

Sunghoon Im

CONTACT INFORMATION **DGIST** (Daegu Gyeongbuk Institute of Science and Technology)
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RESEARCH INTERESTS Computer Vision (3D reconstruction, Scene understanding)
Machine Learning (Deep learning, AI for social good)
Robot Vision (Sensor fusion, SLAM)

ACADEMIC APPOINTMENTS **DGIST**, Daegu, Korea Sep 2019 – Present
Assistant Professor, Information and Communication Engineering

Carnegie Mellon University (CMU), Pittsburgh, US Jun 2019 – Aug 2019
Visiting Scholar, Robotics Institute, working with Prof. Martial Hebert and Prof. Jean Oh.

Microsoft Research Asia (MSRA), Beijing, China Feb 2018 – Aug 2018
Research Intern, Internet Graphics Group, working with Dr. Stephen Lin.

KAIST, Daejeon, Korea Mar 2014 – Aug 2019
Research Assistant, Robotics and Computer Vision Lab., working with Prof. In So Kweon

EDUCATION **KAIST**, Daejeon, Korea

Ph.D., Electrical Engineering Aug 2019
• Dissertation: "Robust 3D Imaging using a Single Hand-held Cameras"
• Advisor: Prof. In So Kweon

M.S., Electrical Engineering Feb 2016
• Advisor: Prof. In So Kweon

Sogang University, Seoul, Korea

B.S., Electronic Engineering Feb 2014
• Summa cum laude

PUBLICATIONS **International Journal**

1. **Sunghoon Im**, Hyowon Ha, Hae-Gon Jeon, Stephen Lin and In So Kweon, "Deep Depth from Uncalibrated Small Motion Clip", *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)*, Apr 2021.
2. Hae-Gon Jeon, Jaeheung Surh, **Sunghoon Im** and In So Kweon, "Ring Difference Filter for Fast and Noise Robust Depth from Focus", *IEEE Transactions on Image Processing (TIP)*, Dec 2020.
3. **Sunghoon Im**, Hae-Gon Jeon and In So Kweon, "Robust Depth Estimation using Auto-Exposure Bracketing", *IEEE Transactions on Image Processing (TIP)*, May 2019.

4. **Sunghoon Im**, Hyowon Ha, Gyeongmin Choe, Hae-Gon Jeon, Kyungdon Joo and In So Kweon, “Accurate 3D Reconstruction from Small Motion Clip for Rolling Shutter Cameras”, *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)*, Apr 2019.
5. Gyeongmin Choe, Seong-heum Kim, **Sunghoon Im**, Joon-Young Lee, Srinivasa Narasimhan and In So Kweon, “RANUS: RGB and NIR Urban Scene Dataset for Deep Scene Parsing”, *IEEE Robotics and Automation Letters (RAL)*, Feb 2018.
6. Seunghak Shin, **Sunghoon Im**, Inwook Shim, Hae-Gon Jeon, and In So Kweon, “Geometry Guided 3D propagation for Depth from Small Motion”, *IEEE Signal Processing Letters (SPL)*, Dec 2017.

