

Haoran Ren
ARC DECRA Fellow
MQ Research Fellow
Department of Physics and Astronomy
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Biography

Dr Haoran Ren is a Honorary Research Fellow at Macquarie University. He is currently working as an ARC DECRA Fellow at Monash University. His nanophotonic research aims to develop advanced optical materials and nanotechnology for both fundamental light-matter interactions and broad photonic applications. Dr Ren received a PhD from Swinburne University of Technology in 2017. He was a postdoc at RMIT University from 2017 to 2018. In 2018, Dr Ren won a Victoria Fellowship to visit the CNRS in France. In 2019, Dr Ren was awarded a Humboldt Postdoctoral Research Fellowship and moved his research to LMU Munich in Germany. In December 2020, he started a MQRF at Macquarie University. Dr Ren is an Associate Investigator for the ARC Centre of Excellence for Transformative Meta-Optical Systems (TMOS).

Qualifications

Optics, PhD, Nanophotonic manipulation of angular momentum for information optics, Swinburne University of Technology
1 Mar 2013 → 8 Feb 2017
Award Date: 8 Feb 2017

Employment

Honorary Research Fellow

Honorary Fellow
School of Mathematical and Physical Sciences
Macquarie University
1 Jun 2022 → present

MQ Photonics Research Centre

Macquarie University
14 Dec 2020 → present

DECRA Fellow

Monash University
Clayton, Australia
1 Jun 2022 → present

Humboldt Research Fellow

Ludwig-Maximilians-Universität München
Munich, Germany
1 Jan 2019 → 31 Dec 2020

Postdoc

Royal Melbourne Institute of Technology (RMIT University)
Bundoora, Australia
1 Oct 2016 → 31 Dec 2018

Research outputs

Nanophotonic materials for twisted-light manipulation

Ren, H. & Maier, S. A., 24 Aug 2023, In: Advanced Materials. 35, 34, p. 1-16 16 p., 2106692.

Strong polarization dependent nonlinear excitation of a perovskite nanocrystal monolayer on a chiral dielectric nanoantenna array

Vinçon, I., Wendisch, F. J., De Gregorio, D., Pritzl, S. D., Akkerman, Q. A., Ren, H., de S. Menezes, L., Maier, S. A. & Feldmann, J., 16 Nov 2022, In: ACS Photonics. 9, 11, p. 3506-3514 9 p.

Optical metasurfaces for energy conversion

Cortés, E., Wendisch, F. J., Sortino, L., Mancini, A., Ezendam, S., Saris, S., de S. Menezes, L., Tittl, A., Ren, H. & Maier, S. A., 12 Oct 2022, In: Chemical Reviews. 122, 19, p. 15082–15176 95 p.

Metasurface measuring twisted light in turbulence

Dinter, T., Li, C., Kühner, L., Weber, T., Tittl, A., Maier, S. A., Dawes, J. M. & Ren, H., 21 Sept 2022, In: ACS Photonics. 9, 9, p. 3043-3051 9 p.

Radial bound states in the continuum for polarization-invariant nanophotonics

Kühner, L., Sortino, L., Berté, R., Wang, J., Ren, H., Maier, S. A., Kivshar, Y. & Tittl, A., 25 Aug 2022, In: Nature Communications. 13, 1, p. 1-8 8 p., 4992.

Plasmonic Bound States in the Continuum to Tailor Light-Matter Coupling

Aigner, A., Tittl, A., Wang, J., Weber, T., Kivshar, Y., Maier, S. A. & Ren, H., 21 Jul 2022, (Submitted) arXiv.org, (arXiv).

An achromatic metafiber for focusing and imaging across the entire telecommunication range

Ren, H., Jang, J., Li, C., Aigner, A., Plidschun, M., Kim, J., Rho, J., Schmidt, M. A. & Maier, S. A., 20 Jul 2022, In: Nature Communications. 13, 1, p. 1-10 10 p., 4183.

