Anand Bhattad

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Research Interests

Generative Models; Neural Rendering; Inverse Graphics; Intrinsic Images; Image-based Lighting; Perceptual Organization and Physics Awareness in Large Vision Models

Education

University of Illinois Urbana-Champaign (UIUC), USA

Ph.D., Computer Science 2019 – 2024
Thesis: **Exploring Knowledge in Generative Models**
Thesis committee: **David Forsyth (Advisor)**, Alexei A. Efros, William T. Freeman, Derek Hoiem, Svetlana Lazebnik, Shenlong Wang

M.S., Computer Science 2017 – 2018
M.S., Civil Engineering 2015 – 2017

National Institute of Technology Karnataka (NITK) Surathkal, India

B.Tech., Civil Engineering 2011 – 2015

Work Experience

Toyota Technological Institute at Chicago, Research Assistant Professor 2023 – now

University of California Berkeley, Visiting Scholar; Host: Alexei A. Efros 2024

Allen Institute of Artificial Intelligence, Research Intern with Aniruddha Kembhavi 2023

Intel, Research Intern with Stephan R. Richter in Vladlen Koltun's team 2021

NVIDIA, Research Intern with Andrew Tao and Bryan Catanzaro 2020

Fyusion Inc, Research Intern with Abhishek Kar and Rodrigo Ortiz Cayon 2019

Siemens Corporate Technology, Computer Vision & DL Intern with Jan Ernst 2017

Michigan State University, Research Intern with Nizar Lajnef 2014

IIIT Hyderabad, Research Intern with Ramacharla Pradeep Kumar 2013

Selected Honors and Awards

Outstanding Reviewer, ICCV 2023

Best Paper Nomination, CVPR 2022

Outstanding Emergency Reviewer, CVPR 2021

Outstanding Teaching Assistant, Intro Computing: Engrg & Sci 2016

Papers Under Review (Preprints on arXiv)

Self-selected Key Papers are Highlighted; * denotes equal contribution, and † indicates equal advising

3. **Generative Models: What do they know? Do they know things? Let's find out!**
   Xiaodan Du, Nicholas Kolkin, Greg Shakhnarovich, **Anand Bhattad**
   In Submission at *ICLR 2025*

2. **ZeroComp: Zero-shot Object Compositing from Image Intrinsics via Diffusion**
   Zitian Zhang, Frédéric Fortier-Chouinard, Mathieu Garon, **Anand Bhattad**, Jean-François Lalonde
   In Submission at *WACV 2025*

1. **UrbanIR: Large-Scale Urban Scene Inverse Rendering from a Single Video**
   Zhi-Hao Lin, Bohan Liu, Yi-Ting Chen, Kuan-Sheng Chen, David A. Forsyth, Jia-Bin Huang, **Anand Bhattad**, Shenlong Wang
   In Submission at *3DV 2025*

