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 — Pittsburgh, PA
Ph.D. Candidate in Electrical and Computer Engineering — Sep. 2017 – Present
Advisors: Aswin C. Sankaranarayanan and Ioannis Gkioulekas

Seoul National University — Seoul, Korea
M.S. in Electrical Engineering and Computer Science — Mar. 2012 – Feb. 2014
Advisor: Kyoung Mu Lee
Thesis: "Occlusion-Aware Motion Deblurring for Bilayer Scenes"
Outstanding Thesis Award

Seoul National University — Seoul, Korea
B.S. in Electrical and Computer Engineering — Mar. 2008 – Feb. 2012
Summa Cum Laude

WORK EXPERIENCE

Carnegie Mellon University — Pittsburgh, PA
Research Assistant — Sep. 2017 – Present

- Developing 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)

Snap Inc. — (Remote) New York, NY
Research Intern with Shree Nayar and Jian Wang, Computational Imaging Group — May. 2020 – Aug. 2020

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

Korea Institute of Science and Technology — Seoul, Korea
Research Scientist (military service), Center for Imaging Media Research — 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 — Palo Alto, CA
Research Intern with Irwin Sobel — Jan. 2012 – Feb. 2012

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

PUBLICATIONS

"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

INVITED TALKS

"Kaleidoscopic Imaging for Full-Surround 3D Reconstruction"
- TechTalk, Meta Reality Labs Research, Pittsburgh — Apr. 2022
- Topics in 3D Vision Workshop, Seoul National University — Jan. 2022

TEACHING

Teaching Assistant, Carnegie Mellon University
- 15-463/663/862 Computational Photography — Fall 2020
- Recitation for 18-290 Signals and Systems — Spring 2019, 2020

SERVICES

Reviewer, CVPR (2019-), ICCV (2019-), ECCV (2020-), BMVC (2019), ICLR (2022), NeurIPS (2022), SIGGRAPH (2022), 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

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