Mingguang He, MD PhD MPH FRANZCO

Chair Professor of Experimental Ophthalmology
Global STEM Scholar under HKSARG's Global STEM Professorship Scheme
The Hong Kong Polytechnic University

Prof. Mingguang He is currently Chair Professor of Experimental Ophthalmology in the Hong Kong Polytechnic University, Global STEM scholar under HKSARG's Global STEM Professorship scheme. He is the former *Research at Melbourne Accelerator Program* Distinguished Professor of Ophthalmology, University of Melbourne and Centre for Eye Research Australia, Director of WHO Collaborating Centre for Prevention of Blindness (Australia).

He undertook his medical training in China and holds a Master of Public Health degree from Johns Hopkins University in Baltimore, and PhD in ophthalmology at Moorfields Eye Hospital in London.

Professor He is a global expert in vision-related clinical and epidemiologic research. He has led some important epidemiological studies and clinical trials, including the first population-based study on myopia in China, the first population-based study on glaucoma in China, a clinical trial to prove the efficacy of increased outdoor time on myopia prevention published in JAMA 2015 and a prophylactic clinical trial on angle closure glaucoma published in Lancet 2019. He has published more than 500 publications which have attracted more than 20,000 citations (Google scholar H index 75 by May 2023).

He has received more than 10 million major research grants in Australia, including the prestigious NHMRC investigator Grant and Medical Research Future Fund for his research on artificial intelligence. He founded and served as the first president of the Asia Pacific Tele-Ophthalmology Society. He was a founding council member of Asia Pacific Myopia Society and deputy Secretary-General for Asia Pacific Academy of Ophthalmology.

He has been named one of the top 100 most influential and inspirational individuals who have demonstrated "Ten Years of Excellence and Impact in Ophthalmology" on the esteemed Ophthalmologist Power List in 2023.

RESEARCH INTERESTS

Clinical and epidemiological studies: In 2004, Prof He initiated and completed the first population-based study on glaucoma in mainland China. In 2003-2006, with a grant supported by US National Eye Institute and World Health Organization, he completed population-based studies and reported prevalence and characteristics of refractive error in school-aged children in both urban and rural Chinese children. In 2009-2011, with supported from US National Eye Institute, he completed a population-based study and systematically reported the prevalence of presbyopia and recently completed a 2 year follow up visit for the study cohort. In 2009, he established the Guangzhou Government Servant Eye Study where he enrolled over 9000 people and incorporated eye examination into the annual physical checkup program with an aim to investigate eye biomarker and phenotypes as predictors for important life events. In 2011, he established the first Chinese High Myopia Registry where he enrolled over 1000 people with high myopia and intended to follow up them for a long time aiming to understand the natural history and risk factors on progression and the development of retinal damage. This series of studies help understand the prevalence, clinical characteristics, natural history and risk factors for important eye diseases such as glaucoma, myopia and retinal diseases.

Big data research and technology development: He invented devices that facilitate the diagnosis and surgery of eye disease. He held about 21 patents on equipment development and software development. *He has been working on a project using a*rtificial intelligence and fundus camera to build automated screening for eye diseases, in which he collected 200,000 images with clinical labelling and develop a CNN deep learning system for 5 common eye conditions. In 2017 and 2018 he published his research findings about AI in JAMA and Diabetes Care respectively. He will translate this into a web-based software, opportunistic screening for GP clinics and diagnostic assistance for endocrinology clinics. He collaborated with the Sax Institute to build a team of big data researchers to run the 45 and Up Study analysis that involved around 250K people enrolled in New South Wales where a variety of prediction models, based on traditional random forest and novel deep learning model, have been developed for diabetic retinopathy, ageing, diabetes and multiple chronic diseases.

Twin study: Prof He established a large-scale twin registry and enrolled over 9000 pairs of young twins in Guangzhou. He and his co-workers collected phenotypes and DNA for over 1200 pairs of twins aged 7-15 years as well as their parents and siblings in 2006 and most of the twins were examined annually since 2006. Genome-wide scan has been completed for all samples.

