

6th EOS Topical Meeting on Visual and Physiological Optics

(EMVPO 2012)

**Dublin, Ireland
20-22 August 2012**

ISBN: 978-1-63266-231-6

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2012) by the European Optical Society
All rights reserved.

Printed by Curran Associates, Inc. (2014)

For permission requests, please contact the European Optical Society
at the address below.

European Optical Society
c/o Laser Zentrum Hannover
Hollerithallee 8
30419 Hannover Germany

Phone: +49-511-2788-115
Fax: +49-511-2788-119

www.myeos.org/about

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2634
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

ORAL PAPERS

Optical Modelling of the Human Eye and IOL Design.....	1
<i>Alexander V. Goncharov</i>	
Myopic Eye Analysis Using Hartmann Shack Sensor: Evaluating Centroid Detection Methods For Poisson Noise Dominant Spots.....	3
<i>Akondi Vyas</i>	
Measuring Accommodative Response with a Double-pass System.....	5
<i>M. Aldaba, M. Vilaseca, F. Diaz-Douton, M. Arjona, J. Pujol</i>	
Peripheral Refraction Out To 60 Degrees From Fixation Using The Hartmann-Shack Technique.....	7
<i>David A. Atchison, Ankit Mathur</i>	
An Eye for Optical Illusions.....	9
<i>Michael Bach</i>	
Multimodal Multiphoton Imaging (THG-SHG-2PEF) Of The Human Cornea.....	10
<i>Nicolas Olivier, Gael Latour, Florent Aptel, Ariane Deniset-Besseau, Jean-Marc Legeais, Karsten Plamann, Marie-Claire Schanne-Klein, Emmanuel Beaurepaire</i>	
Light Focusing by Photoreceptor Cell Nuclei.....	12
<i>Zuzanna Blaszcak, Moritz Kreysing, Jochen Guck</i>	
Impact of Spherical Aberration and Stiles Crawford Apodization on Refractive Error.....	14
<i>Renfeng Xu, Bradley A Thibos</i>	
Adaptive Optics Imaging of the Retina.....	16
<i>Stephen A. Burns, Toco Y. Chui, D. A. VanNasdale, Z. Zhong, A. E. Elsner</i>	
Imaging Photoreceptor Structure in Retinitis Pigmentosa and Usher Syndrome: Results and Challenges	17
<i>J. Carroll, P. Godara, R. F. Cooper, V. Williams, P. Summerfelt, J. E. Kim, D. P. Han, D. V. Weinberg, K. E. Stepien, A. Dubra, T. B. Connor</i>	