Refereed Conference Papers

13. **Latent Intrinsics Emerge from Training to Relight**
    Xiao Zhang, William Gao, Seemandhar Jain, Michael Maire, David A. Forsyth, **Anand Bhattad**
    NeurIPS 2024 (Spotlight presentation)
12. **From an Image to a Scene: Learning to Imagine the World from a Million 360° Videos**
    Matthew Wallingford, **Anand Bhattad**, Aditya Kusupati, Vivek Ramanujan, Matt Deitke, Aniruddha Kembhavi, Roozbeh Mottaghi, Wei-Chiu Ma, Ali Farhadi
    NeurIPS 2024
11. **Videoshop: Localized Semantic Video Editing with Noise-Extrapolated Diffusion Inversion**
    Xiang Fan, **Anand Bhattad**†, Ranjay Krishna†
    ECCV 2024
10. ***Shadows Don't Lie and Lines Can't Bend!* Generative Models don't know Projective Geometry...for now**
    Ayush Sarkar*, Hanlin Mai*, Amitabh Mahapatra*, Svetlana Lazebnik, David A. Forsyth, **Anand Bhattad**
    CVPR 2024
9. **StyLitGAN: Image-based Relighting via Latent Control**
   Anand Bhattad, James Soole, David A. Forsyth
   CVPR 2024
8. **StyleGAN Knows Normals, Depth, Albedo, and More**
   Anand Bhattad, Daniel McKee, Derek Hoiem, David A. Forsyth
   NeurIPS 2023
7. **OBJect 3DIT: Language-guided 3D-aware Image Editing**
   Oscar Michel, **Anand Bhattad**, Eli Vanderbilt, Ranjay Krishna, Aniruddha Kembhavi, Tanmay Gupta
   NeurIPS 2023
6. **Improving Equivariance in State-of-the-Art Supervised Depth and Normal Predictors**
   Yuanyi Zhong, **Anand Bhattad**, Yuxiong Wang, David A. Forsyth
   ICCV 2023
5. **Cut-and-Paste Object Insertion by Enabling Deep Image Prior for Reshading**
   Anand Bhattad, David A. Forsyth
   3DV 2022 (Spotlight presentation)
4. **DIVeR: Real-time and Accurate Neural Radiance Fields with Deterministic Integration for Volume Rendering**
   Liwen Wu, Jae Yong Lee, **Anand Bhattad**, Yuxiong Wang, David A. Forsyth
   CVPR 2022 (Best Paper Nomination; Oral presentation)
3. **View Generalization for Single Image Textured 3D Models**
   Anand Bhattad, Aysegul Dundar, Guilin Liu, Andrew Tao, Bryan Catanzaro
   CVPR 2021
2. **Unrestricted Adversarial Perturbations via Semantic Manipulation**
   Anand Bhattad*, Min-Jin Chong*, Kaizhao Liang, Bo Li, David A. Forsyth
   ICLR 2020
1. **Improved Style Transfer with Calibrated Metrics**
   Mao-Chuang Yeh*, Shuai Tang*, **Anand Bhattad**, Chuhang Zou, David A. Forsyth
   WACV 2020

Refereed Workshop Papers

5. **Intrinsic LoRA: A Generalist Approach for Discovering Knowledge in Generative Models**
   Xiaodan Du, Nicholas Kolkin, Greg Shakhnarovich, **Anand Bhattad**
   CVPR-W 2024 (Oral presentation)
   workshops: Generative Models for CV, AI for 3D Gen, SyntaGen, SynthData4CV, Dataset Distillation
4. **UrbanIR: Large-Scale Urban Scene Inverse Rendering from a Single Video**
   Zhi-Hao Lin, Bohan Liu, Yi-Ting. Chen, David A. Forsyth, Jia-Bin Huang, **Anand Bhattad**, Shenlong. Wang
   CVPR-W 2024
   workshop: SynthData4CV
3. **MIMIC: Masked Image Modeling with Image Correspondences**
   Kalyani Marathe, Mahtab Bigverdi, Nishat Khan, Tuhin Kundu, Patrick Howe, Sharan Ranjit S, **Anand Bhattad**, Aniruddha Kembhavi, Linda G. Shapiro, Ranjay Krishna
   CVPR-W 2024
   workshop: 3D with Multi-View Supervision (Archival long paper)
2. **Big but Imperceptible Adversarial Perturbations via Semantic Manipulation**
   Anand Bhattad[⋆], Min-Jin Chong[⋆], Kaizhao Liang, Bo Li, David A. Forsyth
   CVPR-W 2019 (Oral presentation)
   workshop: Adversarial Machine Learning in Real-World Computer Vision Systems
1. **Detecting Anomalous Faces with "No Peeking" Autoencoders**
   Anand Bhattad, Jason Rock, David A. Forsyth
   CVPR-W 2018 (Oral presentation)
   workshop: Vision with Biased and Scarce Data