Clinical Trial: Prof He is running a clinical trial on prophylaxis of angle closure in Chinese people where he enrolled 890 participants with angle closure and laser one-randomly selected eye. Four years follow up visit has been completed. The research was published in the Lancet in 2019.In 2009 he ran a clinical trial to investigate the impact of outdoor intervention on the control of myopia. Approximately 2000 students at grade 1 of primary schools were enrolled and 3-years follow up visit has been completed. In 2015 he published the finding of this clinical trial on myopia in JAMA.

QUALIFICATIONS

2015 Fellow, Royal Australian and New Zealand College of Ophthalmologists
2006 Doctor of Philosophy, University College London, UK
2005 Doctor of Medicine, Sun Yat-sen University, China
2001 Master of Public Health, Johns Hopkins University, USA
2000 Master of Science, University College London, UK
1998 Master of Medicine, Sun Yat-sen University of Medical Sciences, China
1993 Bachelor of Medicine, Sun Yat-sen University of Medical Sciences, China

PREVIOUS EMPLOYMENT

2015-2023 Professor of Ophthalmology, University of Melbourne & Centre for Eye Research Australia, Melbourne, Australia
2009-2015 Associate Director, Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangzhou
2003-2006 Associate Professor of Ophthalmology, Zhongshan Ophthalmic Center, Sun Yat- sen University, Guangzhou
1998-2003 Ophthalmic Attending Doctor (Consultant), Zhongshan Ophthalmic Center, Sun Yat-sen University Guangzhou
1993-1998 Ophthalmic Resident, Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangzhou

ACADEMIC LEADERSHIP

2019- Founding council member, Asia Pacific Ocular Imaging Society
2016- Founding president, Asia Pacific Tele-Ophthalmology Society
2015- Founding council member, Asia Pacific Myopia Society

2014- Director, Preventive Ophthalmology Panel, Chinese Ophthalmological Society
2013-2022 Deputy Secretary-General and Council Member, Asia-Pacific Academy of Ophthalmology
2001-2012 Country Director, Helen Keller International

PROFESSIONAL SERVICE

Professional society membership
2009- Member, International Glaucoma Research Society
2005- Member, Asia-Pacific Academy of Ophthalmology
2004- Member, World Glaucoma Association
2003- Member, American Academy of Ophthalmology
2000- Member, Association for Research in Vision and Ophthalmology
2000- Member, Chinese Ophthalmological Society

Editorial Board
2021- British Journal of Ophthalmology (Deputy Editor-in-chief)
2018-2021 Ophthalmology Glaucoma
2016- Clinical Experimental Ophthalmology
2013- Asia-pacific Journal of Ophthalmology
2012- PLOS ONE
2011-2018 Ophthalmology
2011- Molecular Vision
2009- Chinese Journal of Ophthalmology
2007- International Glaucoma Review

Panel and committees for clinical guideline and consensus

2015 World Health Organisation Expert Consensus on myopia
2019-2021 American Academy of Ophthalmology Task Force for Myopia
2019 International Myopia Institute Consensus and White Paper
2019-2021 Asia Pacific Myopia Society Public Education White Paper
2011 World Glaucoma Association Consensus #8: Progression of glaucoma
2008 World Glaucoma Association Consensus #5: Glaucoma screening
2006 World Glaucoma Association Consensus #3: Angle closure and angle closure glaucoma

Peer review involvement
National Health & Medical Research Council (NHMRC) Grants, Australia
National Natural Science Foundation of China (NNSFC) Grants, China
Health and Medical Research Grant under the Government of the Hong Kong HKSAR
Welcome Trust, United Kingdom

