NEWSLETTER

COMMISSION INTERNATIONALE D'OPTIQUE · INTERNATIONAL COMMISSION FOR OPTICS

ICO PRIZE TO COMPUTATIONAL PHASE IMAGING

Prof. Chao Zuo been awarded the 2025 ICO Prize "for his substantial contributions to computational phase imaging and optical metrology.

Prof. Chao Zuo is a Zijin Chair Professor at the Department of Optical Engineering in Nanjing University of Science and Technology (NJUST), China. He is the founder and director of the Smart Computational Imaging Laboratory (SCILab) and the Smart Computational Imaging Research Institute (SCIRI).

Prof. Chao Zuo, received his B.E. and Ph.D. degrees from NJUST, with research experience at the Institut für Technische Optik in Germany and Nanyang Technological University in Singapore. His research has centered on integrating optical modulation with information processing to enable novel "indirect" and "computational" imaging and metrology mechanisms, technologies, and instrumentation, establishing systematic theories and methods for non-interferometric quantitative phase imaging [1,2] and intensity diffraction tomography [3,4].

His findings have opened a new era in which strict coherence and interferometry are no longer prerequisites for quantitative phase imaging and diffraction tomography, paving the way toward a new generation of label-free 3D microscopy with applications in all branches of biomedicine [5]. Meanwhile, Prof. Zuo developed composite phase-shifting strategies for single-shot 3D profilometry [6], achieving the world-record speed of 100,000 frames per second [7] and enabling real-time, high-speed, and even transient 3D shape measurements, now widely adopted. For the first time, he introduced deep learning into optical metrology [8], initiating a paradigm shift in the discipline from physics-based modeling to data-driven learning [9]. Recently, his group has been pushing computational phase imaging toward regimes of super-resolution [10], ultrafast acquisition [11], and system miniaturization [12], seeking to overcome fundamental physical barriers in what can be optically captured, digitally reconstructed, and quantitatively interpreted.

REFERENCES

1. C. Zuo, et. al, Opt. Lasers Eng. 135, 106187 (2020).
2. C. Zuo, et. al, Opt. Lasers Eng. 128, 106003 (2020).
3. J. Li, et. al, Light Sci. Appl. 11(1), 154 (2022).
4. S. Zhou, et. al, Optica 9(12), 1362–1373 (2022).
5. Y. Fan, et. al," PhotoniX 2(1), 19 (2021).
6. C. Zuo, et. al, Opt. Lasers Eng. 109, 23–59 (2018).
7. B. Wang, et. al, Light Sci Appl 14(1), 70 (2025).
8. S. Feng, et. al, Adv. Photon. 1(2), 025001 (2019).
9. C. Zuo, et. al, Light Sci. Appl. 11(1), 39 (2022).
10. J. Qian, et. al, eLight 3(1), 4 (2023).
11. W. Chen, et. al, PhotoniX 5(1), 25 (2024).
12. X. Zhang, et. al, Sci. Adv. 11(12), eadt3909 (2025).

ICO VP Prof. Kaoru Minoshima chairs the ICO Prize Committee

Label-free 3D computational phase microscopes developed by Prof. Zuo's research group at the Smart Computational Imaging Laboratory (SCILab, www.scilaboratory.com), commercialized by ZIRCON Ltd. (www.zircon-opto.com), co-founded by Prof. Zuo.

ICO/IUPAP MEDAL TO NONLINEAR SPECTROSCOPY

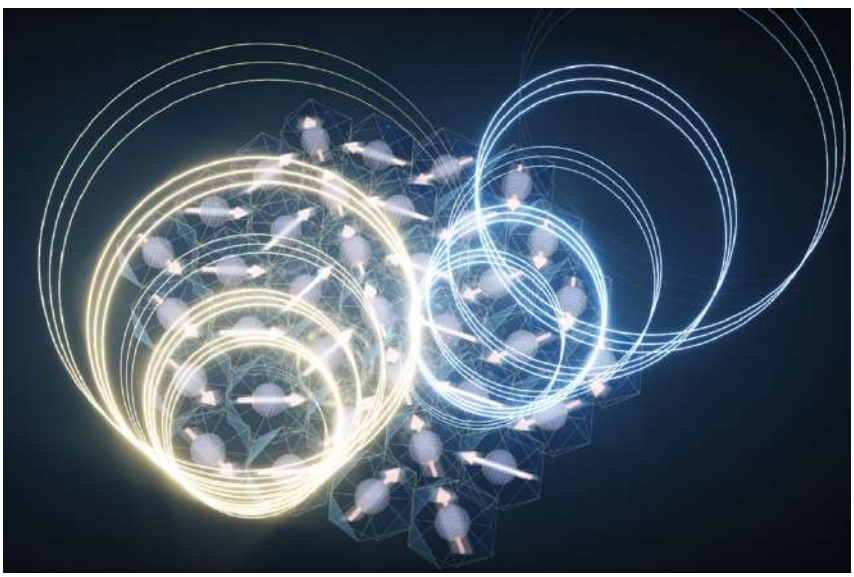
Awarded the "Early Career Scientist Prize in Optics Medal" for developing precision spectroscopy tools for the metrology of interactions and correlations in quantum materials.

