

# Plenary Talk – Conferencia Plenaria

Wednesday july/3

9:30-10:15 h

(Salón de Actos)

Miércoles 3/julio

## **Prof. Andrew Forbes**

School of Physics,  
University of the Witwatersrand,  
Johannesburg  
[andrew.forbes@wits.ac.za](mailto:andrew.forbes@wits.ac.za)



## **Seeing through Distortion with Structured Light**

Light can be tailored in its many degrees of freedom for so-called structured light. This opens many exciting avenues in seeing smaller in imaging, enhanced precision in manufacturing, and in optical communication and information processing, where the many forms of structured light can be used as an information alphabet. Unfortunately, light gets distorted when passing through noisy channels, negating the benefits of its initial structure. Here I will outline how to find degrees of freedom and forms of structured light that are invariant to noisy channels, and show near distortion-free transport of classical and quantum forms of structured light, even in highly distorted media.

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### **Short bio:**

Andrew has at various times in his career found himself as teacher, janitor, secretary, receptionist, web-master, systems engineer, sales rep, manager, director, and sometimes a scientist. Andrew is presently a Distinguished Professor within the School of Physics at the U. Witwatersrand (South Africa) where in 2015 he established a new laboratory for Structured Light. Andrew is active in promoting photonics in Africa, a founding member of the Photonics Initiative of South Africa and Director of South Africa's Quantum Roadmap. He is a Fellow of SPIE, Optica, the South African Institute of Physics (SAIP), and an elected member of the Academy of Science of South Africa. He holds an A-rating by the South African NRF, 4 honorary professorships, is editor-in-chief of the IoP's Journal of Optics and sits on the editorial board of five other international journals. Andrew has won several awards, including the NSTF national award for his contributions to photonics in South Africa, the Georg Forster prize from the Alexander von Humboldt Foundation for outstanding contributions to photonics, the SAIP Gold Medal, the highest award for physics in South Africa, making him the youngest winner to date, the Sang Soo Lee award from Optica and the Korean Optical Society and the TWAS Prize for Physics. Andrew spends his time having fun with the taxpayers' money, exploring structured light in lasers as well as classical and quantum optics.

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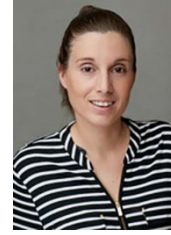
Wednesday july/3

10:15-11:00 h (Salón de Actos)

Miércoles 3/julio

## **Dr. Ana Doblas**

PI Optical Imaging Research Lab  
Department of Electrical & Computer Engineering  
University of Massachusetts Dartmouth  
[adoblas@umassd.edu](mailto:adoblas@umassd.edu)



## **What is Digital Holographic Microscopy? State of the Art and Applications**

Quantitative Phase Imaging (QPI) techniques provide quantitative information about the refractive index variations and thickness of samples, which is not accessible with conventional intensity-based imaging systems. Among the different QPI methods, Digital Holographic Microscopy (DHM) stands out for its high resolution, sensitivity, wide field of view and fast acquisition rate. This talk provides an overview of the basic principles of DHM systems, including a description of the optical designs and the different reconstruction strategies to reconstruct quantitative phase images with high accuracy. hardware and software information. To finish, we will revise the applicability of DHM systems to different applications, including biological and biomedical research studies, characterization of materials, and oceanography sciences.

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### **Short bio:**

Ana Doblas received her BS, Ms., and Ph.D. degrees in Physics from the Universitat de València, Spain, in 2010, 2011, and 2015, respectively. After she finished her PhD work, she joined the Optical Coherence Imaging Laboratory under the supervision of Dr A. Oldenburg (Department of Physics and Astronomy, University of North Carolina in Chapel Hill, U.S.A.), where she did her 1-year Postdoc. From 2016 to the summer of 2023, she was in the Department of Electrical and Computer Engineering at the University of Memphis (Memphis, Tennessee, U.S.A.). From 2016 to 2018, she was the Research Assistant Professor at the Computational Imaging Research Laboratory (CIRL). In 2019, she became an Assistant Professor and principal investigator of the Optical Imaging Research Laboratory (OIRL). In 2021, she received the NSF CAREER award for her project titled “Three-dimensional super-resolution light microscopy of thick, unprocessed biological samples.” Since Fall 2023, she has joined UMass Dartmouth, becoming the newest faculty member of the Electrical & Computer Engineering department. Her current research interests are focused on optical engineering, computational optics, and three-dimensional imaging. Her final goal is to advance the fundamental science and engineering in imaging and photonics instrumentation for biological and biomedical applications, transitioning research outcomes to commercial products and systems. Since 2012, she has co-authored of 46 peer-reviewed scientific journals, her work has been presented at over eighty-five international conferences, and she is co-inventor of three US patents.

