

Sunghoon Im

CONTACT INFORMATION DGIST (Daegu Gyeongbuk Institute of Science and Technology)
Department of Information and Communication Engineering Tel.: +82-53-785-6323
E3-314, Techno jungang-daero 333, Hyeonpung-eup, E-mail: sunghoonim@dgist.ac.kr
Dalseong-gun, Daegu, Republic of Korea, 42988 Homepage: <https://cvlab.dgist.ac.kr/>

RESEARCH INTERESTS Computer Vision (3D reconstruction/localization, Scene understanding)
Deep Learning (Data-hungry, Generalization, Robustness)
Applications - Autonomous driving, AR/VR

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/Workshop

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. Jeonghoon Kim, **Sunghoon Im** and Sunghyun Cho, “ProFeat: Unsupervised Image Clustering via Progressive Feature Refinement”, *Workshop on Learning From Limited or Imperfect Data (CVPRw)*, Jun 2021.
3. 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.
4. 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 (NeurIPSw)*, Dec 2020.
5. 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.
6. 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.
7. 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.
8. **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.
9. 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.
10. **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.

11. Jaehung 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.
12. **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.
13. 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.
14. 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.
15. **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.
16. **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.

Other Publications

1. Jaehung 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. **Development of unsupervised learning system for 3D object detector calibration**
 - Principal investigator
 - Hyundai NGV (Hyundai Motor Group)
 - 2020.04.15 - 2021.04.14 (12 months, ₩76.5M)

2. **A study on deep-learning-based video understanding**
 - Principal investigator
 - ETRI, ICT RD program of MSIP/IITP
 - 2021.03.15 - 2021.11.15 (8 months, ₩60M)

3. **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)

4. **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 - 2023.12.31 (44 months, ₩260M)

5. **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)

Completed 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	<ul style="list-style-type: none"> • The Information and Communications Technology Express (ICT Express) 	
REVIEWER (JOURNAL)	<ul style="list-style-type: none"> • 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) 	
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 • Dabeoo, 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"> • The Korean Institute of Broadcast and Media Engineers, Online • ETRI (Electronics and Telecommunications Research Institute), Daegu • 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 	<p>Apr 2021 Mar 2021 Oct 2020 Oct 2020 Jun 2020 Jan 2020 Dec 2019 Nov 2019 Oct 2019 Sep 2019x Sep 2019 Aug 2019 Apr 2019 Jan 2019</p>
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 	<p>Apr 2019 Sep 2018 Aug 2018 Apr 2018</p>

- Kim Choong-Ki Award, 2016 Research Performance Evaluation, KAIST EE Apr 2017
- Best Poster Presentation Award, IPIU 2017 Feb 2017
- Qualcomm Innovation Award 2016, Qualcomm Korea Corp. and KAIST Mar 2016
- Silver prize, 22th HumanTech Paper Award, Samsung Electronics Co., Ltd. Feb 2016
- Best Poster Award, IWRCV 2015 General Chair Nov 2015
- Official Best 10% Paper Selection, ICIP 2015 Organizing Committee Sep 2015
- Design Project Competition(Silver Prize), Sogang University Nov 2013
- Prize for the top first percentile GPA, Sogang University Sep 2011, Feb 2012, Sep 2012

HONORS

- NeurIPS 2020 Top 10% of high-scoring reviewer Oct 2020
- CVPR 2019 Doctoral Consortium Jun 2019
- ICLR 2019 Travel Award May 2019
- Microsoft Research Asia (MSRA) fellowship 2018 Winner Oct 2018
- Global Ph.D. Fellowship, National Research Foundation of Korea 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: 2021/04/16