

# CURRICULUM VITAE

**Hong Hua, Ph.D.**

Professor of Optical Sciences, University of Arizona

(Updated on February 26<sup>th</sup>, 2024)

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## Contact Information

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## Fields of Major Research Interests

Dr. Hong Hua is the Founder and Principal Investigator (PI) of 3D Visualization and Imaging Systems Laboratory (3DVIS Lab) at the James C. Wyant College of Optical Sciences at the University of Arizona. 3DVIS Lab specializes in a wide variety of optical technologies enabling advanced 3D displays, virtual and augmented reality technologies, and novel imaging systems. 3DVIS lab also pursues research projects to gain better understanding of human visual perception and visual artifacts via 3D displays and to investigate design principles for effective human-computer interface in augmented reality systems. Examples of systems and technologies we have been researching on include, but not limited to, head-worn displays (aka head-mounted displays or HMDs), head-mounted light field displays, eye movement tracking methods, large-scale heterogeneous augmented environments for collaboration, endoscopy, and microscopy. 3DVIS Lab provides students training on a full range of multidisciplinary skills, from creation of novel system concepts and advanced optical system designs (such as freeform optical surfaces, diffractive optical element, aspherics), to system instrumentation, calibration and testing, programming, as well as user-in-the-loop subjective and objective assessment techniques.

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## Chronology of Education

Universities Attended	Department	Degrees	Dates Awarded
University of Central Florida	School of Optics/CREOL	Visiting student	02/1999-07/1999
Beijing Institute of Technology	Opto-electronic Engineering	Ph.D. with honors	1999
Beijing Institute of Technology	Opto-electronic Engineering	B.S.E. with honors	1994

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## Chronology of Employment

### Professor

- ❖ College of Optical Sciences, University of Arizona, 2015-

### Associate Professor

- ❖ College of Optical Sciences, University of Arizona, 2009-2015
- ❖ (Joint) Department of Electrical and Computer Engineering, University of Arizona
- ❖ (Joint) Department of Computer Sciences, University of Arizona

### Assistant Professor

- ❖ College of Optical Sciences, University of Arizona, 2004-2009
- ❖ (Joint) Department of Electrical and Computer Engineering, University of Arizona, 2004-2009
- ❖ (Joint) Department of Computer Sciences, University of Arizona, 2004-2009
- ❖ Department of Information and Computer Sciences, University of Hawaii at Mānoa, 01/2003-12/2003

### Beckman Research Fellow

- ❖ Beckman Institute for Advanced Science and Technology, University of Illinois at Urbana-Champaign, 12/1999-12/2002

## Postdoctoral Research Associate

- ❖ School of Optics/CREOL, University of Central Florida, 08/1999-12/1999
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## Honors and Awards

### Honors

- ❖ Inducted as a member of the IEEE VGTC VR Academy, 2023
- ❖ Inaugural Women of Impact (2022), University of Arizona
- ❖ Finalist for the Innovator of the Year (Academia Category), Governor's Celebration of Innovation (2020, 2021, 2022)
- ❖ Finalist for the Tucson Women of Influence 2020 in the category of Technology Champion sponsored by Tucson Local Media, 2020
- ❖ Designated as Fellow of National Academy of Inventors (NAI), 2019
- ❖ Plenary Speaker, Electronic Imaging by Society for Imaging Science and Technology, January 2019
- ❖ Designated as OSA Fellow, 2019
- ❖ Fumio Okano Best Paper Prize at the 2017 SPIE Conference on "Three-Dimensional Imaging, Visualization, and Display" for the paper "Optical methods for enabling focus cues in head-mounted displays for virtual and augmented reality," awarded in April 2018
- ❖ Distinguished Student Paper Award (Co-authored with student) at the 2017 SID International Symposium (Display Week) for the paper "An integral-imaging-based head-mounted light-field display using a tunable lens and aperture array," 2017
- ❖ Intel Faculty Research Award, 2016-2019
- ❖ Google Faculty Research Award, 2016
- ❖ Best Paper Award, SPIE Defense Security and Sensing, 2015
- ❖ Fumio Okano Best Paper Prize, SPIE Conference on Three-dimensional imaging, visualization, and display, 2014
- ❖ Designated as SPIE Fellow, 2013
- ❖ Designated as Optical Society of America (OSA) Senior Member, 2012
- ❖ Xu Teli Visiting Chair Professor at the Beijing Institute of Technology, 2012
- ❖ Honored as UA Researchers @ Leading Edge on Innovation Day at UA, 2010
- ❖ Distinguished Student Paper Award (Co-authored with student) at the 2011 SID International Symposium (Display Week) for the paper "A depth-fused multi-focal-plane display prototype enabling focus cues in stereoscopic displays," 2011
- ❖ Best Student Paper Award (co-authored with students) at the 7<sup>th</sup> IEEE and ACM International Symposium on Mixed and Augmented Reality (ISMAR'08) for the paper "An optical see-through head-mounted display with addressable focal planes", 2008
- ❖ Recipient of National Science Foundation (NSF) CAREER Award, 2007
- ❖ Best Paper Award (Honorable Mention), IEEE Virtual Reality 2003
- ❖ Excellent Ph.D. Dissertation, Beijing Institute of Technology, 1999
- ❖ First Prize of Excellent Scientific Papers, Beijing Institute of Technology, 1998
- ❖ Excellent B.S.E. Thesis, Beijing Institute of Technology, 1994

### Scholarships

- ❖ Beckman Fellowship, Beckman Institute for Advanced Science and Technology, University of Illinois at Urbana-Champaign, 12/1999-12/2002
- ❖ China Instrument and Control Society Scholarship (~50 awardees selected nation wide), 12/1997 and 12/1994
- ❖ Xu Teli Scholarship (~10 awardees selected at Beijing Institute of Technology), 01/1996
- ❖ Aerospace Long-March Scholarship (~5 awardees selected at Beijing Institute of Technology), 11/1993
- ❖ Ma Shixiu Optical Engineering Scholarship (1 awardee selected in the Department of Opto-electronic

Engineering, Beijing Institute of Technology), 12/1992

- ❖ The People's Scholarship of Beijing Institute of Technology (First prize, 7 times, 1990-1994)

### **Major Awards/Scholarship Received by Supervised Students**

- ❖ Elliot Kwan, Winner of the Robert S. Hilbert Memorial Optical Design Competition held by Synopsis's Optical Solution Group (Previously known as Optical Research Associates), 2021
- ❖ Miaomiao Xu, Winner of the 2020 Jack Jewell Endowed Research Award for Extreme Optics, 2020
- ❖ Miaomiao Xu, Winner of the Robert S. Hilbert Memorial Optical Design Competition held by Synopsis's Optical Solution Group (Previously known as Optical Research Associates), 2018
- ❖ Miaomiao Xu, 2<sup>nd</sup> Prize Winner at 2018 SPIE Student Optical Design Competition: VR,AR, MR (Photonics Europe)
- ❖ Austin Wilson, 3<sup>rd</sup> Prize Winner at 2018 SPIE Student Optical Design Competition: VR,AR, MR (Photonics Europe)
- ❖ Hekun Huang, SID 2017 Distinguished Student Paper Award
- ❖ Hekun Huang, Winner of the Robert S. Hilbert Memorial Optical Design Competition held by Synopsis's Optical Solution Group (Previously known as Optical Research Associates), 2017
- ❖ Yi Qin, Winner of the Robert S. Hilbert Memorial Optical Design Competition held by Synopsis's Optical Solution Group (Previously known as Optical Research Associates), 2015
- ❖ Xinda Hu, Winner of the Robert S. Hilbert Memorial Optical Design Competition held by Synopsis's Optical Solution Group (Previously known as Optical Research Associates), 2014
- ❖ Xinda Hu, SID 2011 Distinguished Student Paper Award
- ❖ Dewen Cheng, SPIE Price/Williams Optical Design and Engineering Scholarship, 2010
- ❖ Rui Zhang, SPIE Scholarships on Optical Science and Engineering, 2009
- ❖ Rui Zhang, Outstanding Graduate Student, College of Optical Sciences, University of Arizona, 2009
- ❖ Dewen Cheng, Optical Research Associates Student Optical Design Award, 2009
- ❖ Dewen Cheng, Michael Kidger Memorial Scholarship, 2009
- ❖ Sheng Liu, IEEE and ACM Best Student Paper Award, 2008
- ❖ Craig Pansing, Optical Research Associates Student Optical Design Award, 2005

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## **Teaching**

### **University of Arizona, College of Optical Sciences**

- ❖ Opti471B, Advanced Optics Lab, Spring 2005-date (Undergraduate)
- ❖ Opti588 and Opti588DL, Introduction to Display Sciences and Technology, Fall 2006-date (Graduate)

### **2017 Optical Design & Testing Short Course Program, co-organized by College of Optical Sciences and Utsunomiya University Center for Optical Research and Education,**

- ❖ Full-day short course on "Introduction to AR/VR Optical System," Tokyo, Japan, August 1-3rd, 2017

### **University of Hawaii at Mānoa, Department of Information and Computer Sciences**

- ❖ ICS 681: Selected Topics in Computer Graphics, Spring 2003 (Graduate)
- ❖ ICS 481: Introduction to Computer Graphics, Fall 2003 (Undergraduate)

### **2009 IEEE and ACM International Symposium on Mixed and Augmented Reality**

- ❖ Half-day tutorial on "3D display technology: fundamentals and state-of-art technologies", co-taught with Jannick Rolland, Oct. 21<sup>st</sup>, 2009, Orlando, USA

### **2000 5<sup>th</sup> International Conference on Human Interaction with Complex Systems**

- ❖ Workshop on Technology of head-mounted displays for 3D visualization and wearable computers (half day), April 30-May 2, 2000, Urbana, Illinois, USA

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## **Advising and Mentoring**

### **Ph.D. Dissertations in Progress**

- ❖ Cheng-Ting Huang (08/2021-present), Ph.D. student of Optical Sciences
- ❖ Feiyi Shen (08/2021-present), Ph.D. student of Optical Sciences
- ❖ Alisha Hitehead (08/2021-present), Ph.D. student of Optical Sciences
- ❖ Yanzhou (Alex) Lu, (08/2022-present), Ph.D. student of Optical Sciences

