

# MINGREN SHEN

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## EDUCATION

### University of Wisconsin-Madison

Overall GPA: 3.89 / 4.0

Ph.D. Materials Science, focus on machine learning for material informatics, expected May 2021

M.S. Computer Sciences, May 2019; M.S. Materials Science, December 2020

Selected Courses: *Artificial Intelligence, Algorithm, Big Data Systems, Machine Learning, Data Science Principles*

Teaching Assistant of Chem 103(2 Semesters)

### University of Chinese Academy of Sciences

M.S. Physics, July 2016

Overall GPA: 3.83 / 4.0

### Nanjing University

B.S. Physics, July 2013

Overall GPA: 3.82 / 4.0

## SELECTED PROJECTS

### Use of Machine Learning For Identification of Mucinous Pancreas Cancer

June. 2020 - Present

- Examine the prediction potential of building pancreas cancer classifiers based on radiometric features
- Solved the imbalanced dataset problem with Synthetic Minority Oversampling Technique (SMOTE)
- Accepted in annual meeting of Society of Abdominal Radiology, 2021

### Automated Defect Recognition in Electron Microscopy Images and Videos

March. 2018 - March. 2020

- Automated identification of dislocation loops in irradiated steels
- Used Faster R-CNN (ChainerCV) for detecting material defects in microscopy images and YOLO(Keras+Tensorflow) for microscopy videos
- Improved performance **F1 from 0.65/0.78 to 0.91/0.95** which was faster and more stable than human experts

### GAN for Super Resolution of Simulated STEM Images

September. 2018 - October. 2020

- Developed Generative Adversarial Networks (pix2pix) model to convert lower resolution but fast generate simulated STEM images to the higher resolution but slower generated images.
- Reduced relative error **from 10% to 1%** and satisfied all physical requirements

### Identifying Bleeding Sites on Blood Vessel X-ray Images

September. 2018 - Present

- Developed a two-stage model to solve the bleeding site detection problem.
- The first stage (ResNet152) classifies bleeding and non-bleeding patients, **achieving 86% accuracy**
- The second stage (YOLO) finds the bleeding sites on the image, **identifying 13 of the 19 bleeding sites.**
- Accepted by a radiologist conference, CIRSE2019 and CIRSE2020.

### Others

Course Projects

- **Building Query Time Optimized Video Inference System by Feature Map Reusing:** Optimizing the latency of a video inference system by reusing the intermediate results of first CNN (ResNet50) to accelerate the calculation of second CNN (ResNet152) and achieved **18% latency decrease without sacrificing the accuracy of the model**
- [https://github.com/iphyer/FocusIngestOpt\\_FinalProject\\_CS744Fall2018](https://github.com/iphyer/FocusIngestOpt_FinalProject_CS744Fall2018)
- **BBQ: Bounding Box Quality Checker,**: A web service built with Flask for checking the quality of object detection algorithm. [https://github.com/iphyer/BBQ\\_Madhacks2018](https://github.com/iphyer/BBQ_Madhacks2018)
- **Twitter Gender Classifier:** Collected Twitter user data( text and profile ) from St Louis, MO to build a user gender classifier( Random Forest ) based on Twitter messages. [https://github.com/iphyer/cs760\\_TwitterDemographics](https://github.com/iphyer/cs760_TwitterDemographics)
- **Driver-test-schedule-system:** Developed email reminder service for Driver-testers when there were personalized available space for their driving test in College Town of TAMU. <https://github.com/iphyer/RoadTest-Scheduler>

## SKILLS

**Programming:** Python, Java, C **Software:** Linux, Git, Bash **Frameworks:** Keras, PyTorch, Pandas, Scikit-learn, OpenCV

## SELECTED PUBLICATIONS

1. Lawrence, Nick, **Mingren Shen**, Ruiqi Yin, Cloris Feng, and Dane Morgan. "Exploring Generative Adversarial Networks for Image-to-Image Translation in STEM Simulation." arXiv preprint arXiv:2010.15315 (2020).
2. Xiaoyu Sun, Nathaniel J. Krakauer, Alexander Politowicz, WeiTing Chen, Qiying Li, Zuoyi Li, Xianjia Shao, Alfred Sunaryo, **Mingren Shen**, James Wang, Dane Morgan. "Assessing Graphbased Deep Learning Models for Predicting Flash Point." Molecular Informatics (2020), 39, 1900101.
3. Liu, Yilin, Gregory R. Kirk, Brendon M. Nacewicz, Martin A. Styner, **Mingren Shen**, Dong Nie, Nagesh Adluru, Benjamin Yeske, Peter A. Ferrazzano, and Andrew L. Alexander. "Harmonization and Targeted Feature Dropout for Generalized Segmentation: Application to Multi-site Traumatic Brain Injury Images." In Domain Adaptation and Representation Transfer and Medical Image Learning with Less Labels and Imperfect Data, pp. 81-89. Springer, Cham, 2019.