

Chen-Hsuan Lin

Senior Research Scientist @ NVIDIA Research

Address: 2788 San Tomas Expressway, Santa Clara, CA 95051, USA
E-mail: chenhsuanl@nvidia.com • Website: <https://chenhsuanlin.bitbucket.io/>

Research Interests

Computer vision & graphics – 3D reconstruction, view synthesis, neural rendering
Deep learning – generative modeling, self-supervised learning, generative AI applications

Education

Carnegie Mellon University

Ph.D. in Robotics (School of Computer Science)

- Advisor: Simon Lucey
- Recipient of NVIDIA Graduate Fellowship (2019)
- Thesis: Learning 3D Registration and Reconstruction from the Visual World
- Thesis committee: Simon Lucey (chair), Deva Ramanan, Abhinav Gupta, Andrea Vedaldi

Pittsburgh, PA, USA
Aug. 2017 – Jun. 2021

Carnegie Mellon University

M.S. in Robotics (School of Computer Science)

- Advisor: Simon Lucey
- Thesis: The Conditional Lucas & Kanade Algorithm

Pittsburgh, PA, USA
Aug. 2014 – Aug. 2016

National Taiwan University

B.S. in Electrical Engineering

- Advisor: Homer H. Chen

Taipei, Taiwan
Sep. 2009 – Jun. 2013

Experiences

NVIDIA Research

Senior Research Scientist

Research Scientist

- Manager: Ming-Yu Liu
- Research in 3D reconstruction, 3D generation, and neural rendering [2][3][4]
- Recognized with Best Inventions of 2023 by TIME Magazine [3]
- Technical co-lead of NVIDIA Edify 3D (productized AI model for 3D asset generation) [1]

Santa Clara, CA, USA
Jun. 2023 – present
Aug. 2021 – May 2023

Carnegie Mellon University

Graduate Research Assistant

- Advisor: Simon Lucey
- Learning registration and reconstruction of neural 3D scene representations [5]
- Self-supervised 3D shape reconstruction via differentiable and neural rendering [6] [11]
- Non-rigid 3D structure recovery from 2D keypoints of single objects [7][14]
- Structured optimization of image registration for visual tracking and recognition [10] [13] [15]
- Dense 3D reconstruction of faces from 2D self-captured monocular videos

Pittsburgh, PA, USA
Sep. 2014 – Jun. 2021

Facebook AI Research (Meta AI)

Research Intern

- Mentors: Kaiming He, Georgia Gkioxari, Justin Johnson
- Learning 3D representations for improving 2D object detection systems

Menlo Park, CA, USA
May 2019 – Aug. 2019

Adobe Research

Research Intern

- Mentors: Oliver Wang, Bryan Russell, Eli Shechtman, Vladimir Kim, Matthew Fisher
- Photometric optimization for 3D mesh reconstruction from RGB videos [8]

Seattle, WA, USA

May 2018 – Nov. 2018

Adobe Research

Research Intern

- Mentors: Eli Shechtman, Oliver Wang, Ersin Yumer
- Learning realistic geometric corrections of objects for image compositing [9]

Seattle, WA, USA

Apr. 2017 – Aug. 2017

National Taiwan University

Undergraduate Research Assistant

- Advisor: Homer H. Chen
- Perceptual qualitative rate-distortion optimization for video compression

Taipei, Taiwan

Sep. 2011 – Aug. 2013

MediaTek Inc.

Software Engineering Intern (computer vision)

- Distributed algorithms for parallelized face detection on mobile devices

Hsinchu, Taiwan

Jul. 2012 – Sep. 2012

Publications

Technical Reports

- [1] NVIDIA: Chen-Hsuan Lin (core contributor)
[Edify 3D: Scalable High-Quality 3D Asset Generation](#)
arXiv preprint (2411.07135), 2024

