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Vol. 12, No. 3

# ***Ophthalmic Technologies XXI***

**Fabrice Manns**  
**Per G. Söderberg**  
**Arthur Ho**  
*Editors*

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## Introduction

The papers contained in this volume were presented at the twenty-first conference on Ophthalmic Technologies, held from January 22 to 24, 2011, at the Moscone Center in San Francisco, California as a part of the SPIE Photonics West BIOS Meeting.

A total of 53 papers and 15 posters were presented by scientists, clinicians, and engineers from academia, private clinics, and industry representing 24 different countries in 5 different continents. Topics included advances in adaptive optics for retinal imaging, new developments in ophthalmic optical coherence tomography, and novel uses of lasers for diagnostic and surgery. The lively poster session held on Monday evening was one of the highlights of the meeting.

The eleventh Pascal Rol Award was presented to Dr. James Loudin and his colleagues from Stanford University, CA for their excellent paper on "*Photovoltaic retinal prosthesis*" (7885-37). Established in memory of Dr. Pascal O. Rol, former chair and co-founder of the Ophthalmic Technologies conference, the award is in recognition of the best manuscript and presentation. We are extremely grateful to Drs. Wolfgang Drexler, Arthur Ho, Karen Joos, Ezra Maguen, Daniel Palanker, and Jean-Marie Parel who reviewed the manuscripts and had the difficult task of selecting the winner among six excellent finalists. The other finalists were Drs. Baumann (7885-16), Brinkmann (7885-26), Furukawa (7885-30), Kocaoglu (7885-10), and Leitgeb (7885-18).

The conference hosted its sixth presentation on the topic of unmet technological needs in a clinical area. Prof. Sonia Yoo, from the Bascom Palmer Eye Institute in Miami, USA, gave an outstanding overview of the challenges and technological needs in the field of corneal transplant surgery.

We are very grateful to Topcon Advanced Biomedical Imaging Laboratory and The Swedish Ophthalmological Society, Resident Optics Course for sponsoring the 2011 award and keynote lecture through the Pascal Rol Foundation.

We thank the Program Committee members, session chairs, speakers and participants, as well as the SPIE staff, especially Annie Gerstl and Marilyn Gorsuch, for their support and dedication in making this conference a success.

We extend an invitation for the Ophthalmic Technologies XXII conference, which is scheduled for January 21, 22, and 23, 2012 in San Francisco, CA.

**Fabrice Manns**  
**Per G. Söderberg**  
**Arthur Ho**



**Eleventh Pascal Rol Award for Excellence in Ophthalmic Technologies**

**Supported through the Pascal Rol Foundation**

**Presented on January 23, 2011 to**

**James Loudin et al**

**for their excellent paper on**

**"Photovoltaic Retinal Prosthesis"**



Fabrice Manns presents the 2011 Pascal Rol Award to James Loudin

<b>2010</b>	<b>Daniel Hammer</b>	<i>Multimodal adaptive optics for depth enhanced high-resolution ophthalmic imaging</i>
<b>2009</b>	<b>Kazuhiro Kurokawa</b>	<i>1<math>\mu</math>m wavelength adaptive optics scanning laser ophthalmoscope</i>
<b>2008</b>	<b>Boris Povazay</b>	<i>Minimum distance mapping using volumetric OCT: A novel indicator for early glaucoma diagnosis</i>
<b>2007</b>	<b>Yoshiaki Yasuno</b>	<i>Clinical examinations of anterior eye segments by three-dimensional swept-source optical coherence tomography</i>
<b>2006</b>	<b>Enrique Fernandez</b>	<i>Adaptive optics using a liquid crystal spatial light modulator for ultrahigh-resolution optical coherence tomography</i>
<b>2005</b>	<b>Karsten König</b>	<i>Cornea surgery with nanojoule femtosecond laser pulses</i>
<b>2004</b>	<b>Daniel Palanker</b>	<i>Attracting retinal cells to electrodes for high-resolution stimulation</i>
<b>2003</b>	<b>Igor Ermakov</b>	<i>Non-invasive optical techniques for the measurement of macular pigments</i>
<b>2002</b>	<b>Georg Schuele</b>	<i>Non-invasive temperature measurements during laser irradiation of the retina with optoacoustic techniques</i>
<b>2001</b>	<b>Matthew Smith</b>	<i>Minimizing the influence of fundus pigmentation on retinal vessel oximetry measurements</i>



**The 2011 Pascal Rol Lecture on Ophthalmic Technologies**  
**Saturday January 22, 2011**



**Professor Sonia Yoo, MD**

Bascom Palmer Eye Institute, University of Miami, Miami, FL

***Technology needs for corneal transplant surgery***

**SUMMARY**

Corneal transplant surgery has undergone numerous modifications over the years with improvements in technique, instrumentation and eye banking. The main goals of corneal transplantation are achieving excellent optical clarity with long-term graft survival. Penetrating, anterior and posterior lamellar surgery along with femtosecond laser technology have partially met these goals, but outcomes are often unpredictable and surgeon dependent. Technology to predictably separate stroma from Descemet's membrane, techniques to minimize endothelial cell loss, improvements in imaging technology and emerging techniques like laser welding that might replace suturing, eventually making corneal transplantation a refractively predictable procedure are on the wish list of the cornea surgeon..

*"The Pascal Rol Lecture on Ophthalmic Technologies" is presented by a leading clinical ophthalmologist with a strong interest and pioneering research contributions to the field of ophthalmic technologies. This invited lecture is intended to trigger further development of ophthalmic technologies by stimulating discussions between basic scientists, engineers, and clinicians.*

*The 2011 lecture was supported by Topcon Advanced Biomedical Imaging Laboratory and the Swedish Ophthalmological Society, Resident Optics Course ([www.pascalrolfoundation.org](http://www.pascalrolfoundation.org))*

