Supreeth Prajwal Shashikumar

Contact Information

email:	spshashikumar@health.ucsd.edu
Webpage:	https://supreethprajwal.github.io/
Blog:	https://point85.ai/
Google Scholar:	https://goo.gl/DauGSL

Education

2015 - April 2020 — **Georgia Institute of Technology, USA**
PhD, Electrical and Computer Engineering
Advisor: Prof. Shamim Nemati
Specialization: Machine learning in healthcare
Thesis: *Generalizable Models for Prediction of Physiological Decompensation from Multivariate and Multiscale Physiological Time Series using Deep Learning and Transfer Learning Techniques*

2015 - Dec 2019 — **Georgia Institute of Technology, USA**
M.S, Electrical and Computer Engineering
Advisor: Prof. Shamim Nemati

2011 - 2015 — **National Institute of Technology Karnataka, Surathkal, India**
Bachelor of Technology, Electronics and Communcation Engg.
Advisor: Prof. Deepu Vijayasenan
Thesis: *Speech Enhancement using Beamforming Technique*

Work Experience

Computational and Data Science Research Specialist, May 2020 - Present
University of California San Diego Health, Dept. of Biomedical Informatics, USA

- Current responsibilities include applying advanced machine learning and deep learning techniques for development of risk prediction models in the in-patient hospital setting
- Responsible for leading a multidisciplinary team of clinicians and IT experts to integrate disease prediction models with existing Electronic Medical Records.
- Additional responsibilities include mentoring undergraduate and graduate students in the NematiLab

Co-founder and Advisor, Oct 2021 - Present
Healcisio Inc., USA

- Part of founding team of Healcisio Inc.
- Currently serving in the role of an R&D advisor

Bioinformatics Programmer (Part-time), Dec 2019 - May 2020
University of California San Diego Health, Dept. of Biomedical Informatics, USA

- Moved the data processing and deep learning pipeline of Nematilab to Amazon Web Services
- Regularly used AWS EC2 instances and SageMaker for training deep learning models for early prediction of sepsis

Research Internships

Research Intern, Summer 2019
University of California San Diego Health, Dept. of Biomedical Informatics, USA

- Supervisor: Shamim Nemati

Research Intern, Summer 2018
Microsoft Research Cambridge, UK

- Worked in the Healthcare AI team to develop interpretable models for predicting clinical outcomes of patients with Traumatic Brain Injury
- Supervisor: Pijika Watcharapichat, Cheng Zhang and Ari Ercole

Engineering Intern, Summer 2014
Qualcomm Incorporated, Bangalore, India

Research Intern, Summer 2013
Electro-Medical and Speech Technology Laboratory, IIT Guwahati, India

- Worked on detection of Vowel Onset points and Vowel End Points in speech
- Supervisor: S.R.M. Prasanna

Honors and achievements

- Selected to attend the Deep Learning and Reinforcement Learning Summer School - 2019 organized by CIFAR and AMII at University of Alberta, Canada. [300 accepted out of 1300] 2019
- Awarded the student travel grant to attend the KDD conference 2018
- Awarded travel grant to attend *Rapid Biomedical Knowledge Base Construction from Unstructured Data* workshop at Stanford University. 2017

Grants/Awards

- Recipient of the 2020 Amazon Research Awards (link)
  - Privacy preserving continual learning with applications to critical care
- Awarded "UCSD DBMI Staff of the year - 2021"

News Coverage

- A Deep Learning Model to Predict Sepsis Early (link)
  - Appeared in *Physician's Weekly*
- Weigh In Social Factors Along with Clinical Conditions When Predicting Sepsis Risks (link)
  - Appeared in *American Hospital Association*
- Social determinants of health may help predict sepsis readmission (link)
  - Appeared in *Healthcare IT news*

Under Review/In preparation

- **Development and Temporal Validation of Novel Actionable Sepsis Phenotypes**, *Journal paper under review*

