## PROCEEDINGS OF SPIE

## Nonimaging Optics: Efficient Design for Illumination and Solar Concentration XVII

Roland Winston Eli Yablonovitch Editors

24 August – 4 September 2020 Online Only, United States

Sponsored and Published by SPIE

**Volume 11495** 

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 SPIEDigitalLibrary.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 *Nonimaging Optics: Efficient Design for Illumination and Solar Concentration XVII*, edited by Roland Winston, Eli Yablonovitch, Proceedings of SPIE Vol. 11495 (SPIE, Bellingham, WA, 2020) Seven-digit Article CID Number.

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510637962

ISBN: 9781510637979 (electronic)

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA Telephone +1 360 676 3290 (Pacific Time)· Fax +1 360 647 1445 SPIF org

Copyright © 2020, Society of Photo-Optical Instrumentation Engineers.

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 copying fees. The Transactional Reporting Service base fee for this volume is \$21.00 per article (or portion thereof), which should be paid directly to the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923. Payment may also be made electronically through CCC Online at 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. The CCC fee code is 0277-786X/20/\$21.00.

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.



**Paper Numbering:** Proceedings of SPIE follow an e-First publication model. A unique citation identifier (CID) number is assigned to each article 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

	ADVANCED DEVELOPMENTS
11495 06	Advances in flowline simulations: virtual source computation method [11495-4]
	CONCENTRATOR DESIGNS
11495 08	Computational method for optimizing segmented nonimaging concentrators [11495-6]
11495 OA	Caustic surface produced by a simple lens considering a point source placed at arbitrary position along the optical axis [11495-8]
	ILLUMINATION
11495 OB	Freeform optics for dynamic illumination [11495-9]
11495 OC	Designing compact and ultra-efficient aspherical lenses with prescribed irradiance properties for extended light sources [11495-10]
	NEW CONCEPTS
11495 OF	Reflector design and study via conformal mappings [11495-13]
11495 OH	Analysis on optical efficiency for tiling polygonal luminescent waveguides [11495-15]
11495 OI	Hamiltonian formulation of flowlines, first step for Wigner formalism analysis [11495-16]
	NUMERICAL AND FREEFORM METHODS
11495 OJ	Freeform compound concentrators for indoor optical wireless communications [11495-17]
11495 OL	Green's function formalism for nonimaging optics [11495-19]

## **SOLAR APPLICATIONS**

11495 OM	Progress in the development of two stage concentrated (53X) parabolic trough solar thermal collector [11495-20]
11495 ON	Preliminary experimental results of a novel low cost solar thermal collector with integrated optics for desalination processes [11495-21]
11495 00	Low cost solar photovoltaic-thermal (PVT) collector using aluminum minichannels and nonimaging optics [11495-22]
11495 OP	Novel volume holographic grating-based spectrum-splitting concentrator for hybrid solar system [11495-23]
11495 OQ	Modeling monthly insolation data [11495-24]
11495 OS	Solar concentration, solar resource utilization, and sustainability [11495-26]
11495 OT	External compound parabolic concentrator (XCPC) for decarbonizing industrial processing heat [11495-27]