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Summary

Optical Biofluidics Imaging Group **explores** the collective functional and morphological responses of complex cellular network in 3D under external stimulations (fluid shear, micro-textured surfaces, surface ligands). We **discover** novel optical principles for the development of 4D imaging flow assays by exploring the interface of optics, surface chemistry and data science. Through our imaging, computational and biological tools, we shall **profile** complex functional behavior of cellular network and **validate** drug targets or the study of diseases and disorders.

Steve earned degrees in electronics engineering, physics and trained in advanced bioimaging and industry instrumentation. In his undergraduate and research assistantship, he studied phase singularities in shaped light field (aka fluidic vortex of light) by pioneering optical holography and so-gel electron lithography methods. He then headed R&D department at Einst Technology Pte Ltd to develop confocal laser scanning technologies. He left Singapore to pursue PhD at Uni St Andrews (UK) with [Kishan Dholakia](#) in collaboration with [Ewan Wright](#) from OSC at University of Arizona. His PhD led to the invention of an optical fiber-capillary fluidics diagnostic tool to resolve the fundamental optical nonlinearity properties of nanofluids suspensions. In parallel to his PhD, he developed new optical tweezers and imaging tools to study optical gene transfection in mammalian cells. At Harvard, he worked with [Andy Yun](#) as a NIH/NIDDK postdoctoral fellow to pioneer *in vivo* imaging tools that investigated micro-blood vessel flow dynamics in organ transplantation and taste sensation in mice.

At start of his independent lab in mid-2013, he invented fluidic-lens shaping principles for low cost high performance smartphone microscopy and was awarded the [2014 ANSTO Innovative Technology Award by Australian Museum](#). From 2012- 2020, with successive competitive research fellowships (UNSW Vice Chancellor Fellow, ANU NIG-FERL, ARC DECRA and 3 competitive project grants, he led the development of 5 Bespoke BioImaging tools, [each tailored to study cellular activities under fluidic flows across size and time scales; contributing to the study of spatial temporal biology](#). His tools have been reported in Cell, Nature Protocol, Lab On Chip, Biophys J, Opt Lett, Biomed Opt Exp, Blood Advances, Sci Rep, Advanced Biosystem, Advanced Functional Materials. Since 2015, he has filed 4 international patents (WO2015113105A1, WO2017205892A1, WO2018045409A1, AUSIP-2019904929).

Since 2015, he was awarded major project grants with total amount ~ \$16.3 million; as ANU lead-Chief Investigator- on major competitive project grants (ARC, NHMRC, Industry) ~ \$2.67 million, as co-Chief Investigator (ACRF, ARC, Industry) worth \$3.85 million and participant (industry) ~ \$8.75 million. In 2021, he is the Director of Technology and a Chief Investigator of ACRF (InCite) Centre and will serve on the Advisory Editorial Board of Biomicrofluidics-AIP. He was a finalist for 2015 [ANU Last lecture](#) finalist- nominated by student society, convenor of Biomedical Imaging since 2015 and [ANU MIT-Harvard \(HST\)-BioOptics summer school \(NSF\)](#) from 2014-2018 and 2021-2022 [Janelia Research Campus-JCSMR Educational Seminar Series](#). He delivered invited oral presentations at over 20 international and national conferences, as invited, plenary, keynote, public lectures organised by Google, ANSTO, Royal Society-NSW, TedXCanberra and Optical Societies (OSA, EOS, AOS) and Fraunhofer institute and Czech Academy of Sciences. His work received media coverage in TIME, ABC News, Sunrise (Ch7) ,SMH, The Australian, CBS News and Smithsonian.

A. EDUCATION / TRAINING

HARVARD MEDICAL SCHOOL / MASSACHUSETTS GENERAL HOSPITAL Wellman Centre for Photomedicine Postdoctoral, BioImaging (Immunology, Oncology) <i>Project: Adaptive Intravital Microscopy</i> <i>Advisor: Seok-Hyun (Andy) Yun (Harvard Uni, MIT)</i>	Boston, Cambridge 12/2012
UNIVERSITY OF ST ANDREWS School of Physics and Astronomy PhD, Physics (Optical Tweezers, Nanophotonics, Biophysics) <i>Thesis: Optical trapping: optical interferometric metrology and nanophotonics</i> <i>Advisors: Kishan Dholakia (Uni. of St Andrews), Ewan Wright (Uni. of Arizona)</i>	St. Andrews, Fife 06/2010
NANYANG TECHNOLOGICAL UNIVERSITY Electrical and Electronics Engineering Bachelor with Honours, Engineering (Electronics) <i>Thesis: Computer generated holograms for optical tweezers *Gold Award</i> <i>Advisor: XiaoCong Yuan (NTU)</i>	Singapore 07/2002

B. APPOINTMENTS

THE AUSTRALIAN NATIONAL UNIVERSITY John Curtin School of Medical Research, College of Health and Medicine <ul style="list-style-type: none">Group Leader (Tenured) - <u>Optical Biofluids Imaging Group (°BIG)</u> <i>ANU Senior Fellow</i>CI, Centre for Intravital Imaging of Niches for Cancer Immune TherapyCI, Centre for Computational Biomedical Sciences	Canberra, ACT 01/2021 – Present 01/2021 – Present 09/2021 – Present
RSEEME, College of Engineering and Computer Science <ul style="list-style-type: none">Group Leader (Tenured) - Applied Optics Lab <i>ARC-DECRA Fellow</i>Junior Group Leader (Tenure-Track) - Applied Optics Lab <i>ANU-NIG Future Engineering Research Leader</i>Associate Investigatorship, <i>CoE Advanced Molecular Imaging</i>,	01/2017–12/2020 05/2013– 12/2016 01/2014 – 1/2021
UNIVERSITY OF NEW SOUTH WALES School of Physics <ul style="list-style-type: none">Vice-Chancellor Fellow, <i>Project: Optical Manipulation of Nanowires</i>	Kensington, Sydney 03/2012 – 04/2013
WELLMAN PHOTOMEDICINE & HARVARD MEDICAL SCHOOL BioOptics Lab <ul style="list-style-type: none">NIDDK/NIH Postdoctoral Fellow, <i>Project: Intravital Imaging</i>Physical Science Oncology Centre, Methodist Hospital-Node	Cambridge, MA 02/2010 -03/2012
UNIVERSITY OF ST ANDREWS Optical Trapping Lab <ul style="list-style-type: none">Graduate research Assistant, <i>Project: Multimodality Microscopy, Colloidal Nonlinear optics</i>	St. Andrews, Fife 02/2006 -06/2010
EINST TECHNOLOGY PTE LTD R&D Department <ul style="list-style-type: none">Manager, Consultant <i>Project: Confocal microscope and optical tweezers for nanoscience</i>	Singapore 02/2005 – 2/2007, 1/2010

C. VISITING APPOINTMENTS (Scientist, Fellow, Faculty)

Czech Academy of Sciences (CAS), Coherent X-Ray Laser (CFEL), Hamburg, (Germany), National Institutes of Health: Bethesda, MD, (USA), Garvan Institute of Medical Research (Sydney), Singapore University of Technology and Design (Singapore), Nanyang Technological University (Singapore).

