Qi Sun

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EDUCATION

Doctor of Philosophy 08/2013 - 05/2018
Computer Science, Stony Brook University, *Stony Brook, NY*
Advisor: Distinguished Professor Arie Kaufman
Dissertation: Computational Methods for Immersive Perception
IEEE VR 2019 Best Dissertation Award

Bachelor of Science 08/2013
Mathematics, Taishan Honors College, Shandong University, China 10/2010 - 08/2013
Computer Science, Shandong University, China 09/2009 - 10/2010

EMPLOYMENT

Assistant Professor 01/2021 -
Tandon School of Engineering, New York University

Research Scientist 06/2018 - 01/2021
Adobe Research, *San Jose, CA*

Research Intern 07/2017 - 09/2017
Adobe Research, Procedural Imaging Group, *San Jose, CA*
With by Paul Asente, Cynthia Lu and Li-Yi Wei

Research Intern 04/2017 - 07/2017
NVIDIA Research, New Experiences Group, *Redmond, WA*
With Anjul Patney, Morgan McGuire, Omer Shapira, Aaron Lefohn and David Luebke

Research Intern 06/2016 - 08/2016
NVIDIA Research, New Experiences Group, *Santa Clara, CA*
With Fu-Chung Huang, Joohwan Kim and David Luebke

Research Intern 11/2012 - 02/2013
Microsoft Research Asia, Hardware Computing Group, *Beijing, China*

RESEARCH INTERESTS

My research bridges computer graphics, VR/AR, computational cognition towards joint-optimization of human and system performance in immersive media. Beyond academic publications, my research has also been demonstrated to hundreds of users, attracted major media (e.g., BBC) reports, won an IEEE VR Best Dissertation Award, and an ACM SIGGRAPH Best Paper Award, as well as transferred to commercial systems reaching 40,000+ customers.

FULL PUBLICATIONS

Major Journal/Conference Papers:

19 **Color-Perception-Guided Display Power Reduction For Virtual Reality**
Budmonde Duinkharjav, Kenneth Chen, Abhishek Tyagi, Jiayi He, Yuhao Zhu, **Qi Sun**
ACM Transactions on Graphics (SIGGRPAH Asia 2022)

18 **Force-Aware Interface Via Electromyography For Natural VR/AR Interaction**
Yunxiang Zhang, Benjamin Liang, Boyuan Chen, Paul Torrens, S. Farokh Atashzar, Dahua Lin, **Qi Sun**
ACM Transactions on Graphics (SIGGRPAH Asia 2022)

17 **FoV-NeRF: Foveated Neural Radiance Fields For Virtual Reality**
Nianchen Deng, Zhenyi He, Jiannan Ye, Budmonde Duinkharjav, Praneeth Chakravarthula, Xubo Yang, **Qi Sun**
IEEE Transactions on Visualization and Computer Graphics (Proceedings of ISMAR) 2022

16 **Image Features Influence Reaction Time: A Learned Probabilistic Perceptual Model For Saccade Latency**
Budmonde Duinkharjav, Praneeth Chakravarthula, Rachel Brown, Anjul Patney, **Qi Sun**
[Best Paper Award] ACM Transactions on Graphics (SIGGRPAH 2022)

15 **Joint Neural Phase Retrieval And Compression For Energy- And Computation-Efficient Holography On The Edge**
Yujie Wang, Praneeth Chakravarthula, **Qi Sun**, Baoquan Chen
[Honorable Mention Award] ACM Transactions on Graphics (SIGGRPAH 2022)

14 **Dually Noted: Layout-Aware Annotations With Smartphone Augmented Reality**
Jing Qian, **Qi Sun**, Curtis Wigington, Han Han, Tong Sun, Jennifer Healey, James Tompkin, Jeff Huang
ACM Conference on Human Factors in Computing Systems (CHI) 2022

13 **Larger Visual Changes Compress Time: The Inverted Effect of Asemantic Visual Features on Interval Time Perception**
Sandra Malpica, Belen Masia, Laura Herman, Gordon Wetzstein, David Eagleman, Diego Gutierrez, Zoya Bylinskii, **Qi Sun**
PLOS One 2022

12 **Instant Reality: Gaze-Contingent Perceptual Optimization For 3D Virtual Reality Streaming**
Shaoyu Chen, Budmonde Duinkharjav, Xin Sun, Li-Yi Wei, Stefano Petrangeli, Jose Echevarria, Claudio Silva, **Qi Sun**
IEEE Transactions on Visualization and Computer Graphics (Proceedings of IEEE VR) 2022