Analysis Of The Stiles-Crawford Effect Of The First Kind With Tuneable Interference Gratings	19
<i>Sara Castillo, Brian Vohnsen</i>	
Interocular Differences in Visual Latency Induced by Reduced-Aperture Contact Lenses or Corneal Inlays for Presbyopia.....	21
<i>Sotiris Plainis, Dionysia Petratou, Trisevgeni Giannakopoulou, Hema Radhakrishnan, Ioannis G. Pallikaris, W. Neil Charman</i>	
Gradient Refractive Index Reconstruction In Accommodating Non-Human Primate Crystalline Lenses	23
<i>A. De Castro, J. Birkenfeld, B. Maceo, F. Manns, J. M. Parel, S. Marcos</i>	
Shape Of The Posterior Cornea Described By Zernike Polynomials: Influence Of Anterior Corneal Shape And Central Reference Point.....	25
<i>T. De Jong, M. T. Sheehan, S. A. Koopmans, N. M. Jansonius</i>	
Look-up Table of Quadrics Applied to Corneal Topography.....	28
<i>J. Espinosa, A. B. Roig, J. Perez, D. Mas, C. Illueca</i>	
A New Optical Instrument For The Optical Measurement Of Intraocular Scattering Using Modulated Visible Light	30
<i>H. S. Giniis, O. Sahin, G. M. Perez, J. M. Bueno, P. Artal</i>	
Optimized Microlens-Array Geometry for Hartmann-Shack Wavefront Sensor.....	32
<i>O. G. Oliveira, D. W. De Lima Monteiro, R. F. O. Costa</i>	
Optical Modelling of the Human Eye and IOL Design.....	34
<i>Alexander V. Goncharov</i>	
Positional Sensitivity to Microstimuli Detected in the Human Retina	36
<i>W. M. Harmening, W. S. Tuten, A. Roorda, L. C. Sincich</i>	
Two-photon Imaging of the Retina.....	38
<i>J. J. Hunter, R. Sharma, B. Masella, L. Yin, W. H. Merigan, G. Palczewska, K. Palczewski, D. R. Williams</i>	
Possible Origin Of Black Spots In Interferometric Measurements Of Tear Film Surface.....	40
<i>H. T. Kasprzak, D. T. Szczesna-Iskander, D. Mas</i>	
Fixation Quality with a Bessel Beacon in an Adaptive Optics System	42
<i>E. M. Daly, A. J. Lambert, J. C. Dainty</i>	
In Vivo Polarization-Resolved SHG Imaging Of The Corneal Microstructure	44
<i>G. Latour, I. Gusachenko, L. Kowalcuk, I. Lamarre, M. C. Schanne-Klein</i>	

