Sungkil Lee (이성길), Ph.D. ***Curriculum Vitae***

Professor
Dept. of Computer Science and Eng. (소프트웨어학과)
Dept. of Immersive Media Eng. (실감미디어공학과)
Sungkyunkwan University (성균관대학교)
Seobu-ro 2066, Jangan-gu
Suwon (수원) 16419
Republic of Korea

sungkil@skku.edu
https://cg.skku.edu/slee/

Office: +82 31-290-7126
Fax.: +82 502-302-1838

Research Statement

My research interest lies largely in *computer graphics*. Among the primary areas of computer graphics research, I am particularly focusing on rendering and it associated areas, which analyzes and computationally improves interactions between lights, 3D geometries, and views. Fundamental principles underlying the topics include physics, optics, GPU algorithms, and visual perception. Ongoing research subjects include: real-time Graphics-Processing-Unit (GPU) rendering, optical systems, deep learning and rendering, very-high-resolution GPU imaging, GPU algorithms, virtual reality (VR), global illumination, and information visualization.

Real-Time GPU Rendering and Physically-Based Optical Rendering Despite the recent strides made in graphics algorithms and hardware, real-time rendering of natural phenomena remains challenging. In general, we sacrifice quality for real-time performance, which approximates physics. However, we believe there are always creative possibilities to improve images as similar in quality to reference solutions, while maintaining interactive real-time performance. GPUs considerably help us to realize our novel algorithms and data structures with high performance.

Our former studies on optical effects were successful attempts to prove our belief. Creative combinations of rasterization and ray tracing allowed us to achieve real-time performance and high image quality at the same time. We are still seeking for creative solutions to many open rendering problems, including optics and global illumination.

Deep Learning and Rendering Deep learning (DL) allows us to explore many open-problem spaces, in which we usually cannot intuitively obtain a computational model. We are investigating its possibilities in the two aspects. *Rendering for DL* focuses on the generation of (labeled) images that can be fed into the network as input. This significantly helps to widen the application areas of DL, where we cannot easily attain the input data. To this end, we divert realistic rendering towards imperfect real imagery (CG images are too ideal and clean for this purpose). Another possibility is *DL for rendering*. Unlike what it sounds like, DL's mechanism and rendering is contradicting, because many phenomena in the rendering are computationally predictable with explicit models. Instead, we now understand DL as a compact nonlinear modeler for many rendering problems, and explore many possibilities in how it can be effectively utilized in modeling-based areas.

Very-High-Resolution GPU Imaging As 4K and 8K displays become popular, the traditional raster algorithm/pipelines may potentially encounter a bottleneck in the pixel processing. Processing in a native resolution may not be optimal in the near future. To this end, we are investigating how to design a novel pipeline with resolution-independent G-buffers, which encodes geometry and shading information in much lower data-space complexity and reconstructs at a higher resolution without precision loss.

GPU Algorithms Rendering usually handles a gigantic amount of data. To facilitate rendering, graphics hardware has been rapidly evolving the recent decades. One of the important advances is a user-programmable rendering pipeline. Accordingly, the capability of GPU expands beyond the traditional usage to encompass general-purpose computing. We attempt to achieve improved performance in general computing up to order of two magnitudes. Such an approach is focused on creative algorithms rather than a simple use of GPU and CUDA/OpenCL.

VR Illumination and Display Algorithms Real-time global illumination for VR and augmented reality (AR) requires to be computed with hard real-time constraints. We are trying to develop efficient techniques to achieve visually plausible and temporally coherent appearances. In particular, volume-based approximation of global illumination techniques are improved. Also, the global illumination techniques for pure VR are extended to AR with efficient acquisition of scene geometry, light sources, and materials from input video streams.

Stereoscopic (binocular) display needs to be employed to mediate interactive VR/AR experiences. Such display devices still incur visual fatigues in many optical and perceptual aspects. To cope with these problems, we are investigating how to improve optical accuracy of VR display in terms of motion blur and optical aberrations.

Information Visualization Effective visualization of informative data involves in-depth understandings on human visual perception. Unlike common approaches based on image analysis, our research advances more to image synthesis solutions, leading to perceptually-effective visualization. Visual saliency is one of the important keys to such approaches.

Professional Positions

Professor 2021–present
Department of Software, Sungkyunkwan University, Suwon, Republic of Korea.

Associate professor 2015–2021
Department of Software, Sungkyunkwan University, Suwon, Republic of Korea.

Visiting professor 2017–2018
Computer Graphics and Visualization (CGV) Group, Delft University of Technology (TU Delft), Netherlands.