Vectorial wavefront holography based on a polarisation-insensitive hologram

Ren, H., Jun 2022, In: Journal of Optics. 24, 6, p. 1-7 7 p., 064008.

Laser manufacturing of 3D meta-optics for advanced light manipulation

Ren, H. & Maier, S. A., 5 Mar 2022, *Advanced Fabrication Technologies for Micro/Nano Optics and Photonics XV*. San Francisco: SPIE, (Proceedings of SPIE; vol. PC1201204).

Nanophotonics shines light on hyperbolic metamaterials

Aigner, A., Dawes, J. M., Maier, S. A. & Ren, H., 10 Jan 2022, In: Light: Science and Applications. 11, 1, p. 1-4 4 p., 9.

Roadmap on multimode light shaping

Piccardo, M., Ginis, V., Forbes, A., Mahler, S., Friesem, A. A., Davidson, N., Ren, H., Dorrah, A. H., Capasso, F., Dullo, F. T., Ahluwalia, B. S., Ambrosio, A., Gigan, S., Treps, N., Hiekkamäki, M., Fickler, R., Kues, M., Moss, D., Morandotti, R., Riemensberger, J., & 18 others Kippenberg, T. J., Faist, J., Scalari, G., Picqué, N., Hänsch, T. W., Cerullo, G., Manzoni, C., Lugiato, L. A., Brambilla, M., Columbo, L., Gatti, A., Prat, F., Shiri, A., Abouraddy, A. F., Alù, A., Galiffi, E., Pendry, J. B. & Huidobro, P. A., Jan 2022, In: Journal of Optics. 24, 1, p. 1-53 53 p., 013001.

Arbitrary structured quantum emission with a multifunctional imaging metalens

Ren, H., 2022, (Submitted) arXiv.org, (arXiv).

Metasurface measuring twisted light in turbulence

Dinter, T., Kühner, L., Li, C., Weber, T., Tittl, A., Maier, S. A., Dawes, J. M. & Ren, H., 2022, *CLEO/PR 2022: Conference on Lasers and Electro-Optics Pacific Rim*. Sapporo Japan: Optica Publishing Group, 2 p. CMP16A_05

Metasurface measuring twisted light in turbulence

Dinter, T., Kühner, L., Li, C., Weber, T., Tittl, A., Maier, S. A., Dawes, J. M. & Ren, H., 2022, *CLEO-PR 2022: Proceedings of the 2022 Conference on Lasers and Electro-Optics Pacific Rim*. Piscataway, NJ: Institute of Electrical and Electronics Engineers (IEEE), 2 p. CMP16A-05

Nanophotonic manipulation of optical angular momentum for high-dimensional information optics

Fang, X., Ren, H., Li, K., Luan, H., Hua, Y., Zhang, Q., Chen, X. & Gu, M., 2 Dec 2021, In: Advances in Optics and Photonics. 13, 4, p. 772-833 62 p.

Orbital-angular-momentum-controlled hybrid nanowire circuit

Ren, H., Wang, X., Li, C., He, C., Wang, Y., Pan, A. & Maier, S. A., 28 Jul 2021, In: Nano Letters. 21, 14, p. 6220-6227 8 p.

Optical vortices in nanophotonics

Li, C., Maier, S. A. & Ren, H., Jul 2021, In: Chinese Optics. 14, 4, p. 792-811 20 p.

Self-constructed multiple plasmonic hotspots on an individual fractal to amplify broadband hot electron generation

Wang, X., Liu, C., Gao, C., Yao, K., Masouleh, S. S. M., Berté, R., Ren, H., de S. Menezes, L., Cortés, E., Bicket, I. C., Wang, H., Li, N., Zhang, Z., Li, M., Xie, W., Yu, Y., Fang, Y., Zhang, S., Xu, H., Vomiero, A., & 4 othersLiu, Y., Botton, G. A., Maier, S. A. & Liang, H., 22 Jun 2021, In: ACS Nano. 15, 6, p. 10553–10564 12 p.