Journal Publications

- **Optimizing the Implementation of Clinical Predictive Models to Minimize National Costs: A Sepsis Case Study**, Parker Rogers, Aaron Boussina, Supreeth P. Shashikumar, Gabriel Wardi, Christopher Longhurst, Shamim Nemati, *Accepted for publication at Journal of Medical Internet Research* (Yet to appear online)
- **Inclusion of social determinants of health improves sepsis readmission prediction models**, Fatemeh Amrollahi, Supreeth P. Shashikumar, Angela Meier, Lucila Ohno-Machado and Shamim Nemati, *Journal of the American Medical Informatics Association, 2022*
- **Leveraging Clinical Data Across Healthcare Institutions for Continual Lifelong Learning of Predictive Risk Models**, Fatemeh Amrollahi, Supreeth P. Shashikumar, Andre Holder and Shamim Nemati, *Scientific Reports, 2022*
- **Artificial Intelligence Sepsis Prediction Algorithm Learns to Say "I Don't know"**, Supreeth P. Shashikumar, Gabriel Wardi, Atul Malhotra and Shamim Nemati, *npj Digital Medicine, 2021*
- **A Locally Optimized Data-Driven Tool to Predict Sepsis-Associated Vasopressor Use in the ICU**, Andre Holder, Supreeth P. Shashikumar, Gabriel Wardi, Timothy Buchman and Shamim Nemati, *Critical Care Medicine, 2021*
- **DeepAISE — An End-to-End Development and Deployment of a Recurrent Neural Survival Model for Early Prediction of Sepsis**, Supreeth P. Shashikumar, Chris Josef, Ashish Sharma and Shamim Nemati, *Artificial Intelligence in Medicine, 2020*
- **Development and Prospective Validation of a Deep Learning Algorithm for Predicting Need for Mechanical Ventilation**, Supreeth P. Shashikumar, Gabriel Wardi, et al., *Chest, 2020*
- **Predicting Progression to Septic Shock in the Emergency Department using an Externally Generalizable Machine Learning Algorithm**, Gabriel Wardi, Morgan Carlile, Andre Holder, Supreeth P. Shashikumar, et al., *Annals of Emergency Medicine, 2020*

- **Early prediction of sepsis from clinical data: the PhysioNet/Computing in Cardiology Challenge 2019**, Matthew Reyna, Christopher Josef, Russell Jeter, Supreeth P. Shashikumar, et al., *Critical Care Medicine, 2019*
- **Ventricular ectopic beat detection using a wavelet transform and a convolutional neural network**, Qichen Li, Chengyu Liu, Qiao Li, Supreeth P Shashikumar, Shamim Nemati, Zichao Shen, Gari D Clifford, *Physiological Measurement, 2019*
- **Deep learning in the cross-time frequency domain for sleep staging from a single-lead electrocardiogram**, Qiao Li, Qichen Li, Chengyu Liu, Supreeth P Shashikumar, Shamim Nemati, Gari D Clifford, , *Physiological Measurement, 2018*
- **Multiscale Network Dynamics between Heart Rate and Locomotor Activity Are Altered in Schizophrenia:**, Erik Reinertsen, Supreeth P Shashikumar, Amit J Shah, Shamim Nemati and Gari D Clifford, *Physiological Measurement, 2018*
- **Multiscale Network Representation of Physiological Time Series for Early Prediction of Sepsis:**, Supreeth P Shashikumar, Qiao Li, Gari D Clifford and Shamim Nemati, *Physiological Measurement, 2017* [Physiological Measurement Highlights of 2017 - (link)]
- **Early Sepsis Detection in Critical Care Patients using Multiscale Blood Pressure and Heart Rate Dynamics:**, Supreeth P Shashikumar, Matthew D Stanley, Ismail Sadiq, Qiao Li, Andre Holder, Gari D Clifford and Shamim Nemati, *Journal of Electrocardiology, 2017*

Book Chapters

- **Leveraging Artificial Intelligence To Maximize Use Of Electronic Health Record Data**, Shamim Nemati, Supreeth P. Shashikumar, Fatemeh Amrollahi, Tsung-Ting Kuo, and Lucila Ohno-Machado, *Survey on the Use of Information and Communication Technologies in Brazilian Healthcare Facilities: ICT in Health 2019. São Paulo: (2020)*

Conference Publications

- **A Comparison of Uncertainty Estimation Methods for Deep Learning-based Clinical Risk Scores**, Archil Srivastava, Supreeth P. Shashikumar and Shamim Nemati, *2022 AMIA Symposium*
- **Contextual Embeddings from Clinical Notes Improves Prediction of Sepsis**, Fatemeh Amrollahi, Supreeth P. Shashikumar, Fereshteh Razmi and Shamim Nemati, *2020 AMIA Symposium*
- **AIDEx: A FHIR Based Real-time Software Platform for Forecasting the Onset-time of Sepsis**, Fatemeh Amrollahi, Supreeth P. Shashikumar and Shamim Nemati, *IEEE EMBS International Conference on Biomedical & Health Informatics (BHI), 2020*
- **Detection of Paroxysmal Atrial Fibrillation using Attention Based Bidirectional Recurrent Neural Networks:**, Supreeth P. Shashikumar, Amit J. Shah, Gari D. Clifford and Shamim Nemati, *24th ACM SIGKDD International Conference on Knowledge Discovery & Data Mining (KDD), 2018*
- **A FHIR-Enabled streaming sepsis prediction system for ICUs:**, Joel R Henry, Dennis Lynch, Jeff Mals, Supreeth P Shashikumar, Andre Holder, Ashish Sharma and Shamim Nemati, *40th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), 2018*
- **A deep learning approach to monitoring and detecting atrial fibrillation using wearable technology:**, Supreeth P. Shashikumar, Amit J Shah, Qiao Li, Gari D Clifford and Shamim Nemati, *IEEE EMBS International Conference on Biomedical & Health Informatics (BHI), 2017*
- **Improved vowel onset and offset points detection using bessel features:**, Biswajit Dev Sarma, Supreeth P. Shashikumar and SR Mahadeva Prasanna , *International Conference on Signal Processing and Communications (SPCOM), 2018*

