

# 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.

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## EDUCATION

### Carnegie Mellon University

Ph.D. Candidate in Electrical and Computer Engineering

Advisors: Aswin C. Sankaranarayanan and Ioannis Gkioulekas

Pittsburgh, PA

Sep. 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

Mar. 2012 – Feb. 2014

### Seoul National University

B.S. in Electrical and Computer Engineering

*Summa Cum Laude*

Seoul, Korea

Mar. 2008 – Feb. 2012

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## WORK EXPERIENCE

### Apple

*Research Intern with Rick Chang and Karren Yang, AIML*

- Working on neural rendering

Seattle, WA

Jan. 2023 – Present

### Carnegie Mellon University

*Research Assistant*

- 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)

Pittsburgh, PA

Sep. 2017 – Present

### Snap Inc.

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

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

(Remote) New York, NY

May. 2020 – Aug. 2020

### Korea Institute of Science and Technology

*Research Scientist (military service), Center for Imaging Media Research*

- Developed multiple-camera capture system with 3D multi-view deblurring algorithm for dynamic 3D facial reconstruction

Seoul, Korea

Mar. 2014 – Aug. 2017

- 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

Research Intern with Irwin Sobel

Palo Alto, CA  
Jan. 2012 – Feb. 2012

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

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## PUBLICATIONS

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### “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

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## AWARDS AND HONORS

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

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## INVITED TALKS

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### “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

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## TEACHING

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**Teaching Assistant**, Carnegie Mellon University

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

Fall 2020

Spring 2019, 2020

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## SERVICES

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**Program Committee**, ICCP 2023

**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)

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## TECHNICAL SKILLS

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

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## GRADUATE COURSEWORK

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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: Jun 15, 2023