- Host professor: Prof. Dr. Elmar Eisemann

Assistant professor 2011–2015
Department of Software, Sungkyunkwan University, Suwon, Republic of Korea.

Postdoctoral researcher 2009–2011
Computer Graphics Department (D4), Max-Planck-Institut (MPI) Informatik, Germany.

- Advisers: Prof. Dr. Hans-Peter Seidel (MPI Informatik) and Prof. Dr. Elmar Eisemann (TU Delft)

Educational Qualifications

Ph.D. in* Computer Science and Engineering*, POSTECH 2002–2009
Dissertation: *Real-Time Perceptual Rendering with Computational Visual Attention Tracking in Virtual Environments*

- Advisers: Profs. Seungmoon Choi (POSTECH) and Gerard Jounghyun Kim (Korea University)

B.S. in* Materials Science and Engineering*, POSTECH 1994–2002
Minor in *Computer Science and Engineering*

Academic Memberships

Regular	ACM, ACM SIGGRAPH, Eurographics, Asia Graphics, IEEE, IEEE CS
Regular	KCGS (한국컴퓨터그래픽스학회), KHCI (한국HCI학회)
Lifetime	KIISE (한국정보과학회), KIPS (한국정보처리학회)

Professional Academic Services

International Program Committee

Eurographics Symp. Rendering: 2023
ACM/EG High Performance Graphics (HPG): 2023, 2022, 2021
3D Systems and Applications (3DSA): 2023
Pacific Graphics: 2022, 2019, 2014
ACM Web3D: 2020
CAD/Graphics: 2017, 2015
Eurographics: 2015, 2014
IEEE Virtual Reality: 2014
IEEE/ACM ISMAR: 2009

Conference Referee

ACM SIGGRAPH: 2024, 2023, 2022, 2019, 2018, 2016, 2014, 2008
ACM SIGGRAPH ASIA: 2022, 2018, 2014, 2013, 2011
ACM SIGCHI: 2015
Eurographics (EG): 2021, 2015, 2014, 2012
IEEE Visualization (VIS): 2020, 2010
Eurographics Symp. on Rendering (EGSR): 2014, 2011
High Performance Graphics (HPG): 2023, 2022, 2021
Pacific Graphics (PG): 2019, 2015, 2014, 2013, 2012
EG/VGTC Conf. on Visualization (EuroVis): 2019
Graphics Interface (GI): 2014
CAD/Graphics: 2017, 2015
Motion in Graphics (MIG): 2010
SIAM Conf. Mathematics for Industry (MI): 2009
IEEE Virtual Reality (VR): 2024, 2020, 2014, 2009
IEEE 3DUI: 2009
IEEE/ACM ISMAR: 2009, 2008
WorldHaptics: 2015
IEEE Int. Conf. on Consumer Electronics (ICCE): 2012
Int. Conf. on Database Systems for Advanced Applications (DASFAA): 2018

Journal Referee

ACM Transactions on Graphics (TOG): 2023, 2011
IEEE Transactions on Visualization and Computer Graphics (TVCG): 2021, 2011
Computer Graphics Forum (CGF): 2013, 2009
IEEE Computer Graphics and Applications (CGA): 2011
Computers and Graphics (CnG): 2021, 2013
IEEE Transactions on Computational Imaging (TCI): 2022, 2021
IEEE Computer Graphics and Applications (CGA): 2011
The Visual Computer (VisCom): 2017, 2014

IEEE Transactions on Circuits and Systems for Video Technology (TCSVT): 2014
Elsevier Journal of Visual Communications and Image Representation (JVCI): 2013
Graphical Models (GMod): 2014
Journal of Supercomputing: 2014

Award Committee/Referee

Pacific Graphics (PG) Best Papers: 2019
Samsung HumanTech Award: 2014, 2013

Domestic Academic Services

Program Chair of KCGS 2021 (한국컴퓨터그래픽스학술대회 2021 프로그램위원장)
Program Chair of KCGS 2020 (한국컴퓨터그래픽스학술대회 2020 프로그램위원장)
한국정보과학회 우수학술대회목록 4차 개편위원회 분과 전문위원: 2020
Vice President of Korea CG Society (한국컴퓨터그래픽스학회 이사)
KCGS Editor (한국컴퓨터그래픽스학회 논문편집위원): 2016–2018
PC member of Korea Software Congress (조직위원회 부위원장): 2018
한국정보과학회 우수학술대회목록 3차 개편위원회 분과 전문위원: 2018
연구성과실용화진흥원 기술사업화 전문가협의체 전문위원: 2015.3–2016.2