Conference Papers

- [2] Jonathan Lorraine, Kevin Xie, Xiaohui Zeng, Chen-Hsuan Lin, Towaki Takikawa, Nicholas Sharp, Tsung-Yi Lin, Ming-Yu Liu, Sanja Fidler, and James Lucas
[ATT3D: Amortized Text-to-3D Object Synthesis](#)
In *IEEE International Conference on Computer Vision (ICCV)*, 2023
- [3] Zhaoshuo Li, Thomas Müller, Alex Evans, Russell H. Taylor, Mathias Unberath, Ming-Yu Liu, and Chen-Hsuan Lin
[Neuralangelo: High-Fidelity Neural Surface Reconstruction](#)
In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2023
TIME Magazine's Best Inventions of 2023
- [4] Chen-Hsuan Lin *, Jun Gao*, Luming Tang*, Towaki Takikawa*, Xiaohui Zeng*, Xun Huang, Karsten Kreis, Sanja Fidler†, Ming-Yu Liu†, and Tsung-Yi Lin
[Magic3D: High-Resolution Text-to-3D Content Creation](#)
In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2023 (**highlight**)
- [5] Chen-Hsuan Lin, Wei-Chiu Ma, Antonio Torralba, and Simon Lucey
[BARF: Bundle-Adjusting Neural Radiance Fields](#)
In *IEEE International Conference on Computer Vision (ICCV)*, 2021 (**oral presentation**)
- [6] Chen-Hsuan Lin, Chaoyang Wang, and Simon Lucey
[SDF-SRN: Learning Signed Distance 3D Object Reconstruction from Static Images](#)
In *Conference on Neural Information Processing Systems (NeurIPS)*, 2020
- [7] Chaoyang Wang, Chen-Hsuan Lin, and Simon Lucey
[Deep NRSfM++: Towards Unsupervised 2D-3D Lifting in the Wild](#)
In *IEEE International Conference on 3D Vision (3DV)*, 2020 (**oral presentation**)

- [8] **Chen-Hsuan Lin**, Oliver Wang, Bryan C. Russell, Eli Shechtman, Vladimir G. Kim, Matthew Fisher, and Simon Lucey
Photometric Mesh Optimization for Video-Aligned 3D Object Reconstruction
In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2019
- [9] **Chen-Hsuan Lin**, Ersin Yumer, Oliver Wang, Eli Shechtman, and Simon Lucey
ST-GAN: Spatial Transformer Generative Adversarial Networks for Image Compositing
In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2018
- [10] Chaoyang Wang, Hamed Kiani Galoogahi, **Chen-Hsuan Lin**, and Simon Lucey
Deep-LK for Efficient Adaptive Object Tracking
In *IEEE International Conference on Robotics and Automation (ICRA)*, 2018
- [11] **Chen-Hsuan Lin**, Chen Kong, and Simon Lucey
Learning Efficient Point Cloud Generation for Dense 3D Object Reconstruction
In *AAAI Conference on Artificial Intelligence (AAAI)*, 2018 (**oral presentation**)
- [12] Rui Zhu, Chaoyang Wang, **Chen-Hsuan Lin**, Ziyang Wang, and Simon Lucey
Object-Centric Photometric Bundle Adjustment with Deep Shape Prior
In *IEEE Winter Conference on Applications of Computer Vision (WACV)*, 2018
- [13] **Chen-Hsuan Lin** and Simon Lucey
Inverse Compositional Spatial Transformer Networks
In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2017 (**oral presentation**)
- [14] Chen Kong, **Chen-Hsuan Lin**, and Simon Lucey
Using Locally Corresponding CAD Models for Dense 3D Reconstructions from a Single Image
In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2017
- [15] **Chen-Hsuan Lin**, Rui Zhu, and Simon Lucey
The Conditional Lucas & Kanade Algorithm
In *European Conference on Computer Vision (ECCV)*, 2016

Patents

Neural Networks to Generate Pixels U.S. Patent Application No. 17/990614	Aug. 2024
High Resolution Text-to-3D Content Creation U.S. Patent Application No. 18/232279	May 2024
3D Object Reconstruction using Photometric Mesh Representation U.S. Patent No. 10769848	Sep. 2020
Image Composites using a Generative Adversarial Neural Network U.S. Patent No. 10719742	Jul. 2020

Honors & Awards

Awards & Prizes

- Best Inventions of 2023, TIME Magazine Oct. 2023
- Top Poster Award finalist, NVIDIA GPU Technology Conference (GTC), 2020 Mar. 2020
- Outstanding Achievement Award, 2012 Altera InnovateAsia FPGA Design Competition Sep. 2012

Fellowships & Scholarships

- NVIDIA Graduate Fellowship Dec. 2018
- Amazon Go Ph.D. Fellowship (declined) Dec. 2018
- Study Abroad Scholarship, Ministry of Education, Taiwan Jun. 2018

