DANIEL S. JEON

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RESEARCH INTERESTS

My research interests include **computational imaging**, **optics**, **hyperspectral imaging**, **BRDF acquisition**, and **computer graphics**. Specifically, I have developed various camera systems and algorithms for high-resolution imaging system including hyperspectral imaging, stereo imaging and time-of-flight imaging. Also I exploited **deep neural network** to learn **hyperspectral imaging** with **compressive sensing**, image **super-resolution** for stereo system and an end-to-end learned imaging system using **diffractive optics**. My recent research developed a **polarimetric time-of-flight** imaging system using **differentiable time-of-flight rendering** to reduce multipath inteference.

EDUCATION

09/2016–Present **KAIST, PhD Student in Computer Science**

09/2014–08/2016 **KAIST, M.S in Computer Science**

– Thesis: Multisampling Compressive Video Spectroscopy

03/2010–08/2014 **KAIST, B.S in Computer Science**

PROGRAMMING SKILLS

- Programming Language: C, C++, CUDA, Python, MATLAB
- Library: PyTorch, Tensorflow, Mitsuba, OpenGL, OpenCV

PUBLICATIONS

International Journals:

[J1] **Daniel S. Jeon**, Seung-Hwan Baek, Shinyoung Yi, Qiang Fu, Xiong Dun, Wolfgang Heidrich, Min H. Kim. "Compact Snapshot Hyperspectral Imaging with Diffracted Rotation," ACM Transactions on Graphics (TOG), 37(6), pp. 268:1–12, 2018, presented at **SIGGRAPH** 2019 **(SCI-IF=5.084)**

[J2] **Daniel S. Jeon**, Inchang Choi, Min H. Kim, "Multisampling Compressive Video Spectroscopy," Computer Graphics Forum (CGF), 35(2), May 12, 2016, pp. 467-477, presented at **EUROGRAPHICS** 2016 **(SCI-IF=2.116)**

[J3] Inseung Hwang, **Daniel S. Jeon**, Adolfo Muñoz, Diego Gutierrez, Xin Tong, Min H. Kim, "Sparse Ellipsometry: Portable Acquisition of Polarimetric SVBRDF and Shape with Unstructured Flash Photography," ACM Transactions on Graphics (TOG), 41(4), Aug. 8 - Aug. 11, 2022, presented at **SIGGRAPH** 2022 **(SCI-IF=5.084)**

[J4] Shinyoung Yi, **Daniel S. Jeon**, Ana Serrano, Se-Yoon Jeong, Hui-Yong Kim, "Modelling Surround-aware Contrast Sensitivity for HDR Displays," Computer Graphics Forum (CGF), 2022 **(SCI-IF=2.116)**

[J5] Seung-Hwan Baek, **Daniel S. Jeon**, Xin Tong, Min H. Kim. "Simultaneous acquisition of polarimetric svbrdf and normals," ACM Transactions on Graphics (TOG), 37(6), pp. 268:1–12, 2018, presented at **SIGGRAPH** Asia 2018, **(SCI-IF=5.084)**

[J6] Joo Ho Lee, Adrian Jarabo, **Daniel S. Jeon**, Diego Gutierrez, Min H. Kim. "Practical multiple scattering for rough surfaces," ACM Transactions on Graphics (TOG), presented at **SIGGRAPH** Asia 2018, 37(6), pp. 275:1–15, 2018 **(SCI-IF=5.084)**

[J7] Dongmin Keum, Kyung-Won Jang, **Daniel S. Jeon**, Charles S. Hwang, Elke K. Buschbeck, Min H. Kim, Ki-Hun Jeong. "Xenos peckii vision inspires an ultrathin digital camera," Nature Publishing Group (NPG), **Light: Science and Applications**, 7:80(1), Oct. 24, 2018. **(SCI-IF=13.714)**

[J8] Inchang Choi, **Daniel S. Jeon**, Giljoo Nam, Diego Gutierrez, Min H. Kim (2017), "High-Quality Hyperspectral Reconstruction Using a Spectral Prior," ACM Transactions on Graphics (TOG), 36(6), Nov. 27-30, 2017, pp. 218:1–13, presented at **SIGGRAPH** Asia 2017 **(SCI-IF=5.084)**

International Conference Proceedings:

[C1] **Daniel S. Jeon**, Seung-Hwan Baek, Inchang Choi, Min H. Kim, "Enhancing the Spatial Resolution of Stereo Images using a Parallax Prior," Proc. IEEE Computer Vision and Pattern Recognition (**CVPR**) 2018

[C2] Seung-Hwan Baek, Hayato Ikoma, **Daniel S. Jeon**, Yuqi Li, Wolfgang Heidrich, Gordon Wetzstein, Min H. Kim (2020), "Single-shot Hyperspectral-Depth Imaging with Learned Diffractive Optics," Proc. IEEE International Conference on Computer Vision (ICCV) 2021

[C3] Shinyoung Yi, **Daniel S. Jeon**,, Ana Serrano, Se-Yoon Jeong, Hui-Yong Kim, Diego Gutierrez, Min H. Kim, "Modeling Surround-aware Contrast Sensitivity," Proc. Eurographics Symposium on Rendering (EGSR) 2021