## Mesa Redonda

Wednesday July/3

15:00-16:00 h (Salón de Grados)

Miércoles 3/julio

**Dra. Ana Vidu Afloarei**

Facultad de Derecho,  
Universidad de Deusto  
[ana.vidu@deusto.es](mailto:ana.vidu@deusto.es)



### Acoso en la Academia: una responsabilidad de todos y todas

El acoso en el ámbito laboral es un problema presente desde siempre que, en la actualidad se denuncia más. En la Academia no sólo hemos de prestar atención al acoso sexual de superiores hacia trabajadores, sino que también entra en juego su posible existencia entre docentes y estudiantado. Las Sociedades Científicas agrupan a profesionales de diferentes campos de conocimiento, les ponen en contacto y propician las redes laborales e incluso de amistad. ¿Cómo se debe reaccionar desde una Sociedad Científica ante una denuncia verosímil de acoso? ¿Cuál es el papel que deben jugar? ¿Cuál debería ser la actitud del resto de socios y socias? ¿Debería una persona bajo sospecha verosímil ocupar un papel relevante en una Sociedad Científica? ¿Tienen recursos las Sociedades Científicas para ejercer algún tipo de presión sobre los sospechosos? Estas son las preguntas que nos hacemos en Mujeres en Óptica y Fotónica, y sobre las que pretendemos dialogar con todos y todas vosotras.

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#### Short bio:

Ana Vidu es investigadora postdoctoral Marie Sklodowska-Curie en la Universidad de California-Berkeley, y en la Universidad de Deusto, llevando a cabo el proyecto #UniswithHeart sobre redes y mecanismos de solidaridad para prevenir y responder al acoso sexual en las universidades. Ana es también miembro electo del Comité Ejecutivo de la ESA (Asociación Europea de Sociología) (2021-2024) y co-coordinadora de la Red de Investigación: Women's and Gender Studies. Ana también es miembro de la Red de Investigación de la ESA sobre Sociología del Derecho, así como miembro de la Asociación Internacional de Sociología (ISA) y de la Asociación Americana de Sociología (ASA), entre otras asociaciones, como la Asociación Europea de Mujeres Juristas (EWLA). La Dra. Vidu ha sido asistente editorial de la revista de la ISA, "International Sociology" desde 2015 hasta 2020. Recibió el Premio Extraordinario por su Licenciatura y también por su Máster en Sociología. Su tesis doctoral aportó conocimientos científicos pioneros en España sobre el tratamiento de una de las primeras denuncias contra un profesor por acoso sexual en la Universidad de Barcelona, comparándola con la primera denuncia en la Universidad de California-Berkeley. Fue cofundadora de la "Red solidaria de víctimas de violencia de género en las universidades" (actualmente *MeToo Universidad*). Ana Vidu ha participado en múltiples congresos internacionales, proyectos de investigación competitiva y ha publicado numerosos artículos científicos sobre violencia de género y consentimiento sexual.

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- Estructura de la mesa redonda:
    - (1) Conferencia (30').
    - (2) Diálogo con la Prof. Millán (ex-presidenta de SEDOPTICA) (15').
    - (3) Turno abierto de palabra para el público (15').

# Meeting **OPTICA** Representative

Wednesday july/3

18:30-19:00 h (Salón de Grados)

Miércoles 3/julio

**Prof. Susana Marcos**

Center for Visual Sciences  
The Institute of Optics and Flaum Eye Institute  
University of Rochester, Rochester  
[smarcos2@ur.rochester.edu](mailto:smarcos2@ur.rochester.edu)



## How OPTICA can shape your career?

Professional societies provide an excellent framework to a researcher's day to day work, but it is hard to think of a scientific society that better accompanies your career than Optica, nurturing students since their beginning of the journey, young professionals, seasoned academics, and industry. In this presentation, I will review programs from Optica and its Foundation (from Student Chapters and Ambassador program, to funding opportunities), its portfolio of meetings and journals, and corporate engagement activities. I will share bits of my journey at Optica, and other examples of how Optica can share a career in Optics, creating opportunities for growth, boosting the impact of your and creating long-lasting connections.