11 **Leveraging Human Visual Perception For An Optimized Virtual Reality Experience**
Qi Sun
IEEE Computer Graphics and Applications (Invited) 2021

10 **Gaze-Contingent Retinal Speckle Suppression For Holographic Displays**
Praneeth Chakravarthula, Zhan Zhang, Okan Tarhan Tursun, Piotr Didyk, **Q. Sun**, Henry Fuchs
IEEE Transactions on Visualization and Computer Graphics (Proceedings of ISMAR) 2021

9 **Tailored Reality: Perception-Aware Scene Restructuring For Adaptive VR Navigation**
Zhi-Chao Dong, Wenming Wu, Zenghao Xu, **Q. Sun**, Guanjie Yuan, Ligang Liu, Xiao-Ming Fu
ACM Transactions on Graphics 2021

8 **Deep Multi Depth Panoramas for View Synthesis**
K. Lin, Z. Xu, B., P. Srinivasan, Y. Hold-Geoffroy, S. DiVerdi, **Q. Sun**, K. Sunkavalli, R. Ramamoorthi
European Conference on Computer Vision (ECCV) 2020

7 **Eccentricity Effects on Blur and Depth Perception**
Qi Sun, Fu-Chung Huang, Li-Yi Wei, David Luebke, Arie Kaufman, Joohwan Kim
Optics Express Vol. 28 No. 5, 2020

6 **DiffTaichi: Differentiable Programming for Physical Simulation**
Yuanming Hu, Luke Anderson, Tzu-Mao Li, **Qi Sun**, Nathan Carr, Jonathan Ragan-Kelley, Frédo Durand
International Conference on Learning Representations (ICLR) 2020

5 **Learning to Reconstruct 3D Manhattan Wireframes from a Single Image**
Yichao Zhou, Haozhi Qi, Simon Zhai, **Qi Sun**, Zhili Chen, Li-Yi Wei, Yi Ma
ICCV 2019 (Oral Presentation, 4.3% acceptance rate)

4 **Reducing Simulator Sickness with Perceptual Camera Control**
Ping Hu, **Qi Sun**, Piotr Didyk, Li-Yi Wei, Arie Kaufman
ACM Transactions on Graphics (SIGGRAPH Asia 2019)

3 **Towards Virtual Reality Infinite Walking: Dynamic Saccadic Redirection**
Qi Sun, Anjul Patney, Li-Yi Wei, Omer Shapira, Jingwan Lu, Paul Asente, Suwen Zhu, Morgan McGuire, David Luebke, Arie Kaufman
ACM Transactions on Graphics (SIGGRAPH 2018) [BBC interview]

2 **Perceptually-Guided Foveation for Light Field Displays**
Qi Sun, Fu-Chung Huang, Joohwan Kim, Li-Yi Wei, David Luebke, Arie Kaufman
ACM Transactions on Graphics (SIGGRAPH Asia 2017)

1 **Mapping Virtual and Physical Reality**
Qi Sun, Li-Yi Wei, Arie Kaufman
ACM Transactions on Graphics (SIGGRAPH 2016)

Other Papers & Posters

8 **Modeling And Optimizing Human-In-The-Loop Visual Perception Using Immersive Displays: A Review**
Qi Sun, Budmonde Duinkharjav, Anjul Patney
SID Display Week 2022

7 **Has Half the Time Passed? Investigating Time Perception at Long Scales**
Sandra Malpica, Belen Masia, Laura Herman, Gordon Wetzstein, David Eagleman, Diego Gutierrez, Zoya Bylinskii, **Qi Sun**
Vision Science Society 2020

6 **A Transparent Display with Per-Pixel Color and Opacity Control**
TJ Rhodes, Gavin Miller, **Qi Sun**, Daichi Ito, Li-Yi Wei
SIGGRAPH 2019 Emerging Technologies

5 **Benefits of 3D Immersion for Virtual Colonoscopy**
Koosha Mirhosseini, **Qi Sun**, Krishna Gurijala, Bireswar Laha, Arie Kaufman
IEEE Visualization Workshop on 3DVis 2014

4 **Data-Driven Human Motion Synthesis Based on Angular Momentum Analysis**
Ping Hu, **Qi Sun**, Xiangxu Meng, and Jingliang Peng
IEEE International Symposium on Circuits and Systems, ISCAS 2013

3 **Modeling 3D Faces from Samplings via Compressive Sensing**
Qi Sun, Yanlong Tang, and Ping Hu
International Conference on Digital Image Processing, 2013

