# Narathip (Nick) Reamaroon


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## Education

**PhD in Computational Medicine & Bioinformatics, University of Michigan,** Ann Arbor, MI. 2016 - 2020

- **Dissertation**: Label Uncertainty and Learning Using Partially Available Privileged Information in Detection of Acute Respiratory Distress Syndrome: Applications of Machine Learning to Health Research and Medicine
- **Main courses**: Machine Learning, Signal Processing and Machine Learning, Deep Learning in Bioinformatics, Biostatistics Applied Data Science, Mathematics of Biological Networks, Linear Algebra, Probability and Computing
- **Activities**: Involved in education outreach efforts and undergrad/graduate mentorship opportunities.

**BS in Computational Neuroscience, University of California, San Diego,** La Jolla, CA. 2009 - 2013

- **Main courses**: Information Theory, Algorithms for Analysis of Neural Data, Biophysical Basis of Neuronal Computation, Neurodynamics, Computational Neurobiology, Waves & Optics, Multivariate Analysis, Probability Theory.

## Skills

- **Programming languages**: Python, Matlab, R.
- **Machine learning**: TensorFlow, Keras, PyTorch, Scikit-learn.
- **Spoken languages**: English (native), Thai (fluent), Spanish (conversational)
- **Misc**: Git, distributed computing, SQLite, Tableau, HTML5, CSS3.

## Experience

**Graduate Researcher, Biomedical & Clinical Informatics Lab,** Ann Arbor, MI. 2016 - present

Worked under the supervision of Dr. Kayvan Najarian on applications of AI and machine learning in health research.

- Developed theoretically motivated, principled algorithms for predictive modeling and early detection of critical illnesses.
- Created methods (see Projects) to incorporate label uncertainty and learning using partially available privileged information (*LULUPAPI*) for subsets of data accessible only during model training but not available during testing/deployment.
- Led multiple projects from start to finish: including data acquisition + processing, algorithm development, model training + validation, and publications in multiple journals and conferences.

**Research Associate, Dart Neuroscience,** San Diego, CA. 2014 - 2016

Predictive modeling, statistical analysis, and assay validation for drug discovery.

- Built data visualization dashboard with an interactive interface (Tableau) to improve high-throughput screening efficiency.
- Deployed and maintained machine learning models for real-time analysis of EC50 from target dose response curves.

## Projects

**Privileged Information in Reinforcement Learning, XGBoost, and Support Vector Machines** 2020 - present

Learning Using Privileged Information (LUPI) paradigm for utilizing knowledge/data only available during model training.

- Implemented heteroscedastic dropout for reinforcement learning to incorporate partially available privileged information.
- Created sequential minimal optimization style algorithms and quadratic loss functions to implement LUPI in ML models.
- Designed practical techniques and strategies for hyper-parameter tuning with Bayesian optimization.

**Feature Engineering and Transfer Learning w/ Convolutional Neural Networks and Deep Residual Networks** 2019 - 2020

Predictive modeling and detection of critical illness from chest x-rays and CT scans.

- Developed novel feature extraction technique (Directional Blur) to capture diffuse lung opacities as a mathematical concept.
- Implemented and trained a U-Net based model (and pretrained networks) for lung segmentation and feature extraction.

**Label Uncertainty from Clinical Ambiguity in Medical Diagnosis** 2017 - 2018

Early detection of disease, outcome prediction, and continuous health monitoring.

- Designed a library of tools to account for diagnostic uncertainty in supervised and semi-supervised learning tasks.
- Time-series analysis of longitudinal health record data with stochastic modeling under strong mixing conditions.

**More projects, information, and list of publication available at nickreamaroon.com**