

# KOKI NAGANO

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## RESEARCH INTERESTS

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Appearance Capture, Multi-view Face Capture, Computer Animation and Simulation, GPU Rendering, Autostereoscopic Display, Realistic Digital Characters, Virtual Reality

## EDUCATION

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**University of Southern California (USC), Los Angeles, CA** 8/2012 - present  
Viterbi School of Engineering, Ph.D. student, Department of Computer Science

**Tokyo Institute of Technology, Tokyo** 4/2008 - 3/2012  
B.E., Environmental Design Program, Department of Social Engineering, School of Engineering

**The Film School of Tokyo Summer Program, Tokyo** 8/2009  
Practical movie shooting training with a 16 mm film camera along with professional filming equipment. Learned the manipulation of lighting equipment, direction and linear film editing

## WORK EXPERIENCE

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**Graphics Lab, USC Institute for Creative Technologies** 6/2012 - present  
*Graduate Research Assistant*  
Advisor: Prof. Paul Debevec  
***Multi-view Stereo on Consistent Face Topology***  
***Skin Stretch: Simulating Dynamic Skin Microgeometry***  
***Measurement and Modeling of Skin Microstructure Deformation and Microfacet BRDF***  
***Capture and Automultiscopic Projector Array for Interactive Life-sized Digital Humans***  
***Automultiscopic 3D Display Optimized For Displaying a Face***

**Oculus Research / Facebook Pittsburgh** 8/2016 – 1/2017  
*Research Intern*  
Director: Dr. Yaser Sheikh, Manager: Takaaki Shiratori, Jason Saragih  
***Research for Photoreal Digital Avatar for VR***

**Weta Digital** 5/2016 – 7/2016  
*Research Intern*  
Manager: Dr. Antoine Bouthors  
***Research at LookDev R&D Department***

**Institut de recherche en informatique et systèmes aléatoires (IRISA), Rennes 4, 5/2012**  
*Visiting Research Assistant*  
Advisors: Prof. Sumanta Pattanaik, Prof. Kadi Bouatouch

**SELECTED PUBLICATIONS**

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1. **Multi-view Stereo on Consistent Face Topology**  
Fyffe G\*, Nagano K\*, Huynh L, Saito S, Busch J, Jones A, Debevec P, and Li H (\*joint first authors).  
Accepted to *Eurographics 2017 Full Papers*
2. **Photorealistic Facial Texture Inference Using Deep Neural Networks**  
Saito S, Wei L, Hu L, Nagano K, and Li H. In *CVPR 2017(Spotlight Presentation) / arXiv 2016*
3. **Time-Offset Conversations on a Life-Sized Automultiscopic Projector Array**  
Jones A, Unger J, Nagano K, Busch J, Yu X, Peng H, Barreto J, Alexander O, Bolas M, and Debevec P. In *CVPR Workshop on Computational Cameras and Displays 2016*
4. **Massively Parallel Inverse Rendering Using Multi-Objective Particle Swarm Optimization**  
Nagano K, Collins T, Chen C, and Nakano A. In *Journal of Visualization 2016*
5. **GPU-Based Inverse Rendering With Multi-Objective Particle Swarm Optimization**  
Nagano K, Collins T, Chen C, and Nakano A.. In *ACM SIGGRAPH ASIA 2015 Symposium on Visualization in High Performance Computing. (SIGGRAPH ASIA '15)*
6. **Skin Microstructure Deformation with Displacement Map Convolution**  
Nagano K, Fyfee G, Alexander O, Barbic J, Li H, Ghosh A, and Debevec P, In *ACM Transactions on Graphics, Proceedings of the 42<sup>nd</sup> ACM SIGGRAPH Conference and Exhibition 2015. (SIGGRAPH '15)*
7. **Skin Stretch: Simulating Dynamic Skin Microgeometry**  
Nagano K, Fyfee, G, Huang J, Alexander O, Busch J, Nichols C, Koylazov V, Ruskov R, Aerni M, Danny Y, and Debevec P. In *ACM SIGGRAPH 2015 Computer Animation Festival. (SIGGRAPH '15)*
8. **An Automultiscopic Projector Array for Interactive Digital Humans**  
Jones A, Unger J, Nagano K, Busch J, Yu X, Peng H, Alexander O, and Debevec P. In *ACM SIGGRAPH 2015 Emerging Technologies (SIGGRAPH '15)*
9. **Building a Life-Size Automultiscopic Display Using Consumer Hardware**  
Jones A, Unger J, Nagano K, Busch J, Yu X, Peng H, Alexander O, and Debevec P. In *GPU Technology Conference 2015 Presentation*
10. **Measurement and modeling of microfacet distributions under deformation**  
Nagano K, Alexander O, Barbic J, Li H, and Debevec P. In *ACM SIGGRAPH 2014 Talks (SIGGRAPH '14)*
11. **Creating a life-sized automultiscopic Morgan Spurlock for CNNs "Inside Man"**  
Jones A, Unger J, Nagano K, Busch J, Yu X, Peng H, Alexander O, and Debevec P. In *ACM SIGGRAPH 2014 Talks (SIGGRAPH '14)*
12. **Interpolating vertical parallax for an autostereoscopic 3D projector array**  
Jones A, Nagano K, Liu J, Busch J, Yu X, Bolas M, Debevec P. *SPIE Stereoscopic Displays and Applications XXV 2014.*