### **Ph.D. Dissertations Directed**

- ❖ PengYinjie Lv (08/2018-07/2023), graduated with Ph.D. in Optical Sciences, "Perceptual driven approach to the design of statically foveated head-mounted displays," University of Arizona.
- ❖ Elliot Kwan (08/2014-08/2022), graduated with Ph.D. in Optical Sciences, "Advancements in light field-based laparoscopes," University of Arizona.
- ❖ Jeremy Katz (08/2015-05/2022), graduated with Ph.D. in Optical Sciences, "A high-throughput multi-resolution foveated laparoscope," University of Arizona.
- ❖ Austin Wilson (08/2016-12/2021), graduated with Ph.D. in Optical Sciences, "Development of occlusion-capable optical see-through head-mounted displays for augmented reality," University of Arizona.
- ❖ Xuan Wang (01/2016-08/2021), graduated with Ph.D. in Optical Sciences, "Methods of enhancing performance in integral imaging based light field head mounted displays," University of Arizona (Currently with Meta Inc./Facebook Inc.)
- ❖ Miaomiao Xu (08/2014-05/2020), graduated with Ph.D. in Optical Sciences, "Methods of enhancing optical performance in AR & VR: dynamic range and image quality," University of Arizona (Currently with Meta Inc./Facebook Inc.)
- ❖ Mohan Xu (02/2015-06/2020), graduated with Ph.D. in Optical Sciences, "Computational multi-layer light field displays—systematic analysis and evaluation method," University of Arizona (Currently with Apple Inc.)
- ❖ Hekun Huang (08/2013-08/2019), graduated with Ph.D. in Optical Sciences, "Development and optimization of head-mounted light-field displays," University of Arizona (Currently with Meta Inc./Facebook Inc.)
- ❖ Sheng-Huei Derek Lu (05/2011-2016), Ph.D. student of Optical Sciences (Currently with Apple Inc.)
- ❖ Yi Qin (08/2010-2015), graduated with Ph.D. in Optical Sciences, "A multi-resolution foveated laparoscope," University of Arizona (Currently with Google Inc.)
- ❖ Leonard D Brown (08/2004-2015), graduated with Ph.D. in Computer Sciences, "Design, evaluation, and extension of serious games for training in mine safety," University of Arizona (Currently with University of Arizona)
- ❖ Xinda Hu (08/2009-12/2014), graduated with Ph.D. in Optical Sciences, "Development of the depth-fused multi-focal-plane display technology," University of Arizona (Currently with Google Inc.)
- ❖ Sheng Liu (08/2005-08/2010), graduated with Ph.D. in Optical Sciences, "Methods for generating addressable focus cues in stereoscopic displays," University of Arizona (Currently with Goertek Inc.)
- ❖ Rui Zhang (01/2006-05/2010), graduated with Ph.D. in Optical Sciences, "Development and Assessment of Polarized Head Mounted Projection Displays," University of Arizona (Currently with Amazon Inc.)
- ❖ Dewen Cheng (08/2007-10/2010), Visiting Ph.D. Student of Optical Sciences, co-supervised with Prof. Yongtian Wang from Beijing Institute of Technology in China (Currently with Beijing Institute of Technology)

### **MS Theses/Reports (In progress and completed)**

- ❖ Sihan Wu (05/2020-present), MS student of Optical Sciences
- ❖ Yanzhou (Alex) Lu, (09/2020-05/2022), MS student of Optical Sciences
- ❖ Zheng Zhang (01/2020-07/2023), graduated with MS degree in Optical Sciences

- ❖ Sheng-lin Ye (2017-present), MS student of Optical Sciences (currently employed at Apple Inc.)
- ❖ Zhiheng Jia (2018-12/2023), graduated MS student of Optical Sciences (currently employed at Magic Leap Inc.)
- ❖ Ruxuan Zhang (08/2018-12/2019), MS report, "Design of a large field of view automotive head-up display based on three-mirror anastigmatic system," University of Arizona, graduated with MS degree in December 2019
- ❖ PengYinjie Lv (08/2016-05/2018), MS student of Optical Sciences
- ❖ Austin Wilson (02/2014-08/2016), MS student of Optical Sciences
- ❖ Jason Kuhn (05/2010-2016), MS thesis, "Measurement and Analysis of Wavefront Deviations and Distortions by Freeform Optical See-through Head-Mounted Displays," Optical Sciences, University of Arizona, graduated with MS degree in May 2016
- ❖ Nickolaos Savidis (08/2007-05/2009), M.S. report, "Application and Effects of Tracking in 3D Visualization," Optical Sciences, University of Arizona, graduated with MS degree in May 2009
- ❖ Glenn Scott Gibb (08/2007-12/2007), M.S. report, "Characteristics, applications, and physics of volumetric three-dimensional displays," Optical Sciences, University of Arizona, graduated with MS degree in December 2007
- ❖ Craig Pansing (02/2004-06/2006), M.S. Thesis, "Optimization of illumination schemes for an eye-tracked head mounted display," Optical Sciences, University of Arizona, graduated with MS degree in June 2006
- ❖ Prasanna Krishnaswamy (02/2004-12/2004), M.S. Thesis, "Design and assessment of improved feature-based eye tracking methods for head mounted displays," Electrical and Computer Engineering, University of Arizona, graduated with MS degree in December 2004
- ❖ Chunlian Hao (04/2003-12/2003), M.S. Report, "Magnetic tracker calibration for augmented reality," Information and Computer Sciences, University of Hawaii at Mānoa, graduated with MS degree in December 2003

### **Undergraduate Research Advising**

- ❖ Technical advisor for Senior Capstone Project (ENGR 498) (09/2004-05/2005): supervised the 3DCAM team with 5 senior students (Brian Miller, Diana Walter, David Clark, Curtis Rosenow, and Colan Kennelly)
- ❖ Technical advisor for Senior Capstone Project (ENGR 498) (09/2005-05/2006): supervised the Scatterometer team with 4 senior students (Seth Ginter, James McGovern, Carl Nissly, and Jared Roberts)
- ❖ Supervisor of Undergraduate Directed Research (01/2006-05/2006): Justan Forsyth, senior undergraduate student in the College of Optical Sciences, worked on the project, "Calibration of a panoramic imaging system."
- ❖ Supervisor of Undergraduate Research Assistant (02/2004-10/2004): Minglie Hu, senior undergraduate student in the College of Optical Sciences, worked on the project, "Design and development of a panoramic imaging system."

### **Other Graduate Advising (other than dissertation or thesis)**

- ❖ Joshua Magnus (08/2020-12/2020), Ph.D. student of Optical Sciences
- ❖ Aoxue Han (08/2016-05/2017), Ph.D. student of Optical Sciences
- ❖ Chih-Hung Ting (03/2015-11/2015), Visiting Ph.D. student from National Chiao-Tung University, Taiwan
- ❖ Zheng Chang (10/2014-10/2015), Visiting Ph.D. student from University of Science and Technology Beijing
- ❖ Chao Li (10/2013-04/2014), Visiting Ph.D. student from Nanjing University of Science and Technology
- ❖ Prasad Gabbur (09/2005-08/2008), Ph.D. student of Electrical and Computer Engineering, UA

- ❖ Erick Ruiz (02/2004-05/2006): MS student in the UA College of Optical Sciences, worked on a project “Design and development of a panoramic camera system.”
- ❖ Rui Zhang (01/2005-12/2005): graduate student in the Department of Physics, worked on a project titled “Design of a head-mounted display with mutual occlusion capability.” He was admitted to the Optical Science program as a PhD student in Spring 2006.
- ❖ John Tamkin (01/2004-05/2005): Ph.D. student in the College of Optical Sciences, worked on his dissertation project titled “Multi-resolution fovea-contingent displays.” He passed his dissertation proposal exam on December 17<sup>th</sup>, 2004. He is currently working with the Optical Research Associates.
- ❖ Yuan Wang (09/2004-06/2005), graduate student in the Department of Electrical and Computer Engineering, worked on a project titled “Development of eyetracking algorithms for an eyetracked head-mounted display.”

## **Mentoring**

- ❖ Dr. Sangyoon Lee (07/2011-), Research Assistant Professor
- ❖ Dr. Rengmao Wu (11/2014-11/2015), Post-doctoral Associate
- ❖ Dr. Yuxiang Lin (09/2012-05/2013), Post-doctoral Associate
- ❖ Dr. Sangyoon Lee (05/2008-07/2011), Post-doctoral Associate
- ❖ Dr. Zhenrong Zheng (06/2009-12/2009), Visiting Scholar
- ❖ Dr. Xiaorui Wang (07/2007-06/2008), Visiting Scholar
- ❖ Dr. Ji-Young Oh (06/2005-11/2007), Post-doctoral Associate

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## **Service / Outreach**

### **Local/State Outreach**

- ❖ Hosting REU and RET summer researchers (2012,2013, 2014)
- ❖ 2011 SPIE Visiting Lecturer at the 1st Regional Meeting on Optics (CREO-CICESE) 2011
- ❖ Optical Sciences Community Speaker, University of Arizona, 03/2004 and 04/2007
- ❖ Lecturer/Demonstrator, Arizona Youth University: Optical Sciences Camp, Tucson, Arizona, 06/2006
- ❖ Participant, the Open House held by College of Optical Sciences (in coordination with the 2005 Optical Society of America Annual Meeting), 10/2005
- ❖ Demonstrator, “UA Daughters on Campus” event, 04/2004
- ❖ Lecturer, ICS Student Club, University of Hawaii at Mānoa, 11/2003

### **National/International Outreach and Services**

#### *General and Editorial Services*

- ❖ Chair-Elect and Chair of the Information Acquisition, Processing, and Display Division (IAPD) on the Board of Meetings, OPTICA (2024-)
- ❖ Member, IEEE VGTC VR Academy Selection Committee, 2024-
- ❖ Guest Editor, Optics Express special issue on 3D imaging and display, 2020, 2021, 2022, 2023
- ❖ Guest Editor, Special issue on Integrated Optoelectronics for VR/AR/MR for IEEE Journal of Selected Topics in Quantum Electronics, 2023-2024
- ❖ OPTICA Fellow Members Committee (two-year term),2021,2022
- ❖ Panelist, IEEE Virtual Reality 2019, Japan
- ❖ Associate Editor, Science Advances, 07/2018-01/2021
- ❖ Proposal Review Panelist, National Science Foundation (NSF), 2003-2017 (regularly)
- ❖ Proposal Reviewer, European Research Council, 2016
- ❖ Guest Editor, IEEE/OSA Journal of Display Technology, 2014-2015
- ❖ OSA Joseph Fraunhofer Award/Burley Prize Committee, Optical Society of America, 2011-2013
- ❖ Ad-hoc Proposal Reviewer, National Science Foundation, 2010, 2011,2014, 2015
- ❖ Permanent Consulting Editor, McGraw-Hill Encyclopedia of Science and Technology, 2005-2009
- ❖ Site-visit Review Committee Member, Science of Learning Center, NSF, 11/2005