International Conference

1. Seunghun Lee, Sunghyun Cho, **Sunghoon Im**, “DRANet: Disentangling Representation and Adaptation Networks for Unsupervised Cross-Domain Adaptation”, *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Jun 2021.
2. Seokju Lee, **Sunghoon Im**, Stephen Lin and In So Kweon, “Learning Monocular Depth in Dynamic Scenes via Instance-Aware Projection Consistency”, *The Thirty-Fifth AAAI Conference on Artificial Intelligence (AAAI)*, Feb 2021.
3. Hae-Gon Jeon, **Sunghoon Im**, Jean Oh and Martial Hebert, “Learning Shape-based Representation for Visual Localization in Extremely Changing Conditions”, *IEEE International Conference on Robotics and Automations (ICRA)*, May 2020.
4. Hae-Gon Jeon, **Sunghoon Im**, Byeong-Uk Lee, Dong-Geol Choi, Martial Hebert and In So Kweon, “DISC: A Large-scale Virtual Dataset for Simulating Disaster Scenarios”, *IEEE/RSJ International Conference on Intelligence Robots and System (IROS)*, Nov 2019.
5. Seokju Lee, **Sunghoon Im**, Stephen Lin and In So Kweon, “Learning Residual Flow as Dynamic Motion from Stereo Video”, *IEEE/RSJ International Conference on Intelligence Robots and System (IROS)*, Nov 2019.
6. **Sunghoon Im**, Hae-Gon Jeon, Stephen Lin and In So Kweon, “DPSNet: End-to-end Deep Plane Sweep Stereo”, *International Conference on Learning Representations (ICLR)*, May 2019.
7. Byeong-Uk Lee, Hae-Gon Jeon, **Sunghoon Im** and In So Kweon, “Depth Completion with Deep Geometry and Context Guidance”, *IEEE International Conference on Robotics and Automations (ICRA)*, May 2019.
8. **Sunghoon Im**, Hae-Gon Jeon and In So Kweon, “Robust Depth Estimation from Auto Bracketed Images”, *In Proc. of IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Jun 2018.
9. Jaeheung Surh, Hae-Gon Jeon, Yunwon Park, **Sunghoon Im**, Hyowon Ha and In So Kweon, “Noise Robust Depth from Focus using a Ring Difference Filter”, *In Proc. of IEEE Conference on Computer Vision and Pattern Recognition (CVPR) [Spotlight]*, Jul 2017.
10. **Sunghoon Im**, Hyowon Ha, Francois Rameau, Hae-Gon Jeon, Gyeongmin Choe and In So Kweon, “All-around Depth from Small Motion with A Spherical Panoramic Camera”, *In Proc. of European Conference on Computer Vision (ECCV)*, Oct 2016.

11. Hyowon Ha, **Sunghoon Im**, Jaesik Park, Hae-Gon Jeon and In So Kweon, “High-quality Depth from Uncalibrated Small Motion Clip”, *In Proc. of IEEE Conference on Computer Vision and Pattern Recognition (CVPR)* [Oral], Jun 2016.
12. Hae-Gon Jeon, Joon-Young Lee, **Sunghoon Im**, Hyowon Ha and In So Kweon, “Stereo Matching with Color and Monochrome Cameras in Low-light Conditions”, *In Proc. of IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Jun 2016.
13. **Sunghoon Im**, Hyowon Ha, Gyeongmin Choe, Hae-Gon Jeon, Kyungdon Joo and In So Kweon, “High Quality Structure from Small Motion for Rolling Shutter Cameras”, *In Proc. of IEEE International Conference on Computer Vision (ICCV)*, Dec 2015.
14. **Sunghoon Im**, Gyeongmin Choe, Hae-Gon Jeon and In So Kweon, “Depth from Accidental Motion using Geometry Prior”, *In Proc. of IEEE International Conference on Image Processing (ICIP)* [Top 10% paper], Sep 2015.

International Workshop

1. Seokju Lee, **Sunghoon Im**, Stephen Lin and In So Kweon, “Instance-wise Depth and Motion Learning from Monocular Videos”, *Workshop on Machine Learning for Autonomous Driving & Workshop on Differentiable computer vision, graphics, and physics in machine learning (NeurIPS)*, Dec 2020.

Other Publications

1. Jaeheung Surh, Hae-Gon Jeon, Hyowon Ha, **Sunghoon Im** and In So Kweon, “Fast Depth from Defocus with Your Mobile Phone for Synthetic Defocus”, *In Proc. of the 28th Workshop on Image Processing and Image Understanding (IPIU)*, Feb 2016.
2. **Sunghoon Im**, Hae-Gon Jeon, Hyowon Ha and In So Kweon, “Depth Estimation from Light Field Cameras”, *In Proc. of the 12th International Conference on Ubiquitous Robots and Ambient Intelligence (URAI)*, Oct 2015.
3. Dong-jin Kim, Donggeun Yoo, **Sunghoon Im**, Namil Kim, T. Sirinukulwattana and In So Kweon, “Relative Attributes with Deep Convolutional Neural Network”, *In Proc. of the 12th International Conference on Ubiquitous Robots and Ambient Intelligence (URAI)*, Oct 2015.

