

Qi Sun

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🌐 <http://www.qisun.me>

📅 March 29, 2024

EDUCATION

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|---|---|
| Doctor of Philosophy Computer Science, Stony Brook University, <i>Stony Brook, NY</i> Advisor: Distinguished Professor Arie Kaufman Dissertation: Computational Methods for Immersive Perception 🏆 IEEE VR 2019 Best Dissertation Award | 08/2013 - 05/2018 |
| Bachelor of Science Mathematics, Taishan Honors College, Shandong University, China Computer Science, Shandong University, China | 08/2013 10/2010 - 08/2013 09/2009 - 10/2010 |

EMPLOYMENT

| | |
|--|-------------------|
| Assistant Professor Tandon School of Engineering, New York University | 01/2021 - |
| Research Scientist Adobe Research, San Jose, CA | 06/2018 - 01/2021 |
| Research Intern Adobe Research , Procedural Imaging Group, <i>San Jose, CA</i> | 07/2017 - 09/2017 |
| Research Intern NVIDIA Research , New Experiences Group, <i>Redmond, WA</i> | 04/2017 - 07/2017 |
| Research Intern NVIDIA Research , New Experiences Group, <i>Santa Clara, CA</i> | 06/2016 - 08/2016 |
| Research Intern Microsoft Research Asia , Hardware Computing Group, <i>Beijing, China</i> | 11/2012 - 02/2013 |

RESEARCH INTERESTS

My research bridges human-centered computer graphics and VR/AR with machine learning and computational cognition to create immersive performance and experiences that surpass the physical world. With broad support from NSF, DARPA, NASA, and industry, it has earned awards, including the IEEE VR Best Dissertation Award and various Best Paper Awards in venues such as ACM SIGGRAPH and IEEE ISMAR. Beyond academic publications, the research has been demonstrated to hundreds of users, featured in major media reports (e.g., BBC), and applied to commercial products, reaching over 40,000 customers.

AWARDS AND HONORS

| | |
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| IEEE VR 2024 Best Paper Honorable Mention Award | 2024 |
| IEEE VIS 2023 Best Paper Honorable Mention Award | 2023 |
| SIGGRAPH 2022 Best Paper Award | 2022 |
| SIGGRAPH 2022 Best Paper Honorable Mention Award | 2022 |
| ISMAR 2022 Best Journal Paper Award | 2022 |

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| NVIDIA Applied Research Accelerator Award | 2022 |
| IEEE VR Best Dissertation Award | 2020 |
| Stony Brook Computer Science Special Chair Fellowship | 2013 - 2014 |

STUDENT AWARDS

Budmonde Duinkharjav

1. Deborah Rosenthal, MD Award: NYU Outstanding Performance on PhD Qualification 2022
2. Snap Research Fellowship Honorable Mention 2022

FULL PUBLICATIONS

marked **my students and **myself** in bold

Refereed Journal

19. **Q Modeling The Impact Of Head-Body Rotations On Audio-Visual Spatial Perception For Virtual Reality Applications**
[Best Paper Honorable Mention Award] Edurne Bernal-Berdun, Mateo Vallejo, **Qi Sun**, Ana Serrano, Diego Gutierrez
IEEE Transactions on Visualization and Computer Graphics (IEEE VR) 2024
18. **The Shortest Route Is Not Always the Fastest: Probability-Modeled Stereoscopic Eye Movement Completion Time in VR**
Budmonde Duinkharjav, Benjamin Liang, Rachel Brown, Anjul Patney, **Qi Sun**
ACM Transactions on Graphics (SIGGRAPH Asia 2023)
17. **Q ARGUS: Visualization Of AI-Assisted Task Guidance In AR**
S.C. Quispe, J. Rulff, E. McGowan, B. Steers, G. Wu, S. Chen, I. Roman, R. Lopez, E. Brewer, C. Zhao, J. Qian, K. Cho, H. He, **Q. Sun**, H. Vo, J.P. Bello, M. Krone, C. Silva
[Best Paper Honorable Mention Award] IEEE Transactions on Visualization and Computer Graphics (VIS 2023)
16. **Reconstructing Room Scales with a Single Sound for Augmented Reality Displays**
Benjamin Liang, Andrew Liang, Iran Roman, Tomer Weiss, **Budmonde Duinkharjav**, JP Bello, **Qi Sun**
Journal of Information Display 24.1 (2023)
15. **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 (TOG) 41.6 (2022): 1-16. (SIGGRAPH Asia 2022)
14. **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 (TOG) 41.6 (2022): 1-18. (SIGGRAPH Asia 2022)
13. **Q FoV-NeRF: Foveated Neural Radiance Fields For Virtual Reality**
Nianchen Deng, Zhenyi He, Jiannan Ye, **Budmonde Duinkharjav**, Praneeth Chakravarthula, Xubo Yang, **Qi Sun**
[Best Journal Paper Award] IEEE Transactions on Visualization and Computer Graphics 28.11 (2022): 3854-3864 (Proceedings of ISMAR) 2022

