

# HAOZHU WANG

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## SUMMARY

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I develop machine learning algorithms to aid decision making, most of which are inspired by healthcare applications. My past work involves causal inference, survival analysis, model explainability and credibility, model compression, and reinforcement learning. I'm currently developing meta-learning algorithms for training deep models on small-sized datasets.

## EDUCATION

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**University of Michigan** Sep 2016 - Sep 2021(expected)  
*Ann Arbor, MI*

- Ph.D. in Electrical and Computer Engineering (Machine Learning track). GPA: 3.94/4.00.

**Nankai University and Tianjin University** Sep 2011 - July 2015  
*Tianjin, China*

- B.Eng in Optoelectronics. GPA: 3.92/4.00. Ranked 2nd out of 65.

**Massachusetts Institute of Technology** Jan 2015 - Jun 2015  
*Boston, MA*

- Visiting student, EECS

## PROFESSIONAL EXPERIENCE

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**Graduate student instructor** Sep 2017 - Dec 2017  
*EECS 545 Machine Learning*

- Designed homeworks and held weekly office hours
- Designed Python and Jupyter Notebook tutorial for over 100 graduate students

## RESEARCH EXPERIENCE

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**Patient Risk Stratification with Individual Treatment Effect** Sep 2018 - Sep 2019  
*University of Michigan* *Professor Jenna Wiens*

- Proposed to model intermediate adverse event with multitask-learning and decomposition approaches.
- Compared the performance of the proposed methods and baseline methods on both synthetic and real datasets.
- Paper submitted to JAMIA.

**Return to Work After Injury** Jan 2018 - Now  
*University of Michigan* *Professor Jenna Wiens*

- Cleaned and analyzed claim dataset with 1.25 million patient records.
- Trained deep learning models for predicting return to work.
- Trained treatment policies using Q-learning from observational data.
- Research abstract accepted by Machine Learning for Healthcare Conference.

**Spatial and Temporal Invariance of Player Tracking Data** Aug 2018 - Jan 2019  
*University of Michigan* *Professor Jenna Wiens*

- Implemented convolutional neural networks, long short-term memory networks, and feedforward networks for predicting scores using player tracking data.
- Demonstrated a spatial invariance flipping the court does not affect the prediction accuracy.
- Demonstrated a temporal invariance that leveraging data longer than 0.5 second does not prediction accuracy.
- Our work provides insights for future work on player tracking data.

- Implemented ordered weighted  $\ell_1$  (OWL) and group OWL (GrOWL) regularized deep neural networks in Tensorflow.
- Investigated sparsity inducing and correlation discovering properties of GrOWL for both convolutional layers and fully connected layers of deep neural network.
- Successfully compressed LeNet-5 and VGG-16 for more than 10 times. Paper published in ICLR 2018.

## PUBLICATIONS

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### Machine Learning Publications:

Erkin Otles, **Haozhu Wang**, Suyanpeng Zhang, Brian Denton, Jon Seymour, Jenna Wiens. Return to Work After Injury: A Sequential Prediction & Prescription Problem. Machine Learning for Healthcare (Clinical Abstract), 2019.

Jiaxuan Wang, **Haozhu Wang**, Fahad Kamran, Jenna Wiens. Exploiting Spatial and Temporal Invariances when Mining Player Tracking Data in Basketball. (under review)

**Haozhu Wang**, Jeeheh Oh, Jenna Wiens. Targeting Interventions: Improving Estimates for Individual Treatment Effects by Explicitly Modeling Intermediate Events. (under review)

(Co-first author) Dejiao Zhang\*, **Haozhu Wang\***, Mario A.T.Figueiredo, Laura Balzano. Learning to Share: Simultaneous Parameter Tying and Sparsification in Deep Learning, International Conference on Learning Representations 2018.

Jiaxuan Wang, Jeeheh Oh, **Haozhu Wang**, Jenna Wiens. Learning Credible Models. Proceedings of the 24th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining. ACM, 2018.

### Other Publications:

Zhao, Qing-Yuan, Di Zhu, Niccol Calandri, Andrew E. Dane, Adam N. McCaughan, Francesco Bellei, **Hao-Zhu Wang**, Daniel F. Santavica, and Karl K. Berggren. Single-photon Imager Based on a Superconducting Nanowire Delay Dine. *Nature Photonics* 11, no. 4 (2017): 247-251.

Wenqi Zhu, Ting Xu, **Haozhu Wang**, Cheng Zhang, Agrawal Amit, Deotare Parag, Henri Lezec. Surface-Plasmon-Polariton Laser based on a Metallic Trench Fabry-Perot Resonator, accepted by *Science Advances* (2017).

Che-Hsuan Cheng, **Haozhu Wang**, Zidong Li, Parag Deotare. Highly Sensitive Photodetectors Based on Inorganic and Organic Heterostructure, submitted to *IEEE Photonic Conference* (2017).

**Wang Haozhu**, Yang Fenghe, Yang Fan, Nie Meitong, Yang Jianjun. Investigation of Femtosecond-Laser Induced Periodic Surface Structure on Molybdenum. *Chinese Journal of Lasers*, 42(1), 0103001 (2015).

## AWARDS

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**Rackham Conference Travel Grant Award**, University of Michigan, 2018

**Outstanding Graduate Award**, Tianjin University, 2015

**National Scholarship**, Chinese Ministry of Education, 2014

**Kitano Foundation of Lifelong Integrated Education Scholarship**, Nankai University, 2013

**Grand Prize of Physics Competition for College Students**, Tianjin, 2013

**First Tier Scholarship**, Nankai University, 2012

**Outstanding High School Students**, Sichuan Provincial Department of Education, China, 2011

**National First Prize in Applied Physics Competition for Middle School Students**, Chinese Ministry of Education, 2008

## SKILLS

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**Programming Languages:** Python, Matlab, C/C++, R, Julia

**Deep Learning Frameworks:** Pytorch, Tensorflow, Keras

**Others:** Linux, Bash, SQL