Changil Kim | Curriculum Vitæ

Postdoctoral Fellow
Computer Science and Artificial Intelligence Laboratory
Massachusetts Institute of Technology

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EDUCATION

Aug. 2015 **Doctor of Sciences** *Zurich, Switzerland*
Eidgnössische Technische Hochschule Zürich (ETH Zurich)
- Thesis: *3D Reconstruction and Rendering from High Resolution Light Fields*
- Advisor: Markus Gross; Co-advisor: Alexander Sorkine-Hornung (Disney Research)

Nov. 2010 **Master of Science in Computer Science** *Zurich, Switzerland*
Eidgnössische Technische Hochschule Zürich (ETH Zurich)
- Thesis: *Scene Reconstruction from a Light Field*
- Advisors: Markus Gross, Wojciech Matusik, Simon Heinzle

Feb. 2005 **Bachelor of Science in Computer Science** *Daejeon, Korea*
Korea Advanced Institute of Science and Technology (KAIST)
- Thesis: *Streaming High-Definition Television over the Wired Network*
- Advisors: Kilnam Chon, Chin-Wan Chung

RESEARCH AND WORK EXPERIENCES

Oct. 2016 – *present* **Postdoctoral Fellow** *Cambridge, MA, USA*
Computer Science and Artificial Intelligence Laboratory (CSAIL), Massachusetts Institute of Technology (MIT)
- Mentor: Wojciech Matusik
- Led projects on data-driven inverse modeling of physical simulations and optimization for digital fabrication, crowdsourced data acquisition for image/video processing, and multi-modal representation learning of biometric data in collaboration with researchers at MIT, Adobe Research, and Google Research

Sept. 2015 – Aug. 2016 **Postdoctoral Researcher** *Zurich, Switzerland*
Interactive Geometry Lab, ETH Zurich
- Mentor: Olga Sorkine-Hornung
- Led projects on geometry acquisition and processing, in particular, reconstruction of manifold surfaces from noisy 3D point clouds in collaboration with Disney Research

Dec. 2010 – Aug. 2015 **Research Assistant & Teaching Assistant** *Zurich, Switzerland*
Disney Research & Computer Graphics Laboratory, ETH Zurich
- Conducted doctoral research about image-based 3D reconstruction from densely sampled light fields in collaboration with Disney Research; developed a full 3D reconstruction pipeline, *Maru Set Scanning*, which has been used in production movies in Disney studios and earned me credits in two Disney movies, *Maleficent* and *Cinderella*
- Worked on adaptive 3D rendering algorithms that optimize 3D content for stereoscopic and multi-scopic displays

June 2009 – Jan. 2010 **Research Intern** *Zurich, Switzerland*
Disney Research
- Mentors: Steven Poulakos, Jeroen van Baar
- Collaborated with Disney researchers on the projects of perceptually based stereoscopic deghosting and descattering

Jan. 2005 – Aug. 2008 **Project Manager** *Seoul, Korea*
Research and Development Center, SK Telecom
- Led substantially sized R&D projects on digital broadcasting and security on mobile devices

Feb. 2000 – Mar. 2003 **Software Engineer** *Seoul, Korea*
Insung Information
- Developed voice over IP based on H.323, computer-telephony integration, and unified messaging system

Feb. 1999 – Dec. 1999 **Software Engineer** *Seoul, Korea*
Cyberbank
- Worked on the firmware and the operating system of a PDA with CDMA wireless connection

HONOURS AND AWARDS

Feb. 2019 **Sony Focused Research Award**
Funding of USD 150,000 for 12 months

Oct. 2016 **Postdoctoral Fellowship** *Bern, Switzerland*
Swiss National Science Foundation (SNSF)
Funding of CHF 101,700 for 18 months (plus a matching fund from MIT for 6 months)

Oct. 2016 **Best Paper Award** *Stanford, CA, USA*
International Conference on 3D Vision (3DV)

Dec. 2011 **Back Cover Image**
Proceedings on ACM SIGGRAPH Asia

Apr. 2007 **IR52 Jang Young Shil Award** *Seoul, Korea*
Ministry of Science and Technology of the Republic of Korea
Awarded for outstanding scientific and technological achievements