University Services

Positions

2019.01.01–2020.12.31	Department Chair, Department of Software
2019.01.01–2020.12.31	Department Chair, Department of Computer Science and Engineering
2018.03.01–2019.02.28	ABEEK PD (공학교육혁신센터 프로그램 주관 교수)
2014.03.01–2015.12.31	Department Chair, GSIT (정보통신대학원 정보통신공학과)
2014.03.01–2015.12.31	Department Chair, GSIT (정보통신대학원 IT컨설팅학과)

Steering Committee

2023.03–2023.10	BK21 Four 사업 제안서 작성위원
2018.03–2018.10	BK21+ 사업 운영위원
2018.04–2018.06	BK21+ 사업 중간점검 보고서 작성위원
2015.06–2015.08	BK21+ 사업 중간평가 보고서 작성위원
2013.09–2014.02	BK21+ 사업 실무간사
2015.12–2016.12	소프트웨어대학 교원인사규정 개편 위원
2015.03–2017.02	소프트웨어플랫폼학과(대학원) 운영위원
2014.03–2017.02	정보통신대학원(인문사회캠퍼스) 운영위원
2015.03–present	IT융합학과(대학원 고용계약형학과) 운영위원
2016.01–2017.02	소프트웨어대학 연구진흥위원회 위원
2015.12, 2016.12	소프트웨어중심대학 사업 보고서 작성위원

Selected Publications (대표연구실적)

[1] Janghun Kim and **Sungkil Lee**, "Potentially Visible Hidden-Volume Rendering for Multi-View Warping," *ACM Trans. Graphics (Proc. SIGGRAPH)*, vol. 42, no. 4, 86:1–11, 2023.

[2] Moonsoo Jeong, Hyogeun Byun, and **Sungkil Lee**, "Learning Camera Parameters with Weighted Edge Attention from Single-View Images," *IEEE Access*, vol. 11, pp. 16 896–16 906, 2023.

[3] Yuna Jeong, Seung Youp Baek, Yechan Seok, Gi Beom Lee, and **Sungkil Lee**, "Real-Time Dynamic Bokeh Rendering with Efficient Look-Up Table Sampling," *IEEE Trans. Vis. and Computer Graphics*, vol. 28, no. 2, pp. 1373–1384, 2022.

[4] Gi Beom Lee, Moonsoo Jeong, Yechan Seok, and **Sungkil Lee**, "Hierarchical Raster Occlusion Culling," *Computer Graphics Forum (Proc. Eurographics'21)*, vol. 40, no. 2, pp. 489–495, 2021.

[5] Junyong Lee, **Sungkil Lee**, Sunghyun Cho, and Seungyong Lee, "Deep Defocus Map Estimation using Domain Adaptation," *Proc. IEEE Computer Vision and Pattern Recognition (CVPR)*, 2019, pp. 12 222–12 230.

[6] Timothy R. Kol, Pablo Bauszat, **Sungkil Lee**, and Elmar Eisemann, "MegaViews: Scalable Many-View Rendering with Concurrent Scene-View Hierarchy Traversal," *Computer Graphics Forum*, vol. 38, no. 1, pp. 235–247, 2019.

[7] **Sungkil Lee**, Younguk Kim, and Elmar Eisemann, "Iterative Depth Warping," *ACM Trans. Graphics (presented at SIGGRAPH'19)*, vol. 37, no. 5, 177:1–13, 2018.

[8] Leonardo Scandolo, **Sungkil Lee**, and Elmar Eisemann, "Quad-Based Fourier Transform for Efficient Diffraction Synthesis," *Computer Graphics Forum (Proc. EGSR'18)*, vol. 37, no. 4, pp. 167–176, 2018.

[9] Hyuntae Joo, Soonhyeon Kwon, Sangmin Lee, Elmar Eisemann, and **Sungkil Lee**, "Efficient Ray Tracing Through Aspheric Lenses and Imperfect Bokeh Synthesis," *Computer Graphics Forum (Proc. EGSR'16)*, vol. 35, no. 4, pp. 99–105, 2016.

[10] Myongchan Kim, **Sungkil Lee**, and Seungmoon Choi, "Saliency-Driven Real-Time Video-to-Tactile Translation," *IEEE Trans. Haptics*, vol. 7, no. 3, pp. 394–404, 2014.

[11] **Sungkil Lee**, Mike Sips, and Hans-Peter Seidel, "Perceptually Driven Visibility Optimization for Categorical Data Visualization," *IEEE Trans. Vis. and Computer Graphics (invited to IEEE InfoVis 2013)*, vol. 19, no. 10, pp. 1746–1757, 2013.