[C4] Andreas Meuleman, Hyeonjoong Jang, **Daniel S. Jeon**, Min H. Kim, "Real-Time Sphere Sweeping Stereo from Multiview Fisheye Images," Proc. IEEE Computer Vision and Pattern Recognition (CVPR 2021, Oral)

[C5] Hakyeong Kim, Andreas Meuleman, **Daniel S. Jeon**, Min H. Kim, "High-Quality Stereo Image Restoration from Double Refraction," Proc. IEEE Computer Vision and Pattern Recognition (CVPR 2021)

[C6] Dahyun Kang, **Daniel S. Jeon**, Hakyeong Kim, Hyeonjoong Jang, Min H. Kim, "View-dependent Scene Appearance Synthesis using Inverse Rendering from Light Fields," Proc. IEEE International Conference on Computational Photography (ICCP 2021)

[C7] Inseung Hwang, **Daniel S. Jeon**, Min H. Kim, "Single-shot Acquisition of Cylindrical Mesostructure Normals using Diffuse Illumination," Proc. International Conference on Computer Vision Theory and Applications (VISAPP) 2020

[C8] Hyeonjoong Jang, **Daniel S. Jeon**, Min H. Kim, "Fast Omnidirectional Depth Densification," Proc. International Symposium on Visual Computing (ISVC 2019, Oral)

[C9] Dongmin Keum, **Daniel S. Jeon**, Charles S. H. Hwang, Elke K. Buschbeck, "Ultrathin Camera Inspired by Visual System Of Xenos Peckii," Proc. IEEE International Conference on Micro Electro Mechanical Systems (MEMS) 2016

[C10] Dongmin Keum, **Daniel S. Jeon**, Min H. Kim, Ki-Hun Jeong, "Ultrathin Camera Inspired by Visual System Of Xenos Peckii," Proc. IEEE International Conference on Solid-State Sensors, Actuators and Microsystems (TRANSDUCERS) 2015

AWARDS

- **2018 Naver Ph.D. Fellowship**, Naver
- **2016 Master's Thesis Award**, Korea Computer Graphics Society

PATENTS

US Patent:

[1] Min Hyuk Kim, **Daniel S. Jeon**, "Hyperspectral imaging spectroscopy method using kaleidoscope and system therefor", U.S. Patent App.: 15/637,884, published in Jun. 29, 2017.

Korea Patents:

[2] Ki-Hun Jeong, Myeong-Su Ahn, Min Hyuk Kim, **Daniel S. Jeon**, "Spectral Apparatus Incorporating Tunable Spectral Filter with Multiple Resonances, and Method for Acquiring Spectral Information Thereof", KR Patent App. : 10-2020-0035039, published in Mar. 23, 2020.

[3] Min Hyuk Kim, **Daniel S. Jeon**, "Lensless Hyperspectral Imaging Method and Apparatus Therefor", KR Patent App. : 10-2019-0071347, published in Jun. 17, 2019.

[4] Min Hyuk Kim, **Daniel S. Jeon**, "Stereo Super-ResolutionImaging Method using Deep Convolutional Networks and Apparatus Therefor", KR Patent App. : 10-2083721-0000, published in Feb. 25, 2020.

[5] Min Hyuk Kim, **Daniel S. Jeon**, "Hyperspectral Imaging Spectroscopy Method Using Kaleidoscope and System Therefor", KR Patent App. : 10-1915883-0000, registered in Sep. 31, 2018.

RESEARCH PROJECTS

[1] **Mobile Time-of-Flight** (2021-Present), Samsung Mobile, Development of high-resolution time-of-flight imaging algorithm for mobile system.

[2] **Polarimetric 3D Imaging** (2021-2022), Microsoft Research Asia (MSRA), A polarimetric 3D imaging.

[3] **Lensless Hyperspectral & Depth Imaging** (2019-2022), NRF, Development of lensless hyperpsectral imaging and depth imaging system using end-to-end learning with diffractive optical elements.

[4] **Time-of-Flight Multipath Interference Correction** (2018-Present), SK Hynix, Development of high-resolution time-of-flight camera system for depth measurement.

[5] **Compact Hyperspectral Imaging** (2017-2018), Samsung Science & Technology Foundation, Healthcare Edion ultra-thin spectral camera for smart glass.

[6] **Lensless Imaging** (2017-2018), SK Hynix, Development of color imaging algorithm using lensless camera with diffractive optical elemtents.

[7] **Synthetic Defocus** (2016-2017), SK Hynix, Development of fast re-focusing algorithm for stereo camera.

[8] **Super-resolution** (2015-2016), SK Hynix, Development of super resolution algorithm for stereo camera using deep neural network.

[9] **High-Quality Face Scanning** (2016), EVR Studio, Created digital human for VR games.

[10] **Collaborative Photography,** (2015-2016), KAIST Center for Mobile Software Platform, Developing applications for mobile software platform.

[11] **Depth from a Duel Aperture** (2013-2015), Global Frontier Projects (CISS), developed a depth-from-defocus method for a dual aperture.

REFERENCES

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