Prof. Edoardo Baldini is an Assistant Professor of Physics at the University of Texas at Austin, where he leads an experimental research group focused on the development of ultrafast optical spectroscopy methods.

Operating at the intersection of optical science, condensed-matter physics, and quantum information science, Prof. Baldini's research is driven by the goal of identifying – and ultimately controlling – exotic quantum states of matter using tailored light fields [1-6]. He received his Ph.D. in Physics with honors from the École Polytechnique Fédérale de Lausanne (EPFL) in 2017 [7]. From 2017 to 2021, he was a postdoctoral fellow at MIT with Nuh Gedik, where he utilized advanced ultrafast photoemission and terahertz techniques to probe symmetry-broken quantum phases in and out of equilibrium [8-10]. He established his independent research group at the University of Texas at Austin. Using nonlinear optical techniques – such as transient second harmonic generation microscopy and multidimensional THz spectroscopy – his group studies how low-energy collective modes influence underlying order parameters and couple to other excitations in solids. These approaches provide direct experimental input for theoretical models and enable new insights into emergent quantum behavior. In this context, Prof. Baldini's group has achieved the first time-resolved optical microscopy measurement of dynamical magnetoelectric couplings in exfoliated van der Waals multiferroics, uncovering intrinsically chiral magnetoelectric oscillations and record-strength terahertz-range interactions [1].

In parallel, his group and collaborators have developed nonlinear terahertz spectroscopic methods that expose coherent, anharmonic couplings between spin waves in antiferromagnets, establishing a new operating regime for nonlinear magnonics at terahertz frequencies [3-4]. His ongoing goals also include the development of cavity-enhanced platforms to investigate the role of the cavity environment and of vacuum electromagnetic fields on exotic quantum phases and their excitations [5-6], as well as the integration of tailored laser pulses with photoemission microscopy.

Through these efforts, Prof. Baldini's work establishes nonequilibrium optical techniques as a powerful and versatile framework for uncovering new regimes of light-matter interaction and for controlling the excitations that shape emergent order in quantum materials. His contributions have been recognized with numerous honors, including the Ludwig Genzel Prize, the Sloan Research Fellowship, the NSF CAREER Award, the AFOSR Young Investigator Program Award, and the W. M. Keck Foundation Science and Engineering Research Award.



Pictorial representation of chiral magnetoelectric oscillations driven by a tailored laser pulse in a van der Waals multiferroic material [1].

REFERENCES
[1] Nature 632, 273-279 (2024)
[2] Sci. Adv. 10, eadn0929 (2024)
[3] Nat. Phys. 20, 788-793 (2024)
[4] Nat. Phys. 20, 801-806 (2024)
[5] Nat. Nanotechnol. 17, 1060-1064 (2022)
[6] Nature 622, 464-465 (2023)
[7] Springer Nature, DOI:10.1007/978-3-319-77498-5
[8] Nat. Phys. 16, 541-545 (2020)
[9] Nat. Commun. 12, 4837 (2021)
[10] PNAS 120, e2221688120 (2023)

ICO VP Prof. Yaseera Ismaily chairs the ICO/IUPAP Medal Committee

Galileo Galilei Medal to Luminescence Thermometry

His foundational research established robust protocols for fabricating thermally sensitive luminescent nanoparticles

Prof. Miroslav D. Dramićanin is a full professor at the Faculty of Physics of the University of Belgrade (Serbia) and the research professor at the Vinča Institute of Nuclear Sciences.

Prof. Dramićanin is the head of the Center of Excellence for Photoconversion (CONVERSE) and Principal Investigator of several international (Horizon Europe) and national grants. His research group investigates luminescent materials and their applications in lighting devices and optoelectronic sensors. The group is especially focused on the field of luminescence thermometry, for developing advanced temperature readout methods, theories, and new luminescent materials for temperature measurement.

