



## **2020 International Workshop on Health Intelligence (W3PHIAI 2020)**

**Friday, February 7<sup>th</sup> 2020**

Location: Gibson (second floor of the conference hotel)

Time: 8:30am – 6:00pm

### **Workshop Programme:**

**8:30am - 8:40am**

Opening Remarks (Martin Michalowski & Arash Shaban-Nejad)

**8:40am - 9:30am (40 minute talk, 10 minute questions)**

Keynote Speaker: Dr. Ram D. Sriram, Chief of the Software and Systems Division,  
Information Technology Laboratory  
The National Institute of Standards and Technology (NIST)

Title: *Transforming Healthcare Through AI Revolutions*

Abstract: The health care enterprise involves many different stakeholders -- consumers, health care professionals and providers, researchers, and insurers. AI will play an important role in many tasks that these stakeholders undertake. These include: image diagnostics, medical decision making, prior authorization, drug design, nutrition advisor, patient scheduling, etc.. The National Institute of Standards and Technology (NIST) is an agency of the United States Government. NIST's mission is to generally strengthen the U.S. economy and improve the quality of life by working with industry to develop and apply technology, measurements and standards. The U.S. President's Executive Order on AI (see <https://www.whitehouse.gov/articles/accelerating-americas-leadership-in-artificial-intelligence/>) calls for NIST to lead the development of appropriate technical standards for reliable, robust, trustworthy, secure, portable, and interoperable AI systems. I will discuss relevant AI thrusts at NIST on health care informatics, focusing on the use of machine learning, knowledge representation and natural language processing. I will also discuss the need for explanations in AI systems (XAI) and current state of the art in medical XAI.

**\*\*denotes remote presentation**

**9:30am - 10:30am (20 minutes per paper)**

Session 1: Deep Learning (Long presentations, 3 papers) (Session Chair: Arash Shaban-Nejad)

1. Visualization of deep models for predicting health outcomes\*\*  
***Authors:** Yuyang Liu, Jienan Yao, Brenna Li, Zhen Gou, Chloe Pou-Prom, Joshua Murray, Amol Verma, Muhammad Mamdani and Marzyeh Ghassemi*
2. DeStress: Deep Learning for Unsupervised Identification of Mental Stress in Firefighters from Heart Rate Variability (HRV) Data  
***Authors:** Ali Oskooei, Sophie Mai Chau, Jonas Weiss, Arvind Sridhar, María Rodríguez Martínez and Bruno Michel*
3. IFGAN: Missing Value Imputation using Feature-specific Generative Adversarial Networks  
***Authors:** Yangsibo Huang, Wei Qiu and Quanzheng Li*

**10:30am - 11:00am**

Coffee Break

**11:00am - 12:00pm (20 minutes per paper)**

Session 2: Knowledge Representation (Long Presentations, 3 papers) (Session Chair: Martin Michalowski)

1. Constructing Artificial Data for Fine-tuning for Low-Resource Biomedical Text Tagging with Applications in PICO Annotation\*\*  
***Authors:** Gaurav Singh, Zahra Sabet, John Shawe-Taylor and James Thomas*
2. KELSA: A Knowledge-Enriched Local Sequence Alignment Algorithm for Comparing Patient Medical Records  
***Authors:** Ming Huang, Nilay Shah and Lixia Yao*
3. A Generalizable Method for Automated Quality Control of Functional Neuroimaging Datasets  
***Authors:** Matthew Kollada, Qingzhu Gao, Monika Mellem, Tathagata Banerjee, William Martin*

**12:00pm - 1:40pm**

Lunch (on your own)

**1:30 pm - 2:40 pm**

**Poster Session (15 Posters)**

1. Machine learning discrimination of Parkinson's Disease stages from walker-mounted sensors data  
**Authors:** *Nabeel Seedat and Vered Aharonson*
2. Automatic Segregation and Classification of Inclusion and Exclusion Criteria of Clinical Trials to Improve Patient Eligibility Matching  
**Authors:** *Tirthankar Dasgupta, Ishani Mondal, Abir Naskar and Lipika Dey*
3. Explaining Models by Propagating Shapley Values  
**Authors:** *Hugh Chen, Scott Lundberg and Su-In Lee*
4. Controlling for Confounding Variables: Accounting for Dataset Bias in Classifying Patient-Provider Interactions  
**Authors:** *Kristen Howell, Megan Barnes, J. Randall Curtis, Ruth A. Engelberg, Robert Y. Lee, William B. Lober, James Sibley and Trevor Cohen*
5. Learning Representations to Augment Statistical Analysis of Drug Effects on Nerve Tissues  
**Authors:** *Hamid R. Karimian, Kevin J. Pollard, Michael J. Moore and Parisa Kordjamshidi*
6. A Deep Learning Approach for Classifying Nonalcoholic Steatohepatitis Patients from Nonalcoholic Fatty Liver Disease Patients using Electronic Medical Records  
**Authors:** *Pradyumna Byappanahalli Suresha, Yunlong Wang, Cao Xiao, Lucas Glass, Yilian Yuan and Gari D. Clifford*
7. Accelerating Psychometric Screening Tests with Prior Information  
**Authors:** *Trevor Larsen, Gustavo Malkomes and Dennis Barbour*
8. Tell Me About Your Day: Designing a Conversational Agent for Time and Stress Management  
**Authors:** *Libby Ferland, Jude Sauve, Michael Lucke, Jerry Nie, Malik Khadar, Serguei Pakhomov and Maria Gini*
9. Towards Automated Performance Status Assessment: Temporal Alignment of Motion Skeleton Time Series  
**Authors:** *Tanachat Nilanon, Luciano Nocera, Jorge Nieva and Cyrus Shahabi*
10. Can an Algorithm be My Healthcare Proxy?  
**Authors:** *Duncan Mcelfresh, Samuel Dooley, Charles Cui, Kendra Griesman, Weiqin Wang, Tyler Will, Neil Sehgal and John Dickerson*