12. **🏆 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 (TOG) 41.4 (2022): 1-15. (SIGGRPAH 2022)
 11. **🏆 Joint Neural Phase Retrieval And Compression For Energy- And Computation-Efficient Holography On The Edge**
Yujie Wang, Praneeth Chakravarthula, **Qi Sun**, Baoquan Chen
[Best Paper Honorable Mention Award] ACM Transactions on Graphics (TOG) 41.4 (2022): 1-16. (SIGGRPAH 2022)
 10. **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 17, no. 3 (2022)
 9. **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 28.5 (2022)
 8. **Leveraging Human Visual Perception For An Optimized Virtual Reality Experience**
Qi Sun
IEEE Computer Graphics and Applications 41.6 (2021): 164-170.
 7. **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 27.11 (2021): 4194-4203. (Proceedings of ISMAR)
 6. **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
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5. **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
 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)

Refereed Conference

15. **Exploiting Human Color Discrimination For Memory- And Energy-Efficient Image Encoding In Virtual Reality**

Nisarg Ujjainkar, Ethan Shahan, **Budmonde Duinkharjav**, **Kenneth Chen**, **Qi Sun**, Yuhao Zhu
ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS 2024)

14. **Imperceptible Color Modulation For Power Saving In VR/AR**

Kenneth Chen, **Budmonde Duinkharjav**, Nisarg Ujjainkar, Ethan Shahan, Abhishek Tyagi, Jiayi He, Yuhao Zhu, **Qi Sun** ACM SIGGRAPH 2023 Emerging Technologies (SIGGRAPH '23). Article 8, 1–2.

13. **Toward Optimized VR/AR Ergonomics: Modeling And Predicting User Neck Muscle Contraction**

Yunxiang Zhang, **Kenneth Chen**, **Qi Sun**

ACM SIGGRAPH 2023 Conference Proceedings (pp. 1-12)

12. **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
Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems, pp. 1-15. 2022

11. **Modeling And Optimizing Human-In-The-Loop Visual Perception Using Immersive Displays: A Review**

Qi Sun, **Budmonde Duinkharjav**, Anjul Patney

SID Symposium Digest of Technical Papers (Vol. 53, No. 1, pp. 190-193)

Pre-NYU

10. **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

9. **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

8. **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

7. **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

International Conference on Computer Vision (ICCV) 2019 (Oral Presentation)

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

Book Chapters

1 **Real VR: Digital Immersive Reality**

Springer Lecture Notes in Computer Science 2020 (Dagstuhl Book Chapter)

SOFTWARE CREDITS

Adobe Dimension

GRANTED PATENTS

Sharing of user markings between printed and digital documents

Tong Sun, **Qi Sun**, Jing Qian, CM Wigington

US11520974B2, granted 2022-12-06

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 Subjectively Mapped Virtual and Physical Reality Image Data

Arie Kaufman, **Qi Sun** and Li-Yi Wei
US10403043B2, granted 2019-09-03

KEYNOTE AND DISTINGUISHED TALKS

Toward Human-Centered XR: Bridging Cognition and Computation

CMU VACS 2024

Human-Centric Optical Designs and Architectures

Plenary Panel: SPIE Photonics West 2024

Co-Optimizing Human-System Performance in XR

36th Conference on Graphics, Patterns and Images (SIBGRAPI) 2023

University of Houston 2022

Digital Twins: New Frontiers Today

MIT Horizon Podcast 2022

OTHER INVITED TALKS

Co-Optimizing Human-System Performance in VR/AR

Ohio State University 2023

University of Maryland 2023

MIT 2022

Harvard University 2022

NVIDIA 2022

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

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| 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 |

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).

