

ADVANCED OPTICAL TECHNOLOGIES

SPECIAL ISSUE
**10 BEST REVIEWS AND TUTORIALS IN
ADVANCED OPTICAL TECHNOLOGIES**

EDITOR-IN-CHIEF
Michael Pfeffer

THOSSMEDIA

DE
—
G



ADVANCED OPTICAL TECHNOLOGIES

EDITOR-IN-CHIEF

Michael Pfeffer, Weingarten, Germany
University of Applied Sciences Ravensburg-Weingarten, Germany

EDITORIAL BOARD

Stefan Bäumer, TNO Delft, Netherlands
Jan Burke, BIAS, Germany
Donis Flagello, Nikon RCA, USA
Michael Golub, Tel Aviv University, Israel
Jin Guofan, Tsinghua University, China
Norbert Kaiser, Fraunhofer IOF, Germany
Malgorzata Kujawinska, Warsaw University of Technology, Poland
Irina Livshits, St. Petersburg National Research University, Russia
Peter Loosen, Fraunhofer ILT, Germany
Yi Luo, Tsinghua University, China
Angus Macleod, Thin Film Center Inc., USA
Douglas McCarter, McCarter Machine Inc., USA
Andrew Rakich, ESO, Germany
Peter Seitz, University of Neuchâtel, Switzerland
Stefan Sinzinger, Technical University Ilmenau, Germany
Kimio Tatsuno, OITDA, Tokyo, Japan
Hugo Thienpont, Vrije Universiteit Brussel, Belgium
Michael Totzeck, Carl Zeiss AG, Germany
Wilhelm Ulrich, Carl Zeiss AG, Germany
Hexin Wang, Carl Zeiss Shanghai Co. Ltd., China

MANAGING EDITOR

Holger Kleessen, Berlin, Germany

FOUNDING PUBLISHER

Andreas Thoss, THOSS Media GmbH, Berlin, Germany



DE GRUYTER

European Optical Society

The publisher, together with the authors and editors, has taken great pains to ensure that all information presented in this work (programs, applications, amounts, dosages, etc.) reflects the standard of knowledge at the time of publication. Despite careful manuscript preparation and proof correction, errors can nevertheless occur. Authors, editors and publisher disclaim all responsibility for any errors or omissions or liability for the results obtained from use of the information, or parts thereof, contained in this work.

The citation of registered names, trade names, trademarks, etc. in this work does not imply, even in the absence of a specific statement, that such names are exempt from laws and regulations protecting trademarks etc. and therefore free for general use.

ISSN 2192-8576 · e-ISSN 2192- 8584

All information regarding notes for contributors, subscriptions, Open access, back volumes and orders is available online at www.degruyter.com/aot.

EDITOR-IN-CHIEF Michael Pfeffer, Weingarten, Germany, University of Applied Sciences Ravensburg-Weingarten, Germany, Hochschule Ravensburg-Weingarten, Doggenriedstrasse, Postfach 1261, 88241 Weingarten, Germany, Tel.: +49 (0)751 501 9539, Fax: +49 (0)751 501 9874, Email: michael.pfeffer@hs-weingarten.de

MANAGING EDITOR Holger Kleessen, Berlin, Germany, Email: contact@advanced-optics.org

FOUNDING PUBLISHER Andreas Thoss, THOSS Media GmbH, Wolfshagener Str. 56, 13187 Berlin, Germany, Email: th@thoss-media.com

RESPONSIBLE FOR ADVERTISEMENTS Heiko Schulze, De Gruyter, Genthiner Straße 13, 10785 Berlin, Germany. Tel.: +49 (0)30 260 05-358, Fax: +49 (0)30 260 05-264, Email: anzeigen@degruyter.com

© 2015 Walter de Gruyter GmbH, Berlin/Boston and THOSS Media GmbH

TYPESETTING Compuscript Ltd., Shannon, Ireland

PRINTING Franz X. Stücker Druck und Verlag e.K., Ettenheim

Printed in Germany



Contents

Editorial

Andreas Thoss and Michael Pfeffer
AOT is giving back: 10 Best reviews and tutorials for free
— 221

Community

Elina Koistinen
EOS News – EOS at the World of Photonics Congress 2015 — 223

Conference Notes — 225

Conference Calendar — 231

Special Issue: 10 Best reviews and tutorials in Advanced Optical Technologies

Optical Design

David Shafer
Lens designs with extreme image quality features — I

Christoph Menke and G.W. Forbes,
Optical design with orthogonal representations of rotationally symmetric and freeform aspheres — II

Optical Engineering, Aspheres

Matthias Beier, Andreas Gebhardt, Ramona Eberhardt, and Andreas Tünnermann
Lens centering of aspheres for high-quality optics — III

Microoptics

Hans Zappe
Micro-optics: a micro-tutorial — IV

LED Lighting

Julius Muschaweck and Christopher Wiesmann
Extracting light out of LEDs — V

Lithography

Kafai Lai
Review of computational lithography modeling: focusing on extending optical lithography and design-technology co-optimization — VI

Super-Resolution Microscopy

Klaus Weisshart, Thomas Dertinger, Thomas Kalkbrenner, Ingo Kleppe and Michael Kempe
Super-resolution microscopy heads towards 3D dynamics — VII

Optics for Materials Processing

Koji Sugioka and Ya Cheng
A tutorial on optics for ultrafast laser materials processing: basic microprocessing system to beam shaping and advanced focusing methods — VIII

Remote Sensing

Mikhail A. Vorontsov
Speckle effects in target-in-the-loop laser beam projection systems — IX

Optical Materials

Peter Hartmann
Optical glass: past and future of a key enabling material — X