2 **Kinect-Based Automatic 3D High-Resolution Face Modeling**
Qi Sun, Yanlong Tang, Ping Hu, and Jingliang Peng
International Conference on Image Analysis and Signal Processing 2012

1 **Buyers Satisfaction in A Virtual Fitting Room Scenario Based on Realism of Avatar**
Qi Sun, Seyedkoosha Mirhosseini, Ievgeniia Gutenko, Ji Hwan Park, Charilaos Papadopoulos, Bireswar Laha, Arie Kaufman
IEEE Symposium on 3D User Interfaces, 3DUI 2015

Books:

1 **Real VR: Digital Immersive Reality**
Springer Lecture Notes in Computer Science 2020 (Dagstuhl Book Chapter)

AWARDS

SIGGRAPH 2022 Best Paper Award	2022
SIGGRAPH 2022 Best Paper Honorable Mention Award	2022
NVIDIA Applied Research Accelerator Award	2022
IEEE VR 2019 Best Dissertation Award	2020
Stony Brook Computer Science Special Chair Fellowship	2013 - 2014

GRADUATE ADVISEES

Budmonde Duinkharjav, current PhD student at NYU
Yunxiang Zhang, current PhD student at NYU
Benjamin Liang, current PhD student at NYU
Kenneth Chen, current MSc Student at NYU
Qin Ying Chen, current MSc Student at NYU
Luigia Than, current MSc Student at NYU
Xi Peng, current MSc Student at NYU

Erica Chou, MSc student at NYU
Shaoyu Chen, PhD student at NYU
Yuanming Hu, PhD student at MIT->CEO@Taichi
Sandra Malpica, PhD student at University of Zaragoza
Yichao Zhou, PhD student at UC Berkeley->Engineer@Apple

Dushyant Goyal, Master at SBU. Now machine learning research engineer at Element Inc.

SELECTED PRESS/MEDIA

Image Features Influence Reaction Time.
ACM SIGGRAPH, EurekAlert!, NVIDIA Developer Blog, etc.

Adobe Glasswing Transparent Display.
The Verge, CNET, Axios, Next Reality, Printed Electronics World, TechHQ etc.

Towards Virtual Reality Infinite Walking.
BBC News (personal interview), SIGGRAPH blog, IEEE, Adobe News, NVIDIA Blog, Two Minute Papers, Stony Brook News, Road to VR, Hackaday, VR Focus, VR World, Inverse, ScienceDaily, eurekAlert, newsAtlas, Sohu.com (Chinese), RedShark News, VR Soldier, Stylus, InAVate, 4gamer (Japanese) Virtual Reality Magazine (German), Microsiervos (Spanish) etc.

Mapping Virtual and Physical Reality.
SIGGRAPH Technical Papers Preview, Business Wire, Seamless Virtual Reality News (Japanese), leiphone.com/sina.cn etc. (Chinese), Tencent gameinstitute, Game II DOOSAN Gallery New York.

Perceptually-Guided Foveation for Light Field Displays.
Road to VR, Seamless Virtual Reality News (Japanese).

TEACHING

Instructor
Virtual and Augmented Reality, NYU — 2022 Fall

Instructor
Information Visualization, NYU — 2021 Fall, 2022 Spring

Guest Lecturer
CSE 564: Visualization, Stony Brook University — 2018 Spring
Frontiers of Computing Studies, Peking University — 2019 Summer GAMES-CN Webinar — 2017

Teaching Assistant
CSE 214: Computer Science II, Stony Brook University — 2013 Fall

Graduate Mentor
CSE 593: Independent Study in Computer Science, Stony Brook University — 2013 Fall, 2014 Spring

INVITED TALKS

Modeling and Optimizing Human Behaviors in XR
Stanford — 2022
Intel — 2022
Google — 2022
General Motors — 2022
NASA XR Technical Interchange meeting — 2022
SID Display Week — 2022
U.S. Food and Drug Administration (FDA) — 2022
Meta Reality Labs — 2022
Snap Inc — 2022

Human-Centered Immersive Graphics
University of Zaragoza, Spain — 2021
Rochester University, NY — 2021
University of Sydney, Australia — 2021
New York University, Brooklyn, NY — 2020
Boston University, Boston, MA — 2020
University of North Carolina, Chapel Hill, NC — 2020
University of Texas, Dallas, TX — 2020

University of Illinois, Chicago, IL 2020
Dartmouth College, Hanover, NH 2020

Human Learning: Understanding and Computing the Eyes and Brain in VR
Schloss Dagstuhl, Wadern, Germany 2019
Max-Planck-Institut für Informatik, Saarbrücken, Germany 2019
Microsoft Research Asia, Beijing, China 2019