PUBLIC EDUCATION

2. Effective User Studies in Computer Graphics
Eurographics 2023
1. Visual Computing for Computer Architect
ASPLOS 2023

NYU COURSES

2. Fall 2021 & Spring 2022 & Spring 2023 CS-GY 6313 Information Visualization
1. Fall 2022 & Fall 2023 CS-GY 9223 Virtual and Augmented Reality

GRADUATE ADVISEES

Budmonde Duinkharjav, PhD student at NYU, 2021 Spring-
Yunxiang Zhang, PhD student at NYU, 2022 Fall-
Kenneth Chen, PhD student (previously MSc) at NYU, 2023 Fall-

Luigia Than, current MSc Student at NYU, 2022 Fall-
Benjamin Liang, MSc student at NYU, 2022 Fall-
Qinchun Li, graduated MSc Thesis Student at NYU, 2021 Fall-2023 Spring
Xi Peng, graduated MSc Thesis Student at NYU, 2021 Fall-2023 Spring
Qin Ying Chen, graduated MSc Thesis Student at NYU, 2021 Spring-2023 Spring
Erica Chou, graduated MSc Thesis Student at NYU, 2021 Spring-2023 Spring

Eduarne Bernal-Berdun, visiting PhD student from University of Zaragoza

PHD THESIS COMMITTEE

Dr. Zhenyi He, NYU Courant
Karl Rosenberg, NYU Courant
Ho-Hsiang Wu, NYU Steinhardt
Shaoyu Chen, NYU Tandon
Daniel Martin, University of Zaragoza
Luca Surace, Università della Svizzera italiana

SERVICE

Editor

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| Associate Editor, IEEE Transactions on Visualization and Computer Graphics (TVCG) | 2023- |
| Associate Editor, ACM Transactions on Applied Perception | 2023- |
| 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

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| ACM Symposium on Applied Perception, Conference Chair | 2023 |
| IEEE VR, Publicity Chair | 2023 |
| IEEE ISMAR, Video and Registration Chair | 2022 |

Conference Program Committee

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| SIGGRAPH | 2024 |
| SIGGRAPH Asia | 2023 |
| ACM Annual Symposium on Computer Animation (SCA) | 2023 |
| Computer Graphics International (CGI) | 2023 - 2024 |
| IEEE VR | 2023 |
| IEEE VGTC VR Best Dissertation Award | 2022-2023 |
| ACM/SIGGRAPH conference on Motion, Interaction, and Games (MIG) | 2022 |

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| Pacific Graphics | 2022-2023 |
| ACM Symposium on Applied Perception (SAP) | 2022 |
| Eurographics Symposium on Rendering | 2022 |
| IEEE ISMAR | 2021-2024 |
| ACM SIGGRAPH Asia XR and VR Theater | 2020-2021 |
| Grace Hopper Celebration (GHC) | 2020,2023 |
| ACM ETRA | 2020-2021, 2023 |
| 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, 2024 |
| National Science Foundation (NSF) panelist | 2020, 2021 |

Reviewer

ACM SIGGRAPH (Asia), Nature Scientific Reports, Optics Express, 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.

Internal

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| NYU Organizer, KAIST-NYU workshop on Metaverse | 2023 |
| Faculty Search Committee, NYU Shanghai, Urban x CS position | 2023 |
| Seminar Organizer, NYU CUSP Seminar Series | 2023-2024 |
| Committee Member, NYU CSE PhD Admission | 2023-2024 |
| Chair/Committee Member, NYU CUSP Fellowship program | 2022-2023 |
| Committee Member, NYU CUSP C-Faculty Committee | 2023 |
| Committee Member, NYU CSE Visiting Faculty | 2023-2024 |
| 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 | 2021-2022 |
| NYU Center for Urban Science and Progress Faculty Fellowship search committee | 2021-2022 |
| Adobe Research PhD fellowship committee | 2018 - 2019 |
| Adobe Research Women-in-Technology Scholarship committee | 2019 |