

# PROCEEDINGS OF SPIE

[SPIDigitalLibrary.org/conference-proceedings-of-spie](https://SPIDigitalLibrary.org/conference-proceedings-of-spie)

## Front Matter: Volume 12136

, "Front Matter: Volume 12136," Proc. SPIE 12136, Unconventional Optical Imaging III, 1213601 (31 May 2022); doi: 10.1117/12.2642895

**SPIE.**

Event: SPIE Photonics Europe, 2022, Strasbourg, France

# PROCEEDINGS OF SPIE

## ***Unconventional Optical Imaging III***

**Marc P. Georges**  
**Gabriel Popescu**  
**Nicolas Verrier**  
*Editors*

**3–7 April 2022**  
**Strasbourg, France**

**9–20 May 2022**  
**ONLINE**

*Sponsored by*  
SPIE

*Cosponsored by*  
City of Strasbourg (France)  
IdEx University of Strasbourg (France)  
CNRS (France)  
iCube (France)  
Université de Strasbourg (France)

*Cooperating Organisations*  
Photonics 21 (Germany)  
EOS—European Optical Society (Germany)  
Photonics Public Private Partnership (Belgium)  
Photonics France (France)

*Published by*  
SPIE

**Volume 12136**

Proceedings of SPIE 0277-786X, V. 12136

Unconventional Optical Imaging III, edited by Marc P. Georges, Gabriel Popescu,  
Nicolas Verrier, Proc. of SPIE Vol. 12136, 1213601 · © 2022 SPIE  
0277-786X · doi: 10.1117/12.2642895

Proc. of SPIE Vol. 12136 1213601-1

The papers in this volume were part of the technical conference cited on the cover and title page. Papers were selected and subject to review by the editors and conference program committee. Some conference presentations may not be available for publication. Additional papers and presentation recordings may be available online in the SPIE Digital Library at [SPIDigitalLibrary.org](http://SPIDigitalLibrary.org).

The papers reflect the work and thoughts of the authors and are published herein as submitted. The publisher is not responsible for the validity of the information or for any outcomes resulting from reliance thereon.

Please use the following format to cite material from these proceedings:

Author(s), "Title of Paper," in *Unconventional Optical Imaging III*, edited by Marc P. Georges, Gabriel Popescu, Nicolas Verrier, Proc. of SPIE 12136, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X  
ISSN: 1996-756X (electronic)

ISBN: 9781510651487  
ISBN: 9781510651494 (electronic)

Published by

**SPIE**

P.O. Box 10, Bellingham, Washington 98227-0010 USA

Telephone +1 360 676 3290 (Pacific Time)

[SPIE.org](http://SPIE.org)

Copyright © 2022 Society of Photo-Optical Instrumentation Engineers (SPIE).

Copying of material in this book for internal or personal use, or for the internal or personal use of specific clients, beyond the fair use provisions granted by the U.S. Copyright Law is authorized by SPIE subject to payment of fees. To obtain permission to use and share articles in this volume, visit Copyright Clearance Center at [copyright.com](http://copyright.com). Other copying for republication, resale, advertising or promotion, or any form of systematic or multiple reproduction of any material in this book is prohibited except with permission in writing from the publisher.

Printed in the United States of America by Curran Associates, Inc., under license from SPIE.

Publication of record for individual papers is online in the SPIE Digital Library.

**SPIE. DIGITAL  
LIBRARY**

[SPIDigitalLibrary.org](http://SPIDigitalLibrary.org)

---

**Paper Numbering:** A unique citation identifier (CID) number is assigned to each article in the Proceedings of SPIE at the time of publication. Utilization of CIDs allows articles to be fully citable as soon as they are published online, and connects the same identifier to all online and print versions of the publication. SPIE uses a seven-digit CID article numbering system structured as follows:

- The first five digits correspond to the SPIE volume number.
- The last two digits indicate publication order within the volume using a Base 36 numbering system employing both numerals and letters. These two-number sets start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B ... 0Z, followed by 10-1Z, 20-2Z, etc. The CID Number appears on each page of the manuscript.