Technical Reports

3. **Blocks2World: Controlling Realistic Scenes with Editable Primitives**
   Vaibhav Vavilala, Seemandhar Jain, Rahul Vasanth, **Anand Bhattad**, David A. Forsyth
   Technical Report, arXiv 2023
2. **Make It So: Steering StyleGAN for Any Image Inversion and Editing**
   Anand Bhattad, Viraj Shah, Derek Hoiem, David A. Forsyth
   Technical Report, arXiv 2023
1. **SIRfyN: Single Image Relighting from your Neighbors**
   David A. Forsyth, **Anand Bhattad**, Pranav Asthana, Yuanyi Zhong, Yuxiong Wang
   Technical Report, arXiv 2021

Patents

1. **Intrinsic-ControlNet: Zero-shot Object Compositing from Image Intrinsics**
   Zitian Zhang, Frédéric Fortier-Chouinard, Mathieu Garon, **Anand Bhattad**, Jean-François Lalonde
   Pending

Mentoring

Doctoral Students

- Xiaoyan Xing, University of Amsterdam, Project on Image-based Relighting — 2024 – now
- Jun Myeong Choi , UNC Chapel Hill, Project on Inverse-Graphics based Relighting — 2024 – now
- Xiao Zhang, UChicago, **Paper at NeurIPS 2024** — 2023 – now
- Matthew Wallingford, University of Washington, **Paper at NeurIPS 2024** — 2023 – now
- Xiaodan Du, TTIC, **Paper at CVPR-W 2024** | **Paper in Review** — 2023 – now
- Zitian Zhang, Université Laval, **Paper in Review** — 2023 – now

- Xiang Fan, University of Washington, **Paper at ECCV 2024** 2023 – now
- Ayush Sarkar, UIUC, **Paper at CVPR 2024** 2023 – now
- Vaibhav Vavilala, UIUC, Project on Blocks World 2023 – now
- Kalyani Marathe, University of Washington, **Paper at CVPR-W 2024** 2023 – 2024
- Zhi-Hao Lin, UIUC, **Paper at CVPR-W 2024; Paper in Review** 2023 – 2024

Master's Students

- Yixin (Tracy) Zhu, UChicago, Project on Improving Projective Geometry in Generated Images 2024 – now
- Hanlin (Asher) Mai, UIUC, **Paper at CVPR 2024** 2023 – now
- Frédéric Fortier-Chouinard, Université Laval, **Paper in Review** 2023 – now
- Seemandhar Jain, UIUC | Now: PhD at UCSD, **Paper at NeurIPS 2024** 2023 – 2024
- James Soole, UIUC | Now: Research Engineer at MATLAB, **Paper at CVPR 2024** 2023
- Feiran Wang, UIUC, Project on NeRF + Latent Illumination 2023
- Pranav Asthana, UIUC | Now: PhD at UMD, Project on Relighting from Neighbors 2021 – 2022
- Kexuan (Klaus) Zou, UIUC | Now: Software Engineer at NVIDIA, Project on 2D Meshes 2019 – 2020

Bachelor's Students

- Zhiyan (Alex) Wang, UChicago, Project on Improving Projective Geometry in Generated Images 2024 – now
- Joshua Ahn, UChicago, Project on Wavelets in Neural Radiance Fields 2024
- Amitabh Mahapatra, UIUC, **Paper at CVPR 2024** 2023 – now
- Kuan-Sheng Chen, UIUC, Project on Improving Generative Models with Intrinsic Images 2023
- Oscar Michel, AI2 | Now: PhD at NYU, **Paper at NeurIPS 2023** 2023
- Liwen Wu, UIUC | Now: PhD at UCSD, **Paper at CVPR 2022 (Best Paper Nomination)** 2022
- Brian Chen, UIUC | REU at CMU's RI | Next: Hive AI, Project on Lighting Correction 2020 – 2022
- Anchu Zhu, UIUC | Next: MS in CS at USC, Project on Anomaly Detection 2018 – 2019