D. HONORS, AWARDS, FELLOWSHIP

Scientific Steering Committee, ACRF INCite	2021
Advisory Editorial Board Member, American Institute of Physics, Biomicrofluidics	2021
Australian Research Council Discovery Early Career Award	2015
Royal Society (NSW) Speaker Medal	2014
Australian Eureka Prize “ANSTO Innovative Use of Technology”	2014
YouFab Global Creative Awards (Finalist)	2014
Edmund Optics International Higher Education Grant (Finalist)	2013
Future Engineering Research Leader (FERL) Fellowship	2012
UNSW Vice-Chancellor Fellowship Award	2012
Physical Sciences Oncology Young Investigators’ Meeting	2011
The Royal Society (UK) International Incoming Fellowship	2006
Nanyang Research Scholarship	2003
Gold Award for Top Undergraduate Honor Research Project	2002

D. INVITED TALK | KEYNOTE | PUBLIC LECTURE

Sechenov International Biomedical Summit	2021
Conference on Lasers and Electro-Optics (CLEO, Biomedical Applications)	2020
New and Emerging Technologies: Biotech meets Medicine (Fraunhofer institute)	2019
Biophotonics Early Careers Workshop (Uni Adelaide)	2019
International Society of Thrombosis and Haemostasis-Biorheology	2019
Australian New Zealand NanoMicroFluidics (ANZNMF)	2019
European Optical Society, Symposium for Optofluidic	2019
JCSMR Director’s “Health through discovery” (Public Lecture)	2018
Congress of the Australian Institute of Physics	2018
Institute of Scientific Instruments, Akademie věd České republiky (Public Lecture)	2018
Australian New Zealand NanoMicrofluidics student workshop (Tutorial)	2018
John Curtin School of Medical Research School Seminar	2017
7th Advances in Microfluidics & Nanofluidics Conference	2017
OSA Photonics Healthcare	2017
OSA/CLEO Pacific Rim	2017
Asia Pacific Physics/Australian Institute of Physics	2016
Australian Camp of Parasitology (Keynote)	2016
Melbourne Photonics Symposium,	2016
OSA Photonics and Fibre Technology	2016
Australian Conference on Microscopy	2016

Australian Camp of Parasitology (Keynote)	2015
Material Research Society (Singapore)	2015
Australian Camp of Parasitology	2014
GOOGLE First World (Keynote)	2014
Australian Nuclear Science and Technology Organization (Keynote)	2014
The Royal Society of New South Wales (Keynote)	2014
Australian Biomedical Engineering Conference	2014
TEDxCanberra, Australia (Keynote)	2014
OSA Optical Fabrication and Testing (OF&T)	2014
Animal Models of Weight Loss Surgery	2011
St Andrews Open Association (Public Lecture)	2011

E. FUNDINGS

Total Direct/Indirect funding ~AUD \$16.5 million (Chief, Partner, Associate: Investigatorship– CI,PI,AI)

CI-A, B (lead role- Direct Lab Funds)

Raster Adaptive Optics	CI-C, ACRF InCite	2021-2022	\$200,000
Understanding & controlling thrombus	CI-B, NHMRC Ideas	2021-2024	\$890,000
5D Imaging Flow Cytometry for BioFluids	CI-A, ARC-Discovery Proj	2020-2023	\$470,000
Multiplex Microscopy for Platelet biology	CI-B, ARC-Discovery Proj	2019-2022	\$440,000
Fluorescent nanodiamonds trafficking	CI-A, CSIRO seed grant	2020	\$2,500
Industry Priming grant	CI-A, ASTE	2017	\$7,000
Regulating gene delivery with light	Fellowship, ARC-DECRA,	2016-2019	\$330,000
Ultraflexible polygon microscopy I	CI-A, AusIndustry	2018-2019	\$100,000
Mobile Microscopy	CI-A, PBCRC,	2014-2015	\$30,000
Disposable Microscope Lens Fabrication	CI-A, Connect Venture,	2014-2015	\$51,000
Moldless fabrication of lenses	CI-A, Industry (Romar Eng)	2016	\$30,000
DiSCAPE	AI, ARC-Centre Adv Mol Imaging	2017,	\$50,000
Rapid immune imaging of spleen	AI, ARC-Centre Adv Mol Imaging	2016-2017	\$50,000
Light-based genetic engineering	Vice Chancellor Fellowship (UNSW)	2012-2015	\$270,000
			\$2.87 mil

Co-CI, External-led

Intravital Imaging of Niches for Cancer Immune Therapy	CI-C, ACRF	2021-2024	\$2,800,000
3-photon AO deep live imaging	CI-C, ARC-LIEF	2021	\$875,000
Ultraflexible polygon microscopy II	PI, AusIndustry	2019-2020	\$50,000
			\$3.85 mil

Participant

System Microscopy	CI-G, ARC-Infrastructure	2017-2018	\$600,000
OCT and XCT	CI-E, DB-exploration,	2016-2020	\$8,000,000
Multimodality OCT	CI-B, Connect Venture,	2016-2017	\$50,000
In-vivo adaptive laser scalpel endoscopy	Fellowship, UNSW-ECR	2013	\$20,000
Ultrafast spectroscopy and imaging	PI, MREII,	2013	\$100,000
			\$8.75 mil