[12] Yuna Jeong, Kangtae Kim, and **Sungkil Lee**, "Real-Time Defocus Rendering with Level of Detail and Subsample Blur," *Computer Graphics Forum*, vol. 32, no. 6, pp. 126–134, 2013.

[13] **Sungkil Lee** and Elmar Eisemann, "Practical Real-Time Lens-Flare Rendering," *Computer Graphics Forum (Proc. EGSR'13)*, vol. 32, no. 4, pp. 1–6, 2013.

[14] Matthias Hullin, Elmar Eisemann, Hans-Peter Seidel, and **Sungkil Lee**, "Physically-Based Real-Time Lens Flare Rendering," *ACM Trans. Graphics (Proc. SIGGRAPH'11)*, vol. 30, no. 4, 108:1–9, 2011.

[15] **Sungkil Lee**, Elmar Eisemann, and Hans-Peter Seidel, "Real-Time Lens Blur Effects and Focus Control," *ACM Trans. Graphics (Proc. SIGGRAPH'10)*, vol. 29, no. 4, 65:1–7, 2010.

[16] **Sungkil Lee**, Elmar Eisemann, and Hans-Peter Seidel, "Depth-of-Field Rendering with Multiview Synthesis," *ACM Trans. Graphics (Proc. SIGGRAPH ASIA'09)*, vol. 28, no. 5, 134:1–6, 2009.

[17] **Sungkil Lee**, Gerard J. Kim, and Seungmoon Choi, "Real-Time Depth-of-Field Rendering Using Anisotropically Filtered Mipmap Interpolation," *IEEE Trans. Vis. and Computer Graphics*, vol. 15, no. 3, pp. 453–464, 2009.

[18] **Sungkil Lee**, Gerard J. Kim, and Seungmoon Choi, "Real-Time Tracking of Visually Attended Objects in Virtual Environments and Its Application to LOD," *IEEE Trans. Vis. and Computer Graphics*, vol. 15, no. 1, pp. 6–19, 2009.

[19] **Sungkil Lee**, Gerard J. Kim, and Seungmoon Choi, "Real-Time Depth-of-Field Rendering Using Splatting on Per-Pixel Layers," *Computer Graphics Forum (Proc. Pacific Graphics'08)*, vol. 27, no. 7, pp. 1955–1962, 2008.

[20] **Sungkil Lee** and Gerard J. Kim, "Effects of Visual Cues and Sustained Attention on Spatial Presence in Virtual Environments Based on Spatial and Object Distinction," *Interacting with Computers*, vol. 20, no. 4–5, pp. 491–502, 2008.

Other Publications: Journal Articles

[1] Joo Young Chun *et al.*, "Prediction of specific anxiety symptoms and VR sickness based on in-situ autonomic physiological signals during VR treatment in patients with social anxiety disorder: mixed-methods study," *JMIR Serious Games*, vol. 10, no. 3, e38284, 2022.

[2] Ji-Won Hur *et al.*, "VR-Based Psychotherapy in Social Anxiety Disorder: An fMRI Study using a Self-Referential Task," *JMIR Mental Health*, vol. 8, no. 4, e25731, 2021.

[3] Sun Geol Baek, **Sungkil Lee**, and Young Ik Eom, "Efficient Single-Pair All-Shortest-Path Query Processing," *Information Sciences*, vol. 546, pp. 1306–1327, 2021.

[4] Hyun-Jin Kim *et al.*, "Effectiveness of a Participatory and Interactive Virtual Reality Intervention in Patients With Social Anxiety Disorder: A Longitudinal Questionnaire Study," *J. Med. Internet Res*, vol. 22, no. 10, e23024:1–16, 2020.

[5] Young Im Kim *et al.*, "Visuo-Haptic-Based Multimodal Feedback Virtual Reality Solution to Improve Anxiety Symptoms: A Proof-of-Concept Study," *Psychiatry Investig*, vol. 16, no. 2, pp. 167–171, 2019.

[6] Euijai Ahn, **Sungkil Lee**, and Gerard Jounghyun Kim, "Real-time adjustment of contrast saliency for improved information visibility in mobile augmented reality," *Springer Virtual Reality*, vol. 22, no. 3, pp. 245–262, 2018.

[7] Martin Cadik, Daniel Sykora, and **Sungkil Lee**, "Automated Outdoor Depth-Map Generation and Alignment," *Elsevier Computers & Graphics*, vol. 74, pp. 109–118, 2018.

