Minghao Liu

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EDUCATION

University of California, Santa Cruz **Sep 2019—June 2025**

Ph.D. in Computer Science and Engineering (Advanced to candidacy)

University of California, Santa Cruz (UCSC) **Sep 2015—Jun 2019**

B.S. in Computer Science and B.A. in Business Management Economics

INDUSTRY EXPERIENCE

Accenture @ Advanced AI *Mountain View, CA*

Research Scientist Manager. **June 2025—Present**

- Designed and implemented batch simulation product for AI refinery platform, creating an in-house Omniverse Farm equivalent with customizable pipeline architecture for client-specific simulation workflows. (Product)
- Developed proof-of-concept integrations combining Vision Language Action (VLA) models with NVIDIA Isaac Sim and robotic sensing agents, advancing Accenture's capabilities in simulation and autonomous robotics systems. (POC)
- Built client-facing demonstration systems for Physical AI team, showcasing early-stage simulation and robotics capabilities to support business development as part of a newly established team.

Meta @ Reality Lab *Sausalito, CA*

Research Scientist Intern **June 2024—Feb 2025**

- Proposed a biophysics-bound, latent diffusion-based generative AI for 3D human avatar generation, ensuring adherence to biophysical laws and enhancing realism and scientific grounding for avatar creation. (Target SIGGRAPH 25)
- Utilized a mid-scale capture-in-the-wild dataset and a small high-quality light stage capture for diffusion model training, resulting in cinematic-quality avatar results that remain expressive across different identities.
- Combined diffusion model with an refiner, resulting in high-quality albedo, bump map, and 3D mesh generation at 2K resolution.
- Integrated the diffusion model generation with a physics-based differentiable renderer, achieving cinematic-quality rendering results and enabling identity inversion from captures in the wild.

Meta @ Reality Lab *Sausalito, CA*

Research Scientist Intern **June 2023 — May 2024**

- Proposed an innovative training scheme for StyleGAN based generative AI, specializing in human albedo texture generation, ensuring adherence to biophysical laws, thereby enhancing realism and scientific grounding over unguided synthesis.
- Implemented a methodology utilizing direct object measurements from human skin properties (e.g., melanin levels) to refine generative AI controls, offering a more precise and scientifically sound approach than reliance on broad, imprecise annotations.
- Devised a method that significantly enhances data augmentation techniques by efficiently generating diverse, high-quality albedo maps of human textures, overcoming the limitations and excessive costs of traditional data capture methods.
- Full time intern during summer, research collaboration in between the two Meta internships

ByteDance *Mountain View, CA*

Research Scientist Intern **June 2021—Dec 2022**

- Proposed a self-supervised method for an avatar auto-creation system that generates editable, fine-grained cartoon avatars based on human input images, leading to publication at SIGGRAPH Asia 2022.
- Utilized GAN-based stylization methods to overcome domain gaps and neural imitators to address non-differentiability issues in rendering systems.
- Developed novel tagging-based annotation methods for human-cartoon annotations that improve quality, reduce annotator confusion, and expand to other rendering systems at a limited cost.
- Conducted human user studies using internal annotation teams and Amazon Turkers, designing excellent interfaces and reports for method comparisons, which reduced annotator confusion and ensured fair and consistent results.

PUBLICATIONS

Model Driven

Diji Yang*, **Minghao Liu***, Chung-Hsiang Lo, Yi Zhang, James Davis, *GenIR: Generative Visual Feedback for Mental Image Retrieval*. (NeurIPS25) (Co-first author)

Minghao Liu, Stephane Garbli, Sebastien Speierer, Nikolaos Sarafianos, Lukas Bode, Matt Chiang, Christophe Hery, James Davis, and Carlos Aliaga, *BioAvatarDiff: A Biophysically-Bound Diffusion model for 3D Avatar Generation*. (**Meta** Intern EGSR 2025)

Jiaheng Wei*, **Minghao Liu***, Jiahao Luo, Qiutong Li, James Davis, and Yang Liu. *DuelGAN: A Duel Between Two Discriminators Stabilizes the GAN Training* . (ECCV 2022) (Co-first author)

Shen Sang, Tiancheng Zhi, Guoxian Song, **Minghao Liu**, Chunpong Lai, Jing Liu, Linjie Luo, Xiang Wen, and James Davis. *AgileAvatar: Stylized 3D Avatar Creation via Cascaded Domain Bridging*. (SIGGRAPH Asia 2022) (**Bytedance Intern**)

Minghao Liu, Jiahao Luo, Xiaohan Zhang, Yang Liu, and James Davis. *Low-light Image Enhancement Using Chain-consistent Adversarial Networks*. (ICPR 2022)