# Contents

vii *Conference Committee*

---

## APPLICATIONS: BIOMED I

---

12136 02 **Axial organization of muscular myosin identified by the optical and computational pipeline FAMOUS** [12136-3]

---

## ADVANCED METHODS: DIGITAL HOLOGRAPHY I

---

12136 03 **Effects of some model approximations in the reconstructions of digital in-line holograms: simulations, experiments on calibrated objects and model refinement assessment** [12136-10]

12136 04 **Total internal reflection holographic microscopy for cellular imaging** [12136-11]

---

## ADVANCED METHODS: PHASE IMAGING

---

12136 05 **Lensless phase imaging microscopy by multiple intensity diffraction pattern (Invited Paper)** [12136-13]

12136 06 **Polarization-sensitive Fourier ptychography microscopy using dome-shaped LED illuminator** [12136-14]

12136 07 **Nonlinear primal dual-method phase retrieval for X-ray in-line phase contrast imaging** [12136-15]

12136 08 **Terahertz ptychography with efficient FOV for breast cancer tissue imaging** [12136-42]

---

## ADVANCED METHODS: WAVEFRONT SENSING

---

12136 09 **Model eye assessment by 3D fast-scanning peripheral refraction wavefront sensor** [12136-19]

12136 0A **Shack-Hartmann based wavefront and intensity sensing via U-Net** [12136-22]

---

**ADVANCED METHODS: COMPUTATIONAL IMAGING**

---

- 12136 0B **Compressive sensing instrumental concepts for space applications (Invited Paper)** [12136-23]
- 12136 0C **Compressive sensing for Earth observation: the effect of a moving scene** [12136-25]
- 12136 0D **Giga-voxel multispectral time-resolved imaging with single-pixel detection and data fusion** [12136-26]

---

**ADVANCED METHODS: MICRO-/NANOSCOPY**

---

- 12136 0E **Lock-in amplified differential phase contrast** [12136-28]
- 12136 0F **Light field multiphoton microscopy with temporal focusing-based volume selective excitation** [12136-32]

---

**ADVANCED METHODS: POLARIZATION**

---

- 12136 0G **Machine learning for white matter fibre tract visualization in the human brain via Mueller matrix polarimetric data** [12136-35]
- 12136 0H **Chiral structured illumination microscopy: fast imaging chiral domains at super-resolution** [12136-38]
- 12136 0I **Temperature stable and versatile polarization modulators for bioimaging applications** [12136-40]
- 12136 0J **Swept-wavelength null polarimetry for weak linear birefringence imaging** [12136-99]

---

**ADVANCED METHODS: LIGHT SCATTERING**

---

- 12136 0K **Underwater imaging method and apparatus utilizing multiple beam interference** [12136-47]

---

**COMPUTING, MODELLING, DESIGN: DESIGN AND CO-DESIGN**

---

- 12136 0M **On design of hybrid diffractive optics for achromatic extended depth-of-field (EDoF) RGB imaging** [12136-49]
- 12136 0N **On the use of differentiable optical models for lens and neural network co-design** [12136-50]
- 12136 0O **Comparison of three methods for end-to-end optimization of hybrid optical/digital imaging systems with professional optical design software** [12136-51]

---

**ADVANCED METHODS: TOMOGRAPHY AND OCT**

---

12136 OP **OCT-assisted needle for epidural injection** [12136-56]

---

**COMPUTING, MODELLING, DESIGN: AI FOR BIOMED**

---

12136 OQ **Mode-mapping qOBM microscopy to virtual hematoxylin and eosin (H&E) histology via deep learning** [12136-58]

---

**ADVANCED METHODS: MULTIMODAL/HYPERSPECTRAL**

---

12136 OR **High-resolution snapshot hyperspectral computed tomography imaging spectrometer: real-world applications** [12136-64]

12136 OS **Multimodal microscopy from tomographic diffraction microscopy acquisitions** [12136-66]

---

**APPLICATIONS: BIOMED II**

---

12136 OT **Tomographic phase microscopy at single cell scale without a-priori knowledge of cell orientations: smart strategies for rotation angles recovery** [12136-68]