PATENTS

Registration

1. METHOD AND APPARATUS FOR ESTIMATING DEPTH USING RING DIFFERENCE FILTER, Publication date: Sep 28, 2018. (10-2017-0091717)
2. DEPTH MAP ACQUISITION DEVICE AND DEPTH MAP ACQUISITION METHOD, Publication date: Apr 19, 2018. (10-2016-0103546)
3. METHOD AND APPARATUS FOR ACQUIRING DEPTH MAP FROM ALL-AROUND CAMERA, Publication date: Apr 17, 2018. (10-2016-0167525)
4. DEPTH INFORMATION ACQUIRING DEVICE AND METHOD THEREOF, Publication date: Aug 11, 2017. (10-2016-0076766)
5. APPARATUS AND METHOD FOR DEPTH MAP GENERATION, Publication date: Jun. 02, 2016. (10-2016-0015703)

RESEARCH
GRANTS

On-going projects

1. Multi-spectral Stereo-based Dynamic Scene Understanding

- Principal investigator
- Young Researcher Program, National Research Foundation of Korea (NRF)
- 2020.03.01 - 2023.02.28 (36 months, ₩300M)

2. Development of Low Latency VR-AR streaming Technology based on 5G edge cloud

- Research participant
- Institute of Information communications Technology Planning Evaluation(IITP)
- 2020.04.01 - 2023.12.31 (45 months, ₩240M)

3. Collaborative AI based Autonomous Driving System toward Safe, Reliable, and Scalable Human-in-the-Loop Cloud Mobility Service

- Research participant
- P-COE (Center of Excellence), DGIST
- 2020.05.01 - 2022.12.31 (32 months, ₩195M)

Finished projects

1. All-around 3D reconstruction with hand-held VR cameras for augmented reality

- Principal investigator
- Global Ph.D. Fellowship, National Research Foundation of Korea (NRF)
- 2016.03.01 - 2019.02.28 (36 months, ₩60M + Full scholarship)

2. A study on learning-based novel-view synthesis algorithms for multi-view LF images

- Principal investigator
- ETRI, ICT RD program of MSIP/IITP
- 2020.03.01 - 2020.11.30 (9 months, ₩40M)

3. Advancement of geographic data construction system based on deep learning

- Research participant
- Dabeoo
- 2020.06.15 - 2020.12.15 (6 months, ₩16M)

TEACHING

- Introduction to Deep Learning, Fall 2020.
- Deep Learning, Spring 2020.
- Computer Vision, Fall 2019, Spring 2021.

EDITOR

- The Information and Communications Technology Express (ICT Express)

REVIEWER
(JOURNAL)

- International Journal of Computer Vision (IJCV)
- Computer Vision and Image Understanding (CVIU)
- Pattern Recognition (PR)
- Neurocomputing
- IEEE Robotics and Automation Letters (RAL)
- IEEE Access
- International Journal of Control, Automation and Systems (IJCAS)
- IEIE Transactions on Smart Processing and Computing (IEIE SPC)
- Journal of Institute of Control, Robotics and Systems (ICROS)

