Mingren Shen

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Education

University of Wisconsin-Madison *Overall GPA: 3.9 / 4.0*
Ph.D. Materials Science and Engineering, December 2021
M.S. Materials Science and Engineering December 2020
M.S. Computer Sciences, May 2019

University of Chinese Academy of Sciences M.S. Physics , July 2016 *Overall GPA: 3.9 / 4.0*

Nanjing University B.S. Physics, July 2013 *Overall GPA: 3.8 / 4.0*

Work Experience

Machine Learning Engineer *Amazon; April.2022 - Now*

- Building large scale data pipeline for Amazon Fresh Supply Chain Optimization and Prediction

SELECTED PROJECTS

Use of Machine Learning For Identification of Mucinous Pancreas Cancer *June. 2020 - June. 2021*

- Examine the prediction potential of building pancreas cancer classifiers based on radiometric features
- Solved imbalanced data problem with Synthetic Minority Oversampling Technique(SMOTE) achieved 85% accuracy

Automated Defect Recognition in Electron Microscopy Images and Videos *March. 2018 - March. 2020*

- Automated identification of defects in electron microscopy images or videos of irradiated steels where Faster RCNN (ChainerCV) was used microscopy images and YOLO(Tensorflow) was used 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

Computational molecular dynamic simulation of Biological System *November. 2016 - January. 2018*

Advisor: Prof. Qiang Cui, Department of Chemistry, UW-Madison

- Using computational methods to study the self assembling process of DNA complex
- Studying several advanced algorithms like Infinite-swap replica exchange molecular dynamics Algorithm, Important Sampling Methods

Computational Micro Fluid Dynamics Simulation *September. 2013 - July. 2016*

Advisor: Prof. Mingchen Yang, Institute of Physics of University of Chinese Academy of Sciences

- Hydrodynamics simulation of complex micro fluids with Molecular Dynamics (MD) and Multi Particle Collision method(MPC)
- Design of diffusiophoresis micro pump to actuate micro fluids by density gradient
- Developing all computational models in C

Selected Publications

1. **Mingren Shen**, Dina Sheyfer, Troy David Loeffler, Subramanian K.R.S. Sankaranarayanan, G. Brian Stephenson, Maria K.Y. Chan and Dane Morgan. Machine learning for interpreting coherent X-ray speckle patterns. Computational Materials Science 230 (2023): 112500.
2. **Mingren Shen**, Jacobs, Ryan, Yuhan Liu, Wei Hao, Xiaoshan Li, Ruoyu He, Jacob RC Greaves et al. *Performance and limitations of deep learning semantic segmentation of multiple defects in transmission electron micrographs*. Cell Reports Physical Science (2022): 100876.
3. **Mingren Shen**, Guanzhao Li, Dongxia Wu, Yuhan Liu, Jacob Greaves, Wei Hao, Nathaniel J. Krakauer, Leah Krudy, Jacob Perez, Varun Sreenivasan, Bryan Sanchez, Oigimer Torres, Wei Li, Kevin Field, and Dane Morgan. *Multi Defect Detection and Analysis of Electron Microscopy Images with Deep Learning*, Computational Materials Science 199 (2021): 110576.
4. **Mingren Shen**, Guanzhao Li, Dongxia Wu, Yudai Yaguchi, Jack C. Haley, Kevin G. Field, and Dane Morgan. *A deep learning based automatic defect analysis framework for In-situ TEM ion irradiations*, Computational Materials Science 197 (2021): 110560.
5. **Mingren Shen** et al. *Assessing Graphbased Deep Learning Models for Predicting Flash Point*, Molecular Informatics (2020), 39 , 1900101.

6. Kevin G. Field, Ryan Jacobs, **Mingren Shen**, Matthew Lynch, Priyam Patki, Christopher Field, and Dane Morgan. *Development and Deployment of Automated Machine Learning Detection in Electron Microcopy Experiments*, Microscopy and Microanalysis 27, no. S1 (2021): 2136-2137.
7. Awe, Adam M., Michael M. Vanden Heuvel, Tianyuan Yuan, Victoria R. Rendell, **Mingren Shen,** Agrima Kampani, Shanchao Liang, Dane D. Morgan, Emily R. Winslow, and Meghan G. Lubner. *Machine learning principles applied to CT radiomics to predict mucinous pancreatic cysts*, Abdominal Radiology (2021): 1-11.
8. Gurbani, Sidharth, Dane Morgan, Varun Jog, Leo Dreyfuss, **Mingren Shen,** Arighno Das, E. Jason Abel, and Meghan G. Lubner. *Evaluation of radiomics and machine learning in identification of aggressive tumor features in renal cell carcinoma (RCC)*, Abdominal Radiology (2021): 1-11.
9. 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).
10. **Mingren Shen** et al. *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.
11. **Ming-Ren Shen**, Rui Liu, Ke Chen, and Mingcheng Yang. "Diffusive-Flux-Driven Microturbines by Fore-and-Aft Asymmetric Phoresis." Physical Review Applied 12, no. 3 (2019): 034051.
12. Luo, Guan-Zheng, Ziyang Hao, Liangzhi Luo, **Mingren Shen**, Daniela Sparvoli, Yuqing Zheng, Zijie Zhang et al. "N 6-methyldeoxyadenosine directs nucleosome positioning in Tetrahymena DNA." Genome biology 19, no. 1 (2018): 200.
13. **Ming-Ren Shen**, Fangfu Ye, Rui Liu, Ke Chen, Mingcheng Yang, and Marisol Ripoll. "Chemically driven fluid transport in long microchannels." The Journal of chemical physics 145, no. 12 (2016): 124119.
14. **Ming-Ren Shen**, Liu Rui, Hou Mei-Ying, Yang Ming-Cheng, and Chen Ke. "Mesoscale simulation of self-diffusiophoretic microrotor." ACTA PHYSICA SINICA 65, no.17 (2016).