Dec. 2006 **Korea Internet Award** *Seoul, Korea*
Ministry of Information and Communication of the Republic of Korea
Awarded the Presidential Prize

Nov. 2006 **New Radio Technology Award** *Seoul, Korea*
Korea Radio Promotion Association
Awarded the Minister of Information and Communication Prize

PUBLICATIONS

June 2019 Tae-Hyun Oh*, Tali Dekel*, **Changil Kim*,** Inbar Mosseri, William T. Freeman, Michael Rubinstein, Wojciech Matusik.
"Speech2Face: Learning the Face Behind a Voice."
*Proceedings of IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), *equal contributions, to appear*

Dec. 2018 **Changil Kim,** Hijung Valentina Shin, Tae-Hyun Oh, Alexandre Kaspar, Mohamed Elgharib, Wojciech Matusik.
"On Learning Associations of Faces and Voices."
Proceedings of Asian Conference on Computer Vision (ACCV)

Dec. 2018 Liang Shi, Vahid Babaei, **Changil Kim,** Michael Foshey, Yuanming Hu, Pitchaya Sitthi-amorn, Szymon Rusinkiewicz, Wojciech Matusik.
"Deep Multispectral Painting Reproduction via Multi-Layer, Custom-Ink Printing."
ACM Transactions on Graphics, 37(6); Proceedings of ACM SIGGRAPH Asia

Sept. 2018 Tae-Hyun Oh*, Ronnachai Jaroensri*, **Changil Kim,** Mohamed Elgharib, Frédo Durand, William T. Freeman, Wojciech Matusik.
"Learning-based Video Motion Magnification."
*Proceedings of European Conference on Computer Vision (ECCV), *equal contributions,* ***oral presentation***

Sept. 2018 Yağız Aksoy, **Changil Kim,** Petr Kellnhofer, Sylvain Paris, Mohamed Elgharib, Marc Pollefeys, Wojciech Matusik.
"A Dataset of Flash and Ambient Illumination Pairs from the Crowd."
Proceedings of European Conference on Computer Vision (ECCV)

Apr. 2018 Alexandre Kaspar, Geneviève Patterson, **Changil Kim,** Yağız Aksoy, Wojciech Matusik, Mohamed Elgharib.
"Crowd-Guided Ensembles: How Can We Choreograph Crowd Workers for Video Segmentation?"
Proceedings of ACM CHI Conference on Human Factors in Computing Systems (CHI)

Oct. 2017 Ajay Nandoriya*, Mohamed Elgharib*, **Changil Kim,** Mohamed Hefeeda, Wojciech Matusik.
"Video Reflection Removal Through Spatio-Temporal Optimization."
*Proceedings of IEEE International Conference on Computer Vision (ICCV), *equal contributions*

Oct. 2016 Kaan Yücer, **Changil Kim,** Alexander Sorkine-Hornung, Olga Sorkine-Hornung.
"Depth from Gradients in Dense Light Fields for Object Reconstruction."
Proceedings of International Conference on 3D Vision (3DV), ***oral presentation, best paper award***

Oct. 2016 Katja Wolff, **Changil Kim,** Henning Zimmer, Christopher Schroers, Mario Botsch, Olga Sorkine-Hornung, Alexander Sorkine-Hornung.
"Point Cloud Noise and Outlier Removal for Image-Based 3D Reconstruction."
Proceedings of International Conference on 3D Vision (3DV)

Sept. 2015 **Changil Kim,** Kartic Subr, Kenny Mitchell, Alexander Sorkine-Hornung, Markus Gross.
"Online View Sampling for Estimating Depth from Light Fields."
Proceedings of IEEE International Conference on Image Processing (ICIP), ***oral presentation, top 10%***

Dec. 2014 **Changil Kim,** Ulrich Müller, Henning Zimmer, Yael Pritch, Alexander Sorkine-Hornung, Markus Gross.
"Memory Efficient Stereoscopy from Light Fields."
Proceedings of International Conference on 3D Vision (3DV), ***oral presentation***