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| REVIEWER (CONFERENCE) | <ul style="list-style-type: none"> • IEEE Conference on Computer Vision and Pattern Recognition (CVPR) 2019, 2020, 2021 • IEEE International Conference on Computer Vision (ICCV) 2019 • European Conference on Computer Vision (ECCV) 2020 • Conference on Neural Information Processing Systems (NeurIPS) 2020 • International Conference on Machine Learning (ICML) 2020, 2021 • International Conference on Learning Representations (ICLR) 2021 • Association for the Advancement of Artificial Intelligence (AAAI) 2020, 2021 • IEEE International Conference on Robotics and Automations (ICRA) 2021 • IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2017 • Asian Conference on Computer Vision (ACCV) 2020 • IEEE Winter Conference on Applications of Computer Vision (WACV) 2020 • International Conference on 3D Vision (3DV) 2020 • International Conference on Machine Vision Applications (ICMVA) 2021 • International Conference on Control, Automation and Systems (ICCAS) 2020 | |
| INDUSTRY CONSULTATION | <ul style="list-style-type: none"> • DWorld, Feb-Mar 2021 • Dabeo, Feb-Jun 2020 | |
| TUTORIAL | <ul style="list-style-type: none"> • Deep Learning for Computer Vision, DWorld, Jan-Feb 2021 • Multiple View Geometry, KETI Sangam, Aug-Oct 2020 | |
| INVITED TALKS | <ul style="list-style-type: none"> • ETRI (Electronics and Telecommunications Research Institute), Daejeon • ETRI (Electronics and Telecommunications Research Institute), Daegu • GIST • KETI (Korea Electronics Technology Institute), Sangam • POSTECH • KETI (Korea Electronics Technology Institute), Pangyo • DGIF (Daegu Technopolis Grand Innovation Festival) • ETRI (Electronics and Telecommunications Research Institute), Daejeon • Sogang University • Lunit • SAIT (Samsung Advanced Institute of Technology) • Koh Young Technology | Oct 2020 Oct 2020 Jun 2020 Jan 2020 Dec 2019 Nov 2019 Oct 2019 Sep 2019x Sep 2019 Aug 2019 Apr 2019 Jan 2019 |
| AWARDS | <ul style="list-style-type: none"> • Excellent Student Award, 2018 Research Performance Evaluation, KAIST EE • Best Poster Award, 2018 Samsung AI Forum, Samsung Research • Excellent Intern Award, Microsoft Research Asia (MSRA) • Honor Student Award, 2017 Research Performance Evaluation, KAIST EE • Kim Choong-Ki Award, 2016 Research Performance Evaluation, KAIST EE • Best Poster Presentation Award, IPIU 2017 • Qualcomm Innovation Award 2016, Qualcomm Korea Corp. and KAIST • Silver prize, 22th HumanTech Paper Award, Samsung Electronics Co., Ltd. • Best Poster Award, IWRCV 2015 General Chair • Official Best 10% Paper Selection, ICIP 2015 Organizing Committee • Design Project Competition(Silver Prize), Sogang University • Prize for the top first percentile GPA, Sogang University | Apr 2019 Sep 2018 Aug 2018 Apr 2018 Apr 2017 Feb 2017 Mar 2016 Feb 2016 Nov 2015 Sep 2015 Nov 2013 Sep 2011, Feb 2012, Sep 2012 |
| HONORS | <ul style="list-style-type: none"> • NeurIPS 2020 Top 10% of high-scoring reviewer • CVPR 2019 Doctoral Consortium • ICLR 2019 Travel Award • Microsoft Research Asia (MSRA) fellowship 2018 Winner • Global Ph.D. Fellowship, National Research Foundation of Korea | Oct 2020 Jun 2019 May 2019 Oct 2018 Aug 2016 |

- International Computer Vision Summer School (ICVSS 2016), Sicily, Italy July 2016
- Summa Cum Laude, Sogang University Feb 2014
- Academic Excellence Scholarship, Sogang University Seb 2012 – Feb 2013
- Scholarship, Korea Scholarship Foundation Feb 2012 – Feb 2014

IT SKILLS

- Languages: Python, MATLAB, C, C++, \LaTeX
- Deep Learning Framework: Pytorch, Torch, Tensorflow

Last Update: 2021/03/02