Industrial Innovations in the Age of VR/AR
Wayfair Inc., Boston, MA 2019

Towards Virtual Reality Infinite Walking, Talk & Live Demo
Adobe Tech Summit, San Francisco, CA 2019
GPU Technology Conference (GTC), San Jose, CA 2018

Computational Methods for Immersive Perception
Harvard University, Cambridge, MA 2018
University of Florida, Gainesville, FL 2018
Adobe Research, San Jose, CA 2017

SERVICE

Co-Editor
MDPI Applied Sciences Special Issue on "New Frontiers in Virtual Reality (VR) Systems" 2021
Frontiers in Virtual Reality on "Virtual Reality for Telepresence" 2021

Chairing
IEEE ISMAR, Video and RegistrationChair 2022

Conference Program Committee
IEEE VR 2023
IEEE VGTC VR Best Dissertation Award 2022
ACM/SIGGRAPH conference on Motion, Interaction, and Games (MIG) 2022
Pacific Graphics 2022
ACM Symposium on Applied Perception (SAP) 2022
Eurographics Symposium on Rendering 2022
IEEE ISMAR 2021-2022
ACM SIGGRAPH Asia XR and VR Theater 2020-2021
Grace Hopper Celebration (GHC) 2020
ACM ETRA Short Papers 2020-2021
ACM CHI Late-Breaking Works 2020-2021
ACM SIGGRAPH Asia Technical Briefs and Posters 2019
ACM SIGGRAPH Symposium on Interactive 3D Graphics and Games (i3D) 2019-2022

PhD Thesis Committee
Zhenyi He, New York University 2021

Reviewer
ACM SIGGRAPH (Asia), Nature Scientific Reports, ACM CHI, IEEE Visualization, IEEE Transactions on Visualization and Computer Graphics, Computer Graphics Forum (CGF), ACM Transaction on

Graphics (TOG), ACM User Interface Software and Technology (UIST), ACM VRST, ACM i3D, IEEE 3D User Interfaces (3DUI), IEEE VR [both Conference and Journal tracks], IEEE ISMAR, ACM Symposium on Applied Perception (SAP), ACM ETRA, IEEE Access, Wiley Computer Animation and Virtual Worlds, IEEE Consumer Electronics Magazine, IEEE Transactions on Emerging Topics in Computing, Virtual Reality Software and Technology (VRST), Springer Virtual Reality, MDPI Applied Sciences, The Visual Computer, Computer & Graphics.

Other

Committee Member, NYU CSE PhD Program	2021
Co-Organizer, NYU CSE New PhD Student Welcome	2021
Mentor, NYU GLASS Program	2021
Mentor, NYU CUSP Capstone Project	2021
NYU Center for Urban Science and Progress postdoctoral search committee	2021-2022
National Science Foundation (NSF) panelist	2020
Adobe Research PhD fellowship committee	2018 - 2019
Adobe Research Women-in-Technology Scholarship committee	2019

SOFTWARE CREDITS

Adobe Dimension

GRANTED PATENTS

Classifying panoramic images
Qi Sun, Li-Yi Wei, Joon-Young Lee, Jonathan Eisenmann, Jinwoong Jung, Byungmoon Kim
US10991085B2, granted 2021-04-27

Dynamic mapping of virtual and physical interactions
Qi Sun, Paul John Asente, Li-Yi Wei, Jingwan Lu
US10957103B2, granted 2021-03-23

Controlling an augmented reality display with transparency control using multiple sets of video buffers
Tenell Glen Rhodes Jr, Gavin Stuart Peter Miller, Li-Yi Wei, **Qi Sun**
US10847117, granted 2020-11-24

Saccadic redirection for virtual reality locomotion
Qi Sun, Anjul Patney, Omer Shapira, Morgan McGuire, Aaron Lefohn, David Luebke
US10573061B2, granted 2020-02-25

Path planning for virtual reality locomotion
Qi Sun, Anjul Patney, Omer Shapira, Morgan McGuire, Aaron Lefohn, David Luebke
US10573071B2, granted 2020-02-25

Adjusting an Angular Sampling Rate during Rendering Utilizing Gaze Information
Qi Sun, Fu-Chung Huang, Joohwan Kim and David Luebke
US10395624B2, granted 2019-08-27

System and Method for Generating a Progressive Representation Associated with Surjectively Mapped Virtual and Physical Reality Image Data
Arie Kaufman, **Qi Sun** and Li-Yi Wei
US10403043B2, granted 2019-09-03