[8] Sun Geol Baek, Dong Hyun Kang, **Sungkil Lee**, and Young Ik Eom, "Efficient Graph Pattern Matching Framework for Network-Based In-Vehicle Fault Detection," *Journal of Systems and Software*, vol. 140, pp. 17–31, 2018.

[9] Sunghun Jo, Yuna Jeong, and **Sungkil Lee**, "GPU-Driven Scalable Parser for OBJ Models," *Journal of Computer Science and Technology*, vol. 33, no. 2, pp. 417–428, 2018.

[10] Jun Suk Kim, **Sungkil Lee**, and Min Young Chung, "Time-Division Random-Access Scheme Based on Coverage Level for Cellular Internet-of-Things in 3GPP Networks," *Pervasive and Mobile Computing*, vol. 44, pp. 45–57, 2018.

[11] Soonhyeon Kwon, Younguk Kim, Kihyuk Kim, and **Sungkil Lee**, "Heterogeneous Volume Deformation and Animation Authoring with Density-Aware Moving Least Squares," *Computer Animation and Virtual Worlds*, vol. 29, no. 1, e1784:1–14, 2018.

[12] Jun Suk Kim, **Sungkil Lee**, and Min Young Chung, "Efficient Random-Access Scheme for Massive Connectivity in 3GPP Low-Cost Machine-Type Communications," *IEEE Trans. Vehicular Technology*, vol. 66, no. 7, pp. 6280–6290, 2017.

[13] Yunji Kang, Woohyun Joo, **Sungkil Lee**, and Dongkun Shin, "Priority-driven spatial resource sharing scheduling for embedded graphics processing units," *Journal of Systems Architecture*, vol. 76, pp. 17–27, 2017.

[14] Kihong Lee, DongWoo Lee, **Sungkil Lee**, and Young Ik Eom, "Power-efficient and High-performance Block I/O Framework for Mobile Virtualization Systems," *Journal of Supercomputing*, vol. 73, no. 4, pp. 1307–1321, 2017.

[15] Yuna Jeong, Hyuntae Joo, Gyeonghwan Hong, Dongkun Shin, and **Sungkil Lee**, "AVIoT: Web-Based Interactive Authoring and Visualization of Indoor Internet of Things," *IEEE Trans. Consumer Electronics*, vol. 61, no. 3, pp. 295–301, 2015.

[16] Sunghoon Yim, **Sungkil Lee**, and Seungmoon Choi, "Evaluation of Motion-Based Interaction for Mobile Devices: A Case Study on Image Browsing," *Interacting with Computers*, vol. 23, no. 3, pp. 268–278, 2011.

[17] Jane Hwang *et al.*, "Requirements, implementation and applications of hand-held virtual reality," *International Journal of Virtual Reality*, vol. 5, no. 2, pp. 59–66, 2006.

Conference Papers and Posters

[1] Seung Youp Baek and **Sungkil Lee**, "Day-to-Night Road Scene Image Translation Using Semantic Segmentation," *Pacific Graphics Posters*, 2020, pp. 47–48.

[2] Gi Beom Lee and **Sungkil Lee**, "Iterative GPU Occlusion Culling with BVH," *High Performance Graphics Posters*, 2020.

[3] Nathan Doh, Hyunga Choi, Bumchul Jang, Sangmin Ahn, Hyojin Jung, and **Sungkil Lee**, "TeeVR: spatial template-based acquisition, modeling, and rendering of large-scale indoor spaces," *ACM SIGGRAPH Emerging Technologies*, 2019, p. 25.

[4] Sangmin Lee and **Sungkil Lee**, "Interactive Additive Diffraction Synthesis," *Eurographics Posters*, 2016.

[5] Kihyuk Kim and **Sungkil Lee**, "Interactive Free-Form Volume Editing," *Eurovis Posters*, 2015.

[6] Hyunjin Lee, Yuna Jeong, and **Sungkil Lee**, "Recursive Tessellation," *ACM SIGGRAPH ASIA Posters*, 2013.

[7] Yuna Jeong, Kangtae Kim, and **Sungkil Lee**, "Multi-Resolution Depth-of-Field Rendering," *ACM SIGGRAPH Posters*, 2012.

[8] Myongchan Kim, **Sungkil Lee**, and Seungmoon Choi, "Saliency-Driven Tactile Effect Authoring for Real-Time Visuotactile Feedback," *Proc. Eurohaptics*, 2012, pp. 258–269.

[9] **Sungkil Lee**, Gerard J. Kim, and Seungmoon Choi, "Real-Time Tracking of Visually Attended Objects in Interactive Virtual Environments," *Proc. ACM VR Software and Tech.*, 2007, pp. 29–38.