AWARDS

2018 Chinese Medical Science and Technology Award-Second Prices
2018 Richard Fan Distinguished Lectureship, Singapore National Eye Centre
2015 Holmes Lecture, Asia-Pacific Academy of Ophthalmology
2014 Raine Visiting Professor Award, University Western Australia & Raine Foundation
2011 Distinguished Young Scholar Award, National Natural Science Foundation of China (NNSFC), China
2007 Top 3 and Top 10 Best Poster Award, World Glaucoma Congress
2007 Nominate Award, Guangdong Province Top 10 Outstanding Youth Medal

2006 Best Paper Presentation, South East Asian Interest Group Conference
2005 Top 10 Best Poster Award, World Glaucoma Congress
2002 Overseas Research Scholarship, UK Government, UK
2002 Graduate Research Scholarship, University College London, UK
1998 "Flying Tulip" travel award, International Council of Ophthalmology Conference

RESEARCH FUNDING

2025-2028 Chief investigator. Financial Support for Non-PAIR Research Centres: PolyU-Stanford Joint Research Centre for Longitudinal Deep Omics (LDO).
2025-2026 Chief investigator. Projects of RISports: SyncPulse ElderlyWatch: AI-Driven Real-Time Monitoring of Exercise and Health for the Elderly.
2024-2026 Chief investigator. PolyU-HuiKang Joint Laboratory for Biotech Innovation: Peptide Screening and Application Solutions.
2023-2027 Chief investigator. Research Matching Grant Scheme (RMGS): Development of an Eye Fatigue Assessment Platform for Equipment Testing and Efficacy Evaluation.
2023-2028 Chief investigator. Mentholatum (Asia Pacific) Limited: PolyU - Rohto Centre of Research Excellence for Eye Care.
2023-2028 Chief investigator. Global STEM Professorship Scheme (PolyU): Smart primary healthcare and eyecare service: from data to algorithms and real-world solutions.
2023-2028 Chief investigator. The Hong Kong Jockey Club Charities Trust: JC STEM Lab of Innovative Light Therapy for Eye Diseases.
2020-2023 Chief investigator A. Medical Research Future Fund (MRFF): National Critical Research Infrastructure Initiative - 2019 Applied Artificial Intelligence Research in Health. Artificial intelligence system to detect eye and cardiovascular diseases. $4,988,487AUD.
2020-2024 Chief investigator A. National Health & Medical Research Council (NHMRC) Investigator grant. Artificial intelligence in ophthalmology: from data to algorithm and real-world application. $2,748,640AUD.
2019-2022 Chief investigator A. National Health & Medical Research Council (NHMRC) partnership grant. Improved early diagnosis of eye disease by integration of retinal photography and artificial intelligence to build an opportunistic screening service in regional and remote primary care settings. $1,015,887 AUD.
2018-2020 Co-investigator. JDRF Strategic Research. Artificial intelligence-assisted opportunistic screening of diabetic retinopathy in patients with type 1 diabetes at endocrinology clinics. 149,983 AUD.
2017-2018 Principal Investigator. Australian Government, Department of Health. Medical Research Future Fund. Integration of retinal photography and artificial intelligence to build opportunistic screening services in primary care settings. 300,000 AUD.
2017-2019 Principal Investigator. Google Impact Challenge, Australia 2016. The Vision At Home (V@Home), an eyesight self-assessment system for remote community. 750,000AUD.
2017-2020 Chief Investigator I. National Health & Medical Research Council (NHMRC), Australia. APP1121979. Young adult myopia: genetic and environmental associations.
2015-2018 Principal Investigator. BUPA Health Foundation. Development of an automated web-based screening system for eye diseases. 486,103AUD.
2015-2019 Principal Investigator. National Natural Science Foundation of China (NNSFC), Key International Cooperative Research Project, 81420108008. A follow-up study for natural progression and intervention of primary angle closure glaucoma. 3,000,000RMB.
2015-2017 Principal Investigator. Ministry of Science and Technology of the PRC. Scientific and Technological Innovation Leader, Ophthalmology.
2013-2015 Australian Cooperative Research Centre. Intelligent Retinal Camera Project.
2012-2015 Principal Investigator. National Natural Science Foundation of China (NNSFC), Distinguished Young Scholar Award, 81125007. Ophthalmology. 2,000,000RMB.

