

NIANYI LI

Curriculum Vitae

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RESEARCH INTERESTS

Computer Vision
Machine Learning
Cognitive Psychology
Computational Photography
Virtual/Augmented Reality



EDUCATION

Ph.D. in Computer & Information Science

University of Delaware

📅 Sep 2013 - Oct 2017

📍 Newark, DE

- Advisor: Dr. Jingyi Yu

B.Eng. in Electronics and Information Engineering

Huazhong University of Science and Technology

📅 Sep 2009 - Jun 2013

📍 Wuhan, China

APPOINTMENTS

Assistant Professor

Clemson University

📅 Fall 2021 -

📍 Clemson, SC

Postdoctoral Associate

Louisiana State University

📅 May 2019 - July 2021

📍 Baton Rouge, LA

Postdoctoral Associate

Duke University

📅 Nov 2017 - May 2019

📍 Durham, NC

RESEARCH EXPERIENCE

Louisiana State University

Gaze pattern analysis in VR and AR scenes, light field acquisition and rendering, fluid surface reconstruction, and 3D face recognition:

- Analyze and compare the gaze pattern in 2D and 3D scenes

- Fixed-location Light Field Acquisition
 - Use deep learning techniques to recover the 3D fluid surface
 - Construct an effective algorithm for 3D face recognition in uncontrolled Environment
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Duke University

Medical image processing, object detection & segmentation, and human gaze prediction:

- Gaze prediction of radiologists on Digital Breast Tomosynthesis Images
 - Mass detection in Digital Breast Tomosynthesis images
 - Lung segmentation and image quality analysis
 - Knee detection and classifying the severity of knee osteoarthritis
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University of Delaware

Computer vision, machine learning and computational photography:

- Saliency detection and human fixation prediction on high-dimensional data
 - XSlits Camera and light field Rendering
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Plex-VR

Deep learning methods for human gaze prediction and surface light field rendering:

- Leverage deep learning technique to predict personalized eye-gaze-based saliency maps for individual
 - Using Deep Learning method to recover surface light field
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Honeywell International Inc.

Jitter-Exposures for image and light field super-resolution:

- Modify the commercial single-lens reflex camera into light field camera
 - Use the modified camera to trade temporal resolution for spatial resolution in excess of the sensor's pixel count without attenuating light or adding additional hardware. An effective image registration algorithm is proposed.
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PUBLICATIONS

📄 Grants Application

- National Science Foundation. "I-Corps: Universal 3D Scanning Through Polarization Field". Co-PI, Dec 1, 2020 - Nov 30, 2022, \$50,000.
- National Science Foundation. "RI: Small: Collaborative Research: Imaging through Turbulence for Long Range Computer Vision". Co-PI, \$500,000 (Pending).

📄 Journal Articles

- Yanyu Xu, Junru Wu, **Nianyi Li**, Shenghua Gao, Jingyi Yu. "Personalized Saliency and Its Prediction". Accepted by *the IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)*, 2018.
- **Nianyi Li**, Jinwei Ye, Yu Ji, Haibin Ling and Jingyi Yu. "Saliency Detection on Light Fields". In *the IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)*, PP(99):1-1, 2016.
- Albert Swiecicki, **Nianyi Li**, Jonathan O'Donnell, Nicholas Said, Jichen Yang, Richard C Mather, William A Jiranek, Maciej A Mazurowski. "Deep learning-based algorithm for assessment of knee osteoarthritis severity in radiographs matches performance of radiologists". In *Computers in biology and medicine*, 133, p.104334, 2021.