[10] **Sungkil Lee**, Gerard J. Kim, and Janghan Lee, "Observing Effects of Attention on Presence with fMRI," *Proc. ACM VR Software and Tech.*, 2004, pp. 73–80.

[11] **Sungkil Lee**, Gerard J. Kim, Albert Rizzo, and Hyungjin Park, "Formation of Spatial Presence: By Form or Content?" *Proc. 7th Annual International Workshop on Presence*, 2004, pp. 20–27.

Selected Cover Images

- Practical Real-Time Lens-Flare Rendering. Back cover, *Proc. EGSR 2013*.
- Physically-Based Real-Time Lens Flare Rendering. Back cover, *Proc. SIGGRAPH 2011*.
- Real-Time Depth-of-Field Rendering Using Anisotropically Filtered Mipmap Interpolation. Front cover, *IEEE Trans. Visualization and Computer Graphics, 15*(3).
- Real-Time Depth-of-Field Rendering Using Point Splatting on Per-Pixel Layers. Back cover, *Computer Graphics Forum, 27*(7) (Proc. Pacific Graphics'08).

Patents

[1] **Sungkil Lee**, *Methods and apparatuses of lens flare rendering using linear paraxial approximation, and methods and apparatuses of lens flare rendering based on blending*, US Patent No.: 9595132, 2017.

[2] **Sungkil Lee** and Younguk Kim, *Method, apparatus, and computer-readable recording medium for depth warping based occlusion culling*, US Patent No.: 9280846, 2016.

[3] Matthias Hullin, **Sungkil Lee**, Hans-Peter Seidel, and Elmar Eisemann,
Method and System for Real-Time Lens Flare Rendering,
Publication No.: WO2012/146303, Application No.: PCT/EP2011/056850, 2012., 2012.

[4] 이성길, 조성훈, 정유나, and 유범재, *확장성 있는 GPU기반의 대용량 OBJ 파일 처리 방법 및 장치*,
등록번호: 10-1827395, 2018.

[5] 이성길, *블렌딩 기반 렌즈 플레어 렌더링 방법 및 장치*, 등록번호: 10-1658883, 2016.

[6] 이성길, *선형 근축 근사를 사용한 렌즈 플레어 렌더링 방법 및 장치*, 등록번호: 10-1465658, 2014.

[7] 이성길 and 정주현, *선형회귀분석을 이용한 합산 영역 테이블의 정밀도 향상을 위한 방법 및 장치 및 이를 이용한 영상 이미지 복원을 위한 필터링 방법 및 장치*, 등록번호: 10-1431715, 2014.

Invited Talks

Conference Presentation

2019.10.04	Seoul, Korea. Pacific Graphics 2019. (invited WIP paper) Depth Warping and Its Applications.
2019.7.30	LA. CA, ACM SIGGRAPH 2019. (invited TOG paper) Iterative Depth Warping.
2013.10.17	Atlanta GA, IEEE VIS 2013. Perceptually Driven Visibility Optimization for Categorical Data Visualization.
2013.06.17	Zaragoza Spain, EGSR 2013. Practical Real-Time Lens-Flare Rendering.
2010.07.25	L.A. CA, SIGGRAPH 2010. Real-time Lens Blur Effects and Focus Control.
2009.12.09	Yokohama Japan, SIGGRAPH ASIA 2009. Depth-of-Field Rendering with Multiview Synthesis.
2008.10.10	Tokyo, Pacific Graphics 2008. Real-Time Depth-of-Field Rendering using Point Splatting on Per-Pixel Layers.
2007.11.03	L.A. CA, VRST 2007. Real-Time Tracking of Visually Attended Objects in Interactive VEs.
2004.10.13	Valencia Spain, Presence Workshop. Formation of Spatial Presence: By Form or Content?

Invited Seminar

2018.04.13	Kyunghee University, Effective Rendering of Optical Effects.
2017.10.18	GFZ Potsdam, Germany. Perceptually Driven Visibility Optimization for Categorical Data Visualization
2017.05.23	CGV Group Seminar, Delft University of Technology, Netherlands. Effective Rendering of optical Effects.
2016.10.27	K-Global Connect Pangyo Festival, Realistic High-Performance Lens-Flare Rendering for Virtual Reality
2016.09.30	Kyunghee University, Introduction to Modern Real-Time Rendering.
2016.05.31	Modern AR/VR Tutorials, The Institute of Electronic and Information Engineers. Real-Time Global Illumination for VR.
2015.04.22	Nexon, Inc. Practical Real-Time Lens-Flare Rendering.
2014.07.11	Samsung Advanced Institute of Technology . Real-Time Postfiltering Effects.

