

## Sunghoon Im

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CONTACT INFORMATION	DGIST (Daegu Gyeongbuk Institute of Science and Technology) Department of Information and Communication Engineering E3-314, Techno jungang-daero 333, Hyeonpung-eup, Dalseong-gun, Daegu, Republic of Korea, 42988	Tel.: +82-053-785-6323 E-mail: sunghoonim@dgist.ac.kr Web: <a href="https://sunghoonim.github.io/">https://sunghoonim.github.io/</a>
RESEARCH INTERESTS	Computer Vision (3D reconstruction, Scene understanding) Machine Learning (Deep learning, AI for social good) Robot Vision (Sensor fusion, SLAM)	
ACADEMIC APPOINTMENTS	<b>DGIST</b> , Daegu, Korea <i>Assistant Professor</i> , Information and Communication Engineering	Sep 2019 – Present
	<b>Carnegie Mellon University (CMU)</b> , Pittsburgh, US <i>Visiting Scholar</i> , Robotics Institute, working with Prof. Martial Hebert and Prof. Jean Oh.	Jun 2019 – Aug 2019
	<b>Microsoft Research Asia (MSRA)</b> , Beijing, China <i>Research Intern</i> , Internet Graphics Group, working with Dr. Stephen Lin.	Feb 2018 – Aug 2018
	<b>KAIST</b> , Daejeon, Korea <i>Research Assistant</i> , Robotics and Computer Vision Lab., working with Prof. In So Kweon	Mar 2014 – Aug 2019
EDUCATION	<b>KAIST</b> , Daejeon, Korea Ph.D., Electrical Engineering • Dissertation: "Robust 3D Imaging using a Single Hand-held Cameras" • Advisor: Prof. In So Kweon	Aug 2019
	M.S., Electrical Engineering • Advisor: Prof. In So Kweon	Feb 2016
	<b>Sogang University</b> , Seoul, Korea B.S., Electronic Engineering • Summa cum laude	Feb 2014
PUBLICATIONS	<b>International Journal</b>  1. <b>Sunghoon Im</b> , Hyowon Ha, Hae-Gon Jeon, Stephen Lin and In So Kweon, "Deep Depth from Uncalibrated Small Motion Clip", <i>IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)</i> , Accepted (Apr 2021 expected).  2. Hae-Gon Jeon, Jaeheung Surh, <b>Sunghoon Im</b> and In So Kweon, "Ring Difference Filter for Fast and Noise Robust Depth from Focus", <i>IEEE Transactions on Image Processing (TIP)</i> , Dec 2020.  3. <b>Sunghoon Im</b> , Hae-Gon Jeon and In So Kweon, "Robust Depth Estimation using Auto-Exposure Bracketing", <i>IEEE Transactions on Image Processing (TIP)</i> , 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.

### Preprints

1. Seokju Lee, **Sunghoon Im**, Stephen Lin and In So Kweon, “Instance-wise Depth and Motion Learning from Monocular Videos”, ArXiv preprint, 2019.

### International Conference

1. 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.
2. 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.
3. 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.
4. **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.
5. 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.
6. **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.
7. 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.
8. **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.
9. 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.

10. 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.
11. **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.
12. **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. 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. **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. 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)

**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 - 2022.12.31 (32 months, ₩195M)

**5. Advancement of geographic data construction system based on deep learning**

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

**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)

**TEACHING**

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

**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 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)**

- IEEE Conference on Computer Vision and Pattern Recognition (CVPR) 2019, 2020
- 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
- International Conference on Learning Representations (ICLR) 2021
- Association for the Advancement of Artificial Intelligence (AAAI) 2020, 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 Control, Automation and Systems (ICCAS), 2020

TUTORIAL	<ul style="list-style-type: none"> <li>• Multiple View Geometry, KETI Sangam, Aug-Oct 2020</li> </ul>	
INVITED TALKS	<ul style="list-style-type: none"> <li>• ETRI (Electronics and Telecommunications Research Institute), Daejeon</li> <li>• ETRI (Electronics and Telecommunications Research Institute), Daegu</li> <li>• GIST</li> <li>• KETI (Korea Electronics Technology Institute), Sangam</li> <li>• POSTECH</li> <li>• KETI (Korea Electronics Technology Institute), Pangyo</li> <li>• DGIF (Daegu Technopolis Grand Innovation Festival)</li> <li>• ETRI (Electronics and Telecommunications Research Institute), Daejeon</li> <li>• Sogang University</li> <li>• Lunit</li> <li>• SAIT (Samsung Advanced Institute of Technology)</li> <li>• Koh Young Technology</li> </ul>	<p>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"> <li>• Excellent Student Award, 2018 Research Performance Evaluation, KAIST EE</li> <li>• Best Poster Award, 2018 Samsung AI Forum, Samsung Research</li> <li>• Excellent Intern Award, Microsoft Research Asia (MSRA)</li> <li>• Honor Student Award, 2017 Research Performance Evaluation, KAIST EE</li> <li>• Kim Choong-Ki Award, 2016 Research Performance Evaluation, KAIST EE</li> <li>• Best Poster Presentation Award, IPIU 2017</li> <li>• Qualcomm Innovation Award 2016, Qualcomm Korea Corp. and KAIST</li> <li>• Silver prize, 22th HumanTech Paper Award, Samsung Electronics Co., Ltd.</li> <li>• Best Poster Award, IWRCV 2015 General Chair</li> <li>• Official Best 10% Paper Selection, ICIP 2015 Organizing Committee</li> <li>• Design Project Competition(Silver Prize), Sogang University</li> <li>• Prize for the top first percentile GPA, Sogang University</li> </ul>	<p>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</p>
HONORS	<ul style="list-style-type: none"> <li>• CVPR 2019 Doctoral Consortium</li> <li>• ICLR 2019 Travel Award</li> <li>• Microsoft Research Asia (MSRA) fellowship 2018 Winner</li> <li>• Global Ph.D. Fellowship, National Research Foundation of Korea</li> <li>• International Computer Vision Summer School (ICVSS 2016), Sicily, Italy</li> <li>• Summa Cum Laude, Sogang University</li> <li>• Academic Excellence Scholarship, Sogang University</li> <li>• Scholarship, Korea Scholarship Foundation</li> </ul>	<p>Jun 2019 May 2019 Oct 2018 Aug 2016 July 2016 Feb 2014 Feb 2012 – Feb 2013 Feb 2012 – Feb 2014</p>
IT SKILLS	<ul style="list-style-type: none"> <li>• Languages: Python, MATLAB, C, C++, <math>\LaTeX</math></li> <li>• Deep Learning Framework: Pytorch, Torch, Tensorflow</li> </ul>	

*Last Update: 2020/10/10*