Gates Foundation
- 2009-2013 Regents Scholarship - University of California
- 2007 Best Buy @15 Scholarship
- 2006 Bright Futures Scholarship

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## Publications

### Journal Articles

- Reamaroon N, Sjoding MW, Lin K, Iwashyna TJ, Najarian K. *Accounting for Label Uncertainty in Machine Learning for Detection of Acute Respiratory Distress Syndrome*. IEEE Journal of Biomedical and Health Informatics. 2019 Jan;23(1):407.
- Sabeti E, Reamaroon N, Mathis M, Gryak J, Sjoding M, Najarian K. *Signal quality measure for pulsatile physiological signals using morphological features: Applications in reliability measure for pulse oximetry*. Informatics in Medicine Unlocked. 2019 Jan 1;16:100222.
- Kalinin AA, Higgins GA, Reamaroon N, Soroushmehr S, Allyn-Feuer A, Dinov ID, Najarian K, Athey BD. *Deep learning in pharmacogenomics: from gene regulation to patient stratification*. Pharmacogenomics. 2018 May;19(7):629-50.

### Conference Papers

- Sabeti E, Drews J, Reamaroon N, Gryak J, Sjoding M, Najarian K. *Detection of Acute Respiratory Distress Syndrome by Incorporation of Label Uncertainty and Partially Available Privileged Information*. In 2019 41st Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC) 2019 Jul 23 (pp. 1717-1720).

### Submitted Articles

- Reamaroon N, Sjoding MW, Derksen H, Sabeti E, Gryak J, Barbaro RP, Athey B, Najarian K. *Robust Segmentation of Lung in Chest X-Ray: Applications in Analysis of Acute Respiratory Distress Syndrome*. Radiology: Artificial Intelligence. 2020
- Sabeti E, Drews J, Reamaroon N, Warner E, Sjoding MW, Gryak J, Najarian K. *Learning Using Partially Available Privileged Information and Label Uncertainty: Applications in Detection of Acute Respiratory Distress Syndrome*. IEEE Journal of Biomedical and Health Informatics. 2020

### Abstracts

- Reamaroon N, Gryak J, Najarian K. *Accurate Lung Segmentation from Noisy Chest X-Rays*. Michigan Institute for Data Science. 2019.
- Reamaroon N, Sjoding MW, Barbaro RP, Gryak J, Iwashyna TJ, Derksen H, Najarian K. *Detection of Acute Respiratory Distress Syndrome from Noisy Chest X-Ray Scans with Machine Learning and Image Processing Techniques*. Fast Forward Medical Innovation. 2018.
- Reamaroon N, Sjoding MW, Najarian K. *Accounting for diagnostic uncertainty when training a machine learning algorithm to detect patients with the Acute Respiratory Distress Syndrome*. Machine Learning for Healthcare. 2017.