Internal

Ultrafast laser facility	CI-C, MEC	2017	\$170,000
Rapid Volumetric Optical Microscope	CI-A, ANU-MEC,	2016	\$90,000
Ultrafast laser for time-resolved imaging	CI-C, ANU-MEC,	2015	\$170,000
Microfluidic and Soft Lithography Facility	CI-A, ANU-MEC,	2015	\$90,000

Future Engineering Research Fellowship	sole-CI, ANU-NIG,	2013-2019	\$500,000 \$1.02 mil
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Other PROJECTS (named co-investigator, advisor)

Advisor,	KickStarter, Macrolens and Microlens for Smartphone	2015
1RC1DK086242-1	Endoscopic Therapy-diagnostics System	2010
1RC2DK088661-01	Small Animal Metabolic Surgery (SAMS) Resource Core	2010
EP/F025602/1	Light Induced Self Assembled Colloidal Systems	2008

F. PUBLICATIONS

(Google Scholar, h-index =22, 1781 total cites, † Corresponding, *Equal Contribution)

F1. BOOK CHAPTER

1. V R. Daria & W.M.Lee, “Optical nanomanipulation and structured-beam optical traps”, **Comprehensive nanoscience and Nanotechnology** 2nd Edition, *Elsevier* 4, 347-360 (2019)
2. Dholakia, K. & W.M.Lee, “Optical Trapping Takes Shape: The Use of Structured Light Fields”, **Advances in Atomic, Molecular and Optical Physics**, *Elsevier* 56. 261-337 (2008)

F2. NEWS ARTICLE | LETTER TO EDITOR

- OSA Spotlight Summary on new way of droplet lens fabrication ([link](#))
- W.M.Lee†” Miniature droplet Lenses for Mobile Microscopy”, **SPIE Newsroom** 0.117/2.1201504005972 (2015)
- Droplet lens work highlighted by Cartwright, "Technology: Smartphone science" *Naturejobs* 531 (2016)
- "Pocket Pathology", *The Pathologist - Texere Publishing* 314, 39-41 (2014)
- “A droplet approach to lens making”, *Australian Optics Society News* 28, 30 (2014)
- "Reinventing Pocket Microscopy", *Proceedings of the Royal Microscopical Society* 37, 41- 43 (2015)
- “Frugal microscopy: Inspiring tomorrow’s interdisciplinary scientist”, *Proceedings of the Royal Microscopical Society* 36, 24-25 (2014)

F3. Peer-Reviewed Publications

- 53 M M. McDonald, Weng Hua Khoo..... P. Timpson, W M Lee,...,P Croucher, T G Phan, “Osteoclasts recycle via osteomorphs during RANKL-stimulated bone resorption” **Cell (Cell Press)** 4 1330-1347 (2021)
- 52 Y Zheng, S J. Montague, Y J Lim, T Xu, E. E. Gardiner, W M Lee, “Label-free multimodal quantitative imaging flow assay for intra-thrombus formation in vitro” **Biophys J (Cell Press)** 2 120 (2021)
- 51 T Xu,Y J Lim, Y Zheng, M S Jung, K Gaus, E E. Gardiner, W M Lee “Modified inverted selective plane illumination microscopy for sub-micrometer imaging resolution in polydimethylsiloxane soft lithography devices” **Lab on Chip**, **20**, 3960-3969 (2020)
- 50 Z Zhang, Y Zheng , T Xu , A Upadhyay, Y J Lim , A Mathews, L X Xie , W M Lee “Holo-UNet: hologram to hologram neural network restoration for high fidelity low light quantitative phase imaging of live cells” **Biomedical Optics Express** 11, 5478 (2020) **Top 20 Photonics Technology selected by Laser Focus World, Press coverage by ACM, Laser Focus World*
- 49 SJ Montague, SM Hicks, C S-M Lee, LA Coupland, CR Parish, WM Lee, RK Andrews, EE Gardiner, "Fibrin exposure triggers α IIb β 3-independent platelet aggregate formation, ADAM10 activity and glycoprotein VI shedding in a charge-dependent manner" **Journal of Thrombosis and Haemostasis** 18: 1447– 1458 (2020) *doi.org/10.1111/jth.14797*