Nanointerferometric discrimination of the spin-orbit Hall effect

Zhang, M., Ren, H., Ouyang, X., Jiang, M., Lu, Y., Hu, Y., Fu, S., Li, Z., Chen, Z., Guan, B-O., Cao, Y. & Li, X., 21 Apr 2021, In: ACS Photonics. 8, 4, p. 1169-1174 6 p.

Optically tunable Mie resonance VO₂ nanoantennas for metasurfaces in the visible

Kepič, P., Ligmajer, F., Hrtoň, M., Ren, H., de S. Menezes, L., Maier, S. A. & Šikola, T., 21 Apr 2021, In: ACS Photonics. 8, 4, p. 1048-1057 10 p.

Ultrahigh numerical aperture meta-fibre for flexible optical trapping

Plidschun, M., Ren, H., Kim, J., Förster, R., Maier, S. A. & Schmidt, M. A., 15 Mar 2021, In: Light: Science and Applications. 10, 1, 11 p., 57.

Topological-insulator-based gap-surface plasmon metasurfaces

Aigner, A., Maier, S. A. & Ren, H., 4 Feb 2021, In: Photonics. 8, 2, p. 1-14 14 p., 40.

3D meta-optics for high-bandwidth twisted light holography

Ren, H. & Maier, S. A., 2021, *DH 2021: Digital Holography and Three-Dimensional Imaging*. Washington, DC: Optica Publishing Group, 2 p. DF2C.5

Radial bound states in the continuum

Kühner, L., Ren, H., Berté, R., Maier, S. A., Kivshar, Y. S. & Tittl, A., 2021, *CLEO: QELS_Fundamental Science 2021*. San Jose, CA: OSA Publishing, 2 p. FTu4F.5

Complex-amplitude metasurface-based orbital angular momentum holography in momentum space

Ren, H., Fang, X., Jang, J., Bürger, J., Rho, J. & Maier, S. A., Nov 2020, In: Nature Nanotechnology. 15, 11, p. 948-955 9 p.

Three-dimensional vectorial holography based on machine learning inverse design

Ren, H., Shao, W., Li, Y., Salim, F. & Gu, M., 17 Apr 2020, In: Science Advances. 6, 16, 7 p., eaaz4261.

A light-programmable metasurface

Ren, H., 20 Mar 2020, In: Nature Electronics. 3, 3, p. 137-138 2 p.

Metasurface-integrated vertical cavity surface-emitting lasers for programmable directional lasing emissions

Xie, Y-Y., Ni, P-N., Wang, Q-H., Kan, Q., Briere, G., Chen, P-P., Zhao, Z-Z., Delga, A., Ren, H-R., Chen, H-D., Xu, C. & Genevet, P., Feb 2020, In: Nature Nanotechnology. 15, 2, p. 125-130 6 p.

Orbital angular momentum holography for high-security encryption

Fang, X., Ren, H. & Gu, M., Feb 2020, In: Nature Photonics. 14, 2, p. 102-108 8 p.

Metasurface orbital angular momentum holography

Ren, H., Briere, G., Fang, X., Ni, P., Sawant, R., Héron, S., Chenot, S., Vézian, S., Damilano, B., Brändli, V., Maier, S. A. & Genevet, P., 1 Dec 2019, In: Nature Communications. 10, 1, 8 p., 2986.

Angular-momentum nanometrology in an ultrathin plasmonic topological insulator film
Yue, Z., Ren, H., Wei, S., Lin, J. & Gu, M., 24 Oct 2018, In: Nature Communications. 9, 1, 7 p., 4413.

Angular momentum-reversible near-unity bisignate circular dichroism
Ren, H. & Gu, M., May 2018, In: Laser and Photonics Reviews. 12, 5, 6 p., 1700255.