12136 OU **On the use of multilook Fourier ptychographic microscopy for observing cells and tissues** [12136-69]

---

**ADVANCED METHODS: DIGITAL HOLOGRAPHY II**

---

12136 OV **An integrated top-stage incubator and lens-free holographic imaging system for culture monitoring applications** [12136-74]

12136 OW **Digital holography in microplastic identification** [12136-75]

---

**POSTER SESSION**

---

12136 OX **Combined electronic speckle pattern interferometry and digital holography for analysis of deformations in magnetic shape memory actuators** [12136-77]

12136 OY **3D indirect time-of-flight imaging employing transmission electroabsorption modulators** [12136-78]

- 12136 0Z     **Hypothetical photo-nuclear effects, dating and imaging on the Shroud of Turin** [12136-79]
- 12136 10     **Contrast gloss evaluation by use of a camera-based gloss meter** [12136-80]
- 12136 11     **Visual inspection via anomaly detection by automated uncertainty propagation** [12136-81]
- 12136 12     **Autofocus in quantitative phase imaging** [12136-84]
- 12136 13     **Experimental validation of dynamic activation of pixelated holograms for retinal projection display** [12136-85]
- 12136 14     **Joint qualitative and quantitative evaluation of fast image dehazing based on dark channel prior** [12136-86]
- 12136 15     **Evaluation of a dual-modal tissue imaging framework based on information fusion using optical coherence and bioimpedance tomography** [12136-87]
- 12136 16     **In vivo compound eye imaging using full-field optical coherence tomography** [12136-88]
- 12136 17     **Autofocus algorithms for lensless on-chip microscopy validated on synthetic targets for microfluidic applications and particle tracking** [12136-89]
- 12136 18     **A cheap, fast, and versatile illumination system for technical cleanliness** [12136-93]
- 12136 19     **Algorithm for the automated determination of the forms to electrical discharge processes used to analyze the formed electrolyte plasma and predict the properties of the formed metal oxide layers** [12136-94]
- 12136 1A     **Mobile smartphone-based augmented reality for industry remote monitoring and maintenance** [12136-95]

# Conference Committee

## *Symposium Chairs*

**Francis Berghmans**, Vrije Universiteit Brussel (Belgium)  
**Thierry Georges**, Oxxius SA (France)  
**Paul C. Montgomery**, Université de Strasbourg (France)

## *Programme Track Chair*

**Francis Berghmans**, Vrije Universiteit Brussel (Belgium)

## *Conference Chairs*

**Marc P. Georges**, Université de Liège (Belgium)  
**Gabriel Popescu**, University of Illinois at Urbana-Champaign  
(United States)  
**Nicolas Verrier**, IRIMAS-Univ. de Haute-Alsace (France)

## *Conference Program Committee*

**Tatiana Alieva**, Universidad Complutense de Madrid (Spain)  
**Pierre H. Chavel**, Institut d'Optique Graduate School (France)  
**Jürgen W. Czarske**, Technische Universität Dresden (Germany)  
**Julien Fade**, Université de Rennes (France)  
**Corinne Fournier**, Université de Jean Monnet Saint-Etienne (France)  
**Irene Georgakoudi**, Tufts University (United States)  
**Sylvain Gioux**, Université de Strasbourg (France)  
**Olivier Haeberlé**, Université de Haute-Alsace (France)  
**Elizabeth M.C. Hillman**, Columbia University (United States)  
**Giancarlo Pedrini**, Institut für Technische Optik (Germany)  
**Neus Sabater**, Technicolor (France)  
**Anne Sentenac**, Institut Fresnel (France)  
**Guohai Situ**, Shanghai Institute of Optics and Fine Mechanics,  
Chinese Academy of Sciences (China)  
**Enrique Tajahuerce**, Universidad Jaime I (Spain)  
**Pauline Trouvé**, ONERA (France)  
**Wilfried Uhring**, ICube-SERTIT (France)  
**Laura Waller**, University of California, Berkeley (United States)  
**Keisuke Goda**, The University of Tokyo (Japan)