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### Short bio:

Susana Marcos is the current David R. Williams Director of the Center for Visual Science, Nicholas George Professor of Optics at the Institute of Optics and Professor of Ophthalmology at the Flaum Eye Institute, University of Rochester, NY, USA. She received a MsC (1992) and PhD (1996) in Physics from the University of Salamanca and was a postdoctoral researcher (1997-2000) at Harvard University, with Fulbright and Human Frontiers Science scholarships. She has been Director and Founder of the Visual Optics and Biophotonics Lab, and Professor of Research at the Institute of Optics, CSIC. She is a pioneer in the development of new techniques for evaluation and treatment in ophthalmology, several of which have been marketed and already contributed to improving the diagnosis and treatment of thousands of patients. She has published >220 highly cited research articles, is the inventor of 27 patent families (14 licensed), co-founder of 2EyesVision, has supervised 25 PhDs and pronounced >300 talks at international conferences. She has served in leadership positions in numerous organizations. At Optica, she has been Chair of the Applications of Visual Science Technical Group, Director at Large (2012-2015), Member of the Awards Committee, Chair of the Tyllier Award and Yves Medal Committee, Editorial Board Member in Biomedical Optics Express and Optica, and guest editor in special issues in Optical journals. Currently, she is Chair of the Optica Publications Council, Member of the Financial Committee and Optica Board Member, and Optica student chapters (CSIC and Rochester) advisor. She is a fellow of multiple societies (including Optica) and has received numerous recognitions, including the Optica Adolph Lomb Medal and the Edwin Land Medal.

# Plenary Talk – Conferencia Plenaria

Thursday July/4

9:00-9:45 h

(Salón de Actos)

Jueves 4/julio

## **Prof. Austin Roorda**

Herbert Wertheim School of Optometry and Vision Science  
University of California, Berkeley

[aroorda@berkeley.edu](mailto:aroorda@berkeley.edu)



## **Hacking Human Vision**

Humans possess an exquisite ability to immediately generate rich and accurate percepts of a viewed scene in color, space, motion and depth. The process is so effortless that we often take it for granted, but like most lines of scientific investigation, the closer you look, the more interesting it gets. An ability to hack the visual system and directly control the factors (optical blur, eye motion, activation of three types of cone photoreceptor cells) that govern the sensory inputs that inform our percepts can offer some insight into this remarkable process. Systems that combine adaptive optics, high-speed tracking, and precise aberration-corrected light delivery to the retina allow us to do just that. I will describe our most recent systems, their capabilities and applications. Specifically, I will focus on experiments that investigate spatial vision [the beneficial role of eye motion for visual acuity] and color vision [how signals from the three cone types are used to generate percepts of color]. I will end with some discussion of how these technologies are being translated for clinical applications.

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### **Short bio:**

Austin Roorda received his Ph.D. from the University of Waterloo in 1996 with joint degrees in Vision Science & Physics. Since that time, Dr. Roorda has been pioneering applications of adaptive optics and ophthalmoscopy, including mapping of the human trichromatic cone mosaic while a postdoc at the University of Rochester, designing and building the first adaptive optics scanning laser ophthalmoscope (AOSLO) at the University of Houston, tracking and targeting light delivery to individual cones in the human eye at UC Berkeley, and being part of the first team to use AO imaging to monitor efficacy of a treatment to slow retinal degeneration. Since 2005, he's been at UC Berkeley where he is a member of the Vision Science, Bioengineering and Neuroscience graduate programs. He is a Fellow of the Optical Society of America, the Association for Research in Vision and Ophthalmology and the American Academy of Optometry. Notable awards are the Distinguished Alumni Award from the University of Waterloo School of Optometry (2007), the Glenn A. Fry Award from the American Academy of Optometry (2009), a John S. Guggenheim Fellowship (2014), an Alcon Research Institute Award (2016) a Leverhulme Visiting Professorship at the University of Oxford and the Rank Prize in Optoelectronics (2024).

# Plenary Talk – Conferencia Plenaria

Thursday july/4

9:45-10:30 h (Salón de Actos)

Jueves 4/julio

## **Dr. Carlos Hernández-García**

Grupo de Investigación en Aplicaciones del Láser y Fotónica  
Unidad de Excelencia en Luz y Materia Estructuradas  
Dpto. Física Aplicada, Universidad de Salamanca  
[carloshergar@usal.es](mailto:carloshergar@usal.es)



## **Attosecond Structured Light**

The development of structured ultrafast laser sources is a key ingredient to advance our knowledge about the fundamental dynamics of electronic and spin processes in matter. It is widely recognized the relevance of ultrafast sources structured in their spin angular momentum (associated to the polarization of light) and orbital angular momentum (associated with the transverse phase profile, or vorticity of a light beam) to study chiral systems and magnetic materials in their fundamental temporal and spatial scales. In the last decade, the possibility to generate structured ultrafast laser pulses in the shortest time scales known, as attosecond pulses, has triggered substantial developments in nonlinear optics. In particular, thanks to the highly nonlinear process of high harmonic generation (HHG), where an intense infrared driving beam is up converted into the EUV extreme-ultraviolet (EUV)/soft x-rays, structured attosecond pulses can be nowadays obtained. In this talk we will review several works that have boosted the field of attosecond structured pulses during the last decade. We will focus not only in the ability to tailor the angular momentum properties of EUV/soft x-ray pulses, but also on how through the angular momentum of the infrared driving beam we can harness the spatiotemporal properties of the attosecond pulses being emitted.