13. **Interpolating vertical parallax for an autostereoscopic 3D projector array**  
Jones A, [Nagano K](#), Liu J, Busch J, Yu X, Bolas M, Debevec P. *the Journal of Electronic Imaging* Vol. 23(1) 2014.
14. **An autostereoscopic projector array optimized for 3D facial display**  
[Nagano K](#), Jones A, Liu J, Busch J, Yu X, Bolas M, Debevec P. In *ACM SIGGRAPH 2013 Emerging Technologies* (SIGGRAPH '13)
15. **Driving high-resolution facial blendshapes with video performance capture**  
Fyffe G, Jones A, Alexander O, Ichikari, R, Graham P, [Nagano K](#), Busch J, Debevec P. In *ACM SIGGRAPH 2013 Talks* (SIGGRAPH '13)
16. **ScritterHDR: Multiplex-Hidden Imaging on High Dynamic Range Projection**  
[Nagano K](#), Utsugi T, Yanaka K, Shirai A, Nakajima M. SIGGRAPH ASIA 2011 Technical Sketches & Posters.
17. **A new 'multiplex content' displaying system compatible with current 3D projection technology**  
[Nagano K](#), Utsugi T, Hirano M, Hamada T, Shirai A, Nakajima M. SIGGRAPH 2010 Posters.
18. **Scritter: A multiplexed image system for a public screen**  
Hamada T, [Nagano K](#), Utsugi T, Shirai A. *Proceedings of Virtual Reality International Conference Laval Virtual*, 2010, pp. 321–323.

## REPORTS & ARTICLES & PATENT

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- **SIGGRAPH 2015 Technical Papers report (in Japanese)**  
Virtual Reality Society of Japan Journal Vol. 20 (3), 2015
- **Understanding Skin Roughness**  
Web article at Wikihuman.org, 2015
- **Information Display**  
Shirai A, [Nagano K](#), Utsugi T, Hamada T, Hirano M. Japan patent application, filed No. 2010-088213, 6th April 2010.

## TEACHING

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**Teaching Assistant** **10/2011 - 11/2011**  
Tokyo Tech CSWC 0856: Media Art Technological Method

## AWARDS AND HONORS

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- **Google PhD Fellowship 2016** (Human Computer Interaction); one of 15 awardees selected from US/Canada PhD students
- **Dean's Fellowship from the USC Viterbi School of Engineering** for Spring 2016, Jan 2016
- **DC EXPO 2015 Special Prize** by Digital Content Expo 2015 (chosen from SIGGRAPH 2015 E-Tech exhibits) for "An Auto-multiscopic Projector Array for Interactive Digital Humans", Oct 2015
- **Best Final Project Prize in CSCI 596 "Scientific Computing and Visualization"**  
for the final project "GPU-Accelerated Inverse Rendering Using Multi-Objective Particle Swarm Optimization", Dec 2014

- **Best “Audience Choice” prize (First prize) in CSCI 599 “Digital Geometry Processing”** for the final project “As-Rigid-As Possible Surface Modeling For Heterogeneous Deformable Surfaces”, May 2014
- **Funai Overseas Scholarship** includes my full tuition, full medical insurance and living costs \$2,500/month for two years from 2012 and round trip expense and preparation expense about \$6,500 (¥500,000).
- **First Academic Prize** in the JASSO’s Student of the Year 2011 with a prize of about \$6,500 (¥500,000) from the Japan Student Services Organization, December 2011
- **Best Media Art Award** from the Center for the Study of World Civilizations, March 2011
- **VRSJ Young Researchers Award** from the Virtual Reality Society of Japan, March 2011
- **Tokyo Tech Award for Student Leadership 2010** from the President of Tokyo Tech, October 2010
- **Tokyo Tech 130<sup>th</sup> Anniversary Memorial Fund** for academic presentations, July-September 2010
- **Excellent Contents Award** from the Society for Art and Science, March 2010

#### VISUALS CREDITS

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- **“Lifelike Human Face Rendering”**, NVidia Demo, May 2013 [[demo](#)]
- **“Activision R&D Real-time Character Demo”**, Demo Movie, March 2013 [[demo](#)]