Symposiums and Preprints

- **Randomized Clinical Trials or Convenient Controls: TREWS or FALSE?**, Shamim Nemati, Supreeth P Shashikumar, Andre L Holder, Gabriel Wardi, Robert L Owens, *medRxiv 2022*
- **Learning to Treat Hypotensive Episodes in Sepsis Patients Using a Counterfactual Reasoning Framework**, Russell Jeter, Li-Wei Lehman, Christopher Josef, Supreeth Shashikumar, Shamim Nemati, *medRxiv 2021*
- **Does the "Artificial Intelligence Clinician" learn optimal treatment strategies for sepsis in intensive care?**, Russell Jeter, Christopher Josef, Supreeth P. Shashikumar and Shamim Nemati, *arXiv 2019*
- **DeepAISE on FHIR—An Interoperable Real-Time Predictive Analytic Platform for Early Prediction of Sepsis:**, Vidyashankar Lakshman, Fatemeh Amrollahi, Veera Supraja Koppisetty, Supreeth P. Shashikumar,

Ashish Sharma, Shamim Nemati, *American Medical Informatics Association Symposium 2018 – FHIR Applications Showcase track* [3rd place winner]

Patents

- **Methods for accurate patient stratification using deep learning predictive models**, Shamim Nemati, Supreeth P. Shashikumar, Atul Malhotra and Jonathan Lam, *United States provisional patent application #63/227,885, filed July 31, 2021*
  - Licensed to Healcisio Inc.
- **Method for detecting abnormal cardiac activity:** Shamim Nemati, Supreeth P. Shashikumar, *United States provisional patent application #62/437,457, filed December 21, 2016*

Reviewer for

- **Journals:** Artificial Intelligence in Medicine, BMC Anesthesiology, BMC Medical Informatics and Decision Making, BMC Pediatrics, Chest, Entropy, Journal of Clinical Medicine, Machine Learning, Nature Communications, npj Digital Medicine, Patterns, PLoS One, Nature scientific reports, Sensors, WIREs Data Mining and Knowledge Discovery
- **Conferences:** Asian Conference on Machine Learning 2022, 2022 IEEE International Conference on Bioinformatics and Biomedicine, Second International Workshop on eXplainable Artificial Intelligence in Healthcare 2022

Service and organization

- Program Committee member - **2022 IEEE International Conference on Bioinformatics and Biomedicine** (link)
- Program Committee member - **Asian Conference on Machine Learning 2022** (link)
- Program Committee member - **Second International Workshop on eXplainable Artificial Intelligence in Healthcare 2022** (link)
- Organizing Committee member - **11th Annual UC San Diego Department of Biomedical Informatics Summer Internship Program** (link)
- Program Committee member - **First International Workshop on eXplainable Artificial Intelligence in Healthcare 2021** (link)
- Co-organizer for the competition - **Early Prediction of Sepsis from Clinical Data: the PhysioNet/Computing in Cardiology Challenge 2019** (link)
- Moderator, Journal Club, Dept. of Biomedical Informatics, UCSD (link)

Advising

- Joram Bakekolo (MSc. Candidate, Machine Intelligence), African Institute for Mathematical Science, 2020-2021
- Heqi Wang (Undergrad @ UCSD), Spring 2021
- Sajad Seyed Mousavi (PhD Intern), Northern Arizona University (co-advised with Shamim Nemati), Summer 2019

Skills

- **Programming Languages:** Python, Matlab
- **Libraries:** Tensorflow, PyTorch, HTK (Hidden Markov Model Toolkit)
- **Cloud Services:** Google Cloud Platform (Compute Engine, ML Engine, BigQuery), Amazon Web Services (EC2, SageMaker)