2009-2019 State Science and Technology & Ministry of Education. Development of preventive ophthalmology.

2008-2011 Principal Investigator. Fight for Sight, UK. Zhongshan Angle-closure Prevention Trial.

2008-2010 Principal Investigator.Michael Dell Susan Foundation. Refractive error intervention program in China (ChildSight®).

2008-2010 Principal Investigator. National Natural Science Foundation of China (NNSFC), 30772393. Guangzhou Twin Eye Study: Progression of myopia and genetic determinants. 290,000 RMB.

2007-2008 Principal Investigator. National Natural Science Foundation of China (NNSFC), Sino-International Special Fund, 30711120368. Sino-Australia Twin ophthalmology bioinformatics platform: Guangzhou Twin Eye Study.60,000 RMB.

2007-2009 Principal Investigator. Ministry of Education of the PRC, Program for New Century Excellent Talents in University (NCET), NCET-06-0720. Prophylactic treatment and natural history of angle closure. 500,000RMB.

2006-2016 Principal Investigator. Sun Yat-sen University, Project 5010. Prophylactic treatment and natural history of angle closure.

2005-2008 Department of Science and Technology, Guangzhou City Government. Guangzhou Twin Eye Study.

2005-2008 Department of Science and Technology, Guangdong Provincial Government. Prophylactic treatment of angle closure glaucoma.

2003-2004 World Health Organization, Geneva and National Eye Institute, USA. N01-EY-9-2103. Refractive Error Study in School-aged children in Guangzhou & Yangxi.

PATENTS

Granted Patents

1. PATENT: “A Method for increasing blood flow and metabolic rate of eye fundus”. Mingguang He, Zhaoyun Cao, Zhuoting Zhu. CN110237432A; EP4011441A1; AU2020233703C1; WO2020244675A1; US20210402205B1. 2019.
2. PATENT: “Wearable eye disease self-diagnosis equipment”. Mingguang He, Zhixi Li. CN113273960A. 2021.
3. PATENT: “Portable glaucoma and ciliary body syndrome diagnosis and treatment instrument”. Mingguang He, Zhuoting Zhu. CN113299396A. 2021.
4. PATENT: “Auxiliary prevention and treatment system for uveitis”. Mingguang He, Zhixi Li. CN113252912A. 2021.
5. PATENT: “Portable diagnose and treat instrument for diabetic retinopathy”. Mingguang He, Zhixi Li. CN113273959A. 2021.
6. PATENT: “Intelligent diagnosis and treatment instrument for age-related macular degeneration”. Mingguang He, Zhixi Li. CN113243887A. 2021.
7. PATENT: “Myopia prevention and control device based on mobile terminal”. Mingguang He, Yinzhi Liu, Zhuoting Zhu. CN110648759A. 2019.
8. PATENT: “Visual training method to improve visual ability based on dynamic brain fitness”. Mingguang He, Zhuoting Zhu. CN109727508A. 2018.
9. PATENT: “A Fundus photograph image intelligent obtaining and grading system”. Mingguang He, Wei Meng. CN105411525A. 2015.
10. PATENT: “Imaging medical information sharing system based on embedded type operation system and cloud platform”. Mingguang He, Wei Meng. CN104463748B. W02016065784A1.2015.
11. PATENT: “Corneal contact lens and method for mouse fundus observation with microscope assistance”. Mingguang He, Xingyan Lin. CN104173022B. W02016033952A1.2015.