Symmetry of Inter-cone Photoreceptor Distance Between Fellow Eyes.....	46
<i>Marco Lombardo, Giuseppe Lombardo, Domenico Schiano Lomoriello, Marianna Rosati, Pietro Ducoli, Sebastiano Serrao</i>	
Night Myopia Explanation In Terms Of Different Stimuli Configuration Between Day And Night.....	48
<i>N. Lopez-Gil, S. C. Peixoto-de-Matos, J. M. Gonzalez-Mejome, L. Thibos</i>	
Binocular Adaptive Optics Visual Analyzer To Optimize Optical Solutions For Presbyopia.....	50
<i>Silvestre Manzanera, Enrique J. Fernandez, Christina Schwarz, Juan Tabernero, Pedro M. Prieto, Pablo Artal</i>	
Quantifying Performance Of Accommodative Intraocular Lenses With 3-D Anterior Segment OCT.....	52
<i>S. Marcos, S. Ortiz, P. Perez-Merino, J. Birkenfeld, S. Duran, I. Jimenez-Alfaro</i>	
Estimation Of The Ocular Point Spread Function By Retina Modeling.....	54
<i>N. Meitav, E. N. Robak</i>	
Accommodating Intraocular Lens Using a Controllable Liquid-Liquid Interface	57
<i>V. V. Molebny</i>	
Refractive Error Sensing in Natural Multifocal Eyes.....	59
<i>R. Navarro, Vicente Fernandez-Sanchez, Norberto Lopez-Gil</i>	
Comparison Of Forward Light Scatter Estimations Using Hartmann-Shack Spot Patterns And C-Quant	61
<i>Benito Lopez Pablo, H. Radhakrishnan, V. Nourrit</i>	
Cellular-Resolution Imaging Of Macaque Retinas With An Adaptive Optics Retinal Camera Designed For Humans	63
<i>E. Odlund, K. Azartash, L. Vabre, B. Lamory-Bardet, N. Chateau</i>	
Quantification of Human Corneal Grafts Transparency	65
<i>O. Casadessus, L. Siozade Lamoine, G. Georges, C. Deumie, L. Hoffart</i>	
A Signal-To-Noise Ratio For The Study Of The Mean Squared Wavefront Estimation Error In Eye Aberrometry	67
<i>E. Pilios, J. Arines, S. Bara</i>	
Driving with Monocular Bioptic Telescope: Strabismus Might Affect Hazard Detection with the Fellow Eye	69
<i>Amy Doherty, Alex Bowers, Eli Peli</i>	
Intraocular Scattering - Measurement and Analysis.....	71
<i>Guillermo M. Perez</i>	
Extension Of Vision Depth-Of-Field By Corrective Lenses With Angular Modulation Of The Optical Power	73
<i>K. Petelczyc, K. Kakarenko, I. Ducin, A. Czerwinski, Z. Jaroszewicz, A. Kolodziejczyk, M. Sypek</i>	
Is the Iris Suitable As a Biometric?	75
<i>D. Rankin, B. Scotney, P. Morrow, B. Pierscionek</i>	
Simultaneous Multiple-depths en-Face Optical Coherence Tomography Imaging of the Retina	76
<i>John A. Rogers, Adrian Gh. Podoleanu</i>	
Peripheral Contrast Sensitivity Function with Adaptive Optics.....	78
<i>R. Rosen, L. Lundstrom, S. Winter, A. P. Venkataraman, P. Unsbo</i>	
Statistical Eye Modelling and Its Applications.....	80
<i>Jos J. Rozema, David A. Atchison, Marie-Jose Tassignon</i>	
Classification Method to Test Natural Adaptation to the High Order Aberrations of the Eye.....	82
<i>L. Sawides, C. Dorronsoro, P. De Gracia, M. Vinas, A. Haun, E. Peli, S. Marcos</i>	
Calibration Of A Commercial Anterior Segment OCT Instrument For Accurate Corneal Topography	84
<i>D. Siedlecki, S. Ortiz, S. Marcos</i>	
Dynamic Purkinje-Meter System to Evaluate Lens Stability.....	86
<i>Juan Tabernero, Pablo Artal</i>	
Retinal Image Quality During Accommodation.....	88
<i>L. Thibos, J. Martin, T. Liu, A. Bradley, D. Diaz-Munoz, N. Lopez-Gil</i>	
Pupil Apodization in Scanning Retinal Imaging	90
<i>B. Vohnsen, B. Lochocki, D. Rativa, C. Vela</i>	
Visual Hyperacuity and Optical Superresolution	92
<i>Gerald Westheimer</i>	
 POSTER PAPERS	
 Clinical Measurements: Entries Of Factor Matrices Of The Dioptric Power Matrix	93
<i>H. Abelman, S. Abelman</i>	

