

BYEONGJOO AHN

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RESEARCH INTERESTS

My research interests are in computational imaging, computer vision and computer graphics. I am interested in identifying visible hints offered by our physical surroundings such as interreflections, and developing imaging systems extending the visibility far beyond human ability such as the reconstruction of objects that are not in the direct line of sight or those with strong self-occlusions.

EDUCATION

Carnegie Mellon University

Ph.D. Candidate in Electrical and Computer Engineering

Advisors: Aswin C. Sankaranarayanan and Ioannis Gkioulekas

Pittsburgh, PA

2017 – Present

Seoul National University

M.S. in Electrical Engineering and Computer Science

Advisor: Kyoung Mu Lee

Thesis: “Occlusion-Aware Motion Deblurring for Bilayer Scenes”

Outstanding Thesis Award

Seoul, Korea

2012 – 2014

Seoul National University

B.S. in Electrical and Computer Engineering

Summa Cum Laude

Seoul, Korea

2008 – 2012

WORK EXPERIENCE

Carnegie Mellon University

Research Assistant

Pittsburgh, PA

Sep. 2017 – Present

- Developed a full-surround neural surface reconstruction method from a single kaleidoscopic image
- Developed a full-surround 3D imaging system of kaleidoscopic structured light, comprising a projector, a camera, and a kaleidoscope
- Developed an imaging method to reconstruct hidden 3D shapes from multiply scattered photon using time-of-flight (ToF) information at picosecond timescale resolution (a.k.a. Non-Line-of-Sight Imaging)

Apple

Research Intern with Rick Chang and Karren Yang, AIML

Seattle, WA

Jan. 2023 – Sep. 2023

- Developed a novel-view acoustic synthesis method by combining blind audio recordings with 3D scene information

Snap Inc.

Research Intern with Shree Nayar and Jian Wang, Computational Imaging Group

(Remote) New York, NY

May. 2020 – Aug. 2020

- Worked on improving Snapcode/QR code detection by increasing the maximum scanning distance

Korea Institute of Science and Technology*Research Scientist (military service), Center for Imaging Media Research*

Seoul, Korea

Mar. 2014 – Aug. 2017

- Developed multiple-camera capture system with 3D multi-view deblurring algorithm for dynamic 3D facial reconstruction
- Developed polarized lighting system with an algorithm for real time acquisition of specular and diffuse normal maps from minimal number of polarized images

HP Labs*Intern with Irwin Sobel*

Palo Alto, CA

Jan. 2012 – Feb. 2012

- Developed 3D video mobile controller using PTZ robot and Android phone

PUBLICATIONS

“Novel-view Acoustic Synthesis From 3D Reconstructed Rooms”

Submitted for Review

“Neural Kaleidoscopic Space Sculpting”**Byeongjoo Ahn**, Michael De Zeeuw, Ioannis Gkioulekas, Aswin C. Sankaranarayanan*IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2023**“Kaleidoscopic Structured Light”****Byeongjoo Ahn**, Ioannis Gkioulekas, Aswin C. Sankaranarayanan*ACM Transactions on Graphics (Proc. SIGGRAPH ASIA)*, 2021**“Convolutional Approximations to the General Non-Line-of-Sight Imaging Operator”****Byeongjoo Ahn**, Akshat Dave, Ashok Veeraraghavan, Ioannis Gkioulekas, Aswin C. Sankaranarayanan*IEEE/CVF International Conference on Computer Vision (ICCV)*, 2019 (Oral Presentation)**“Occlusion-Aware Video Deblurring with a New Layered Blur Model”****Byeongjoo Ahn**, Tae Hyun Kim, Wonsik Kim, Kyoung Mu Lee*arXiv preprint arXiv:1611.09572*, 2016**“Reduced Illumination Patterns for Acquisition of Specular and Diffuse Normal Maps”****Byeongjoo Ahn**, Junghyun Cho, Taekyung Yoo, Ig-Jae Kim*ACM SIGGRAPH ASIA Poster*, 2016**“Dynamic Scene Deblurring”**Tae Hyun Kim, **Byeongjoo Ahn**, Kyoung Mu Lee*IEEE International Conference on Computer Vision (ICCV)*, 2013

AWARDS AND HONORS

Top Reviewer , NeurIPS 2022	2022
Doctoral Study Abroad Scholarship , Korea Foundation for Advanced Studies	2017
Fulbright Graduate Study Award (gratefully declined) , Fulbright	2017
Best Poster Award , KIST R&D EXPO	2014
Outstanding Thesis Award , Department of EECS, Seoul National University	2014
Honorable Mention Award , Samsung Humantech Paper Award	2014
Graduate Scholarship , Kwanjeong Educational Foundation	2012
Presidential Science Scholarship , Korea Student Aid Foundation	2008

TEACHING

Teaching Assistant, Carnegie Mellon University

- 15-463/663/862 Computational Photography
- Recitation for 18-290 Signals and Systems

Fall 2020
Spring 2019, 2020

INVITED TALKS

“Kaleidoscopic Imaging for Full-Surround 3D Reconstruction”

- Connective AI Workshop
- KIST, Visual Intelligence Group
- Meta Reality Labs Research Pittsburgh, TechTalk
- Seoul National University, Topics in 3D Vision Workshop

Aug. 2023
Apr. 2023
Apr. 2022
Jan. 2022

SERVICES

Program Committee, ICCP 2023

Reviewer, CVPR (2019, 2020, 2021, 2022, 2023), ICCV (2019, 2021, 2023), ECCV (2020), BMVC (2019), ICLR (2022, 2023), NeurIPS (2022, 2023), SIGGRAPH (2022), SIGGRAPH ASIA (2023), TIP (2022–)

Student Volunteer, ACCV 2012, ICCP 2021

Volunteer, Camera Building Workshop as part of Gelfand Outreach Program at CMU (2019)

Mentor, CMU AI Mentoring Program (2021)

TECHNICAL SKILLS

Python, MATLAB, C/C++, PyTorch, PyTorch3D

GRADUATE COURSEWORK

16-889	Learning for 3D Vision	Spring 2022
15-868	Physics-based Rendering	Spring 2021
33-353	Intermediate Optics	Fall 2020
15-858	Discrete Differential Geometry	Spring 2020
18-771	Linear Systems	Fall 2019
10-707	Deep Learning	Spring 2019
10-725	Convex Optimization	Fall 2018
16-823	Physics based Methods in Vision	Spring 2018
10-701	Introduction to Machine Learning	Spring 2018
16-720B	Computer Vision	Fall 2017
18-793	Image and Video Processing	Fall 2017
36-705	Intermediate Statistics	Fall 2017

Last updated: Oct 3, 2023