11. Character-level Japanese Text Generations with Attention Mechanism for Chest Radiography Diagnosis  
**Authors:** Sakka Kenya, Nakayama Kotaro, Kimura Nisei, Inoue Taiki, Iwasawa Yusuke, Yamaguchi Ryohei, Kawazoe Yoshimasa, Ohe Kazuhiko and Matsuo Yutaka
12. Multi-Level Embedding with Topic Modeling on Electronic Health Records for Predicting Depression  
**Authors:** Yiwen Meng, William Speier, Michael Ong and Corey Arnold
13. A Multi-Talent Healthcare AI Bot Platform  
**Authors:** Martin Horn, Xiang Li, Lin Chen and Sabin Kafle
14. Implementation of a Personal Health Library (PHL) To Support Chronic Disease Self-Management  
**Authors:** Nariman Ammar, James Bailey, Robert Davis and Arash Shaban-Nejad
15. Natural vs. Artificially Sweet Tweets: Characterizing Discussions of Non-Nutritive Sweeteners in Twitter  
**Authors:** Hande Batan, Dianna Radpour and Michael Paul

**2:40pm - 3:30pm (10 minutes per paper)**

Session 3: Short Papers I (Short Presentations, 5 papers) (Session Chair: Martin Michalowski)

1. Personalized Dual-Hormone Control for Type 1 Diabetes Using Deep Reinforcement Learning\*\*  
**Authors:** Taiyu Zhu, Kezhi Li and Pantelis Georgiou
2. Fast Similar Patient Retrieval from Large Scale Healthcare Data: A Deep Learning-based Binary Hashing Approach\*\*  
**Authors:** Ke Wang, Eryu Xia, Shiwan Zhao, Ziming Huang, Songfang Huang, Jing Mei, Shaochun Li
3. Predicting Mortality in Liver Transplant Candidates  
**Authors:** Jonathon Byrd, Sivaraman Balakrishnan, Xiaoqian Jiang and Zachary Lipton
4. A Dynamic Deep Neural Network for Multimodal Clinical Data Analysis  
**Authors:** Maria Hügler, Gabriel Kalweit, Thomas Hügler and Joschka Boedecker
5. Extracting Structured Data from Doctor-Patient Conversations By Predicting Noteworthy Utterances  
**Authors:** Kundan Krishna, Amy Pavel, Benjamin Schloss, Jeffrey Bigham and Zachary Lipton

**3:20pm – 4:00pm**

Coffee Break

**4:00pm - 5:00pm (20 minutes per paper)**

Session 4: Time Series and Quality Matching (Long Presentations, 3 papers) (Session Chair: Arash Shaban-Nejad)

1. Faster Clinical Time Series Classification with Filter based Feature Engineering Tree Boosting Methods  
***Authors:** Yanke Hu, Wangpeng An, Raj Subramanian, Na Zhao, Yang Gu and Weili Wu*
2. Distributionally Robust Cycle and Chain Packing with Application to Organ Exchange  
***Authors:** Ke Ren, Duncan Mcelfresh, Hoda Bidkhori and John Dickerson*
3. A Kernel to Exploit Informative Missingness in Multivariate Time Series from EHRs  
***Authors:** Karl Øyvind Mikalsen, Cristina Soguero-Ruiz and Robert Jenssen*

**5:00pm - 5:50 pm (10 minutes per paper)**

Session 5: Short Papers II (Short Presentations, 5 papers) (Session Chair: Martin Michalowski)

1. On-line (TweetNet) and Off-line (EpiNet): The Distinctive Structures of the Infectious  
***Authors:** Eun Kyong Shin, Byunghwee Lee and Hawoong Jeong.*
2. Fairness in Time-Critical Influence Maximization with Applications to Public Health Preventative Interventions  
***Authors:** Aida Rahmattalabi, Shahin Jabbari, Phebe Vayanos, Himabindu Lakkaraju and Milind Tambe*
3. Uncertainty Characterization for Predictive Analytics with Clinical Time Series Data  
***Authors:** Yang Guo, Zhengyuan Liu, Savitha Ramasamy and Pavitra Krishnaswamy*
4. Quantitative Evaluation of Emergency Medicine Resident's Non-Technical Skills Based on Trajectory and Conversation Analysis  
***Authors:** Kei Sato, Masaki Onishi, Ikushi Yoda, Kotaro Uchida, Satomi Kuroshima, Michie Kawashima*
5. Medication Regimen Extraction From Medical Conversations  
***Authors:** Sai Prabhakar Pandi Selvaraj and Sandeep Konam*

**5:50 pm - 6:00 pm**

Closing remarks/discussion (Martin Michalowski & Arash Shaban-Nejad)