- ❖ Site-visit Review Committee Member, Science and Technology Center, NSF, 10/2004
- ❖ Ad-hoc Proposal Reviewer, Indiana 21<sup>st</sup> Century Science and Technology Fund, 2004

#### ***Conference/Symposium/Workshop/ Chair and Host Services***

- ❖ Technical Conference Chair, 2024 SPIE AR | VR | MR Symposium, 2023-
- ❖ General Chair, Optica Topical Meeting: 3D Image Acquisition and Display: Technology, Perception and Applications, 2016, 2017, 2018, 2020, 2021, 2022, 2023
- ❖ Co-Chair, Special Session for AR/VR, IMID 2017, Korean Information Display Society, Busan, Korea
- ❖ Co-Chair, Optical Design and Testing V, SPIE Photonic Asia, 2012
- ❖ Co-Chair, Optical Society of America (OSA) 2012 3D Display Technology, Perception, and Application Incubator Meeting, 2012
- ❖ Chair, Symposium on The Future of 3-D Display: the Market Place and the Technology, Frontiers in Optics 2009/Laser Science XXV, Optical Society of America (OSA) 2009 Annual Meeting, San Jose, California, USA, Oct 11-15, 2009
- ❖ Co-Chair, 2008 Workshop on Illumination Modeling: Simulation and Perception of Lit and Unlit Objects (IM), Optical Society of America, Rochester, NY, October 2008
- ❖ Area Chair/Program Committee, the IEEE and ACM International Symposium on Mixed and Augmented Reality (ISMAR), 2007, 2009, 2010, 2011, 2012, 2013, 2014, 2015
- ❖ Registration Chair, ACM International Symposium on User Interface Software and Technology (UIST), 2004 and 2005

#### ***Program Committees***

- ❖ Program Committee, SPIE DSS: Three-Dimensional Imaging, Visualization, and Display, 2014-2019
- ❖ Program Committee, SPIE Conference on Digital Optics for Immersive Displays (Co-held with SPIE Photonics Europe), 2018
- ❖ Program Committee, SPIE Conference on Digital Optical Technologies (Co-held with Laser-World of Photonics Congress) 2017-2019
- ❖ Program Committee, OSA Frontiers in Optics Subcommittee: Information Acquisition, Processing and Display 2017
- ❖ Program Committee, IEEE Virtual Reality (IEEE VR) Conference, 2011, 2012, 2013, 2014
- ❖ Program Committee, SPIE Optical Design and Testing (Photonics Asia), 2007, 2010, 2012, 2014
- ❖ Program Committee, International Conference on Optical Instrument and Technology (Co-sponsored by SPIE), Shanghai, 2009, 2011
- ❖ Program Committee, International Conference on Computer Vision and Pattern Recognition (CVPR), 2009-2011
- ❖ Program Committee, International Conference on Computer Vision (ICCV), 2009
- ❖ Program Committee, ACM Virtual Reality Software and Technology (VRST) 2009, 2010

#### ***Journal/Conference Referee***

- ❖ OSA Journals: Optics Express, Optics Letter, Applied Optics, and JOSA
- ❖ SPIE Journals: Optical Engineering, Journal of Electronic Imaging
- ❖ IEEE Journals: IEEE Transactions on Systems, Man, and Cybernetics, IEEE Computer Graphics and Applications, IEEE Transactions on Visualization and Computer Graphics, IEEE Proceedings
- ❖ Other Journals: Journal of Optics, Optics Communication, Image and Vision Computing, Journal of Virtual Reality
- ❖ Major Conferences: a variety of IEEE and ACM conferences such as IEEE VR, IEEE/ ACM ISMAR, ACM VRST, IEEE Visualization, ACM UIST 2005, ACM Computer-Human Interaction (CHI), SIGGRAPH, International Conference on Computer Vision, International Conference on Computer Vision and Pattern Recognition etc.

#### ***Departmental/College Committees and Services***

- ❖ Chair, Optical Engineering Faculty Search Committee, 09/2023-
- ❖ Member, Dean's Executive Committee, College of Optical Sciences, 2023-

- ❖ Member, Faculty P&T Committee, 2023-24
- ❖ Member, Faculty P&T Committee, 2022-23
- ❖ Chair, Graduate Admission Committee, 08/2021-2022
- ❖ Member, Graduate Admission Committee, 08/2020-2021
- ❖ Chair, Faculty P&T Committee, 2020, 2021
- ❖ Chair, Goodman Endowed Chair Faculty Search Committee, 09/2019-07/2020
- ❖ Optics and Photonics Winter School and Workshop Committee, 06/2018-2020
- ❖ Optical Sciences Colloquium Committee, 2008-2009, 2010-2012, 07/2017-06/2020
- ❖ Member, College P&T Committee, College of Optical Sciences, 2017-2020 (3-yr term)
- ❖ Member, Dean's Executive Committee, College of Optical Sciences, 01/17-12/18 (2-yr term)
- ❖ Member, Opto-mechanics Faculty Search Committee, College of Optical Sciences, 2018
- ❖ Chair, Graduate Curriculum Committee, College of Optical Sciences, 06/2017-06/18
- ❖ Chair, Graduate Prelim Exam Committee, College of Optical Sciences, 2015-2016
- ❖ Graduate Curriculum Committee, College of Optical Sciences, 2014, 2015-2017 (2-yr term)
- ❖ Graduate Admission Committee, College of Optical Sciences, 2011-2012, 2013-2014
- ❖ Undergraduate Curriculum Committee, College of Optical Sciences, 2004-2012, 2014-2015
- ❖ Optical Engineering Faculty Search Committee, 2009, 2010, 2016-7, 2017-18
- ❖ Writing questions for Graduate Comprehensive Exam (2009-present)
- ❖ Jack D. Gaskill Scholarship Committee, 2006
- ❖ Graduate Comprehensive Exam – Oral Examination Committees (31 exams in the last 5 years)
- ❖ Service on Thesis/Dissertation Committees (other than as advisor) (17 committees since 2009)

### University Committees and Services

- ❖ Executive committee member, The University of Arizona Faculty of Chinese Heritage Association, 2021-
- ❖ Committee member, University Research Misconduct Investigation Committee, 07/2019-05/2020
- ❖ Committee member, University Fellow Award Committee, 2019
- ❖ Committee member, Senior Vice President for Research and Innovation Search Committee, 01/2019-05/2019
- ❖ Committee member, University Committee on Ethics and Commitment (2008-2011), elected in June 2008 for a three-year service
- ❖ Vice Chair, University Committee on Ethics and Commitment (2010-2011)

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### Publications (Published or Accepted)

- ❖ *An asterisk (\*) indicates publications substantially based on work done as a graduate student*
- ❖ *PDF files of most of the following publications can be obtained at:*  
<http://wp.optics.arizona.edu/3dvis/publications/publications.html>

### Chapters in Scholarly Books and Monographs

1. Hong Hua and Nikhil Balhram, "Light field displays," in Handbook of Visual Display technology, August 2023.
2. J. Lee, I. Cheng, Hong Hua, S.T. Wu, "Introduction to flat panel displays, 2<sup>nd</sup> Edition," Wiley, 2020.
3. **Hong Hua**, Leonard Brown, and Rui Zhang, "Head-mounted Projection Display Technology and Application," in Handbook of Augmented Reality, Springer Science+Business Media, 2011.
4. J. P. Rolland and **Hong Hua**, "Head-mounted display systems," in *Encyclopedia of Optical Engineering* (Editors: R. Barry Johnson and Ronald G. Driggers), New York, NY: Marcel Dekker, pp.1-13, 2005.
5. J. P. Rolland, F. Biocca, C. Gao, **Hong Hua**, and O. Harrysson. "Design and prototyping of a teleportal ultra-light weight large field of view head mounted display," in *Virtual Reality and Augmented Reality Applications in Manufacturing* (Editors: Ong, S. K., and Nee, A. Y. C.), Publisher: Springer, pp.179-200, July 2004.



## Referred Journal Articles

6. Yanzhao Lu, Xuan Wang, and Hong Hua, "Design and characterization of a varifocal camera system with an extended depth of field and focal range," *Optics Express*, 31(21): 34871-882, 2023.
7. Pengyinjie Lyu and Hong Hua, "Design of a statically foveated display based on perceptual-driven approach," *Optics Express*, 31(2): 2088-2101, 2023.
8. M. Xu and Hong Hua, "Performance evaluation of dual-layer architecture for high dynamic range head mounted displays," *Journal of Information Display*, 1-16, 2023.
9. Hong Hua, "Recent developments in head-mounted light field displays," *Acta Optica Sinica*, 15: 80-89, 2023.
10. B. Javidi, H. Hua, et al., "Focus issue introduction: 3D Image Acquisition and Display": Technology, Perception and Application, *Optics Express*, 31(7): 11557-560, 2023.
11. J. Katz, Hong Hua, S. Lee, M. Nguyen, and A. Hamilton, "A dual-view multi-resolution laparoscope for safer and more efficient minimally invasive surgery," *Scientific Reports*, 12(1): 18444, 2022.
12. X. Wang and H. Hua, "Time-multiplexed method for view density enhancement in integral imaging-based light field displays," *Optics Letters*, 47(17): 4471-74, 2022.
13. E. Kwan and H. Hua, "Calibration of transverse ray and pupil aberrations for light field cameras," *Applied Optics*, 61(24): 6974-84, 2022 (Editor's choice).
14. J. Katz and H. Hua, "High-throughput multi-resolution foveated laparoscope for minimally invasive surgery," *Biomedical Optics Express*, 13(6): 3366-79, 2022.
15. R. Beams, E. Brown, Ryan Beams, Ellenor Brown, Wei-Chung Cheng, Janell S Joyner, Andrea S Kim, Kimberly Kontson, Dimitri Amiras, Tassilo Baeuerle, Walter Greenleaf, Rafael J Grossmann, Atul Gupta, Christoffer Hamilton, Hong Hua, Tran Tu Huynh, Christoph Leuze, Sarah B Murthi, John Penczek, Jennifer Silva, Brennan Spiegel, Amitabh Varshney, Aldo Badano, "Evaluation challenges for the application of extended reality devices in medicine," *Journal of Digital Imaging*, 1-10, 2022.
16. M. Nguyen, J. Nabhani, A. Hamilton, S. Lee, J. Katz, K. Samakar, A. Ghlandian, and H. Hua, "Surgeon assessment of a novel multi-resolution foveated laparoscope," *Surgical Innovation*, 29(6): 769-780, March 2022 (<https://doi.org/10.1177%2F15533506221081100>).
17. E. Kwan and H. Hua, "Prism-based tri-aperture laparoscopic objective for multi-view acquisition," *Optics Express*, 30(2):2836-2851, January 2022.
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  92. Leonard Brown and **Hong Hua**, "Magic Lenses for augmented virtual environments," *IEEE Computer Graphics and Applications*, 26(4): 64-73, July/August 2006.
  93. **Hong Hua**, Prasana Krishnaswamy, and J. P. Rolland, "Video-based eyetracking methods and algorithms in head-mounted displays," *Optics Express*, 14(10): 4328-50, May 2006.
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**Refereed Proceeding Articles (3~5 peer reviewers)** (Only rigorously peer-reviewed conference articles listed in this category)