Paper Reviewing Recognition

- **Highlighted Reviewer**, International Conference on Learning Representations (ICLR), 2022 Apr. 2022
- **Outstanding Reviewer**, IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2021 May 2021

Press Coverage

Forbes: <i>NVIDIA Breaks Ground With Edify 3D</i>	Nov. 2024
NVIDIA Blog: <i>NVIDIA Researchers Harness Real-Time Gen AI to Build Immersive Desert World</i>	Jul. 2024
NVIDIA Blog: <i>For Your Edification: Shutterstock Releases Generative 3D, Getty Images Upgrades Service Powered by NVIDIA</i>	Jul. 2024
VentureBeat: <i>Shutterstock releases generative 3D, Getty Images upgrades service powered by NVIDIA</i>	Aug. 2024
VentureBeat: <i>NVIDIA partners with Shutterstock, Getty Images on AI-generated 3D content</i>	Mar. 2024
NVIDIA Blog: <i>NVIDIA Brings Generative AI to World's Enterprises With Cloud Services for Creating Large Language and Visual Models</i>	Oct. 2023
TIME: <i>NVIDIA Neuralangelo: The 200 Best Inventions of 2023</i>	Oct. 2023
VentureBeat: <i>NVIDIA researchers use AI to turn 2D video clips into detailed 3D graphics</i>	Jun. 2023
The Verge: <i>NVIDIA's new Neuralangelo AI model creates 3D models from 2D video clips.</i>	Jun. 2023
Engadget: <i>NVIDIA's Neuralangelo is an AI model that can generate 3D objects from 2D videos</i>	Jun. 2023
Yahoo! News: <i>NVIDIA's Neuralangelo is an AI model that can generate 3D objects from 2D videos</i>	Jun. 2023
WIRED: <i>NVIDIA Research's Neuralangelo can build 3D structures from 2D videos</i>	Jun. 2023
BBC Science Focus: <i>Breakthrough AI could soon generate whole 3D worlds from 2D videos</i>	Jun. 2023
PetaPixel: <i>NVIDIA's Neuralangelo AI Turns iPhone Video into Detailed 3D Structures</i>	Jun. 2023
Computerworld: <i>NVIDIA Neuralangelo: A faster path to the industrial metaverse</i>	Jun. 2023
NVIDIA Blog: <i>Digital Renaissance: NVIDIA Neuralangelo Research Reconstructs 3D Scenes</i>	Jun. 2023
Forbes: <i>What NVIDIA's New Text-To-3D Means For Engineering & Product Design</i>	Nov. 2022
Ars Technica: <i>3D for everyone? NVIDIA's Magic3D can generate 3D models from text</i>	Nov. 2022
Gigazine: <i>NVIDIA announces AI "Magic3D" that generates high-resolution 3D models from text</i>	Nov. 2022

Invited Talks

High-Resolution Neural 3D Content Creation

- Cornell University Ithaca, NY, USA • Oct. 2024
- Open Data Science Conference (ODSC), 2023 San Francisco, CA, USA • Oct. 2023
- Massachusetts Institute of Technology Cambridge, MA, USA • Sep. 2023

Diffusion Models for 3D Asset Generation

- WACV 2024 Workshop on Rich Media with Generative AI Waikoloa, HI, USA • Jan. 2024
- SIGGRAPH 2023 Course on Diffusion Models Los Angeles, CA, USA • Aug. 2023

Neuralangelo: High-Fidelity Neural Surface Reconstruction

- Taiwan Semiconductor Manufacturing Company Ltd. Hsinchu, Taiwan • Jul. 2023

Magic3D: High-Resolution Text-to-3D Content Creation

- Sea AI Labs & National University of Singapore Singapore • Dec. 2022
- ByteDance Ltd. Singapore • Dec. 2022

Learning 3D Registration and Reconstruction from the Visual World

- National Taiwan University Taipei, Taiwan • Jan. 2022
- Massachusetts Institute of Technology Cambridge, MA, USA • Sep. 2021
- Carnegie Mellon University Pittsburgh, PA, USA • Apr. 2021
- MediaTek Inc. Hsinchu, Taiwan • Apr. 2021
- Facebook (Meta) Reality Labs Redmond, WA, USA • Mar. 2021
- Apple ML Research Seattle, WA, USA • Mar. 2021
- Amazon Science Seattle, WA, USA • Mar. 2021