On-chip noninterference angular momentum multiplexing of broadband light
Ren, H., Li, X., Zhang, Q. & Gu, M., 13 May 2016, In: Science. 352, 6287, p. 805-809 5 p.

Catenary optics for achromatic generation of perfect optical angular momentum
Pu, M., Li, X., Ma, X., Wang, Y., Zhao, Z., Wang, C., Hu, C., Gao, P., Huang, C., Ren, H., Li, X., Qin, F., Yang, J., Gu, M., Hong, M. & Luo, X., Oct 2015, In: Science Advances. 1, 9, 6 p., e1500396.

Athermally photoreduced graphene oxides for three-dimensional holographic images
Li, X., Ren, H., Chen, X., Liu, J., Li, Q., Li, C., Xue, G., Jia, J., Cao, L., Sahu, A., Hu, B., Wang, Y., Jin, G. & Gu, M., 22 Apr 2015, In: Nature Communications. 6, 7 p., 6984.

Polarization-multiplexed multifocal arrays by a π -phase-step-modulated azimuthally polarized beam
Ren, H., Li, X. & Gu, M., 15 Dec 2014, In: Optics Letters. 39, 24, p. 6771-6774 4 p.

Super-resolved pure-transverse focal fields with an enhanced energy density through focus of an azimuthally polarized first-order vortex beam
Li, X., Venugopalan, P., Ren, H., Hong, M. & Gu, M., 15 Oct 2014, In: Optics Letters. 39, 20, p. 5961-5964 4 p.

Three-dimensional parallel recording with a Debye diffraction-limited and aberration-free volumetric multifocal array
Ren, H., Lin, H., Li, X. & Gu, M., 15 Mar 2014, In: Optics Letters. 39, 6, p. 1621-1624 4 p.

Activities

META2022 Invited talk
Haoran Ren (Speaker)
19 Jul 2022 → 22 Jul 2022

Light: Science and Applications (Journal)
Haoran Ren (Reviewer)
5 May 2022

Nano letters (Journal)
Haoran Ren (Reviewer)
1 May 2022

Nanophotonics (Journal)
Haoran Ren (Reviewer)
1 May 2022

Nature Electronics (Journal)
Haoran Ren (Reviewer)
30 Mar 2022

Nature (Journal)
Haoran Ren (Reviewer)
15 Mar 2022

Nature Photonics (Journal)

Haoran Ren (Reviewer)
11 Mar 2022

Optics Express (Journal)

Haoran Ren (Reviewer)
10 Mar 2022

Optica (Journal)

Haoran Ren (Reviewer)
28 Feb 2022

Light: Science and Applications (Journal)

Haoran Ren (Reviewer)
21 Feb 2022

Nature Communications (Journal)

Haoran Ren (Reviewer)
8 Feb 2022

Invited talk at SPIE Photonics West

Haoran Ren (Speaker)
22 Jan 2022 → 27 Jan 2022

Invited talk at SPIE Photonics West 2022

Haoran Ren (Speaker)
22 Jan 2022 → 27 Jan 2022

Light: Science and Applications (Journal)

Haoran Ren (Reviewer)
10 Jan 2022

Nanophotonics (Journal)

Haoran Ren (Reviewer)
10 Jan 2022

APL photonics (Journal)

Haoran Ren (Reviewer)
1 Jan 2022 → 31 Dec 2023

ANZCOP 2021

Haoran Ren (Organiser)
18 Nov 2021 → 19 Nov 2021

APL photonics (Journal)

Haoran Ren (Reviewer)
16 Nov 2021

Nature Communications (Journal)

Haoran Ren (Reviewer)
16 Nov 2021

Communications Physics (Journal)

Haoran Ren (Reviewer)

3 Nov 2021

Topological-insulator-based gap-surface-plasmon metasurfaces

Haoran Ren (Speaker)

11 Oct 2021 → 14 Oct 2021

Sydney OSA Local Section Seminars

Haoran Ren (Participant)