July 2013 **Changil Kim,** Henning Zimmer, Yael Pritch, Alexander Sorkine-Hornung, Markus Gross.
"Scene Reconstruction from High Spatio-Angular Resolution Light Fields."
ACM Transactions on Graphics, 32(4); Proceedings of ACM SIGGRAPH

May 2013 Simon Wenner, Jean-Charles Bazin, Alaxander Sorkine-Hornung, **Changil Kim,** Markus Gross.
"Scalable Music: Automatic Music Retargeting and Synthesis."
Computer Graphics Forum, 32(2); Proceedings of Eurographics

Dec. 2011 **Changil Kim,** Alexander Hornung, Simon Heinzle, Wojciech Matusik, Markus Gross.
"Multi-Perspective Stereoscopy from Light Fields."
ACM Transactions on Graphics, 30(6); Proceedings of ACM SIGGRAPH Asia, ***featured on the ACM TOG back cover***

PATENTS

2015 – 2018 6 US patents granted (US 9,113,043, US 9,165,401, US 9,786,062, US 9,843,776, US 10,074,160, US 10,122,994), 2 applications pending (US 2018/0139436, US 2018/0315168)

2007 – 2009 5 Korean patents granted (KR 10-0699156, KR 10-0833792, KR 10-0838047, KR 10-0840414, KR 10-0902999)

TEACHING EXPERIENCES

Autumn 2018 **Co-instructor** *Cambridge, MA, USA*
Advanced Computer Graphics, MIT
Graduate course; gave lectures on appearance modeling and fabrication

Autumn 2015 **Co-instructor** *Zurich, Switzerland*
Computer Graphics, ETH Zurich
Graduate course; gave lectures on light fields, image-based modeling and rendering, and virtual reality; supervised exams and grading

Autumn 2015 **Co-instructor** *Zurich, Switzerland*
Advanced Topics in Computer Graphics and Vision, ETH Zurich
Graduate seminar course; curated state-of-the-art academic publications, assigned mentors to students, moderated paper presentations and discussions, graded class

Autumns 2011 – 2014 **Teaching Assistant** *Zurich, Switzerland*
Computer Graphics, ETH Zurich
Graduate course; helped develop curriculum, developed exercise problem sets and graded them in a one-on-one manner, developed and graded exam questions, gave weekly recitation lectures and guest lectures

Springs 2012 – 2014 **Teaching Assistant** *Zurich, Switzerland*
Informatik I, ETH Zurich
Undergraduate course for 500+ students; developed and graded exercise problem sets, developed and graded exam questions, gave weekly recitation lectures

Spring 2011 **Teaching Assistant** *Zurich, Switzerland*
Design of Digital Circuits, ETH Zurich
Undergraduate course; designed and graded exercise lab sessions, gave weekly recitation lectures

MENTORED STUDENTS AND INTERNS

Oct. 2018 – *present* — Andy Wang — *Cambridge, MA, USA*
MEng student at MIT
Multi-modal generative model of frontal faces on mobile devices

Dec. 2017 – *present* — Liang Shi — *Cambridge, MA, USA*
PhD student at MIT
Inverse modeling of multi-material fabrication using deep neural networks

Oct. 2016 – Jan. 2017 — Hui Qiao — *Cambridge, MA, USA*
Visiting PhD student from Tsinghua University at MIT
Multi-perspective VR content creation from monocular video

Mar. 2016 – Aug. 2016 — Jonathan Forman — *Zurich, Switzerland*
Master student at ETH Zurich
Light field reconstruction from very sparse input

Nov. 2015 – Aug. 2016 — Kaan Yücer — *Zurich, Switzerland*
PhD student at ETH Zurich
Surface reconstruction from dense circular light fields

Nov. 2015 – Feb. 2016 — Katja Wolff — *Zurich, Switzerland*
Intern at Disney Research
Point cloud denoising from merged range scans

July 2013 – Sept. 2013 — Matan Zohar — *Zurich, Switzerland*
Intern at Disney Research
Depth map error detection and correction