- 48 S.J Montague, Y.J Lim, W.M Lee and E.E Gardiner, “Imaging platelet processes and function – current and emerging approaches for imaging in vitro and in vivo” **Front. Immunol. – Inflammation** (2020) doi: 10.3389/fimmu.2020.00078
- 47 Y X Li, Y J Lim, Q K Xu, L Beattie, E E Gardiner, K Gaus, W Heath, W.M. Lee†, “Raster Scanning Adaptive Optics for video rate correction and large field of view imaging” **Biomedical Optics Express** 2 1032 (2020)
- 46 Y Wang*, X F He*, K F Bruggeman, B Gayen, A Tricoli, W M Lee, R J Williams, D R Nisbet, “Peptide Programmed Hydrogels as Safe Sanctuary Microenvironments for Cell Transplantation” **Advanced Functional Material** 1900390 (2020)
- 45 A. Upadhyaya*, Y Zheng*, W.M.Lee†, “Structured Back focal plane interferometry” **Scientific Reports** 9, 20273 (2019)
- 44 M Lui, E. E. Gardiner, J.F. Arthur, I Pinar, W M Lee, K Ryan, J Carberry, Robert K. Andrews “Thrombus Formation in Shear Gradients: Influence of Shear Forces and Human Platelet-Related Factors” **Int. J. Mol. Sci.** 20(12), 2967 (2019)
- 43 X.F. He, SJ Montague, Xu Tao, EE Gardiner, W.M.Lee†, "Quantifying embolism: label free volumetric mapping of thrombus structure and kinesis in a microfluidic system with optical holography" **Advanced Biosystems** 1800089 (2018) * *Ranked #28/92 of Advanced Biosystems (Altmetric), Canberra Times (Front page), Xinhua, ABC radio, ITW, MedicalExpress (over 7 media outlets)*
- 42 W. M. Lee†, T McMenamin, Y X Li "Optical toolkits for in vivo deep tissue laser scanning microscopy: a primer ", **Journal of Optics** 20 063002 (2018)
- 41 Y X Li, S.J. Montague, A Brüstle, X.F. He, C. Gillespie, K Gaus, E.E. Gardiner, W.M.Lee † “High contrast imaging and flexible photomanipulation for quantitative in vivo multiphoton imaging with polygon scanning microscope” **Journal of Biophotonics** e201700341 (2018)
- 40 T. Kamal, L. Yang, W. M. Lee† "In situ retrieval and correction of aberrations in moldless lenses using Fourier Ptychography ", **Optics Express** 26 2708 -2719 (2018)
- 39 S. J. Montague, C Delierneux, C Lecut, N Layios, R J. Dinsdale, C Lee, N S. Poulter, R K. Andrews, P Hampson, C M. Wearn, N Maes, J Bishop, A Bamford, C Gardiner, W.M.Lee, T Iqbal, N Moiemmen, S. P. Watson, C Oury, P Harrison, E. E. Gardiner, “Soluble GPVI is elevated in injured patients: shedding is mediated by fibrin activation of GPVI”, **Blood Advances** 2 240 (2018)
- 38 Qi Fang, A Curatolo, P Wijesinghe, J Hamzah, P Noble, R Ganss, J K Kim, W. M. Lee, B Kennedy, “Ultrahigh resolution optical coherence elastography through a micro-endoscope: towards in vivo imaging of cellular-scale mechanics” **Biomedical Optics Express** 8 5127 (2017)
- 37 R. Fleddermann*, W. M. Lee *†, K Huang, G. Campbell , P. K. Lam , J. H. Chow, "Compact flexible multi-pass rotary delay line using spinning micromachine mirror" **Scientific Reports** 7 9299 (2017)
- 36 J Choy, S Sane, W M Lee, C Stricker, H Bachor, V Daria, “Improving focal photostimulation of cortical neurons with pre-derived wavefront correction” **Frontiers in Cellular Neuroscience** 11, 105 (2017)
- 35 Y X Li* , V Gautam, A Brustle, I A Cockburn, V R Daria, C Gillespie, K Gaus, C Alt, and W M Lee †* “Flexible polygon-mirror based laser scanning microscope platform for multiphoton in-vivo imaging” **Journal of Biophotonics** 10 1526 (2017) *Highlighted Australian Research Council “Making a difference—Outcomes of ARC supported research” Top 5% of all publication and Ranked #2/720 of Journal of Biophotonics(Altmetric) * Photonics.com, Phys.org, Canberra Times, Xinhua (over 9 media outlets)*
- 34 T Kamal, R Watkins, Z Cen, J Rubinstein, G Kong and W.M.Lee† “Design and fabrication of a passive droplet dispenser for portable high resolution imaging system” **Scientific Reports** 7 41482 (2017)
- 33 X F He, C V Nguyen, M Pratap, Y Zheng, Y Wang, D R. Nisbet, A. G. Maier, W.M.Lee † “Automated Fourier space region recognition filtering for off-axis digital holographic microscopy” **Biomedical Optics Express** 7(8), 3111-3123 (2016)

- 32 W Zhu*, N Eckerskorn, A Upadhyaya, L Li, A V. Rode† and W.M.Lee *† "Dynamic axial control over optically levitating particles in air with an electrically-tunable variable-focus lens" **Biomedical Optics Express** 7(7), 2902-2911 (2016)
- 31 M Choi, W.M. Lee, S H Yun, "Intravital Microscopic Interrogation of Peripheral Taste Sensation", **Scientific Reports** 5 8661 (2015) Top 5% of all publication and Ranked #23/825 of Sci Reports (Altmetric) , * CBS News (US), ABC Radio, Photonics.com, Microscopy And Analysis, Business Insider, Phys.org (over 13 media outlets)
- 30 W.M.Lee†, A. Upadhyaya, P.J. Reece, T G Phan, "Fabricating Low Cost and High Performance Elastomer Lenses using Hanging Droplets", **Biomedical Optics Express** 5 1626-1635 (2014) *Top 5% of all publication and Ranked #2 of all Biomedical Optics Express (Altmetric) *Selected Press Coverage (Print, TV, Radio): OSAOPN, Physics World, Time.com, New Scientist.nl, The Australian, SBS1, NineNews, ABC Radio, Phys.org, Laser Focus World, Photonics.com, International Business Times, MedGadget, COSMOS (over 39 international media articles).*
- 29 L Li*, W.M.Lee*†, X.S Xie, W.Z Krolikowski, A.V. Rode, J Y Zhou, "Shaping Self-imaging Bottle Beams with Modified QuasiBessel Beams", **Optics Letter** 82278-2281 (2014)
- 28 Niko Eckerskorn, Li Li, Richard A. Kirian, Jochen Küpper, Daniel P. DePonte, Wieslaw Krolikowski, W M. Lee, Henry N. Chapman, and Andrei V. Rode, "Hollow Bessel-like beam as an optical guide for a stream of microscopic particles," **Opt. Express** 21, 30492-30499 (2013) ** Reported in Virtual Journal of Bio*
- 27 F Wang, W Toe, W.M. Lee et al "Resolving Stable Axial Trapping Points of Nanowires in an Optical Tweezers Using Photoluminescence Mapping" **Nano letters** 13 1185–1191 (2013)
- 26 Akiyoshi, T., W. M. Lee, et al. "In Vivo Two Photon Microscopy of Aortic Allografts: A New Tool for Investigation of the Dynamics of Graft Vascular Rejection." **American Journal of Transplantation** 12: 466-466. (2012).
- 25 J K Kim*, W.M Lee* et al, In vivo cellular imaging of internal organs in small animals with GRIN fluorescence endomicroscopy: from fabrication to imaging" **Nature Protocols** 7 1456-1469(2012) **Cover Article*
- 24 W. M. Lee, S H Yun "Adaptive aberration correction of GRIN lenses for confocal laser scanning micro-endoscopy," **Optics letters** 36, 4608 (2011). *Reported in Virtual Journal of Bio*
- 23 Y. Arita, M. L. Torres-Mapa, W. M. Lee, T.Cizmar, P. Campbell, F. J. Gunn-Moore, and K. Dholakia, "Spatially optimized gene transfection by laser-induced breakdown of optically trapped nanoparticles," **Applied Physics Letters** 98, 093702 (2011).
- 22 J. C. Shane, M. Mazilu, W. M. Lee, and K. Dholakia, "Effect of pulse temporal shape on optical trapping and impulse transfer using ultrashort pulsed lasers," **Optics Express** 18, 7554-7568 (2010).
- 21 P. Mthunzi, W. M. Lee, A. C. Riches, C. T. A. Brown, F. J. Gunn-Moore, and K. Dholakia, "Intracellular dielectric tagging for improved optical manipulation of mammalian cells," **IEEE Selected Topics in Quantum Electronics** 16, 608-618 (2010).
- 20 T. H. Chow, W. M. Lee†, K. M. Tan, B. K. Ng, and C. J. R. Sheppard, "Resolving interparticle position and optical forces along the axial direction using optical coherence gating," **Applied Physics Letters** 97, 231113 (2010).
- 19 K. M. Tan, M. Mazilu, T. H. Chow, W. M. Lee, K. Taguchi, B. K. Ng, W. Sibbett, C. S. Herrington, C. T. A. Brown, and K. Dholakia, "In-fiber common-path optical coherence tomography using a conical-tip fiber," **Optics Express** 17, 23752384 (2009). *Reported in Virtual Journal of Bio, Covered by OCT News*
- 18 W. M. Lee†, R. El-Ganainy, D. N. Christodoulides, K. Dholakia, and E. M. Wright, "Nonlinear optical response of colloidal suspensions," **Optics Express** 17, 10277-10289 (2009).
- 17 R. El-Ganainy, D. N. Christodoulides, E. M. Wright, W. M. Lee, and K. Dholakia, "Nonlinear optical dynamics in nonideal gases of interacting colloidal nanoparticles," **Physical Review A** 80, 053805 (2009).