107. Sangyoon Lee, and Hong Hua, "Effects of configuration of optical combiner on near-field depth perception in optical see-through head-mounted displays," *Proceedings of 2016 IEEE Virtual Reality*, March 2016.
108. Sangyoon Lee and **Hong Hua**, "A robust camera-based method for optical distortion calibration of head-mounted displays," in *Proceedings of 2013 IEEE Virtual Reality*, pp. 27-30, March 2013.
109. Rui Zhang and **Hong Hua**, "Effects of a Retroreflective Screen on Depth Perception in a Head-mounted Projection Display," *Proceedings of 2010 IEEE and ACM International Symposium on Mixed and Augmented Reality (ISMAR'2010)*, pp. 137-145, October 2010 (<20% acceptance rate for full papers).
110. Leonard D. Brown and **Hong Hua**, "An evaluation of physical affordances in augmented virtual environments: Dataset grounding and magic lens," *Proceedings of IEEE Virtual Reality 2010*, pp. 23-26, March 2010.
111. Sangyoon Lee and **Hong Hua**, "Effects of viewing conditions and rotation methods in a collaborative tabletop AR environment," *Proceedings of IEEE Virtual Reality 2010*, pp.163-170, March 2010 (<20% acceptance rate for full papers).
112. (**Best Student Paper Award**) Sheng Liu, Dewen Cheng, and **Hong Hua**, "An optical see-through head-mounted display with addressable focal planes," *Proceedings of 2008 IEEE and ACM International Symposium on Mixed and Augmented Reality (ISMAR'2008)*, pp. 33-42, September 2008 (<15% acceptance rate for full papers).
113. Sheng Liu and **Hong Hua**, "Spatialchromatic foveation for gaze contingent displays," *Proceedings of the 2008 ACM symposium on Eye Tracking Research and Applications (ETRA'08)*, pp. 139-142, March 2008.
114. C. Gao, N. Ahuja, and **Hong Hua**, "Active aperture control and sensor modulation for flexible imaging," *Proceedings of International Conference on Computer Vision and Pattern Recognition (CVPR'2007)*, pp.1-8, June 2007 (<28.2% acceptance rate).

115. Ji-Young Oh and **Hong Hua**, "User evaluations on form factors of tangible magic lenses," *Proceedings of 2006 IEEE and ACM International Symposium on Mixed and Augmented Reality (ISMAR'2006)*, pp.23-32, October 2006 (<26% acceptance rate for full papers).
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117. Leonard Brown, **Hong Hua**, and C. Gao, "A widget framework for augmented interaction in SCAPE," *Proceedings of 2003 ACM User Interface of Software and Technology (UIST 2003)*, also in *Computer Human Interaction (CHI) Letters*, 5(2), 1-10, October 2003 (<20% acceptance rate).
118. (**Best Paper Award, Honorable Mention**) **Hong Hua**, Leonard Brown, and C. Gao, "A new collaborative infrastructure: SCAPE," *Proceedings of IEEE Virtual Reality 2003 (VR'2003)*, pp. 171-179, March 2003 (<28% acceptance rate).
119. C. Gao, **Hong Hua**, and N. Ahuja, "Easy calibration of a head-mounted projective display for augmented reality systems," *Proceedings of IEEE Virtual Reality 2003 (VR'2003)*, pp. 53-60, March 2003 (<28% acceptance rate).
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121. K. Tan, **Hong Hua**, N. Ahuja, "Multi-view mirror pyramid panoramic camera," *Proceedings of 2002 IEEE Workshop on Omnidirectional Vision*, pp. 87-93, June 2002.
122. **Hong Hua**, C. Gao, Leonard Brown, N. Ahuja, and J. P. Rolland, "A testbed for precise registration, natural occlusion and interaction in an augmented environment using a head-mounted projective display (HMPD)," *Proceedings of IEEE Virtual Reality 2002 (VR'2002)*, pp. 81-89, March 2002 (<27% acceptance rate).
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## Review Articles

127. **Hong Hua**, "Advances in head-mounted light-field displays for virtual and augmented reality," *Information Displays*, 32(4):14-20, July/August 2016.
128. **Hong Hua** and B. Javidi, "Making Augmented Reality Easy on the Eyes," *Optics and Photonics News*, February 2015 (cover story).
129. **Hong Hua**, "Freeform Optical surfaces," McGraw-Hill 2013 Yearbook of Science & Technology, 2013.
130. **Hong Hua**, Yi Qin, and Mike Nguyen, "Multi-resolution foveated laparoscope for safer minimally invasive surgery," SPIE News Room, April 2013.
131. **Hong Hua**, "Sunglass-like displays become a reality with free-form optical technology," SPIE News Room, August 2012 ( DOI: 10.1117/2.1201208.004375).
132. **Hong Hua** and Sheng Liu, "Correct focus cues in stereoscopic displays improve 3D depth perception," SPIE News Room, July 2010 (10.1117/2.1201007.003109).
133. **Hong Hua**, "Merging the worlds of atoms and bits: augmented virtual environments," *Optics and Photonics News*, 17(10): 26-33, October 2006 (cover story).
134. **Hong Hua**, "Stereoscopic displays," McGraw-Hill 2005 Yearbook of Science & Technology, 339-342, 2005.

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## Conferences/Scholarly Presentations

### Colloquia

135. *(Invited)* Hong Hua, "Development of multi-resolution foveated laparoscopes for safer minimally invasive surgery," Biomedical Engineering Seminar, University of Arizona, February 5<sup>th</sup>, 2024.
136. *(Invited)* Hong Hua, "Overview of Recent Research on Mixed Reality Displays," Corporate Research Seminar, Meta Inc., July 18<sup>th</sup>, 2023 (also October 12<sup>th</sup>, 2023).
137. *(Invited)* Hong Hua, "The quest for a harmonious blend of bits and atoms," Cognitive Science Colloquium, University of Arizona, November 4<sup>th</sup>, 2022.
138. *(Invited)* Hong Hua, "The quest for visual comfort in virtual and augmented reality displays," School of Information Colloquium, University of Arizona, October 25<sup>th</sup>, 2019.
139. *(Invited)* **Hong Hua**, "Optical challenges for next-generation VR/AR displays," Technology Expo, OPPO Inc., Shenzhen, China, November 26-29<sup>th</sup>, 2018.
140. *(Invited)* **Hong Hua**, "Head-mounted light field displays for virtual and augmented reality: challenges and opportunities," Colloquium at Food and Drug Administration, September 18<sup>th</sup> 2018.
141. *(Invited)* **Hong Hua**, "Head-mounted light field displays for virtual and augmented reality: challenges and opportunities," College of Sciences Distinguished Lecture Series, Rochester Institute of Technology, February 7<sup>th</sup> 2018.
142. *(Invited)* **Hong Hua**, "Rendering focus cues in head-mounted displays for virtual and augmented reality displays," College of Optical Sciences Colloquium, University of Arizona, November 16<sup>th</sup> 2017.
143. *(Invited)* **Hong Hua**, "Advances in augmented reality displays," College of Optical Sciences Colloquium, University of Arizona, April 24<sup>th</sup> 2014.
144. *(Invited)* **Hong Hua**, "Recent Advancements on Augmented Reality Display Technologies," Optical Engineering Colloquium, Zhejiang University, May 13<sup>th</sup>, 2012.
145. *(Invited)* **Hong Hua**, "Recent Advancements on Augmented Reality Display Technologies," Computer Science Colloquium, University of Arizona, March 5<sup>th</sup>, 2012.
146. *(Invited)* **Hong Hua**, "How to write good scientific papers," Beijing Institute of Technology Colloquium, May 16<sup>th</sup>, 2012.
147. *(Invited)* **Hong Hua**, "Near-eye displays for augmented reality applications," Institute of Computer Graphics Colloquium, Johannes Kepler University, Linz, Austria, January 19<sup>th</sup>, 2011.
148. *(Invited)* **Hong Hua**, "Research on 3D Visualization and Imaging System Development," Beijing Institute Technology Colloquium, China, October 22<sup>nd</sup>, 2010.
149. *(Invited)* **Hong Hua**, "Near-eye displays: what is now and future?" 3M Colloquium talk, June 9<sup>th</sup>, 2009.
150. *(Invited)* **Hong Hua**, "3D visualization techniques in multi-scale collaborative augmented virtual environments," Computer Science Colloquium, University of Arizona, November 16<sup>th</sup>, 2006.

### Seminars and Tutorials

151. *(Invited)* Hong Hua, "Optics in virtual and augmented reality displays," Optical Sciences Winter School Workshop, University of Arizona, January 6<sup>th</sup>, 2024.
152. *(Invited Tutorial)* **Hong Hua**, "Fundamentals of head-mounted displays for virtual and augmented reality," Meta Inc., July 19<sup>th</sup>, 2023.
153. *(Invited)* Hong Hua, "Optics in virtual and augmented reality displays," Optical Sciences Winter School Workshop, University of Arizona, January 6<sup>th</sup>, 2023.
154. *(Invited)* **Hong Hua**, "Head-mounted light field displays for mixed reality," SID (Society of Information Display) Display Week Seminar, June 2022.
155. *(Invited Tutorial)* **Hong Hua**, "Fundamentals of head-mounted displays for virtual and augmented reality," Applied Materials, November 2021.
156. *(Invited Seminar)* **Hong Hua**, "Fundamentals of head-mounted displays for augmented and virtual