Data and Human-AI Driven

Minghao Liu*, Zonglin Di*, Jiaheng Wei*, Zhongruo Wang, Hengxiang Zhang, Ruixuan Xiao, Haoyu Wang, Jinlong Pang, Hao Chen, Ankit Shah, Hongxin Wei, Xinlei He, Zhaowei Zhao, Haobo Wang, Lei Feng, Jindong Wang, James Davis, and Yang Liu, *Automatic Dataset Construction (ADC): Sample Collection, Data Curation, and Beyond*. (Under review) (**Across institutions**: UCSC, CMU, Amazon, MS, and More)

Minghao Liu*, Jiaheng Wei*, Yang Liu, and James Davis, *Do humans and machines have the same eyes? Human-machine perceptual differences on image classification*.(AAAI 25 Oral)

Minghao Liu, Zeyu Cheng, Shen Sang, Jing Liu, and James davis. *Tag-based annotation creates better avatars*. (NeSy25)

Jiahao Luo, Fahim Khan, Issei Mori, Akila de Silva, Eric Sandoval Ruezga, **Minghao Liu**, Alex Pang, and James Davis. *How much does input data type impact final face model accuracy?* (CVPR 2022 Oral)

Survey, Model Understanding

Vanshika Vats, Marzia Binta Nizam, **Minghao Liu**, Ziyuan Wang, Richard Ho, Mohnish Sai Prasad, Vincent Titterton, Sai Venkat Malreddy, Riya Aggarwal, Yanwen Xu, Lei Ding, Jay Mehta, Nathan Grinnell, Li Liu, Sijia Zhong, Devanathan Nallur Gandamani, Xinyi Tang, Rohan Ghosalkar, Celeste Shen, Rachel Shen, Nafisa Hussain, Kesav Ravichandran, and James Davis, *A Survey on Human-AI Teaming with Large Pre-Trained Models*

Yuhao Chen, Chloe Wong, Hanwen Yang, Juan Aguenza, Sai Bhujangari, Benthan Vu, Xun Lei, Amisha Prasad, Manny Fluss, Eric Phuong, **Minghao Liu**, James Davis, *Assessing the Impact of Prompting, Persona, and Chain of Thought Methods on ChatGPT's Arithmetic Capabilities* (**Co-Advisor**, Undergraduate Research Team)

ACADEMIA EXPERIENCE

Research Assistant at AVIS Lab (Advanced Visualization and Interactive Systems) **Sep 2019 — June 2025**

UC Santa Cruz | *PI: James Davis, Alex Pang, and Yang Liu* ***Santa Cruz, CA***

- Led multiple research projects in the field of generative models and human-AI teaming, resulting in multiple publications. (Refer to Publications)
- Managed weekly group meetings, setting agendas and engaging discussions across projects and recent publications, promoting a culture of collaboration and knowledge-sharing.
- Organized a paper reading and brainstorming Slack channel, cultivating good reading habits and inspiring innovative ideas among lab members, and facilitating the exchange of insights and expertise.

Mentor for Undergraduate Research **Jan 2023—Dec 2023**

UC Santa Cruz | *PI: Dr. James Davis* ***Santa Cruz, CA***

- Mentored and led three group projects, guiding undergraduate researchers in exploring innovative ideas and developing their research skills.
- Assessed the math abilities of ChatGPT, investigating its capabilities and limitations in mathematical reasoning. [Team A]
- Developed novel approaches to improve human annotation for human avatar creation, enhancing the accuracy and efficiency of the annotation process. [Team B and C]
- Successfully published two projects as arXiv reports, and submitted one project as a conference submission, which garnered interest from venture capitalists (VCs).

Reviewer experience for journal or conference:

- AI : AAAI 2023, ICLR 2023, WWW 2023 , ICLR 2024. NeurIPS 2023. AAAI 2024, ICML24, AAAI25, ICLR25, ICML25, WWW25
- Computer Vision : CVPR 2023, ICCV-CLVL 2023, ECCV24, CVPR24, CVPR25

Teaching Assistant *UC Santa Cruz* **Sep 2020—June 2024**

- AI/ML courses:
  - *CSE240*: Artificial Intelligence (Graduate course)
  - *CSE142*: Machine Learning and Data Mining (x2)
  - *CSE144*: Applied Machine Learning: Deep Learning (x2)
- Graphics: *CSE160*: Introduction to Computer Graphics (x3)
- Computer science/Math: *1.* Data Structures and Algorithms *2.* Programming in Python, *3.* Applied Discrete Mathematics

Awards

- **Dissertation-Year Fellowship** recipient for 2024-25 at the University of California, Santa Cruz. (3 per year)
- National Interest Waiver (**NIW**) Approval for green card application, considered as an outstanding researcher by USCIS.