

Hui Lin

2145 Sheridan Rd
Evanston, IL, USA, 60208

[Google Scholar](#) [LinkedIn](#) [GitHub](#)
huilinsanluo@gmail.com

Education

Ph.D. student in Electrical Engineering	3.9/4.0	09.2021 – Present
<i>Northwestern University, advised by Aggelos Katsaggelos</i>		<i>Evanston, Illinois, USA</i>
Ph.D. student in Mechanical Engineering		09.2019 – 09.2021
<i>Northwestern University (Mid-study transfer to Electrical Engineering)</i>		<i>Evanston, Illinois, USA</i>
M.S. in Mechanical Engineering	92.7/100.0	09.2016 – 06.2019
<i>Huazhong University of Science and Technology, advised by Bin Li and Xinggong Wang</i>		<i>Wuhan, Hubei, China</i>
B.S. in Materials Processing and Control Engineering	90.1/100.0	09.2012 – 06.2016
<i>Huazhong University of Science and Technology</i>		<i>Wuhan, Hubei, China</i>

Selected Publications

- [1] **Lin, H.**, Apostolidis, C., Katsaggelos, A. Brighteye: Glaucoma Screening with Color Fundus Photographs based on Vision Transformer. arXiv:2405.00857 (2024).
- [2] **Lin, H.**, Lopez Tapia, S., Schiffers, F. et al. Usformer: A Small Network for Left Atrium Segmentation of 3D LGE MRI. Heliyon (2024). ([Talk](#), [Slides](#))
- [3] **Lin, H.**, Liu, T., Katsaggelos, A., Kline, A. StenUNet: Automatic Stenosis Detection from X-ray Coronary Angiography. arXiv:2310.14961 (2023).
- [4] **Lin, H.**, Liu, T., Katsaggelos, A., Kline, A. YOLO-Angio: An Algorithm for Coronary Anatomy Segmentation. arXiv:2310.15898 (2023).
- [5] **Lin, H.**, Mao, Y., Yu, C.X. et al. A deep learning framework for layer-wise porosity prediction in metal powder bed fusion using thermal signatures. Journal of Intelligent Manufacturing (2023).
- [6] Mozaffar, M., Liao, S., **Lin, H.**, Ehmann, K. and Cao, J. Geometry-agnostic data-driven thermal modeling of additive manufacturing processes using graph neural networks. Additive Manufacturing (2021).
- [7] Niu, S., Li, B., Wang, X. and **Lin, H.** Defect Image Sample Generation With GAN for Improving Defect Recognition. IEEE Transactions on Automation Science and Engineering (2020).
- [8] **Lin, H.**, Li, B., Wang, X. et al. Automated defect inspection of LED chip using deep convolutional neural network. Journal of Intelligent Manufacturing (2019). (**highly cited paper**)

Research Experience

Glaucoma Screening with Color Fundus Photographs	01.2024 – 05.2024
<ul style="list-style-type: none">Ranked the 5th in the Justified Referral in AI Glaucoma Screening (JustRAIGS) challenge at ISBI 2024.	
Coronary Artery Segmentation and Stenosis Detection	05.2023 – 02.2024
<ul style="list-style-type: none">Ranked the 3rd in the Automatic Region-based Coronary Artery Disease diagnostics using X-ray angiography images (ARCADE) challenge at MICCAI 2023.	
Left Atrium (LA) Segmentation	09.2021 – 09.2023
<ul style="list-style-type: none">Propose a transformer-and-Unet-based 3D network for LA segmentation in one single stage.Outperform others in a much smaller parameter size (585k) and a competitive dice score (92.43%).	
Layer-wise Porosity Prediction in Metal Powder Bed Fusion	10.2020 – 10.2022

- ConvLSTM is applied to learn the spatiotemporal dependencies in additive manufacturing processes.
- The first to predict porosity based on thermal signatures of previously manufactured layers allowing for real-time quality control.
- Validated in lack of fusion porosity using computerized tomography (CT) scans on the laser powder bed fusion process, achieving an F1-score of 0.75.

Thermal History Prediction for Directed Energy Deposition 03.2020 – 12.2021

- Propose a graph neural network (GNN) combined with a recurrent neural network (RNN) to learn the spatiotemporal dependencies in additive manufacturing processes.
- Predict long-term thermal histories for unseen geometries on the Directed Energy Deposition process.

Defect Image Sample Generation 10.2017 – 06.2019

- The first to generate industrial defect images using a Generative Adversarial Network (GAN) network.
- Generate defect samples from defect-free images to solve the lack of defect samples.
- Improve the accuracy of anomaly detection and defect classification by 0.80% and 2.95%.

LED Chip Defect Detection 11.2015 – 06.2019

- The first to accomplish chip defect classification and localization simultaneously in a single CNN.
- Class activation mapping (CAM) is to localize defect regions without region-level human annotations.
- Outperform others in detecting line blemishes and scratch marks with an inaccuracy of 5.04%.

Reviewer Service

- [1] IEEE Transactions on Automation Science and Engineering
- [2] Journal of Intelligent Manufacturing
- [3] Journal of Biomedical and Health Informatics
- [4] IEEE Transactions on Medical Imaging
- [5] IEEE Transactions on AgriFood Electronics
- [6] Information Processing in Medical Imaging (IPMI)
- [7] European Signal Processing Conference (EUSIPCO)
- [8] IEEE International Symposium on Biomedical Imaging (ISBI)
- [9] Medical Imaging with Deep Learning (MIDL)
- [10] SPIE Medical Imaging
- [11] Medical Image Computing and Computer Assisted Intervention (MICCAI)

Working Experience

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|---|---|-----------------|
| Process Design Engineer | Guangxi Yuchai Machinery Group Co., Ltd. | 07.2015 |
| <ul style="list-style-type: none"> • Improve the casting process for the A8300 product by designing shrink-type and step-type gating systems, adding filters to obstruct slag, and closure under the inner sprue to reduce slag inclusion by 8%. | | |
| Volunteer Teacher | Wat Chork Primary School, Siem Reap, Cambodia | 07.2018 |
| <ul style="list-style-type: none"> • Teach English and computer course for 42 primary students of various ages. | | |
| Minister of Health | Graduate Student Union of Mechanical Department | 09.2016-09.2017 |
| <ul style="list-style-type: none"> • Won the 2nd prize in "Top Ten Characteristic Health Brand Events". | | |

Awards & Honors

Predictive Science and Engineering Design (PSED) Fellowship <i>Northwestern University</i>	2020
Outstanding Graduate Student <i>Huazhong University of Science and Technology</i>	2016&2019
National Scholarship of Master <i>The People's Republic of China</i>	2017
National Encouragement Scholarship <i>The People's Republic of China</i>	2015
Third Prize in the 6th YGB National College Students Casting Process Design Competition <i>Foundry Institution of Chinese Mechanical Engineering Society</i>	2015
Outstanding Individual in HUST College Students Technical Innovation <i>Huazhong University of Science and Technology</i>	2015

Specialized Skills

Python, Matlab, C++, Git, Docker, PyTorch lightning, Assembly Language, JavaScript; AutoCAD, CAE, Abaqus, NX, SEM, Solidworks

Selected Courses

Introduction to Computer Vision, Advanced Computer Vision, Machine Learning, Deep Learning, Social Media Mining , Machine Learning for Medical imaging

Other Interests

jog (half marathon), badminton, fitness, piano, knitting, Chinese calligraphy