- 16 J. L. Hernandez-Pozos, W. M. Lee, L. I. Vera-Robles, A. Campero, and K. Dholakia, "Controlled three-dimensional manipulation of vanadium oxide nanotubes with optical tweezers," **Applied Physics Letters** 93, 243107 (2008).
- 15 W. M. Lee, P. J. Reece, R. F. Marchington, N. K. Metzger, and K. Dholakia, "Construction and calibration of an optical trap on a fluorescence optical microscope," **Nature Protocols** 2, 3226-3238 (2007).
- 14 W. M. Lee, and K. Dholakia, "Optically trapped and controlled microapertures for studies of spatial coherence in an arbitrary light field," **Applied Physics Letters** 90, 261101 (2007).
- 13 K. Dholakia, W. M. Lee, L. Paterson, M. P. MacDonald, R. McDonald, I. Andreev, P. Mthunzi, C. T. A. Brown, R. F. Marchington, and A. C. Riches, "Optical separation of cells on potential energy landscapes: Enhancement with dielectric tagging," **IEEE Selected Topics in Quantum Electronics** 13, 1646-1654 (2007).
- 12 W. M. Lee†, V. Garcas -Chavez, and K. Dholakia, "Interference from multiple trapped colloids in an optical vortex beam," **Optics Express** 14, 7436-7446 (2006).
- 11 X. Yuan, B. P. S. Ahluwalia, W. C. Cheong, L. S. Zhang, W. M. Lee, K. J. Moh, J. Lin, and S. H. Tao, "High efficient microoptical elements for optical vortices in optical manipulation," **OPN**, (2005).
- 10 K. J. Moh, W. M. Lee, W. C. Cheong, and X. C. Yuan, "Multiple optical line traps using a single phase-only rectangular ridge," **Applied Physics B: Lasers and Optics** 80, 973-976 (2005).
- 9 W. M. Lee, B. P. S. Ahluwalia, X. C. Yuan, W. C. Cheong, and K. Dholakia, "Optical steering of high and low index microparticles by manipulating an off-axis optical vortex," **Journal of Optics A: Pure and Applied Optics** 7, 1 (2005).
- 8 S. H. Tao, W. M. Lee, and X. Yuan, "Experimental study of holographic generation of fractional Bessel beams," **Applied optics** 43, 122-126 (2004).
- 7 W. M. Lee, X. C. Yuan, and K. Dholakia, "Experimental observation of optical vortex evolution in a Gaussian beam with an embedded fractional phase step," **Optics Communications** 239, 129-135 (2004).
- 6 W. M. Lee, X. C. Yuan, and W. C. Cheong, "Optical vortex beam shaping by use of highly efficient irregular spiral phase plates for optical micromanipulation," **Optics Letters** 29, 1796-1798 (2004).
- 5 W. M. Lee, and X. C. Yuan, "Experimental observation of pure helical phase interference using moire fringes generated from holograms with dislocations," **Journal of Optics A: Pure and Applied Optics** 6, 482 (2004).
- 4 W. C. Cheong, W. M. Lee, X. C. Yuan, L. S. Zhang, K. Dholakia, and H. Wang, "Direct electron-beam writing of continuous spiral phase plates in negative resist with high power efficiency for optical manipulation," **Applied physics letters** 85, 5784 (2004). * Reported in **Photonics Spectra**
- 3 S. H. Tao, W. M. Lee, and X. C. Yuan, "Dynamic optical manipulation with a higher-order fractional Bessel beam generated from a spatial light modulator," **Optics letters** 28, 1867-1869 (2003).
- 2 W. M. Lee, and X. C. Yuan, "Observation of three-dimensional optical stacking of microparticles using a single Laguerre Gaussian beam," **Applied physics letters** 83, 5124-5126 (2003).
- 1 W. M. Lee, X. Yuan, and D. Tang, "Optical tweezers with multiple optical forces using double-hologram interference," **Optics Express** 11, 199-207 (2003). * Issue Cover * Reported in **Photonics Spectra**

F4. CONFERENCE PROCEEDINGS (Peer Review)

- Yujie Zheng , Samantha J. Montague , Yean Jin Lim, Tienan Xu, Elizabeth E. Gardiner, Woei Ming Lee, "Coherent Optical Scattering and Interferometry (COSI) Microscopy for Morphological Imaging of Thrombus" CLEO (2020) *In Press*
- Ariful Hoque Chowdhury, Richard Hartley, C V Nguyen, Woei Ming Lee, "Detecting polarization state with an optical rotation filter", Asian Conference on Computer Vision *under review* (2020)

