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**), Accepted (Apr 2021 expected).
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. Seokju Lee, **Sunghoon Im**, Stephen Lin and In So Kweon, "Instance-wise Depth and Motion Learning from Monocular Videos", *The Thirty-Fifth AAAI Conference on Artificial Intelligence* (**AAAI**), Feb 2021.
   Workshop on Machine Learning for Autonomous Driving & Workhop on Differentiable computer vision, graphics, and physics in machine learning (**NeurIPSw**), Dec 2020.

2. 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.

3. 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.

4. 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.

5. **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.

6. 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.

7. **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.

8. 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.

9. **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.

10. 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.

11. 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.

12. **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.

13. **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
   - Dabeeo
   - 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 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)
- 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 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 Control, Automation and Systems (ICCAS), 2020

TUTORIAL

- Multiple View Geometry, KETI Sangam, Aug-Oct 2020

INVITED TALKS

- ETRI (Electronics and Telecommunications Research Institute), Daejeon — Oct 2020
- ETRI (Electronics and Telecommunications Research Institute), Daegu — Oct 2020
- GIST — Jun 2020
- KETI (Korea Electronics Technology Institute), Sangam — Jan 2020
- POSTECH — Dec 2019
- KETI (Korea Electronics Technology Institute), Pangyo — Nov 2019
- DGIF (Daegu Technopolis Grand Innovation Festival) — Oct 2019
- ETRI (Electronics and Telecommunications Research Institute), Daejeon — Sep 2019x
- Sogang University — Sep 2019
- Lunit — Aug 2019
- SAIT (Samsung Advanced Institute of Technology) — Apr 2019
- Koh Young Technology — Jan 2019

AWARDS

- Excellent Student Award, 2018 Research Performance Evaluation, KAIST EE — Apr 2019
- Best Poster Award, 2018 Samsung AI Forum, Samsung Research — Sep 2018
- Excellent Intern Award, Microsoft Research Asia (MSRA) — Aug 2018
- Honor Student Award, 2017 Research Performance Evaluation, KAIST EE — Apr 2018
- 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: 2020/10/31