- reality" SID (Society of Information Display) Display Week Seminar, California, August 2020.
157. (*Invited Talk*) Hong Hua, "Wearable displays as assistive technology," University of Arizona, November 20<sup>th</sup>, 2019.
  158. (*Invited Tutorial*) **Hong Hua**, "Fundamentals of head-mounted displays for virtual and augmented reality," Applied Materials, April, 25<sup>th</sup>, 2019.
  159. (*Invited Talk*): Hong Hua, "Optical challenges for next-generation VR/AR displays," Arizona Photonics Day, January 31<sup>st</sup>, 2019.
  160. (*Invited Tutorial*) **Hong Hua**, "Fundamentals of head-mounted displays for virtual and augmented reality," CREOL, University of Central Florida, June 2018.
  161. (*Invited*) **Hong Hua**, "Enabling Focus Cues in Head-mounted Displays for Virtual and Augmented Reality," Samsung Inc., South Korea, August 29<sup>th</sup>, 2017.
  162. (*Invited Tutorial*) **Hong Hua**, "Fundamentals of head-mounted displays for virtual and augmented reality," Applied Materials, May 4<sup>th</sup>, 2017.
  163. (*Invited*) **Hong Hua**, "Engineering challenges in optical see-through augmented reality displays," Corning AR/VR workshop, September 13<sup>th</sup>, 2016.
  164. (*Invited*) Hong Hua, "Head-worn displays for augmented reality applications," Applied Materials AR/VR Workshop, August 3<sup>rd</sup>-4<sup>th</sup>, 2016.
  165. (*Invited Tutorial*) **Hong Hua**, "Head-worn displays for augmented reality applications," Topical Meeting on 3D Image Acquisition and Display, Optical Society of America, July 2016.
  166. (*Invited*) **Hong Hua**, "Near-to-eye displays for augmented reality," Corning Glass Summit, June 3<sup>rd</sup>-4<sup>th</sup>, 2016.
  167. (*Invited*) **Hong Hua**, "Near-to-eye lightfield displays for augmented reality," Huawei Science and Technology Workshop, May 17-18<sup>th</sup>, 2016.
  168. (*Invited Tutorial*) Hong Hua, "Fundamentals of head-mounted displays for virtual and augmented reality," Display Week, Society of Information Displays, May 22<sup>nd</sup>, 2016.
  169. (*Invited*) **Hong Hua**, "Head-worn displays for augmented reality applications," SID (Society of Information Display) Display Week Seminar, San Diego, California, June 2015.
  170. (*Invited*) **Hong Hua**, "Near-to-eye light field displays for augmented reality," Workshop on Light Field Imaging, Stanford University, February 12<sup>th</sup>, 2015.
  171. (*Invited*) **Hong Hua**, "Head-worn displays for augmented reality applications," SID (Society of Information Display) Display Week Seminar, San Diego, California, June 2<sup>nd</sup>, 2014.
  172. (*Invited*) **Hong Hua**, "Augmented reality display technology," Qualcomm Seminar, June 4<sup>th</sup>, 2014.
  173. (*Invited*) **Hong Hua**, "Is Augmented Reality Glass a Reality?" Ricoh Innovation Seminar Series, November 7<sup>th</sup> 2013.
  174. (*Invited*) **Hong Hua**, "Is Augmented Reality Glass a Reality?" Optical Engineering Lecture Series, Beijing Institute of Technology, May 22<sup>nd</sup> 2013.
  175. (*Invited*) **Hong Hua**, "A multi-resolution foveated laparoscope (MRFL)" Optical Engineering Lecture Series, Beijing Institute of Technology, May 26<sup>th</sup> 2013.
  176. (*Invited*) **Hong Hua**, "Near-eye displays for augmented reality applications: now and the future", Google seminar, April 26<sup>th</sup>, 2011.
  177. (*Invited*) **Hong Hua**, "Stereoscopic Displays with Addressable Focus Cues", 1<sup>st</sup> Regional Meeting on Optics (CREO-CICESE), Ensenada, Baja California, Mexico, SPIE Visiting Lecture Program, September 8<sup>th</sup>, 2011.
  178. (*Invited*) **Hong Hua**, "Near-eye displays: now and future," HP Seminar Series, October 2009.
  179. (*Invited*) **Hong Hua**, "Stereoscopic display technology for collaborative augmented environments," Visual Communication and Display Lab of Motorola Inc. (Schaumburg, IL), on June 4<sup>th</sup> 2003.
  180. (*Invited*) **Hong Hua**, "Stereoscopic display technology for collaborative augmented environments," Department of Computer Science, George Mason University, Washington DC, on June 2<sup>nd</sup>, 2003.
  181. (*Invited*) **Hong Hua**, "Stereoscopic display research in augmented environments," the Director's Seminar Series, Beckman Institute, University of Illinois at Urbana-Champaign, September 2002.



182. *(Invited)* **Hong Hua**, “Display and imaging methods in augmented reality”, the Department of Opto-Electronic Engineering, Beijing Institute of Technology, June 2002.

### **Symposia and Conferences**

183. Feiyi Shen and Hong Hua, “Light field camera with extended depth of field using a dual-focal micro-lens array,” Optica 2023 Topical Meeting on 3D Image Acquisition and Display: Technology, Perception and Applications,” August 2023.
184. . *(Invited Paper)* Hong Hua, Hekun Huang, and Xuan Wang, “Review on time-multiplexed methods for high-performance head-mounted light field displays”, Society for Information Display’s Display Week, 54(1): 627-630, May 2023.
185. Cheng-Ting Huang and Hong Hua, “Viewing window extension in integral imaging based head-mounted light field displays using time-multiplexed method,” Society for Information Display’s Display Week, 54(1): 631-633, May 2023.
186. *(Invited)* Hong Hua, “Challenges on high-performance head-mounted light field displays”, Meta Academic Forum, October 18<sup>th</sup>, 2022.
187. *(Invited)* Hong Hua and Hekun Huang, “Optical design and optimization method for head-mounted displays”, Frontiers in Optics – Fabrication, Design and Instrumentation, October 2022.
188. *(Invited)* Hong Hua, “Time-multiplexed methods for high-performance head-mounted light field displays,” 2022 Optica Imaging and Applied Optics Congress, July 2022.
189. Alex Lu and Hong Hua, “A varifocal camera system for light field display calibration,” 2022 Optica Imaging and Applied Optics Congress, July 2022.
190. *(Invited)* Hong Hua, “Light field display technology for mixed reality”, IEEE 5<sup>th</sup> International Conference on Multimedia Information Processing and Retrieval (MIPR 2022), August 2<sup>nd</sup>, 2022.
191. *(Invited)* Hong Hua, “Head-mounted light field displays for virtual and mixed reality,” Conference of the Centre for Vision Research at York University, June 10-15, 2022.
192. *(Invited)* Hong Hua, “Recent progresses on head-mounted light field displays,” Laser Display and Lighting Conferences 2022 (LDC2022), Japan, April 19-22, 2022.
193. **Hong Hua and A. Wilson**, “Design of pupil-matched optical see-through head-mounted display,” IEEE Virtual Reality 2022, March 12-16<sup>th</sup>, 2022.
194. *(Invited)* **Hong Hua and A. Wilson**, “Recent development of occlusion-capable optical see-through head-mounted displays for mixed reality,” 21<sup>st</sup> International Meeting on Information Display (IMID 2021), Seoul, Korea, August 25<sup>th</sup>-27<sup>th</sup>, 2021.
195. *(Invited)* **Hong Hua**, “Review on head-mounted light field displays for mixed reality,” The 5<sup>th</sup> Microdisplay Optical Technology Conference (online), August 15<sup>th</sup>, 2021.
196. *(Invited)* **Hong Hua**, “Freeform optics in wearable displays,” SPIE Conference 11813 (Tribute to James C. Wyant: The Extraordinaire in Optical Metrology and Optics Education,” August, 2021.
197. Elliot Kwan and Hong Hua, “Tri-aperture monocular laparoscopic objective for stereoscopic and wide field of view acquisition,” 2021 OSA Imaging and Applied Optics Congress, July 2021.
198. *(Invited)* **Hong Hua**, “Design of head-mounted light field displays for virtual and augmented reality,” 12<sup>th</sup> International Conference on Optics-photonics Design and Fabrication (ODEF2021), Taoyuan, Taiwan, June 1<sup>st</sup>-3<sup>rd</sup> 2021.
199. Xuan Wang and Hong Hua, “Time-multiplexed high-performance integral imaging light field display,” SPIE Conference on AR VR MR, February 2021.
200. *(Invited Plenary)* **Hong Hua**, “Progresses, challenges and opportunities of head-mounted light field displays for mixed reality,” IEEE Int. Workshop on Multimedia Signal Processing (IEEE MMSP), Tampere, Finland, September 2020.
201. *(Invited)* **Hong Hua**, “Challenges and opportunities for VR/AR optics,” Frontiers in Optics, September 2020.
202. **Hong Hua**, “Graphical methods to Gaussian beam propagation and imaging,” SPIE Conference on “Roland V. Shack Memorial Session: A Celebration of One of the Great Teachers of Optical Aberration

- Theory," Paper 11479-4, August 2020.
203. A. Wilson and **H. Hua**, "Novel single-layer double-pass optical architecture for a pupil-matched occlusion-capable optical see-through head-mounted display," Society for Information Display's Virtual Display Week 2020, August, 2020.
  204. P. Lyu and **H. Hua**, "A new perceptual-driven approach to foveated head-mounted displays," Society for Information Display's Virtual Display Week 2020, August, 2020.
  205. X. Wang and **H. Hua**, "Digitally switchable micro-lens array for integral imaging," Society for Information Display's Virtual Display Week 2020, August, 2020.
  206. (*Invited Keynote*) **Hong Hua**, "Head-mounted light field displays: progresses, challenges, and opportunities," SPIE Conference on Three Dimensional Imaging, Visualization, and Display, Paper 11402-5, April 2020.
  207. (*Invited*) **Hong Hua**, "Current research challenges and opportunity in extended reality devices and evaluation methods," FDA Workshop on "Medical extended reality: toward best evaluation practices for virtual and augmented reality in medicine," Washington D.C., March 2020.
  208. (*Invited Keynote*) **Hong Hua** and Austin Wilson, "Challenges and opportunities for occlusion-capable optical see-through head-mounted displays for augmented reality," SPIE Photonic West OPTO 2020 AR/VR Optics, Paper 11299-4, February 2020.
  209. (*Invited*) **Hong Hua**, "Sampling requirements and visual artifacts of head-mounted light field displays," SPIE Photonic West OPTO Advances in Display Technologies X, Paper 11304-2, February 2020.
  210. M. Xu, and **H. Hua**, "Image analysis of varifocal geometrical lightguide head-mounted display," SPIE Optical Architectures for Displays and Sensing in AR, VR, MR, Paper AVR20-AVR01-18, February 2020.
  211. M. Xu and **H. Hua**, "Method for evaluating 3D display systems based on perceived retinal image," SPIE Optical Architectures for Displays and Sensing in AR, VR, MR, Paper AVR20-AVR01-18, February 2020.
  212. (*Invited Panelist*) **Hong Hua**, "the Future of head-mounted displays," IEEE Virtual Reality 2019, March 26<sup>th</sup>, 2019, Osaka, Japan.
  213. (*Invited*) Austin Wilson and **H. Hua**, "Mutual occlusion in augmented reality displays," OSA Frontiers in Optics, September 2019.
  214. (*Invited*) **Hong Hua**, "Challenges of scaling in head-mounted displays," OSA Imaging and Applied Optics Congress, Munich, Germany, June 2019.
  215. M. Lovett, D. Biffar, A. Hamilton, J. Katz, S. Lee, Hong Hua, M. Nguyen, "Evaluation of learning curve and peripheral awareness using a novel multiresolution foveated laparoscope," 2019 Spring Simulation Conference.
  216. (*Invited Plenary*) **Hong Hua**, "Plenary: The quest for vision comfort: head-mounted light field displays for virtual and augmented reality," IS&T Electronic Imaging 2019, San Francisco, January 2019.
  217. (*Invited*) **Hong Hua**, "Optical challenges for scaling next-generation VR/AR displays," SPIE Photonic West, AR/VR Conference, San Francisco, February 2019.
  218. (*Invited*) **Hong Hua**, H. Huang, and M. Xu "Modeling retinal image formation for light field displays," IS&T Electronic Imaging 2019, San Francisco, January 2019.
  219. Mohan Xu and **Hong Hua**, "Co-axial depth map sensor with an extended depth range," SPIE Photonic West, AR/VR Conference, San Francisco, February 2019.
  220. X. Wang, and **Hong Hua**, "Digitally switchable multi-focal element for wearable displays," SPIE Photonic West, AR/VR Conference, San Francisco, February 2019.
  221. (*Invited*) **Hong Hua** and Hekun Huang "Optimizing head-mounted light field displays for quality and comfort," OSA Frontiers in Optics, September 2018.
  222. Mohan Xu and **Hong Hua**, "Systematic analysis method for multilayer light field display," OSA 2018 Imaging and Applied Optics Congress (Topical Meeting on 3D Image Acquisition and Display: Technology, Perception, and Applications), Orlando, June 2018.
  223. H. Huang and **Hong Hua**, "Design of a high-performance optical see-through light field head-mounted display," Display Week 2018. May 2018.