- F. M. Ayyalil, S. J. Montague, S. Hicks, A. Kaur, A. Jahangiri, N. Pati, P. Crispin, Y. Zheng, X. Tienan, L. Coupland, W. M. Lee, J. D'Rozario, and E. E. Gardiner, *Blood* (American Society of Haematology) 134, 4884-4884 (2019).
- Y. Zheng, W.M. Lee†, Label-free optical scattering and interferometry microscopy for functional imaging of thrombus, *Biophotonics Australasia 2019*, International Society for Optics and Photonics, 2019, p. 1120207.
- Z. Zhang, L. Xie, A. Mathews, X. He, W.M. Lee†, Noise reduction in ultra-low light digital holographic microscopy using neural networks, *Biophotonics Australasia 2019*, International Society for Optics and Photonics, 2019, p. 1120208.
- T. Xu, Y. Li, W.M. Lee†, Upright and inverted polygon microscope (UNI-SCOPE), *Biophotonics Australasia 2019*, International Society for Optics and Photonics, 2019, p. 112021I.
- T. Xu, X. He, Z. Zhang, S. Montague, E. Gardiner, W.M. Lee†, Software package for off-axis digital holographic microscopy imaging processing, *Biophotonics Australasia 2019*, International Society for Optics and Photonics, 2019, p. 112021C.
- Y.J. Lim, Y. Li, W.M. Lee†, Achieving 3D FRAP using multiphoton polygon scanning microscopy, *Biophotonics Australasia 2019*, International Society for Optics and Photonics, 2019, p. 1120217.
- He, SJ Montague, X Tao, EE Gardiner, WM Lee” Advanced Optical Imaging of Blood Thrombus” *EPJ Web Conf* 215, 11003
- Q Fang ; A Curatolo ; P Wijesinghe ; J Hamzah ; R Ganss ; P B. Noble ; K Karnowski ; D D. Sampson ; J K Kim ; W M. Lee ; B.F. Kennedy “Ultrahigh resolution optical coherence elastography combined with a rigid micro-endoscope” *Proc. SPIE* 10053, *Optical Coherence Tomography and Coherence Domain Optical Methods in Biomedicine XXI*, 1005309 (February 17, 2017); doi:10.1117/12.2254815.
- T. Kamal, L. Yang, and W. M. Lee, "Application of computational optics in moldless lenses," in *Imaging and Applied Optics 2017 (3D, AIO, COSI, IS, MATH, pAOP)*, OSA Technical Digest (online) (Optical Society of America, 2017), paper JTU5A.14
- T J McMenamin, W M Lee† “A Compact Multi-Trap Optical Tweezer System based on CD-ROM Technologies” *Proceedings Volume 10347, Optical Trapping and Optical Micromanipulation XIV*; 103472O (2017) <https://doi.org/10.1117/12.2273674>
- X. He, K. Gaus, and W. M. Lee, "Label-free dynamic volumetric imaging of deforming giant unilamellar vesicles under micro-flows," in *Optics in the Life Sciences Congress*, OSA Technical Digest (online) (Optical Society of America, 2017), paper BoS2A.2
- Y. Li, H. M. Huang, G. Burgio, W. Heath, and W. M. Lee, "Dynamic control over field of view in polygon mirror-based laser scanning multiphoton microscope," in *Optics in the Life Sciences Congress*, OSA Technical Digest (online) (Optical Society of America, 2017), paper BoTu3A.2
- T Kamal, J Rubinstein, R Watkins, Z Cen, G Kong and W.M.Lee† “Thimble microscope system” *SPIE BioPhotonics Australasia* 10013, 1001322-1001322-5 (2016)
- T Kamal, R Watkins, Z Cen, and W.M.Lee† “Direct fabrication of silicone lenses with 3D printed parts” *SPIE BioPhotonics Australasia*, 1001336-1001336-6 (2016)
- X F He, Y Zheng, W. M Lee†, “Dynamic holographic microscopy interface”, *SPIE BioPhotonics Australasia* 10013, 1001332-1001332-8 (2016)
- X He, C V Nguyen, M Pratap, Y Zheng, Y Wang, D R. Nisbet, A. G. Maier, W.M.Lee † “Adaptive spatial filtering for off-axis digital holographic microscopy based on region-recognition approach with iterative thresholding” *SPIE BioPhotonics Australasia* 10013, 1001329-1001329-7 (2016)
- Y X Li, W.M.Lee† “PScan1.0 : Flexible software framework for polygon based multiphoton microscopy” *SPIE BioPhotonics Australasia* 10013, 1001333-1001333-6 (2016)
- Y X Li, A Brustle, V Gautam, I Cockburn, V R Daria, C Gillespie, K Gaus and W.M.Lee “ High speed multiphoton imaging” *SPIE BioPhotonics Australasia* 10013, 100130K (2016)
- W Zhu, N Eckerskorn, W M Lee † and A V. Rode" Dynamic axial control over optically levitating particles in air with an electrically-tunable variable-focus lens" *ICONN* (2016)