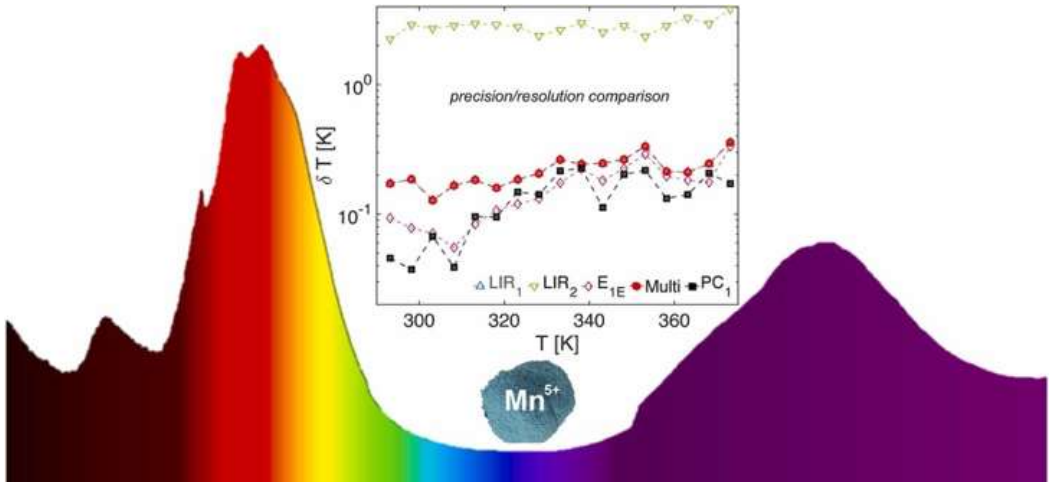
Prof. Dramićanin obtained his Ph.D. with distinction in 1999 from the University of Belgrade, with the thesis focused on the analysis of nonlinear effects in photothermal spectroscopy. His pioneering work focused on meticulously characterizing the performance of various phosphors for luminescence thermometry, particularly those exhibiting strong thermal coupling between different energy levels. The move from bulk materials to nanoscale phosphors [1] has been particularly transformative, enabling the measurement of temperatures within living cells, integrated circuits, and other microscopic structures. A thin film of $GdVO_4$ doped with Dy^{3+}, which was produced using the pulsed laser deposition process, is introduced as a novel optical temperature sensor for harsh environments [2].

Temperature measurements were successfully proven in the region of strong high-energy radiation. This optical thermometer is exceptional because it does not need any specific light stimulation. Instead, it utilizes the energy from the radiation field to generate a luminescent reaction.

His group has pioneered the use of Mn^{5+}-based phosphors for thermometry in the near-infrared spectral range [3]. With a quantum efficiency of about 40%, the Mn^{5+}-activated $Ca_6Ba(PO_4)_4O$ phosphor can generate photons with wavelengths greater than 1000 nm that have an emission spectrum highly sensitive to temperature fluctuations. This phosphor's emission is suitable for temperature measurements in biomedicine [4]. In their latest research, Prof. Dramićanin and his team introduced a new temperature readout from luminescence based on data dimensionality reduction and used this phosphor to showcase the superior performance of the method compared to traditional readout techniques [5].

REFERENCES:
[1] Nanomaterials, 13, 2904 (2023)
[2] Adv. Mater. 28, 7745–7752 (2016)
[3] Light Sci. Appl. 11, 279 (2022)
[4] Adv. Opt. Mater. 11, 2202366 (2023)
[5] Sens. Actuators A Phys. 117292 (2026).

ICO VP Prof. Andrei Naumov chairs the ICO Galileo Medal Committee



Data dimensionality reduction applied to Mn^{5+} emission demonstrates the superior performance over the traditional luminescence thermometry techniques. Graphical abstract from reference [5].

Lord Rayleigh Prize and Medal to Prof. Mark Dennis

Has been awarded in 2025 for 'pioneering theoretical work on structured light and topological optics, from knotted fields to polarisation in the daylight sky'

The Optical Group (*de facto* Optical Society of the UK and Ireland) and the International Commission for Optics (ICO) warmly congratulate Prof. Mark Dennis of Birmingham University, UK.

This is a Silver Subject Medal of the IOP and has been awarded for 'pioneering theoretical work on structured light and topological optics, from knotted fields to polarisation in the daylight sky'.

Prof Dennis is recognised for his 'leading contributions to vector optics and polarisation topology. Working with various collaborators worldwide, he has characterised polarisation singularities and their role in natural and engineered optical fields, from the blue sky and birefringent crystals to laser beams and metamaterials. Notably, his work on skyrmionic hopfions – particle-like textures in propagating, 3D polarisation patterns – has opened a new window onto the topological classification and measurement of complex fields', according to a release from the UK Institute of Physics who awarded the Prize.

Prof Dennis is also a dedicated member of Organising Committee of the Optical Group (*de facto* Optical Society, UK & Ireland) and has been an absolute inspiration to all. He sits on a number of Editorial Boards. We wish him much success in his future endeavours. Congratulations!

IOP Institute of Physics
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International Commission for Optics (http://e-ico.org).

No. 146 JANUARY 2026

Forthcoming events with ICO participation

Below is a list of forthcoming events with ICO participation.
For further information, visit their official websites listed below.

7-10 July 2026
AOP 2026. Applications in Optics & Photonics
Lisbon, Portugal
Contact: Manuel Costa
aop2026@isel.pt
https://aop2026.org

6-10 July 2026
OPTIQUE. Congrès de la SFO.
Dijon, France
Contact: Florence Haddouche
florence.haddouche@institutoptique.fr
https://www.sfoptique.org/

24-28 August 2026
XIV Annual Meeting of the EOS
Tampere, Finland
Contact: Elina Koistinen
elina@europeanoptics.org
https://www.europeanoptics.org/