224. *(Invited)* **Hong Hua**, "Optical challenges for next-generation AR headsets," SPIE Conference on Digital Optics for Immersive Displays (co-held with SPIE Photonics Europe), Strasbourg, France, April 22-26<sup>th</sup>, 2018.
225. *(2<sup>nd</sup> Prize for Student Optical Design Competition)*, M. Xu and **Hong Hua**, "Ultra-thin optical combiner with microstructure mirrors in augmented reality," SPIE Conference on Digital Optics for Immersive Displays (co-held with SPIE Photonics Europe), Strasbourg, France, April 22-26<sup>th</sup>, 2018.
226. *(3<sup>rd</sup> Prize for Student Optical Design Competition)*, A. Wilson and **Hong Hua**, "High-resolution optical see-through vari-focal-plane head-mounted display using freeform Alvarez lenses," SPIE Conference on Digital Optics for Immersive Displays (co-held with SPIE Photonics Europe), Strasbourg, France, April 22-26<sup>th</sup>, 2018.
227. H. Huang and **Hong Hua**, "High-performance integral-imaging based light field augmented reality display," SPIE Conference on Digital Optics for Immersive Displays (co-held with SPIE Photonics Europe), Strasbourg, France, April 22-26<sup>th</sup>, 2018.
228. **Hong Hua** and Hekun Huang, "Angular and Spatial Sampling Requirements in 3D Light Field Displays," IS&T Electronic Imaging 2018, San Francisco, January 28-31<sup>st</sup>, 2018.
229. *(Invited)* **Hong Hua**, "Optimizing head-mounted light field displays for quality and comfort," SPIE Photonic West: VR,AR, MR One-day Industry Conference, January 29<sup>th</sup>, 2018.
230. *(Invited)* **Hong Hua** and Austin Wilson, "Towards occlusion-capable optical see-through head-mounted displays," OSA Frontiers in Optics/Laser Science Conference, Washington D.C., September 20<sup>th</sup>, 2017.
231. *(Invited)* **Hong Hua**, "Head-mounted light field displays for virtual and augmented reality," 17<sup>th</sup> Internal Meeting on Information Display (IMID 2017), Busan, South Korea, August 28-30<sup>th</sup>, 2017.
232. *(Invited)* **Hong Hua**, "Enabling focus cues in head-mounted displays," OSA 2017 Imaging and Applied Optics Congress (Topical Meeting on Imaging Systems and Applications), San Francisco, June 26-29<sup>th</sup>, 2017.
233. Hekun Huang and **Hong Hua**, "Modeling of eye's response in viewing 3D light field displays," OSA 2017 Imaging and Applied Optics Congress (Topical Meeting on 3D Image Acquisition and Display: Technology, Perception, and Applications), San Francisco, June 26-29<sup>th</sup>, 2017.
234. Elliot Kwan, Yi Qin, and **Hong Hua**, "Development of a light field laparoscope for depth reconstruction," OSA 2017 Imaging and Applied Optics Congress (Topical Meeting on 3D Image Acquisition and Display: Technology, Perception, and Applications), San Francisco, June 26-29<sup>th</sup>, 2017.
235. Austin Wilson and **Hong Hua**, "Demonstration of an occlusion-capable optical see-through head-mounted display," Display Week 2017. May 2017.
236. Miaomiao Xu and **Hong Hua**, "Dual-layer high dynamic range head mounted display," Display Week 2017. May 2017.
237. Xuan Wang and **Hong Hua**, "A digitally switchable multi-focal lens using freeform optics for wearable displays," Display Week 2017. May 2017.
238. *(Distinguished Student Paper Award)* Hekun Huang and **Hong Hua**, "An integral-imaging-based head-mounted light-field display using a tunable lens and aperture array," Display Week 2017. May 2017.
239. *(Invited)* **Hong Hua**, "Recent advances in head-mounted light field displays," Display Week 2017. May 2017.
240. *(Invited)* **Hong Hua**, "Enabling focus cues in head-mounted displays," SPIE Commercial + Scientific Sensing and Imaging, April 9-13<sup>th</sup>, 2017.
241. *(Invited Talk)* **Hong Hua**, "Recent advances in head-mounted light field displays for virtual and augmented reality," SPIE Photonics West-Emerging Liquid Crystal Technologies XII, February 2017.
242. Sheng-Huei Lu and **Hong Hua**, "Multifunctional three-dimensional microscopic system," Topical Meeting on 3D Image Acquisition and Display, Optical Society of America, July 2016.
243. Hekun Huang and **Hong Hua**, "Design of an optical see-through multi-focal plane stereoscopic 3D display with eye-tracking ability," Topical Meeting on 3D Image Acquisition and Display, Optical Society of America, July 2016.

244. *(Invited, Best Paper Award)* **Hong Hua**, “Review and current status of head-mounted display technologies,” SPIE-Defense Security and Sensing, April 2015.
245. *(Invited)* **Hong Hua**, H. Huang, B. Javidi, “An integral imaging augmented reality display,” SPIE-Three Dimensional Imaging, Visualization, and Display 2015, April 2015.
246. *(Invited)* **Hong Hua**, “Past and future of wearable augmented reality displays and their applications,” SPIE Annual Conference, San Diego, CA, Aug 2014.
247. *(Invited)* **Hong Hua**, “Wearable displays using freeform optics,” 2014 OSA Classical Optics Congress-Computational Optical Sensing and Imaging, Kona, Hawaii, June 2014.
248. Xinda Hu and **Hong Hua**, “Optical design of an eyetracked head-mounted display using freeform waveguide,” 2014 OSA Classical Optics Congress-International Optical Design Conference, Kona, Hawaii, June 2014.
249. *(Invited Paper, Fumio Okano Best Paper Prize)* **Hong Hua**, X. Hu, C. Gao, and X. Qin, “Eyetracked optical see-through head-mounted display as an AAC device,” in Proc. of SPIE Defense, Security & Sensing – Three-Dimensional Imaging, Visualization, and Display, May 2014.
250. **Hong Hua**, Jason Kuhn, and Sangyoon Lee, “Effects of optical combiner on depth perception in optical see-through head-mounted displays,” 2014 SPIE Defense, Security & Sensing – Head and helmet-mounted displays XIX: design and applications, May 2014.
251. Xinda Hu and **Hong Hua**, “DMD technology enables an optical see-through head-mounted 3D display with true focus cues,” Oral presentation at SPIE MOEMS-MEMS (Emerging Digital Micromirror Device Based Systems and Applications VI), February 2014.
252. Xinda Hu and **Hong Hua**, “A new look inside: wavefront analysis tool for freeform designers,” OSA Topical Meeting on Freeform Optics, Renewable Energy and the Environment Congress 2013, Nov. 3-7, 2013.
253. *(Invited)* **Hong Hua**, “Lightweight, low-cost augmented reality displays enabled by freeform optical technology,” Applied Industrial Optics: Spectroscopy, Imaging and Metrology (AIO), June 2013.
254. *(Invited Keynote)* **Hong Hua**, “Is Augmented Reality Glass a Reality,” SPIE Defense, Security & Sensing – Three-Dimensional Imaging, Visualization, and Display 2013, May 2013.
255. C. Gao, Y. Lin, and **Hong Hua**, “Optical see-through head-mounted display with occlusion capability,” Proceedings of SPIE Defense, Security & Sensing – Head and helmet-mounted displays XIX: design and applications, Vol. 8735, pp. 87350F, May 2013.
256. S. Liu and **Hong Hua**, “Imaging properties in extended depth of field microscopy systems based on single-shot focus scanning technique,” Oral Presentation at SPIE Photonic West, Feb 2013.
257. X. Hu and **Hong Hua**, “An optical see-through multi-focal plane stereoscopic display prototype enabling nearly-correct focus cues,” in Proceedings of SPIE (Stereoscopic Displays and Applications XXIV), Vol. 8648, pp. 86481A, April 2013.
258. Yi Qin, **Hong Hua**, Mike Nguyen, “Development of a laparoscope with multi-resolution foveation capability for minimally invasive surgery,” in Proceedings of SPIE (Photonic West), Vol. 8573, pp. 85739 Feb 2013.
259. C. Gao, Y. Lin, and **Hong Hua**, “Occlusion capable optical see-through head-mounted display using freeform optics,” Proceedings of 2012 IEEE and ACM International Symposium on Mixed and Augmented Reality (ISMAR’2012), pp. 281-282, November 2012.
260. Xinda Hu and **Hong Hua**, “Design of an optical see-through multi-focal-plane stereoscopic 3D display using freeform prisms,” OSA 2012 Annual Meeting, October 2012.
261. Yi Qin, Zhenrong Zheng, **Hong Hua**, “Multi-resolution foveated laparoscope,” OSA 2012 Annual Meeting, October 2012.
262. **Hong Hua** and Chunyu Gao, “Design of a compact eyetracked optical see-through head-mounted display using freeform optics,” SPIE & IST Electronic Imaging Conference, January 2012.
263. *(Distinguished Student Paper Award)* Xinda Hu and **Hong Hua**, “A depth-fused multi-focal-plane display prototype enabling focus cues in stereoscopic displays,” Proc. of 2011 SID International

Symposium (Display Week).