Conference Proceedings

- **Nianyi Li**, Jinwei Ye, Qifan Zhang, S Susan Young. “Unsupervised Non-Rigid Image Distortion Removal via Grid Deformation”. *Computational Imaging VI* 11731, 1173109, 2021. (**Oral presentation**).
- Mateusz Buda, Ashirbani Saha, Ruth Walsh, Sujata Ghate, **Nianyi Li**, Albert Świącicki, Joseph Y Lo, Maciej A Mazurowski. “Detection of masses and architectural distortions in digital breast tomosynthesis: a publicly available dataset of 5,060 patients and a deep learning model”. arXiv preprint arXiv:2011.07995.
- Simron Thapa, **Nianyi Li** and Jinwei Ye. “Dynamic Fluid Surface Reconstruction Using Deep Neural Network”. In the *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2020. (**Oral presentation**).
- Albert Swiecicki, Mateusz Buda, Ashirbani Saha, **Nianyi Li**, Sujata V. Ghate, Ruth Walsh, Maciej A. Mazurowski. “Automatic estimation of knee joint space narrowing by deep learning segmentation algorithms”. In the *Medical Imaging: Computer-Aided Diagnosis*, 2020.
- **Nianyi Li**, Albert Swiecicki, Nicholas Said, Jonathan O’Donnell, Maciej A. Mazurowski. “Automatic Kellgren-Lawrence grade estimation driven deep learning algorithms”. In the *Medical Imaging: Computer-Aided Diagnosis*, 2020 (**Oral presentation**).
- Albert Swiecicki, Nicholas Said, Jonathan O’Donnell, Mateusz Buda, **Nianyi Li**, William A. Jiranek, Maciej A. Mazurowski. “Automatic estimation of knee joint space narrowing by deep learning segmentation algorithms”. In the *Medical Imaging: Computer-Aided Diagnosis*, 2020.
- Yuqi Ding, **Nianyi Li**, S. Susan Young and Jinwei Ye. “Efficient 3D Face Recognition in Uncontrolled Environment”. In the *International Symposium on Visual Computing (ISVC)*, 2019 (**Oral presentation**).
- **Nianyi Li**, Scott McCloskey and Jingyi Yu. “Jittered Exposures for Light Field Super-Resolution”. In *IEEE International Conference on Image Processing (ICIP)* 2019. (**Oral presentation**).
- **Nianyi Li**, Scott McCloskey and Jingyi Yu. “Jittered Exposures for Image Super-Resolution”. In *CVPRW* 2018.
- Chen, Anpei, Minye Wu, Yingliang Zhang, **Nianyi Li**, Jie Lu, Shenghua Gao, and Jingyi Yu. "Deep surface light fields." *Proceedings of the ACM on Computer Graphics and Interactive Techniques* 1, no. 1 (2018): 1-17.
- Yanyu Xu, **Nianyi Li**, Junru Wu, Shenghua Gao and Jingyi Yu. “Beyond Universal Saliency: Personalized Saliency Prediction with Multi-task CNN”. In the *IJCAI*, 2017 (**Best student paper nomination**).
- **Nianyi Li**, Haiting Lin, Bilin Sun, Mingyuan Zhou and Jingyi Yu. “Rotational Crossed-Slit Light Fields”. In *CVPR*, 2016.
- **Nianyi Li**, Bilin Sun and Jingyi Yu. “A Weighted Sparse Coding Framework for Saliency Detection”. In *CVPR*, 2015.
- Quan Zhou, **Nianyi Li**, Jianxin Chen, Shu Cai and Longin Jan Latecki. “Salient Object Detection via Background Contrast”. In *40th IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2015.
- **Nianyi Li**, Jinwei Ye, Yu Ji, Haibin Ling and Jingyi Yu. “Saliency Detection on Light Fields”. In *CVPR*, 2014.
- Quan Zhou, **Nianyi Li**, Yi Yang, Pan Chen and Wenyu Li. “Corner-Surround Contrast for Saliency Detection”. In *International Conference on Pattern Recognition (ICPR)*, 2012.

US PATENT

Imaging device for producing high resolution images using subpixel shifts and method of using same, Application Number US9674430B1, Filed in 2016

TEACHING EXPERIENCE

Graduate Mentor

Louisiana State University

📅 May 2019 – present

📍 Baton Rouge, LA

Simron Thapa, first-year PhD student

- 3D fluid Surface reconstruction and gaze prediction in VR (Published paper in the *the IEEE Conference on Computer Vision and Pattern Recognition (CVPR) 2020*)

Yuqi Ding, first-year PhD student

- 3D face detection and recognition (Published paper in *International Symposium on Visual Computing (ISVC) 2019*)

Intern Mentor

Plex-VR

📅 May 2016-Aug 2016

📍 Shanghai, LA

Yanyu Xu, first-year PhD student in ShanghaiTech University:

- Deep learning method for predicting personalized eye-gaze-based saliency maps for individuals (Published papers in the *28th International Joint Conferences on Artificial Intelligence (IJCAI) 2017* and the *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI) 2018*)

Anpei Chen, Second-year Master student in ShanghaiTech University:

- Deep learning method for surface light field rendering (Published papers in the *ACM SIGGRAPH Symposium on Interactive 3D Graphics and Games 2018*)

Teaching Assistant

University of Delaware

📅 Feb 2016 - May 2016

📍 Newark, DE

CISC106 - General Computer Science for Engineers

- Introductory Computer Science for Engineers, Spring 2016 Open to engineering-major undergraduate students. Responsible for holding lab session (Python programming)

CISC481/681 - Artificial Intelligence

- Advanced course to Artificial Intelligence, Spring 2016 Open to all graduate students. Responsible for giving tutorials on common computer software packages and grading assignments, projects and exams.

AWARDS

Frank A. Pehrson Graduate Student Achievement Award

University of Delaware

📅 2017

📍 Newark, DE

Honorable Graduation

Huazhong University of Science and Technology

📅 2013

📍 Wuhan, China

Scholarship of Outstanding Students

Huazhong University of Science and Technology

📅 2012

📍 Wuhan, China

PRESENTATIONS

Learning to mimic Human visual attention (via remote video recording)

Dalhousie University

📅 April, 2021

📍 Halifax, NS (Canada)

Invited talk (via remote video recording)

Clemson University

📅 April, 2021

📍 Clemson, SC, USA

Invited talk (via remote video recording)

University of North Carolina at Charlotte

📅 March, 2021

📍 Charlotte, NC, USA

Invited talk (via remote video recording)

University of North Carolina at Wilmington

📅 Feb, 2021

📍 Wilmington, NC, USA

Human Attention Simulation on Nature Scenes in Computer Vision (via remote video recording)

Fudan University

📅 Feb, 2017

📍 Shanghai, China

Saliency Detection on High-dimensional Data

Shanghai Jiao Tong University

📅 Aug, 2016

📍 Shanghai, China

Corner-Surround Contrast for Saliency Detection

International Conference on Pattern Recognition (ICPR)

📅 Nov, 2012

📍 Tsukuba, Japan

REVIEWER OF

IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI).

IEEE Transactions on Image Processing (TIP).

IEEE Transactions on Multimedia (MM).

IEEE Transactions on Circuits and Systems for Video Technology (TCSVT).

Pattern Recognition (PR).

The Annual Conference on Neural Information Processing Systems (NIPS).

The AAAI Conference on Artificial Intelligence (AAAI).

Conference on Computer Vision and Pattern Recognition (CVPR)

Machine Vision and Applications (MVAP).