- R. Fleddermann, W. M. Lee †, K Huang, G. Campbell , P. K. Lam , J. H. Chow , D. E. McClelland, "Compact 20 kHz delay line with cascading multi-level phase plate for low coherence interferometry" ANZCORP(2015)
- X.F. He, A. Maier, W.M. Lee† "Mapping the progression of malaria infected erythrocytes with holographic microscopy" Conference on Lasers and Electro-Optics/Pacific Rim, 27P_73
- W. M Lee†, D Wright, R Watkins, Zi Cen, "Integrated elastic microscope device" Proceedings of SPIE-BIOs Optical Diagnostics and Sensing XV: Toward Point-of-Care Diagnostics 93320 (2015)
- M Choi, W.M. Lee, S H Yun, "Intravital Microscopic Interrogation of Peripheral Taste Sensation", Annual Meeting of the Society for Neuroscience(2014)
- W. M. Lee†, "Imaging Cells in Living Animals with two photon in-vivo aberration free endomicroscopy" Australian Biomedical Engineering Conference 2014
- (Invited) W. M. Lee†, "High performance and low cost elastomer optics," in Classical Optics 2014, OSA Technical Digest (online) (Optical Society of America, 2014), OTh4B.1.
- W. M. Lee†, "Stick-On Microscope for Smartphones" Proceedings of SPIE-BIOs Optical Diagnostics and Sensing XIV: Toward Point-of-Care Diagnostics 8951-16 (2014)
- W.M. Lee†, "Microscopy On the Move", SPIE Digital Photography X 9023-9 (2014)
- Li Li, N Eckerskorn, R A. Kirian J Küpper, D P. DePonte, Krolkowski, W.M. Lee, H N. Chapman and A V. Rode "Quasi- Bessel hollow beam as optical guide for micro-particles" SPIE Optical Trapping and Manipulation (2013)
- Wang, F.; Lee, W.M.; Toe, W.J.; Gao, Q.; Tan, H.H.; Jagadish, C.; Reece, P.J., "PL mapping and optimized optical trapping of nanowires SLM beam shaping," Optoelectronic and Microelectronic Materials & Devices (COMMAD), 2012 Conference on , vol., no., pp.29,30, 12-14 (2012)
- F. Wang, W J Toe, A Harstone, W M Lee, D McGloin, Q Gao, H H Tan, CJ Jagadish, P J Reece, "Mapping optical process in semiconductor nanowires using dynamic optical tweezers" SPIE conference (2012) (Accepted)
- W.M. Lee, T. H. Chow, and B. K. Ng, "Resolving interparticle position and optical forces along the axial direction using optical coherence gating," Optical Trapping Applications (OTA), (Optical Society of America, 2011).
- Y. Arita, M. L. Torres-Mapa, W. M. Lee, Tomas Cizmar, F. J. Gunn-Moore, and K. Dholakia, "Laser-Induced Breakdown (LIB) of Optically Trapped Nanoparticles for Gene Transfection," in Biomedical (Optical Society of America, 2010).
- B. S. Ahluwalia, and W. M. Lee, "Collinear non-diffracting beams: classification and properties," Proceedings of SPIE 7613, 76130U (2010).
- E. M. Wright, W. M. Lee, K. Dholakia, R. El-Ganainy, and D. N. Christodoulides, "Optical nonlinearity of liquid nanosuspensions: Kerr versus exponential model," Proceedings of SPIE 7400, 74001J (2009).
- W. M. Lee, J. L. Hernandez-Pozos, L. I. Vera-Robles, A. Campero, P. Andre, S. Chen, and K. Dholakia, "Dielectric enhanced nanoparticles for three-dimensional optical manipulation," Proceedings of SPIE 7400, 740023 (2009).
- W. M. Lee, K. Dholakia, E. M. Wright, R. El-Ganainy, and D. N. Christodoulides, "Probing the nonlinear optical response of nanosuspensions," in CLEO, (SPIE, 2009), pp. 1-2.
- R. El-Ganainy, D. Christodoulides, E. M. Wright, W. M. Lee, and K. Dholakia, "Optical Nonlinearity of a Colloidal NonIdeal Gas of Nano-Suspensions," in CLEO, (Optical Society of America, 2009).
- E. M. Wright, W. M. Lee, P. L. Giscard, and K. Dholakia, "Long distance beam propagation in colloidal suspensions: comparison between theory and experiment," Proceedings of SPIE 7038, 70380P (2008).
- J. Shane, M. Mazilu, W. M. Lee, and K. Dholakia, "Optical trapping using ultrashort 12.9 fs pulses," Proceedings of SPIE 7038, 70380Y (2008).

- W. M. Lee, A. E. Carruthers, V. Garcas-Chavez, and K. Dholakia, "Far field interference measurements of vortex light fields in optical trapping," Proceedings of SPIE 6483, 64830N (2007).
- B. P. S. Ahluwalia, W. C. Cheong, W. M. Lee, and K. J. Moh, "Design and fabrication of micro-optical elements for the generation of various novel beams and its applications in optical tweezers," Proceedings of 20th Congress of the International Commission for Optics, (2005).
- X. C. Yuan, S. H. Tao, W. M. Lee, and B. P. S. Ahluwalia, "Selective optical trapping using optical beams with fractional helical phase," Proceedings of SPIE 5514, 632 (2004).
- X. C. Yuan, B. P. S. Ahluwalia, W. C. Cheong, L. S. Zhang, W. M. Lee, K. J. Moh, S. H. Tao, H. B. Niu, and X. Peng, "Design and fabrication of micro-optical elements for the generation of various novel beams and its applications in optical tweezers," Proceedings of SPIE 6027, 602709 (2006).
- W. M. Lee, X. C. Yuan, and K. J. Moh, "Construction of three-dimensional microstructure using optical beam of designed vortex-shape," Proceedings of SPIE 5514, 387 (2004).
- W. M. Lee, W. C. Cheong, J. Bu, H. Wang, and X. C. Yuan, "High efficient optical manipulation of microparticles using micro-optical elements," in FIOS, (2004), p. L2.

F5. THESIS

- W.M. Lee (2010) "Optical Trapping: Optical Interferometric Metrology and Nanophotonics" University of St Andrews (UK), *Doctoral Thesis*,
- W.M. Lee & W.Y.Yap (2002) "Computer generated holograms for optical tweezers", Nanyang Technological University (Singapore) *Honors (Research) Thesis*

F6. PATENT

- W.M.Lee, Y X Li, Y J Lim, "Raster Scanning Adaptive Optics" Filed Dec 2019
- Z Cen, W.M.Lee "Methods for Fabricating Lenses" AU 2016903569 Filed Aug (2016)
- R Fleddermann, W.M. Lee, J Chow "Improvement in optical delay line" AU2016902093 Filed June (2016)
- W.M. Lee "Fabricating Lenses with Gravity" Patent WO2015113105 A1, PCT/AU2015/000041 (2015)

E. SERVICE & TEACHING

E1. SERVICE

Convenor,	Inaugural Janelia-Australian Bioimaging Edu lectures	2020-2021
Program Committee,	SPIE Photonics Instrumentation Engineering VIII,VIV	2020- present
Instructor,	Lightsheet/SPIM microscopy, AMMS	2020
Program Chair,	Advanced Optical Microscopy, ACMM26	2020
Mentor,	Network for Early Career Acad (CBE-Lecturer Dr Zhang)	2019-2020
Judging Committee,	ANU Vice-Chancellor Awards 2019	2019
Program Committee,	ANZCOP Biophotonics	2019
Program Chair,	OSA Advanced Photonics Congress	2019 - present
Working Group,	School Review – Leadership training	2018-2019
Committee,	School Renaming (REng to RSEEME)	2018-2019
Program Committee,	Optics Within Life Sciences (OWLS)	2018
Program Committee,	IEEE Biomedical Imaging (ISBI)	2017
Program Committee,	5 th International conference for Biophotonics	2017
Core Technical Committee,	OSA Technical Group, Imaging Optics Design	2016- present
Working Committee,	CECS Scholarship selection	2016
Session Chair,	Australian Institute of Physics	2016