264. (*Invited Paper*) **Hong Hua** and Sheng Liu, "Depth-fused multi-focal plane displays enable accurate depth perception," Proc. of SPIE (Optical Design and Testing IV, Photonics Asia 2010), Vol. 7849, 78490P, October 2010.
265. (*Invited Paper*) Dewen Cheng, Yongtian Wang, and **Hong Hua**, "Free form optical system design with differential equations," Proc. of SPIE (Optical Design and Testing IV, Photonics Asia 2010), Vol 7849, 78490Q, October 2010.
266. (*Invited Paper*) Dewen Cheng, Yongtian Wang, and **Hong Hua**, "Large field-of-view and high resolution free-form head-mounted display," Proc. of SPIE-OSA (International Optical Design Conference 2010), Vol 7652, 76520D, June 2010.
267. (*Invited Paper*) **Hong Hua**, Dewen Cheng, Yongtian Wang, and Sheng Liu, "Near-eye displays: state-of-the-art and emerging technologies," Proc. of SPIE (Three-dimensional Imaging, Visualization, and Display 2010 and Display Technologies for Defense, Security, and Avionics IV), Vol 7690, 769009-1, April 2010.
268. Rui Zhang and **Hong Hua**, "Design of a compact light engine for FLCOS microdisplays in a p-HMPD system," *Proceedings of 2008 International Symposium of Society of Information Display (SID'2008)*.
269. Sheng Liu, Chunyu Gao, and **Hong Hua**, "Illumination design of a multi-touch sensing projection screen for augmented virtual environments," *Proceedings of 2008 International Symposium of Society of Information Display (SID'2008)*.
270. Rui Zhang and **Hong Hua**, "Design of a polarized head-mounted projection display using FLCOS microdisplays," *Proceedings of the SPIE International Society for Optical Engineering (Photonic West 2007)*, Vol. 6489, 64890B, San Jose, USA, January 2007.
271. Sheng Liu, Craig Pansing, and **Hong Hua**, "Design of a foveated imaging system using a two-axis MEMS mirror," *Proceedings of 2006 International Optical Design Conference*, Vol. 6342, 63422W-1-W-8, Vancouver, Canada, June 2006.
272. C. Curatu, J.P. Rolland, and **Hong Hua**, "Dual purpose lens for an eye-tracked projection head-mounted display," *Proceedings of International Optical Design Conference*, Vancouver, Vol. 6342, 63420X, Canada, June 2006.
273. C. Curatu, **Hong Hua**, and J. P. Rolland, "Projection-based head-mounted display with eye-tracking capabilities," *Proceedings of the SPIE International Society for Optical Engineering*, Vol. 5875, San Diego, USA, August 2005.
274. **Hong Hua**, "An ultra-bright polarized head-mounted projective display," *OSA 2005 Annual Meeting/Frontiers in Optics*, Tucson, AZ, October 2005 (Oral presentation).
275. (*Invited Paper*) Craig Pansing, **Hong Hua**, and J. P. Rolland, "Optimization of illumination schemes in a head-mounted display integrated with eye tracking capabilities," *Proceedings of the SPIE International Society for Optical Engineering*, Vol. 5875, San Diego, USA, August 2005.
276. Leonard Brown, C. Gao, and **Hong Hua**, "Toward a tangible interface for multi-modal interior design using SCAPE," *2004 IEEE Workshop on Beyond glove and wand based interaction*, March 2004.
277. Y. Ha, **Hong Hua**, R. Martins, and J. P. Rolland, "Design of a wearable wide-angle projection color display," *Proceedings of 2002 International Optical Design Conference*, pp. 67-73, June 2002.
278. **Hong Hua**, C. Gao, and J. P. Rolland, "Study of the imaging properties of retro-reflective materials used in head-mounted projective displays," *Proceedings of SPIE (Aerosense 2002)*, Vol. 4711, pp.194-201, April 2002.
279. J. P. Rolland, **Hong Hua**, and F. Biocca, "Head-mounted projective displays for creating remote collaborative environments," *Proceedings of SPIE (Aerosense 2002)*, Vol. 4711, April 2002.
280. **Hong Hua**, F. Biocca, and J. P. Rolland, "Design of an ultra-light head-mounted projective display and its applications in augmented collaborative environments," *Proceedings of SPIE (Electronic Imaging 2002)*, Vol. 4660, pp.492-497, January 2002.
281. **Hong Hua**, Leonard Brown, C. Gao, N. Ahuja, J. P. Rolland, F. Biocca. "A head-mounted projective

- display and its applications in interactive augmented environments," *SIGGRAPH 2001 Conference Abstracts and Applications--Sketches & Applications*, August 2001.
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283. **Hong Hua**. "Integration of eye tracking capability into optical see-through head-mounted displays," *Proceedings of SPIE (Electronic Imaging 2001)*, pp. 496-503, January 2001.
284. (*Invited Paper*) J. P. Rolland, Y. Ha, L. Davis, **Hong Hua**, C. Gao, F. Biocca, "New paradigm for head-mounted display technology: application to medical visualization and remote collaborative environments," *Proceedings of SPIE*, Vol. 4442, August 2001.
285. **Hong Hua**, C. Gao, J. P. Rolland, "Ultra-light and compact design of head-mounted projective displays with diffractive optical element," *OSA 2000 Annual Meeting*, October 2000 (Oral presentation).
286. **Hong Hua**, C. Gao, and J. P. Rolland, "Design and engineering implementation of head-mounted projective display," *Proceedings of 5<sup>th</sup> International Conference on Human Interaction with Complex Systems*, April 30-May 2, 2000.
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288. \***Hong Hua**, Y. Wang, D. He, "3-D sound techniques in virtual reality," *Transaction on Chinagraph'96*, Publishing House of Electronic Industry, pp. 313-319, September 1996.
289. \*D. He, Y. Wang, X. Yuan, **Hong Hua**, "Design of viewing lens used in head-mounted-display system," *Transaction on Chinagraph'96*, Publishing House of Electronic Industry, pp. 308-312, September 1996.
290. \*Y. Wang, X. Yuan, D. He, **Hong Hua**, "Design of viewing lens for virtual reality," *Proc. Of SPIE* Vol. 2778, pp.71-72, 1996.
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### **Patents and Patent Applications (Only listed US Patents and applications)**

1. Hong Hua and P. Lyu, "Perceptual-driven foveated optical see-through head-mounted displays," Provisional Patent Application, 2023.
2. Travis Sawyer and H. Hua, "Fluorescence-guided laparoscope with microscopic margin analysis capabilities for surgical guidance during tumor resection," Provisional Patent Application, 2023.
3. Hong Hua and Austin Wilson, "A compact occlusion-capable optical see-through HMD based on a light field architecture," Provisional Patent Application, 2022.
4. Hong Hua and Elliot Kwan, "System and methods for multiview image acquisition," Provisional Patent Application, 2021.
5. Hong Hua and X. Wang, "Devices and methods for enhancing the performance of integral imaging based light field displays using time-multiplexing schemes," Provisional Patent Application, 2021.
6. Hong Hua and P. Lyu, "Perceptual-driven foveated displays," Provisional Patent Application, 2021.
7. Hong Hua and M. Xu, "Optical see-through head-mounted light field displays based on substrate-guided combiners," Provisional Patent Application, 2020.
8. Hong Hua and A. Wilson, "Method for occlusion-capable optical see-through head-mounted displays," Provisional Patent Application, 2020.
9. Hong Hua and M. Xu, "Compact high dynamic range HMD with single pass relay," Provisional Patent Application, 2019.
10. Hong Hua and H. Huang, "Optical design methods for head-mounted 3D light field displays," Provisional Patent Application, 2019.
11. Hong Hua and H. Huang, "Methods of rendering light field images for integral-imaging-based light field display," Provisional Patent Application, 2018.

12. Hong Hua and Miaomiao Xu, "Multilayer high-dynamic range head-mounted display," Provisional Patent Application, 2017.
13. Hong Hua and Hekun Huang, "Head-Mounted Light Field Display with Integral Imaging and Relay Optics," Provisional Patent Application, 2017.
14. Hong Hua and Hekun Huang, "High-Performance Head-Mounted Light Field Display with Portion of Relay as Part of Eyepiece," Provisional Patent Application, 2017.
15. Hong Hua and Hekun Huang, "High-Performance Head-Mounted Light Field Display with Compound Surface to Increase FOV," Provisional Patent Application, 2017.
16. Hong Hua and Sheng-huei Lu, "System and methods for extended depth-of-field microscopy," US 2019/0162945 A1. And WO2017177180.
17. Hong Hua, Rengmao Wu, and Yi Qin, "Optical article and illumination system for endoscope," US 10,481,386B2, November 2019.
18. Hong Hua and Jason Kuhn, "A high-resolution freeform eyepiece design with a large exit pupil," Provisional Patent Application 2016.
19. Hong Hua and Bahram Javidi, "Wearable 3D augmented reality display," US patent 10,326,983 B2, June 2019.
20. Dewen Cheng, Yongtian Wang, and Hong Hua, "Wide angle and high resolution tilted head-mounted display device," US 10,281,723 B2, May 2019.
21. Stanley Pau and Hong Hua, "Small portable night vision system," US patent 10,176,961, January 2019.
22. C. Gao, Y. Lin, and Hong Hua, "Apparatus for optical see-through head mounted display with mutual occlusion and opaqueness control capability," US patent 10,175,491 B2, Jan 2019.
23. C. Gao, Hong Hua, "Wide-field of view (FOV) imaging devices with active foveation capability," US patent 10,162,184 B2, December 2018.
24. C. Gao, Hong Hua, "Methods and systems for displaying stereoscopy with a freeform optical system with addressable focus for virtual and augmented reality," US patent 10,156,722 B2, December 2018.
25. Hong Hua and Rui Zhang, "Head-mounted projection display using reflective microdisplay," US patent 10,146,029 B2, December 2018.
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41. Hong Hua and Rui Zhang, "Head-mounted projection display using reflective microdisplay," US patent 8,511,827 B2, August 2013.
42. Hong Hua, "Polarized head-mounted projection display," US Patent 8,259,239 B2, 2012.
43. C. Gao, Hong Hua, and N. Ahuja, "Apparatus and method of acquiring uniform-resolution panoramic images," United States Patent 6,809,887 B1, October 2004.
44. Hong Hua and J. P. Rolland, "Compact lens-assembly for the teleportal augmented reality system," US Patent 6,731,434 B1, May 2004.

