

Zehao He Assistant Professor/Ph.D.

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Work Experience

2023/11 - Present Department of Physics, Capital Normal University Assistant Professor

- Research direction: holographic 3D display, terahertz computational imaging

2021/07 - 2023/10 Department of Precision Instrument, Tsinghua University Postdoc

- Research direction: holographic 3D display, holographic data storage

Education Experience

2017/09 - 2021/06 Department of Precision Instrument, Tsinghua University (Supervisor: **Liangcai Cao**)

- Ph.D. dissertation: dynamical holographic 3D display based on phase-only spatial light modulators

2014/09 - 2017/06 Department of Precision Instrument, Tsinghua University (Supervisor: **Ping Su**)

- Master dissertation: full-color holographic 3D display based on digital micromirror devices

2009/09 - 2013/06 School of Optical and Electronic Information, Huazhong University of Science and Technology

Projects

2023/01 - 2025/12 Natural Science Foundation of China (62205173, **person in charge**)

- Formation mechanisms and suppression methods of errors in computer-generated holography

2021/08 - 2023/10 China Postdoctoral Science Foundation (BX2021140, **person in charge**)

- High-resolution 3D real-time holographic communication based on computer-generated holography

2021/12 - 2024/11 National Key R&D Program (2021YFB2802000, participant)

- PB-level ultra-low power nano optical data storage technology

2022/05 - 2025/04 National Key R&D Program (2021YFB2802300, participant)

- Key technologies and architectures in light-field 3D display

Awards

2023/07 Outstanding Doctorate Dissertation in Optical Engineering, awarded by Chinese Society of Optical Engineering

2021/05 National Postdoctoral Program for Innovative Talents, awarded by Ministry of Human Resources and Social Security

2021/05 Shuimu Scholar, awarded by Tsinghua University

Publications

I have published 31 papers in peer-reviewed journals, some holography-related ones are listed below:

- Qiang Zhang[#], **Zehao He[#]**, Zhenwei Xie, Qiaofeng Tan, Yunlong Sheng, Guofan Jin, Liangcai Cao, and Xiaocong Yuan, "Diffractive optical elements 75 years on: from micro-optics to metasurfaces," Photonics Insights (Accepted, 2023).
- **Zehao He**, Kexuan Liu, Mao Fan, and Liangcai Cao, "Coded aperture-based compressive data page for optical data storage," Optics Letters 48, 4304-4307 (2023).
- Xiaoting Wang, **Zehao He^{*}**, and Liangcai Cao, "Analysis of reconstruction quality for computer-generated holograms using a model free of circular-convolution error," Optics Express 31, 19021-19035 (2023).

- Lidan He, Kexuan Liu, **Zehao He**^{*}, and Liangcai Cao, “Three-dimensional holographic communication system for the metaverse,” Optics Communications 526, 128894 (2023).
- **Zehao He**, Xiaomeng Sui, Hao Zhang, Guofan Jin, and Liangcai Cao, “Frequency-based optimized random phase for computer-generated holographic display,” Applied Optics 60, A145-A154 (2021).
- **Zehao He**, Xiaomeng Sui, Guofan Jin, Daping Chu, and Liangcai Cao, “Optimal quantization for amplitude and phase in computer-generated holography,” Optics Express 29, 119-133 (2021).
- **Zehao He**, Xiaomeng Sui, Guofan Jin, and Liangcai Cao, “Distortion-correction method based on angular spectrum algorithm for holographic display,” IEEE Transactions on Industrial Informatics 15, 6162-6169 (2019).
- **Zehao He**, Xiaomeng Sui, Guofan Jin, and Liangcai Cao, “Progress in virtual reality and augmented reality based on holographic display,” Applied Optics 58, A74-A81 (2019).