Session Chair,	SPIE Biophotonics Australasia	2016
Program Committee,	OSA Advanced Photonics Congress	2014-2018
Judging Committee,	OSA Milton-Chang Award	2015
Colloquium Organizer,	College of Engineering and Computer Science	2014-2016
Attendee,	Go8 Graduate Research Leadership Workshop	2014
Working Committee,	CECS Scholarship selection	2014
Judging Committee,	OSA Excellent Student Chapter	2013
Committee Member,	OSA Optics in Life Science	2012

E2. TEACHING

Coordinator	Harvard/MIT- ANU Biomedical Optics Summer School	2015-2017
Convener	ENGN3820 Biomedical Imaging	2014-present
Lecturer	PHYS8014, BioNanophotonics	2016

E3. REVIEWER

Project Grant	Ministry of Science and Technology (MOST) of Taiwan	2019
Fellowship	American Australian Association Expert Review	2017- present
Project Grant	National Health and Medical Research	2018
Project Grant	Marsden Fund Council (Royal Society of New Zealand)	2017
Project Grant	Research Grants Council (RGC) Hong Kong (GRF1, GRF2, ECS)	2017-present
Project Grant	Australian Research Council (Discovery Linkage Infrastructure)	2014-present
Fellowship	Australian Research Council (Future Fellow Early Career)	2014-present
Project Grant	Rosetrees Trust Research, United Kingdom	2014
Journals	OSA: Opt Lett, OPTICA, Opt Exp, JOSA, Biomed Opt Express. Springer Nature: Scientific Reports, Biomed Micro, Elsevier: Optics Communications, Wiley: Advanced Materials	2010-present
Thesis (PhD)	Uni Auckland, Uni Tasmania, LaTrobe Uni, Macquarie Uni	2016- present

E4. CURRENT RESEARCHERS (v)- visiting

Current Primary Supervisor:	Dr Daniel Yean Jin Lim, Postdoctoral Researcher	2019 - Present
	Ms Yujie Zheng, PhD student	2017 - Present
	Mr Avinash Updahya, PhD student	2017 - Present
	Mr Tienan Xu, PhD student	2019 - Present
	Mr Zhiduo Zhang, Imaging Scientist, MPhil student	2019 - Present
	Mr Hanqi Lin, Imaging Technician	2020 - Present
	Mr Junxiang Zhang, Imaging Technician	2021 - Present
	Mr Jasper Li, Imaging Technician	2021 - Present
	Mr Andrew Waddell, Honours	2020 - Present
	Ms Carmen Longbottom, imaging intern (v)	2021- Present
	Ms Emma Wilson, PhD student (v)	2020 - Present

E5. ALUMNI (Primary supervisor)

Staff

Current Position

2020 : Dr Julia McCoe
 2017-2020: Mr Tao Xu, Lab Technician
 2017-2019: Dr Yuanqing (Alex) Ma, NHMRC Fellow (v)
 2016-2017: Dr Samantha Montague, Postdoc
 2016-2017: Dr Roland Fleddermann, Postdoc
 2015: Mr Zijian Cen, Research Assistant,

Trendbio Pty Ltd
 Toyota Graduate Program
 EMBO Fellow
 Postdoctoral Researcher, JCSMR
 Postdoctoral Researcher, DQS
 Product Analytics Engineer ResMed

Graduate students

2015 - 2019: Mr Yongxiao Li, PhD
 2014 - 2018: Ms Xuefei He, PhD
 2014 - 2018: Ms Tahseen Kamal, PhD
 2016 - 2017: Miss Wei Zhong, Master (v)
 2013 - 2016: Mr Niko Eckerskorn, PhD
 2015 - 2016: Mr Wengou Zhu, PhD (v)
 2014 - 2015: Mr Redmar Vileg Master (v)
 2013 - 2014: Mr Huang Longyao, Masters (ANU)
 2013 - 2014: Miss Sjoukje Schoustra, Masters (v)
 2013 - 2014: Miss Li Li, PhD (v)

Current Position

Postdoctoral, Rockefeller University
 Imaging Engineer, HiSilicon
 Postdoctoral, UNSW-Canberra
 Research Scientist, Science Sport
 Analytics Engineer, CoreLogic RP
 Lecturer, Shenzhen Uni
 PhD student, Leiden Uni
 Sales, Glasstech
 PhD student, Uni Twente
 Research Engineer, Huawei Tech

Undergraduate

2019-2020 Mr Junxiang Zhang
 2019-2020: Mr Sanjeev Prabakaran
 2019 : Mr Alex Taylor
 2017-2018: Mr Zhiduo Zhang
 2017-2018: Mr Tienan Xu
 2018: Ms Hui Wang (v)
 2015 - 2016: Mr Thomas McMenamin
 2015 - 2016: Mr Avinash Upadhy,
 2015 - 2016: Mr Yang Lu
 2015 - 2016: Mr Tao Xu
 2014 - 2015: Mr Misha Petkovic
 2015 - 2016 Miss Yi Du
 2015 - 2016 Miss Yujie Zheng
 2015 - 2016 Mr Lyle Halliday
 2014 - 2015 Mr Zachary Shafron,
 2013 - 2015 Mr Avinash Upadhy,
 2014 - 2015 Ms Rachel Watkins,
 2014 - 2015 Mr David Wright
 2014 - 2015 Mr Jaden Rubstein
 2014 - 2015 Mr Zi Cen (Kenny)
 2014 - 2015 Mr Alan Harrison
 2013 - 2014 Miss Siti Mohd Shari'af

Uni Medalist

**IET Prize, Uni Medalist
 Honor mention (Project)
 Yao Su Student Award
 YouFab Finalist**

Current Position

Undergraduate student, ANU
 Undergraduate student, ANU
 Undergraduate student, ANU
 Research Assistant, MPhil ANU
 PhD student, ANU
 Graduate student, Georgia Tech
 MPhil student ANU
 PhD student ANU
 PhD student QUT
 Technician, MSc, MPhil ANU
 Engineer, Seeing Machines
 --
 PhD student ANU
 Research Engineer Cochlear
 Research Engineer EOS
 PhD student ANU
 Teacher (Mathematics)
 System Engineer
 Engineer
 Analytics Engineer ResMed
 --
 --

**Referees to be provided upon request*