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## Multi-Media

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13. John Overall, "UA professor behind eye-tracking goggles," KVOA Channel 4 news, November 1<sup>st</sup>, 2013. <http://www.kvoa.com/news/ua-professor-behind-eye-tracking-goggles/>
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15. Emily Bregger, "UA professor, graduate students work on hands-free technology similar to Google



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17. Alexis Blue, "UA surgeon, optical scientist collaborate on surgery camera," UANews, January 16th, 2013. <http://uanews.org/story/ua-surgeon-optical-scientist-collaborate-surgery-camera>
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## Grants and Contracts

### Federal Grant Awards

1. National Institute of Health, "Multi-resolution foveated laparoscope for safer minimally invasive surgery"
  - ❖ Award number: 1R01EB018921-01
  - ❖ Funding period: 07/2014-05/2020
  - ❖ Funding amount: \$1,779,165
  - ❖ Role: PI (Co-PIs are Prof. Mike Nguyen at the University of Southern California and Prof. Allen Hamilton at the Department of Surgery at the University of Arizona).
  - ❖ Percent of effort: 85%
2. National Science Foundation / Information and Intelligent Systems, "CHS: Small: Collaborative Research: Development of a wearable 3D integral imaging augmented reality display technology"
  - ❖ Award number: 14-22650
  - ❖ Funding period: 2014-2018
  - ❖ Funding amount: \$250,000
  - ❖ Role: PI (Single PI award), a collaborative proposal at the same funding period and funding amount was awarded to Prof. Bahram Javidi as the PI at the University of Connecticut.
  - ❖ Percent of effort: 100%
3. National Science Foundation / Information and Intelligent Systems/Human Centered Computing, "Development and Assessment of an Eyeglass-style Eyetracked Near-Eye Display using Freeform Optical Technology"
  - ❖ Award number: 11-15489
  - ❖ Funding period: 2011-2015
  - ❖ Funding amount: \$499,599
  - ❖ Role: PI (Single PI award)
  - ❖ Percent of effort: 100%
4. National Institute of Health, "Development of a Multi-resolution foveated laparoscope"
  - ❖ Award number: 1R21EB013370-01
  - ❖ Funding period: 04/2011-03/2014
  - ❖ Funding amount: \$403,250
  - ❖ Role: PI (Co-PI: Prof. Mike Nguyen at the University of Southern California who was an Assistant Professor at the Department of Surgery at the University of Arizona).
  - ❖ Percent of effort: 95%
5. NAVY /STTR phase II (Partner with SA Photonics Corporation), "Development of low-cost augmented reality head mounted display"
  - ❖ Award number: N/A
  - ❖ Funding period: 11/2010-05/2012

- ❖ Funding amount: \$170,376
  - ❖ Role: University PI (Single PI award)
  - ❖ Percent of effort: 100%
6. DARPA(Defense Advanced Research Project Agency)/SBIR phase I (Partner with Utopia Compression Corporation), "A novel high-resolution panoramic camera"
    - ❖ Award number: N/A
    - ❖ Funding period: 01/2010-07/2010
    - ❖ Funding amount: \$12,754
    - ❖ Role: University PI (Single PI award)
    - ❖ Percent of effort: 100%
  7. National Science Foundation / Information and Intelligent Systems/Human Centered Computing, "Enabling focus cues in stereoscopic displays".
    - ❖ Award number: 09-15035
    - ❖ Funding period: 07/2009-06/2013
    - ❖ Funding amount: \$497,599
    - ❖ Role: PI (Single PI award)
    - ❖ Percent of effort: 100%
  8. NAVY /STTR phase I and Option (Partner with SA Photonics Corporation), "Development of low-cost augmented reality head mounted display"
    - ❖ Award number: N/A
    - ❖ Funding period: 07/2009-05/2010
    - ❖ Funding amount: \$30,000 (out of \$100,000 total STTR award)
    - ❖ Role: University PI (Single PI award)
    - ❖ Percent of effort: 100%
  9. National Science Foundation / Information and Intelligent Systems, "CAREER: Development of a heterogeneous display environment to support complex data visualization"
    - ❖ Award number: 06-44446
    - ❖ Funding period: 02/2007-01/2012
    - ❖ Funding amount: \$500,001
    - ❖ Role: PI (Single PI award)
    - ❖ Percent of effort: 100%
  10. National Science Foundation / Information and Intelligent Systems, "Development and assessment of a polarized head mounted projective display technology"
    - ❖ Award number: 05-34777
    - ❖ Funding period: 07/2005-06/2008
    - ❖ Funding amount: \$310,047
    - ❖ Role: PI (Single PI award)
    - ❖ Percent of effort: 100%
  11. National Science Foundation / Information and Intelligent Systems, "IIS/HCI: Collaborative Research: Development and assessment of head-mounted fovea-contingent display technology"
    - ❖ Award number: 04-11578
    - ❖ Funding period: 07/2003-06/2007
    - ❖ Funding amount: \$375,818 out of \$750,000
    - ❖ Role: PI (Single PI award), a collaborative proposal at the same funding period was awarded to Prof. Jannick Rolland as the PI at the University of Central Florida
    - ❖ Percent of effort: 50%
  12. National Science Foundation / Information and Intelligent Systems, "IIS/HCI: Collaborative Research: Development of head-mounted projective display for distance collaborative environments"
    - ❖ Award number: 00-83037

- ❖ Funding period: 07/2000-06/2004
- ❖ Funding amount: \$294,857 out of \$500,000 total budget
- ❖ Role: PI (Single PI award), a collaborative proposal at the same funding period was awarded to Prof. Jannick Rolland as the PI at the University of Central Florida
- ❖ Percent of effort: 60%

## Industry

1. Industry Sponsored Research Award
  - ❖ Award number: N/A
  - ❖ Funding period: 02/2018-08/2023
  - ❖ Funding amount: \$4,000,000
  - ❖ Role: PI (Single PI award)
  - ❖ Percent of effort: 100%
2. Intel Inc., Intel Faculty Research Award
  - ❖ Award number: N/A
  - ❖ Funding period: 09/2016-08/2019
  - ❖ Funding amount: \$300,000
  - ❖ Role: PI (Single PI award)
  - ❖ Percent of effort: 100%
3. Google Inc., Google Faculty Research Award
  - ❖ Award number: N/A
  - ❖ Funding period: 04/2016-03/2017
  - ❖ Funding amount: \$125,000
  - ❖ Role: PI (Single PI award)
  - ❖ Percent of effort: 100%
4. eSight Inc., "Fabrication support for near-to-eye display optical component"
  - ❖ Award number: N/A
  - ❖ Funding period: 09/2015-06/2016
  - ❖ Funding amount: \$53,264
  - ❖ Role: PI (Single PI award)
  - ❖ Percent of effort: 100%
5. eSight Inc., "Near-to-eye display optical component"
  - ❖ Award number: N/A
  - ❖ Funding period: 07/2014-05/2016
  - ❖ Funding amount: \$213,798
  - ❖ Role: PI (Single PI award)
  - ❖ Percent of effort: 100%
6. eSight Inc., "Prism magnifier"
  - ❖ Award number: N/A
  - ❖ Funding period: 04/2014-06/2014
  - ❖ Funding amount: \$5,800
  - ❖ Role: PI (Single PI award)
  - ❖ Percent of effort: 100%
7. Ricoh Inc., Research Gift
  - ❖ Award number: N/A
  - ❖ Funding period: 12/2013
  - ❖ Funding amount: \$15,000
  - ❖ Role: PI
  - ❖ Percent of effort: 100%

8. SA Photonics Corporation , “High Definition Aviation Digital Display (HiDADD): Design of Freeform Eyepiece Prism and Compensator”
  - ❖ Award number: N/A
  - ❖ Funding period: 08/2012-08/2013
  - ❖ Funding amount: \$136,500
  - ❖ Role: PI (Single PI award)
  - ❖ Percent of effort: 100%
9. Osterhout Design Group, “Free-form prism-based design for a see-through head mounted display”, 02/2010~03/2010 (\$12,793).

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#### **Other Grants**

1. Faculty Travel Grant, University of Arizona, October 2005 (\$750).
2. Beckman Institute Research Grant, “Development of a head-mounted projective display for collaborative environments”, Beckman Foundation, 2000-2002 (\$60,000).
3. Beckman Institute Research Grant, “Design and integration of head-mounted display with eye tracking capability,” Beckman Foundation, 2000-2001 (\$35,000).

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#### **Industrial Consulting/Partnerships**

1. Augmented Vision Inc (Inactive), Tucson, AZ, Co-founder, 2010-
2. Utopia Compression Corporation, Los Angeles, CA, Development of a novel high-resolution panoramic camera, 2009-2011
3. Trex Enterprises, San Diego, CA, Dynamic foveal vision display, 2009-2010
4. SA Photonics, San Francisco, CA, Development of a low-cost augmented reality head mounted display, 2009-2013
5. Vision Technology, Champaign, IL, Development of a novel hemispherical view camera, 2001-2002.

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#### **List of Collaborators**

##### **Collaborators on Grants and Publications**

1. Prof. Ronald Driggers, College of Optical Sciences, University of Arizona
2. Prof. David Brady, College of Optical Sciences, University of Arizona
3. Prof. Bahram Javidi, Department of Electrical and Computer Engineering, University of Connecticut
4. Prof. Mike Nguyen (MD), Institute of Urology, Keck School of Medicine, University of Southern California
5. Prof. Allen Hamilton (MD), College of Medicine, University of Arizona
6. Prof. Katalin Scherer (MD), Department of Neurology, University of Arizona
7. Prof. Cass Faux, Department of Speech-Language Pathology, University of Arizona

##### **Graduate and Postdoctoral Advisors**

1. Prof. Yongtian Wang, School of Opto-electronic Engineering, Beijing Institute of Technology (Ph.D. thesis advisor and collaborator)
2. Jannick. Rolland, University of Rochester (Postdoctoral advisor and collaborator)
3. Prof. Narendra Ahuja, University of Illinois at Urbana-Champaign (Postdoctoral advisor and collaborator)

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#### **Accuracy Statement**

*This is a true and accurate statement of my activities and accomplishments. I understand that misrepresentation in securing promotion and tenure may lead to dismissal or suspension under ABOR Policy 6-201 J.1.b.*

Signature: \_\_\_\_\_

A handwritten signature in black ink, consisting of a stylized initial 'H' followed by a series of connected loops and a long horizontal stroke at the end.

Date: 02/20/2024