2014.06.03	UNIST, Real-Time Optical Effect Rendering for Computer Graphics.
2014.04.11	Workshop on Realistic Media, The Korean Society of Broadcast Engineering. Real-Time Optical Effect Rendering.
2014.01.16	CT Forum, Daegu. Real-Time Optical Effect Rendering for Realistic Contents.
2013.11.07	Inha Univ., Real-Time Optical Effect Rendering for Computer Graphics.
2012.09.27	KIST. GPU-Based Real-Time Lens Effects Rendering.
2012.09.19	Korea Univ., Getting started with GPGPU and CUDA.
2012.04.25	Korea Univ., Korea. GPU-Based Real-Time Lens Effects Rendering.
2011.06.10	ETRI, Korea. GPU-Based Real-Time Lens Effects Rendering.
2011.06.10	KAIST, Korea. Real-Time Lens Effects.
2011.06.08	POSTECH, Korea. Real-Time Lens Blur Effects and Focus Control.
2011.04.14	ICAT, Korea. Real-Time Lens Blur Effects.

Research Grants

2022.3–2023.2	Deep Head-Motion Estimation for Latency Reduction in VR Rendering (VR 렌더링 지연 감소를 위한 딥 헤드 모션 예측 기법) National Research Foundation of Korea
2019.6–2021.5	Imperfect Rendering for Deep Learning (딥러닝을 위한 불완전 렌더링) ICT Program, Samsung Research Funding & Incubation Center for Future Technology (삼성미래기술육성재단 ICT창의 사업)
2019.3–2022.2	Dynamic-Resolution Pipeline for Very-High-Resolution Rendering (초고해상도 렌더링을 위한 동적해상도 파이프라인) National Research Foundation of Korea (중견연구자지원사업)
2018.7–2019.6	Image Layer Extraction for Webtoon Conversion (웹툰 변환을 위한 이미지 레이어 추출 연구) Naver Webtoon
2018.3–2019.8	High-Performance Global Illumination Software (초고속 전역조명 소프트웨어 개발) Korea NRF Global Frontier Program (실감교류인체감응솔루션연구단)
2017.11–2020.9	Virtual reality system for personalized mental healthcare contents (맞춤형 정신건강 증진 콘텐츠를 위한 가상현실 시스템) Korea NRF
2016.7–2017.7	Image Improvement for VR Display (VR 디스플레이 이미지 보상 기술 개발) Samsung Electronics
2016.6–2019.12	Research on Mobile Platform-based Entertainment VR (모바일 플랫폼 기반 엔터테인먼트 VR 기술 연구) ICT Research Center (ITRC), Sejong University Institute for Information and communication Technology Promotion (IITP)

2015.9–2018.2	Ultra-Speed Global Illumination for Co-Existent Space (실감교류확장공간을 위한 초고속 전역조명 기술 개발) Korea NRF Global Frontier Program (실감교류인체감응솔루션연구단)
2015.5–2018.4	Software Analysis/Improvement for Seamless GPU Computing (간극없는 GPU 컴퓨팅을 위한 소프트웨어 분석/향상 기법) Korea NRF Mid-Career Program (중견연구자지원사업)
2012.9–2015.8	Parallel Software Library for Real-Time 3D Graphics Implementation (실시간 3D 그래픽스 구현을 위한 병렬처리형 소프트웨어 라이브러리 개발) Korea NRF Global Frontier Program (실감교류인체감응솔루션연구단)
2012.9–2015.8	High-Level GPU Software Modeling and Design Interface (하이레벨 GPU 소프트웨어 모델링 및 디자인 인터페이스) Korea NRF Mid-Career Program (중견연구자지원사업)
2012.1–2015.7	Core Software Technology Research for Cloud Platform (클라우드 플랫폼 핵심 SW 기술 연구) Samsung Electronics
2011.5–2014.4	Perception-Based Optimization of Visualization (시각화의 지각 기반 최적화) Korea NRF New-Researcher Program (한국연구재단 신진연구자지원사업)

Honors and Awards

2022	공로상, 한국컴퓨터그래픽스학회 (2020–2021 학술대회 프로그램위원장), 7월 14일
2020	Society best-paper award, 한국정보과학회
2020	Best-paper award, KCC (한국정보과학회 하계학술대회)
2020	2020년도 한국정보과학회 우수논문상
2019	학부생/주니어 논문경진대회 장려상, KSC (한국정보과학회 동계학술대회) 2018
2015	Best-paper award, KCC (한국정보과학회 하계학술대회)
2014	Best-paper award, KCC (한국정보과학회 하계학술대회)
2013	Best-paper award, KIPS (한국정보처리학회 하계학술대회)
2008	Best-paper award, KHCI (한국HCI학회)