Application Of Multivariate Analysis Of Variance (MANOVA) To Distance Refractive Variability And Mean Distance Refractive State	94
<i>Shirley Abelman, Herven Abelman</i>	
Theoretical Evaluation Of Different Corneal Models For The Correction Of Presbyopia By Laser Refractive Surgery.....	96
<i>R. G. Anera, A. Alarcon, J. R. Jimenez, M. Soler</i>	
Expected Visual Acuity And Depth Of Focus With Spherical And Aspheric Intraocular Lenses.....	98
<i>F. Alba-Bueno, F. Vega, M. S. Millan, R. Navarro</i>	
ESPI Technique For Corneal Biomechanical Properties Study. Brief Discussion And Critical Analysis.....	100
<i>N. Alcon, C. Moreno, A. Tolosa</i>	
Alternative Methodology for Intraocular Lenses Characterization.....	102
<i>F. T. Amaral, D. W. De Lima Monteiro</i>	
Health Risks of Artificial Stereopsis and a Natural Solution	104
<i>Eamonn Ansbro, Catherine Overhauser, Alova</i>	
A New Tool for Depth Perception Training for Autism and Other Conditions	106
<i>Eamonn Ansbro, Catherine Overhauser, Alova</i>	
Kinematics of Eyelid Movement and Eye Retraction in the Blinking	108
<i>J. Perez, J. Espinosa, A. B. Roig, B. Domenech, D. Mas</i>	
Corneal Topographer Based on Null-Screen Testing	110
<i>Amilcar Estrada-Molina, Manuel Campos-Garcia, Rufino Diaz-Uribe, Marco Ramirez-Ortiz</i>	
Effect of the Lens Histology in Optical Aberrations	112
<i>Ana Gargallo, J. Arines, E. Acosta</i>	
Non-rotational, Aspherical Models of the Human Optical System.....	114
<i>S. Giovanzana, H. T. Kasprzak, S. Talu</i>	
Peripheral Aberrations And Changes In Refractive Error During One Year	116
<i>Andreas Hartwig, Neil W. Charman, Hema Radhakrishnan</i>	
Myopes Visual Acuity With Positive And Negative Contrast Stimuli	118
<i>G. Ikaunieks, E. Caure, E. Kassaliete, Z. Meskovska</i>	
Just-noticeable Differences for Ocular Wavefront Aberrations	120
<i>H. Jungnickel, D. Weigel, H. Babovsky, A. Kiessling, R. Kowarschik, M. Gebhardt</i>	
Measurement Of Accommodative Response Curve Based On Brightness Of The Retinal Reflex.....	122
<i>V. Karitans, M. Ozolins, E. Skutele</i>	
Correlative Imaging of Corneas from Diabetic Rats and Human Donors	126
<i>G. Latour, L. Kowalcuk, M. Savoldelli, J. L. Bourges, K. Plamann, F. Behar-Cohen, M. C. Schanne-Klein</i>	
Effects Of Contrast, Cut-Off Spatial Frequency And Phase Of The OTF On Visual Acuity And Subjective Image Quality Score.....	128
<i>R. Legras, A. P. Sansot, G. Vandermeer, Yannick Nochez, R. Navarro</i>	
Effects Of Various Combinations Of Multifocal Optics On Binocular Subjective Image Quality Score	130
<i>R. Legras, G. Vanermeer, Yannick Nochez</i>	
Selection Of A Relevant Human Eye Model To Study Visual Performances Of Corneal Inlays.....	132
<i>J. Jarosz, F. Castignoles, T. Lepine, P. Tankam</i>	
Second-Harmonic Cornea Microscopy Enhancement With Annular Aperture Filters.....	134
<i>JiaJun Li, Brian Vohnsen</i>	
Wavefront Reconstruction For A Thick Fundus Model Using A Shack-Hartmann Wavefront Sensor	136
<i>T. Liu, L. N. Thibos</i>	
Accommodative Response To Chinese And Latin Characters In Myopes And Emmetropes	139
<i>L. Llorente, H. Radhakrishnan, A. Hartwig</i>	
Defocus-Corrected Determination Of The Stiles-Crawford Effect Of The First Kind	141
<i>B. Lochocki, B. Vohnsen</i>	
Printed Test Plates for Color Discrimination Threshold Determination	143
<i>K. Luse, S. Fomins, M. Ozolins</i>	
Assessment of Intraocular Scattering. Comparative Study Using Several Techniques	145
<i>J. A. Martinez-Roda, M. Vilaseca, J. C. Ondategui, L. Almudi, J. Pujol</i>	
Comparison of Accelerated Corneal Cross-Linking to Standard Cross-Linking using Second-Harmonic Optical Microscopy.....	147
<i>R. McQuaid, J. Li, A. Cummings, M. Mrochen, B. Vohnsen</i>	
Variation With The Orientation (Horizontal - Vertical) Of A Ronchi Achromatic Grating In The Vision Of A Color Sequence Located Inside.....	149
<i>J. Montalva Colomer, I. Tortajada Montanana, M. Aguilar Rico</i>	
The Changes of Shape of the Human Cornea with Age	151
<i>R. Navarro, Jos J. Rozema, Marie-Jose Tassignon</i>	