- Magic Leap Inc. Sunnyvale, CA, USA • Mar. 2021
 - NVIDIA Research Santa Clara, CA, USA • Mar. 2021
 - Google Research Seattle, WA, USA • Mar. 2021
- BARF: Bundle-Adjusting Neural Radiance Fields**
- IEEE International Conference on Computer Vision (ICCV), 2021 Montreal, Canada • Oct. 2021
- SDF-SRN: Learning Signed Distance 3D Object Reconstruction from Static Images**
- Massachusetts Institute of Technology Cambridge, MA, USA • Jan. 2021
 - Beijing Academy of Artificial Intelligence Beijing, China • Nov. 2020
- Learning Dense 3D Object Reconstruction without Geometric Supervision**
- NVIDIA GPU Technology Conference (GTC), 2020 San Jose, CA, USA • Mar. 2020
 - Carnegie Mellon University Pittsburgh, PA, USA • Jan. 2020
- Learning to Align without Geometric Supervision**
- Carnegie Mellon University Pittsburgh, PA, USA • Apr. 2019
- Learning Efficient Point Cloud Generation for Dense 3D Object Reconstruction**
- AAAI Conference on Artificial Intelligence (AAAI), 2018 New Orleans, LA, USA • Feb. 2018
- Inverse Compositional Spatial Transformer Networks**
- IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2017 Honolulu, HI, USA • Jul. 2017
 - Oculus Research (Meta Reality Labs) Pittsburgh, PA, USA • Dec. 2016
- The Conditional Lucas & Kanade Algorithm**
- Carnegie Mellon University Pittsburgh, PA, USA • Jun. 2016
 - MathWorks Inc. Natick, MA, USA • Apr. 2016
 - Oculus VR (Meta Platforms Inc.) Menlo Park, CA, USA • Feb. 2016

Professional Services

Area Chair / Senior Program Committee

- International Conference on Learning Representations (ICLR) 2024, 2025
- Conference of the European Association for Computer Graphics (Eurographics) 2024

Journal Paper Reviewer

- IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI) 2021 – 2023
- IEEE Transactions on Visualization and Computer Graphics (TVCG) 2023
- International Journal of Computer Vision (IJCV) 2019, 2020, 2023
- Transactions on Machine Learning Research (TMLR) 2022
- IEEE Transactions on Image Processing (TIP) 2020
- IEEE Transactions on Circuits and Systems for Video Technology (TCSVT) 2019
- Journal of Machine Vision and Applications (MVAP) 2017
- IEEE Transactions on Affective Computing (TAFAC) 2015

Conference Paper Reviewer

- IEEE Conference on Computer Vision and Pattern Recognition (CVPR) 2018 – 2025
- Conference on Neural Information Processing Systems (NeurIPS) 2020 – 2024
- ACM Conference on Computer Graphics and Interactive Techniques in Asia (SIGGRAPH Asia) 2023, 2024
- ACM International Conference on Computer Graphics and Interactive Techniques (SIGGRAPH) 2024
- International Conference on Learning Representations (ICLR) 2022, 2023
- IEEE International Conference on Computer Vision (ICCV) 2019 – 2023
- International Conference on Robotics and Automation (ICRA) 2023
- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2023
- European Conference on Computer Vision (ECCV) 2018 – 2022

- International Conference on Machine Learning (ICML) 2022
- IEEE International Conference on 3D Vision (3DV) 2021
- IEEE International Symposium on Circuits and Systems (ISCAS) 2014

CMU Institutional Services

- Ph.D. in Robotics Research Qualifier Committee 2019, 2020
Examinee: Nathaniel Chodosh, Wei Dong, Ming-Fang Chang, Chaoyang Wang
- M.S. in Robotics Thesis Committee 2018
Examinee: Chaoyang Wang
- M.S. in Robotics Admission Committee 2019

Teaching Experiences

Carnegie Mellon University

Pittsburgh, PA, USA

- **Graduate Student Instructor / Teaching Assistant** Spring 2019
Course: Visual Learning and Recognition (CMU 16-824)
Instructor: Abhinav Gupta
Full lectures: 3D Vision & 3D Reasoning, Semantic Segmentation & Pixel Labeling
- **Head Teaching Assistant** Fall 2017
Course: Computer Vision (CMU 16-720)
Instructors: Srinivasa Narasimhan, Simon Lucey, Yaser Sheikh
- **Teaching Assistant** Fall 2015
Course: Designing Computer Vision Apps (CMU 16-423)
Instructor: Simon Lucey