Presentations

I have given 5 invited presentations, 12 oral presentations and 4 poster presentations in academic conferences. 3 presentations were selected as “best paper award”. Some of them are listed below:

- **Zehao He** and Liangcai Cao, “Fast decoding for coded aperture-based compressive data page in optical data storage” CSOE Advanced Photonics Forum, Beijing, China, October 2023. (Best paper award)
- **Zehao He** and Liangcai Cao, “Coded aperture-based compressive data page for optical data storage,” CSOE International Computational Imaging Conference, Sydney, Australia, June 2023. (Invited presentation)
- **Zehao He**, Kexuan Liu, Xiaomeng Sui, and Liangcai Cao, “Holographic 3D display using depth maps generated by 2D-to-3D rendering approach,” SPIE Photonics West on Demand, San Francisco, US, February 2022. (Invited presentation)
- **Zehao He**, Guofan Jin, and Liangcai Cao, “Distortion correction method based on angular spectrum algorithm for holographic display,” OSJ International Workshop on Holography and Related Technologies, Suzhou, China, December 2018. (Best paper award)

I gave 2 presentations in ICDT 2021 & ICDT 2023. I also registered and attended ICDT 2020 which was held in Wuhan, China, October 2020. These 2 presentations are listed below:

- Kexuan Liu, Jiachen Wu, **Zehao He**^{*} (presenter), and Liangcai Cao, “High-fidelity model-driven deep neural networks for phase-only computer-generated holography,” International Conference on Display Technology, Nanjing, China, April 2023.
- **Zehao He**, Xiaomeng Sui, and Liangcai Cao, “Quantization for continuous complex-amplitude distribution in computer-generated holography,” International Conference on Display Technology, Beijing, China, June 2021.

Patents

I have applied for 15 patents. Currently, 8 of them have been granted.

Organization participations

2023/07-Present	Deputy Secretary-General, Professional Committee on Light Display, CSOE
2022/11-Present	Committee Member, Professional Committee on Opto-electromechanical Technology and System, CIS
2022/11-Present	Committee Member, Professional Committee on Opto-electronic Technology, COS
2021/07-Present	Committee Member, Professional Committee on 3D Imaging and Display, CSIG

Academic participations

2023/06-Present	Member of Youth Editorial Committee, Journal of Applied Optics
2022/03-2022/09	Guest Editor, Special Issue on “Advances & Applications of Imaging on Digital Holography”, Photonics

Letter of Recommendation

17 Dec 2023

To whom it may concern,

I am compiling the present letter to give my recommendation for Dr. Zehao He.

Zehao served as a postdoctoral researcher from July 2021 to October 2023, following his role as a Ph.D. candidate from September 2017 to July 2021 in my group. I have developed a strong acquaintance with him and am pleased to recommend him as a candidate for the ICDT Young Leader Conference 2024.

As a young researcher, Zehao has made notable contributions to high-impact scientific research. He has successfully authored a cover paper accepted by Photonics Insights, encompassing a comprehensive 60-page review on diffractive optics. He has also published a research article on display distortion correction in IEEE Transactions on Industrial and Informatics, a journal with an impact factor of 12.3 in 2023. His paper “Process in virtual reality and augmented reality based on holographic display” has garnered more than 130 citations since its publication. His doctoral thesis was distinguished with the honor of being selected as a National Outstanding Doctorate Dissertation in Optical Engineering. This recognition is exclusive, with only 11 individuals nationwide receiving this distinction in 2023.

Zehao consistently delivers excellent presentations to our group members, collaborators, and at international conferences. His talks are consistently inspiring, showcasing a high level of clarity, quality, and originality. He has been honored with the Best Paper Award at conferences 3 times and has had the privilege of delivering invited talks as a student.

Currently, Zehao is serving as the sub-project leader of an important project funded by the National Key R&D Program. In his capacity as the person in charge, he is also overseeing a project funded by NSFC and a project funded by the China Postdoctoral Foundation. Some of his research achievements have been adopted by Hisense and Huawei.

Zehao has dedicated considerable time to events and services within our optical communities. He holds the position of Deputy Secretary-General of the CSOE Light Display Committee. Additionally, he serves as a technical group member of the CIS Opto-electromechanical Technology and System Committee, COS Opto-electronic Technology Committee, and CSIG 3D Imaging and Display Committee.

Overall, Zehao would be a very distinguished recipient of the qualification for the ICDT Young Leader Conference 2024. His application has my full support. Clearly, he is worth of the recognition.

Best regards,



Liangcai Cao, PhD, Professor, Optica Fellow, SPIE Fellow
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