12. PATENT: “Electronic vision testing system adopting double-blind design”. Mingguang He. CN104000553B. 2014.
13. PATENT: “An innovative device for drug release through posterior segment”. Mingguang He. CN203389001U. 2014.
14. PATENT: “Dancing blanket for self physical fitness testing”. Mingguang He. CN203329344U. 2013.
15. PATENT: “A spectacle simulating symptoms for health education purposes”. Mingguang He. CN202036405U. 2011.
16. PATENT: “An elastic apparatus to support the probe of A-scan”. Mingguang He. CN201929987U. 2011.
17. PATENT: “The ophthalmic surgery film capable of being tom off step by step”. Mingguang He. CN201996726U. 2011.
18. PATENT: “An eye-speculum for cataract surgery”. Mingguang He. CN201949215U. 2011.
19. PATENT: “An anterior chamber depth measuring device with a darkroom”. Mingguang He. CN201929943U. 2011.
20. PATENT: “A device of portable slit lamp system”. Mingguang He. CN201500105U. 2010.
21. PATENT: “A device for making anterior capsulotomy in cataract surgery”. Mingguang He. CN201500225U. 2010.

PUBLICATIONS

Papers

Citation: 24366, H-index: 75 (Source from Google Scholar, April 2023)

Ten most representative publications

1. He M*., Jiang Y., Huang S., Chang D. S., Munoz B., Aung T., Foster P. J., Friedman D. S. Laser peripheral iridotomy for the prevention of angle closure: a single-centre, randomised controlled trial. ***Lancet***. 2019;393(10181):1609-18.
2. Li Z., Keel S., Liu C., He Y., Meng W., Scheetz J., Lee P. Y., Shaw J., Ting D., Wong T., Taylor H., Chang R., He M*. An Automated Grading System for Detection of Vision-Threatening Referable Diabetic Retinopathy on the Basis of Color Fundus Photographs. ***Diabetes care.*** 2018.
3. Keel S., Wu J., Lee P. Y., Scheetz J., He M*. Visualizing Deep Learning Models for the Detection of Referable Diabetic Retinopathy and Glaucoma. ***JAMA ophthalmology.*** 2018.
4. Li Z., He Y., Keel S., Meng W., Chang R. T., He M*. Efficacy of a Deep Learning System for Detecting Glaucomatous Optic Neuropathy Based on Color Fundus Photographs. ***Ophthalmology.*** 2018.
5. Wang W., Yan W., Muller A., Keel S., He M*. Association of Socioeconomics With Prevalence of Visual Impairment and Blindness. ***JAMA ophthalmology.*** 2017.
6. Guo X., Xiao O., Chen Y., Wu H., Chen L., Morgan I. G., He M*. Three-Dimensional Eye Shape, Myopic Maculopathy, and Visual Acuity: The Zhongshan Ophthalmic Center-Brien Holden Vision Institute High Myopia Cohort Study. ***Ophthalmology***. 2017;124(5):679-87.
7. Han X., Ellwein L. B., Guo X., Hu Y., Yan W., He M*. Progression of Near Vision Loss and Incidence of Near Vision Impairment in an Adult Chinese Population. ***Ophthalmology.*** 2017;124(5):734-42.
8. Ding X., Chang R. T., Guo X., Liu X., Johnson C. A., Holden B. A., He M*. Visual field defect classification in the Zhongshan Ophthalmic Center-Brien Holden Vision Institute High Myopia Registry Study. ***The British journal of ophthalmology.*** 2016;100(12):1697-702.
9. Xiao O., Morgan I. G., Ellwein L. B., He M*. Prevalence of Amblyopia in School-Aged Children and Variations by Age, Gender, and Ethnicity in a Multi-Country Refractive Error Study. ***Ophthalmology.*** 2015;122(9):1924-31.

10. He M*., Xiang F., Zeng Y., Mai J., Chen Q., Zhang J., Smith W., Rose K., Morgan I. G. Effect of Time Spent Outdoors at School on the Development of Myopia Among Children in China: A Randomized Clinical Trial. ***JAMA.*** 2015;314(11):1142-8.