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### **Short bio:**

Associate Professor at Universidad de Salamanca (Spain). He obtained his PhD in Physics in 2013. After a Marie Skłodowska Curie postdoctoral stay at JILA, University of Colorado at Boulder (USA), he returned to Universidad de Salamanca where he leads the Unit on Structured Light and Matter (LUMES) and the ERC Starting Grant project ATTOSTRUCTURA. His work focuses on the generation and applications of structured laser pulses, with durations in the attosecond timescale. Together with his colleagues and collaborators, he has designed theoretical tools to understand and combine quantum simulations with highly non-linear strong-field processes. Recipient of the Fresnel Prize 2019, the RSEF-BBVA 2019 Prize for young physics researchers, the IUPAP Young Scientist Prize 2021, and the ICO Prize 2023.



# Conferencia Plenaria

Thursday July/4

15:15-16:00 h (Salón de Actos)

Jueves 4/julio

## **Prof. José Benito Vázquez Dorrió**

Departamento de Física Aplicada,  
Instituto de Física y Ciencias Aeroespaciales,  
Universidad de Vigo  
[bvazquez@uvigo.gal](mailto:bvazquez@uvigo.gal)



## **Aprender Óptica Haciendo Óptica: Dentro y Fuera del Aula**

Aprender Óptica haciendo Óptica es un reto y una necesidad, para acercar y hacer más comprensible este importante campo de la Ciencia y de la Ingeniería, en particular al alumnado de nuestro sistema educativo y en general a la Sociedad. El componente manipulativo y experimental, que permite utilizar todos los sentidos para comprender y establecer relaciones con el mundo natural, se reconoce como una fuente de inspiración, motivación y aprendizaje desde hace mucho tiempo. Es por ello que existen innumerables experiencias ya contrastadas del beneficio del empleo y difusión del aprendizaje activo experimental de la Óptica, teniendo así a nuestra disposición un amplio espectro de recursos para ser empleado por profesorado y alumnado de forma integrada con los contenidos conceptuales a enseñar dentro y fuera del aula. Actividades experimentales bien estructuradas que pueden poner de manifiesto, por ejemplo, los problemas que originaron el conocimiento, la metodología empleada, los avances y las aplicaciones técnicas relacionadas pasadas y recientes, la influencia de los contenidos a nivel social y ambiental, la historia de los contenidos y el aporte de la mujer a los mismos. Es tiempo de que hagamos uso de la información disponible e impulsemos, adaptemos, transformemos y modifiquemos el diseño e implementación de estas potentes herramientas de aprendizaje. En esta ponencia experimental invitada presentaremos nuestra visión y experiencia, así como una panorámica de los recursos disponibles y sugerencias de uso.

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### **Short bio:**

José Benito Vázquez Dorrió es catedrático de Física Aplicada en la Universidad de Vigo y su campo de investigación se centra en las aplicaciones metrológicas de la Óptica. Mantiene al mismo tiempo una línea de investigación e innovación en enseñanza y divulgación de la Física desde principios de los noventa relacionada con el diseño, creación y empleo de actividades manipulativas/experimentales fuera y dentro del aula, utilizando diferentes metodologías activas y herramientas, que han dado lugar, a un número 70mpeti de publicaciones, cursos de formación, organización de congresos, conferencias y proyectos de ámbito nacional e internacional en este 70mpeti de Aprender Física Haciendo Física. Es Vicepresidente de la Asociación Hands-on Science y miembro de la "International Council of Associations for Science Education. Es responsable del Grupo de Innovación Docente de Aprendizaje Manipulativo de la Física de la Universidad de Vigo, vocal del Grupo Especializado de Didáctica e Historia de la Física y la Química de las Reales Sociedades Españolas de Física y de Química, y representante de la RSEF en International Day of Light. Recientemente recibió el Premio Enseñanza y Divulgación de la Física (modalidad Enseñanza Universitaria) de la RSEF-Fundación BBVA 2023.