#### SELECTED INTERNATIONAL PRESS & MEDIA COVERAGE

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- Neural Networks Can Now Turn a Single Photo Into a Creepy 3D Face Render, GIZMODO Dec 2016
- Featuring articles in the “Lighthouse” magazine Los Angeles in April 2016, and Portland/Seattle in November 2016
- How USC’s Automultiscopic 3D Display Works, Tested, Sep 2016
- Hot Stuff! Guncy’s Eye (special feature on my recent paper and work at USC), CGWORLD Magazine (Japan), December 2015
- ACM Digital Library Selection with “Skin Microstructure Deformation with Displacement Map Convolution”, ACM, Sep 2015
- Engineers adopt a flesh approach to making gaming characters more lifelike Imperial College London ([image](#)), Aug 2015
- A Graphics Breakthrough Makes Perfect CGI Skin, GIZMODO, Aug 2015
- Finally, A Convincing 3D Display That Doesn’t Require Glasses, GIZMODO, Aug 2015
- An Auto-Multiscopic Projector Array for Interactive Digital Humans, Creative Applications, Aug 2015
- Digital Faces Are Looking More Human Than Ever, The Verge, Aug 2015
- Will This New Development in CGI Skin Overcome the Uncanny Valley?, Mental floss, Aug 2015
- CGI Skin Just Got a Whole Lot More Realistic, MOTHERBOARD, Aug 2015
- This Graphical Breakthrough Will Allow Lifelike Skin Texture In Future Games, UNILAD, Aug 2015
- Convincing computer-generated people take one step closer, BT, Aug 2015
- SIGGRAPH technical papers highlight, fxguide, Aug 2015
- Videos: the best of Siggraph 2015’s technical papers, CG Channel.com, Jun 2015
- USC dazzles with new technology that enhances CG skin dramatically, CNET Tomorrow Daily, Jun 2015
- Advances In Skin Rendering Technology Are A Little Gross But Mostly Fascinating, digg, Jun 2015

- It Feels Like These CGI Skin Designers Are Just Trying To Scare Us Now, GIZMODO, Jun 2015
- Skin Microstructure Deformation, CG Society, Jun 2015
- This Is The Most Realistic CGI Skin We've Ever Seen, Fast Company, Jun 2015
- Researchers create creepy, hyperrealistic CGI skin, Slash Gear, Jun 2015
- Skin Rendering Technology: How To Make Animated Skin Look Incredibly Real, Medical Daily, Jun 2015
- Skin Microstructure Deformation With Displacement Map Convolution ,CG Record, Jun 2015
- Skin Stretch, Prosthetic Knowledge, Jun 2015
- Auto-Multiscopic Projector Array for Interactive Digital Humans, Prosthetic Knowledge, Jun 2015
- Skin Microstructure Deformation with Displacement Map Convolution, CG Everything, Jun 2015
- Holograms add new dimension to Holocaust survivor's story, NBC Today, May 2015
- How to live forever, Morgan Spurlock's CNN Inside Man Episode 2, Apr 2014
- 3-D Projector Blurs Lines Between Fantasy, Reality, Wall Street Journal, 2013
- Highlights of SIGGRAPH 2013 Emerging Technologies, SIGGRAPHITTI, May 2013

#### INVITED TALKS AND SEMINARS

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- Imperial College London Department of Computing, Digital Domain Chalk Talk, Waseda University, Digital Frontier Inc., Toppan Printing Inc., Visual Computing/GCAD Symposium 2015, Lighthouse Career Forum 2015,

#### GRADUATE COURSES

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- CS580: 3D Graphics and Rendering
- CS596: Scientific Computing and Visualization
- CS599: Digital Geometry Processing
- CS520: Computer Animation and Simulation
- CS582: Geometric Modeling
- Math501: Numerical Analysis and Computation
- CS570: Analysis of Algorithms
- CS571: Web Technologies
- CTAN502a: Experiments in Stereoscopic Imaging
- CS545: Introduction to Robotics

#### PROFESSIONAL SERVICE (REVIEWER)

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- SIGGRAPH 2016, Computer Graphics Forum 2016, SIGGRAPH ASIA 2015 Technical Papers, Pacific Graphics 2016, 2014
- SIGGRAPH ASIA 2015 Emerging Technologies
- GCAD 2014

#### TECHNICAL SKILLS

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- Programming:C/C++/OpenGL/GLSL/OpenCV/Java/Vega FEM/CUDA/Python/Matlab/Mathematica/MPI/OpenMP/LaTex/JavaScript/HTML/
- Professional Tools: Nuke, Maya,V-Ray, Mudbox; Premiere Pro, Photoshop, Dreamweaver, After Effects;
- CG Engineering/Creation: Expert grade at Computer Graphic Certificate, CG-ARTS Society
- Calligraphy; drawing and painting (Japanese ink)

- Languages: Japanese (native), English (fluent), French (conversational)

## WEB

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Personal: <http://www.luminohope.org/>

ICT Graphics Lab: <http://gl.ict.usc.edu/>