Mar. 2013 – Aug. 2013 — Guo Qi — *Zurich, Switzerland*
Visiting bachelor student from Tsinghua University at ETH Zurich
Optical flow in spectral imaging

Sept. 2012 – Jan. 2013 — Werner Randelshofer — *Zurich, Switzerland*
Master student at ETH Zurich
Light field matting

Apr. 2012 – Oct. 2012 — Ulrich Müller — *Zurich, Switzerland*
Master student at ETH Zurich
Variational formulation of stereoscopic rendering from light fields

Mar. 2012 – June 2012 — Christian Reiter — *Zurich, Switzerland*
Bachelor student at ETH Zurich
Interactive stereoscopic rendering from light fields

CONFERENCE TALKS

Sept. 2015 — **IEEE International Conference on Image Processing** — *Québec City, QC, Canada*
Online View Sampling for Estimating Depth from Light Fields

Dec. 2014 — **International Conference on 3D Vision** — *Tokyo, Japan*
Memory Efficient Stereoscopy from Light Fields

July 2013 — **ACM SIGGRAPH** — *Anaheim, CA, USA*
Scene Reconstruction from High Spatio-Angular Resolution Light Fields

Dec. 2011 — **ACM SIGGRAPH Asia** — *Hong Kong, China*
Multi-Perspective Stereoscopy from Light Fields

INVITED TALKS

Mar. 2019 — **University of Victoria** — *Victoria, BC, Canada*
Data-Driven Visual Computing

Oct. 2018 **Pigment and Color Science Forum** *Cambridge, MA, USA*
Deep Multispectral Painting Reproduction via Multi-Layer, Custom-Ink Printing

Aug. 2017 **Google Daydream Tech Talk** *Mountain View, CA, USA*
Plenoptics for Computer Graphics and Vision

MOVIE CREDITS

2015 **"Cinderella,"** Walt Disney Pictures, Visual Effects
3D Set and Prop Scanning

2014 **"Maleficent,"** Walt Disney Pictures, Visual Effects
3D Set Scanning

TECH TRANSFER

2012 – 2016 **"Maru Set Scanning"** for 3D Set Scanning, Disney Enterprises, Inc.
Developed and transferred a complete 3D reconstruction software package for highly detailed movie sets; used for various movie productions in Disney studios

PROGRAM COMMITTEE

July 2016 IEEE International Workshop on Computational Cameras and Displays *Las Vegas, NV, USA*

REFEREE SERVICE

ACM SIGGRAPH
ACM SIGGRAPH Asia
Computer Graphics Forum
Computers
Computers & Graphics
Eurographics
European Conference on Computer Vision
High Performance Graphics
IEEE Journal of Selected Topics in Signal Processing
IEEE Transactions on Circuits and Systems for Video Technology
IEEE Transactions on Computational Imaging
IEEE Transactions on Image Processing
IEEE Transactions on Visualization and Computer Graphics
International Conference on 3D Vision
Journal of Electronic Imaging
Mobile Information Systems
Sensors

COMPUTER SKILLS

C/C++, Python, MATLAB, CUDA, OpenCL, OpenGL/GLSL, WebGL, JavaScript, HTML/CSS, Swift, TensorFlow, PyTorch, Torch, Shell Scripts, LaTeX
Development environments: Vim, GNU/Linux and Unix tools, Xcode, Visual Studio

LANGUAGES

Korean (native)
English (proficient)

MEDIA COVERAGE

Scene Reconstruction (clickable links)
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REFERENCES

Wojciech Matusik (Postdoc mentor)
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Markus Gross (PhD advisor)
Professor, ETH Zurich
Vice President of Research, Disney Research
Universitaetstrasse 6, CNB G 109, 8092 Zurich, Switzerland; +41 44 632 71 14; grossm@inf.ethz.ch

Alexander Sorkine-Hornung (PhD co-advisor)
Research Scientist, Facebook / Oculus
Giesshuebelstrasse 30, 8045 Zurich, Switzerland; +41 78 611 50 67; alexsh@oculus.com

Cambridge, March 2019