23 Sept 2021

3D Meta-optics enabled by laser manufacturing

Haoran Ren (Speaker)

20 Sept 2021 → 22 Sept 2021

APL photonics (Journal)

Haoran Ren (Reviewer)

20 Sept 2021

Science Advances (Journal)

Haoran Ren (Reviewer)

11 Aug 2021

3D meta-optics and on-chip photonics for structured light manipulation

Haoran Ren (Speaker)

20 Jul 2021

Nature Photonics (Journal)

Haoran Ren (Reviewer)

9 Jul 2021

Optica (Journal)

Haoran Ren (Reviewer)

30 Jun 2021

ACS Applied Nano Materials (Journal)

Haoran Ren (Reviewer)

28 Jun 2021

Communications Physics (Journal)

Haoran Ren (Reviewer)

28 Jun 2021

Photonics (Journal)

Haoran Ren (Reviewer)

7 Jun 2021

Sensors (Switzerland) (Journal)

Haoran Ren (Reviewer)

7 Jun 2021

Frontiers in Nanotechnology (Journal)

Haoran Ren (Member of editorial board)

15 May 2021

Introduction to structured light

Haoran Ren (Speaker)

3 May 2021

Lectureship presentation

Haoran Ren (Speaker)

3 May 2021

Seminar in complex beams and chiral nanophotonics

Haoran Ren (Speaker)

3 May 2021

Nature Communications (Journal)

Haoran Ren (Reviewer)

9 Apr 2021

Scientific Reports (Journal)

Haoran Ren (Reviewer)

27 Mar 2021

ACS Photonics (Journal)

Haoran Ren (Reviewer)

23 Mar 2021

Frontiers in Photonics (Journal)

Haoran Ren (Member of editorial board)

22 Mar 2021

Photonics (Journal)

Haoran Ren (Editor)

21 Mar 2021

MQ Photonics Seminar

Haoran Ren (Speaker)

3 Mar 2021

Korea-Australia Nanophotonics Remote Lectureship

Haoran Ren (Speaker)

2 Mar 2021

Optica (Journal)

Haoran Ren (Reviewer)

28 Feb 2021

Results in Physics (Journal)

Haoran Ren (Reviewer)

26 Feb 2021

Nature Communications (Journal)

Haoran Ren (Reviewer)

20 Jan 2021

Nanophotonics (Journal)

Haoran Ren (Reviewer)
10 Jan 2021

Nature Communications (Journal)

Haoran Ren (Reviewer)
15 Aug 2020

Nano letters (Journal)

Haoran Ren (Reviewer)
23 Apr 2020

ACS Photonics (Journal)

Haoran Ren (Reviewer)
18 Apr 2020

OSA-The Optical Society (External organisation)

Haoran Ren (Member)
1 Jan 2020 → 31 Dec 2020

Metamaterial Workshop at Imperial College London (2020)

Haoran Ren (Speaker)
2020

Nature Communications (Journal)

Haoran Ren (Reviewer)
15 Nov 2019

Nature Electronics (Journal)

Haoran Ren (Reviewer)
18 Oct 2019

ACS Photonics (Journal)

Haoran Ren (Reviewer)
15 Oct 2019

ACS Photonics (Journal)

Haoran Ren (Reviewer)
21 Jul 2019

CNRS, Centre National de la Recherche Scientifique (CNRS), CITERES

Haoran Ren (Visiting researcher)
1 Oct 2018 → 30 Dec 2018

Prizes**2015 OSA Foundation Robert S. Hilbert Student Travel Grant**

Ren, Haoran (Recipient), 2015

2016 Chinese Government Prize for the Extraordinary Potential for Outstanding Self-financed Students Abroad

Ren, Haoran (Recipient), 2016

Awards

Projects

MQRAS 21 R2: Smart optical imaging at depths
Lu, Y., Ren, H., Dawes, J., Inglis, D. & Chung, R.
25/01/22 → 31/12/22