Doctoral Committees

- Xiao Zhang, "Representation Learning from and for Generative Models", UChicago 2025
- Xin Yuan, "Interpretable Unsupervised Generative Learning via Factorized Architectures and Structured Bottlenecks", UChicago 2024

Courses Designed

Past Meets Present: A Tale of Two Visions, TTIC; *Course Instructor* Spring 2024

- Developed a new course from scratch on Computer Vision, combining historical and modern approaches
- Taught a class of 20+ students from TTIC and UChicago

Teaching Assistant

Computer Science, UIUC; *Graduate Teaching Assistant* 2016 – 2018

- Applied Machine Learning (CS498 AML), Fall 2018
- Data Structures (CS 225), Spring 2017
- Intro Computing: Engrg & Sci (CS 101), Spring 2016 & Fall 2016

Invited Talks

Generative Models Inside Out

- Midwest Computer Vision Workshop, Indiana University Sep 2024

What Do Generative Image Models Know?

- IIIT Hyderabad, India; Vision Seminar Jan 2024
- Exactech, Inc.; Tech Talk Oct 2023

Exploring Knowledge in Generative Models

- Stanford University in Jiajun Wu's group Jun 2023

- University of Tubingen, Autonomous Vision Group — May 2023

What Do Generative Models Know about Geometry and Illumination?

- UC Berkeley: Vision Seminar — Apr 2023
- NVIDIA Research — Apr 2023
- MIT: Vision and Graphics Seminar — Apr 2023
- CMU: VASC Seminar — Mar 2023
- UW: RAIVN Vision Seminar — Mar 2023

Towards a Productive and Fun PhD Experience

- UIUC: Computer Vision Workshop — Apr 2023

Learning about Light Without Labeled Data

- UMD: Vision Seminar — Mar 2023
- UCSD: Pixel Cafe Seminar — Feb 2023
- TTIC: Research Talk — Feb 2023

Drag-and-Drop Rendering: Towards In the Wild Image Editing

- CMU: Misc-Read Vision Reading Group — Aug 2021

Services & Leadership

Reviewing

- **Area Chair**, CVPR 2025, WACV 2025 — 2024 – now
- **Reviewer**, CVPR, NeurIPS, ECCV, ICCV and PAMI — 2018 – now

Community Building Workshops

- **Lead Organizer**, "CV 20/20: A Retrospective Vision" workshop at CVPR — Jun 2024
- **Lead Organizer**, "Scholars & Big Models: How Can Academics Adapt?" workshop at CVPR — Jun 2023

Technical Workshops

- **Lead Organizer**, "Knowledge in Generative Models" workshop at ECCV — Sep 2024
- **Co-lead Organizer**, "Multimodal Artificial Intelligence " workshop at TTIC — Aug 2024
- **Lead Organizer**, Computer Vision workshop at Allerton, UIUC — Apr 2023
- **Committee**, "Adversarial ML in Real-World Computer Vision Systems", workshop at CVPR — Jun 2019
- **Committee**, "Security and Privacy in Machine Learning" workshop at ICML — Jun 2019

Seminars and Reading Groups

- **Organizer**, UIUC Vision Seminar, a new weekly seminars inviting speakers outside UIUC — 2021 – 2023
- **Organizer**, Vision Lunch (computer vision reading group) — 2021 – 2023
- **Organizer**, UIUC Summer Vision Coffee — 2018

Co-Founder, SchoolEngg — 2013 – 2015

- Forum for high-school students; providing firsthand knowledge of all engineering disciplines
- Renamed as *PrepLift*, an education counselling start-up in India

Co-Founder, American Society of Civil Engineers (ASCE) NITK Chapter — 2013 – 2015

- Co-Founded the *first* ASCE student chapter of India
- Served as treasurer for one year and as a senior advisor for the second year
- Coordinated with board members, faculty, and outside organizations to facilitate 10+ events