Educational Experiences

Ph.D. students I supervised

2019	Yuna Jeong (정유나), KISTI (한국과학기술정보연구원) Thesis: Efficient and Expressive Rendering for Real-Time Defocus Blur and Bokeh

Masters students I supervised

2021	Junwon Kang (강준원) Thesis: Scalable Dynamic Rasterization for Postprocessing
2021	Yechan Seok (석예찬) Thesis: Hybrid Voxel Tracing for Real-Time Global Illumination

2021	Jieun Ko (고지은) Thesis: Efficient and Effective Stratification-Based Technique for Stochastic Sampling
2021	Seung Youp Baek (백승엽) Thesis: Road Scene Image Translation from Day to Night using Semantic Segmentation
2021	Gibeom Lee (이기범) Thesis: Efficient Object Visibility Culling with Screen-Space Ray Casting
2020	Yonggeol Jung (정용걸), Samsung Electronics (삼성전자) Thesis: 가변 크기 타일 기반 웹 엔진 렌더링
2020	Jaewon Choi (최재원), Osstem Thesis: Real-Time Indirect Illumination Rendering with Dual Paraboloid Map
2020	Soonhyeon Kwon (권순현) Thesis: Intuitive Volume Deformation Authoring Framework Using Moving Least Squares with Density-Aware Weighting
2020	Jaemyung Kim (김재명), Teneleven Thesis: Single-pass stereo rendering with bidirectional image warping
2020	Je Seon Lee (이제선) Thesis: Depth Range Shift and Compression for Real-Time Depth-of-Field Rendering
2019	Hyojin Jung (정효진), TeeLabs Thesis: Primitive-based Crack Synthesis with Guidance Vector Field
2019	Yuri Roh (노유리), Hotel Shilla Thesis: Experimental Quality Assessment of Ultra-High-Definition Resolution Image Upscaling of Postprocessing Effects
2019	Soyoung Park (박소영), Naver Labs Thesis: Real-time light source estimation from geometry and texture of indoor scene
2019	Younji Choi (최윤지), Shinhan Bank (신한은행) Thesis: Real-time Intrinsic Image Decomposition using Reconstructed Indoor Scene for Dynamic Relighting
2019	Taemoon Kim (김태문), Teneleven Thesis: Fast User-Weighted Viewpoint/Lighting Control for Multi-Object Scene
2018	Sunghun Jo (조성훈), IDIS Thesis: Scalable parser for massive OBJ models based on GPU
2017	Sangmin Lee (이상민), Samsung Electronics Thesis: Interactive expressive editing of lens flare effect
2017	Hyuntae Joo (주현태), TmaxSoft Thesis: Efficient bokeh synthesis with ray tracing through aspheric lenses
2016	Younguk Kim (김영욱), 인체감응솔루션연구단 Thesis: Efficient occlusion culling using depth warping
2016	Kihyuk Kim (김기혁), Korea Telecom (KT) Thesis: Interactive free-form authoring of volume animation
2015	Kangtae Kim (김강태), Korea Telecom (KT) Thesis: Perceptual color enhancement for OLED display
2015	Juhyun Jung (정주현), SAP Thesis: High-level modular algorithm design for GPGPU computing

2015	Hyunjin Lee (이현진), LG전자 CTO Thesis: Highly adaptive terrain rendering using recursive tessellation

Courses that I offered in Sungkyunkwan University

2011–present	Introduction to Computer Graphics
2012–present	Advanced Topics in Computer Graphics, Computer Graphics Theory
2021–present	Virtual Reality Theory
2019–2019	Computer Graphics Project
2012-2014	Algorithms, Algorithms Analysis (알고리즘해석)
2019–2020	CSE Seminar (컴퓨터공학세미나)
2018–present	Engineering Computer Programming (공학컴퓨터프로그래밍; C++)
2011	Creative Engineering Design
2011	Programming Basics and Practice (C)

Courses for Industrial Participants

2021–2023	파이썬기초및데이터시각화, 삼성전자공과대학교 (SSIT)
2017	Computer Graphics and OpenGL ES 3, System LSI 사업부, Samsung Electronics
2016	Real-Time Rendering for VR, 대한전자공학회 튜토리얼
2014	OpenGL ES , 첨단기술연수소, Samsung Electronics

February 14, 2024