Improving Retinal Image Via Descattering For The Detection Of Diabetic Retinopathy	153
<i>G. Russell, J. Oakley, N. McLoughlin, V. Nourrit</i>	
Waveform Of The Pupil Light Reflex Analysis Taking Into Account Intrinsically Photosensitive Retinal Ganglion Cells Activity	155
<i>Wioletta Nowak, Andrzej Hachol, Anna Sobaszek, Minoru Nakayama, Hitoshi Ishikawa</i>	
Optical Quality And Intraocular Scattering In Eyes Treated Of Amblyopia.....	157
<i>J. C. Ondategui-Parra, J. Martinez-Roda, M. Vilaseca, A. Wert, J. Pujol</i>	
The Minimum Motion And Heterochromatic Techniques To Differentiate Lutein And Zeaxanthin Macular Pigment Optical Density Using CRT And Different Spectral Emission LED Light Stimuli.....	159
<i>M. Ozolinsh, P. Paulins</i>	
Spherocylindrical Error For Oblique Gaze Regarding The Position Of The Center Of Rotation	160
<i>S. Perches, F. Palos, V. Collados, J. Ares</i>	
Discontinuities in the Index Gradient of the Eye Lens	162
<i>B. Piercionek, M. Hoshino, N. Yagi, K. Uesugi, J. Regini</i>	
Automatic Selection and Registration of Adaptive Optics (AO) corrected Best Quality Retinal Images	163
<i>Gomathy Ramaswamy, Nicholas Devaney</i>	
Imaging Quality Of Multifocal Intraocular Lenses. Automated Assessment Setup.....	165
<i>Laura Remon, Arnau Calatayud, Juan A. Monsoriu, Walter D. Furlan</i>	
Chromatic Null Screen Corneal Topographer with Three LCD's	167
<i>M. I. Rodriguez-Rodriguez, A. Jaramillo Nunez, R. Diaz Uribe</i>	
Investigation Of Hartmann Shack And Curvature Sensors In Quantifying Aberrations Of The Myopic Eye.....	169
<i>M. B. Roopashree, Akondi Vyas, S. J. Weddell, B. Raghavendra Prasad</i>	
Individual Biomechanical Model of the Human Eyeball.....	171
<i>E. Szul-Pietrazak, A. Hachol</i>	
Monofractal and Multifractal Analysis in Human Retinal Pathology	173
<i>S. Talu, S. D. Talu, S. Giovanzana, M. Talu, I. V. Petrescu-Mag</i>	
3D Modeling And Reconstruction Of Human Corneal Surface Using Superellipsoids	175
<i>S. Talu, S. D. Talu</i>	
An Estimate Of The Ocular Media Transmittance Using An Updated Psychophysical Method.....	177
<i>Petteri Teikari, Raymond P. Najjar, Kenneth Knoblauch, Dominique Dumortier, Pierre-Loic Cornut, Philippe Denis, Howard M. Cooper, Claude Gronfier</i>	
A Method to Evaluate Peripheral Visual Perception.....	179
<i>I. Timrote, G. Krumina, T. Pladere, M. Skrbe</i>	
Zernike vs Bessel Circular Functions in Visual Optics.....	181
<i>J. P. Trevino, J. E. Gomez-Correa, Robert Iskander, S. Chavez-Cerda</i>	
Singular Optical Fields Used to Calculate Wavefront Aberrations.....	183
<i>J. E. Gomez-Correa, J. P. Trevino, S. E. Balderas-Mata, S. Chavez-Cerda</i>	
Vortex beams in Visual Optics.....	185
<i>J. P. Trevino, J. E. Gomez-Correa, S. Chavez-Cerda</i>	
Effect Of Near-Work On The Lower And Higher-Order Aberrations: 6 Months Longitudinal Follow-Up Investigation.....	187
<i>B. Vasudevan, B. Fisher, B. Case, P. Lam, J. Wayman, A. Blacker</i>	
Near-Work Induced Transient Myopia (NITM) In Anisometropic Eyes	189
<i>B. Vasudevan, Z. Lin, Y. Liang, Y. Zhang, S. Zhao, X. Yang, N. Wang, K. Ciuffreda</i>	
Transposing the Stiles-Crawford Effect from Pupil to Retina in Eye Modelling.....	191
<i>Carmen Vela, Benjamin Lochocki, Brian Vohnsen</i>	
Demonstration of Digital Holographic Display, Optimized for Human Eye Perception	193
<i>Vladimir Venediktov, Mikhail Lyakh, Alexander Sevryugin, Maxim Solov'ev, Irina Pasechnik</i>	
Author Index	