

James T. Schwiegerling

CURRICULUM VITAE

Chronology of Education

B.S. Optics, University of Rochester, 1990.

M.S. Optics, University of Rochester, 1991.

Ph.D. Optical Sciences, University of Arizona, 1995.

Dissertation: Visual Performance Prediction Using Schematic Eye Models.

Adviser: John Greivnkamp

Chronology of Employment

Eastman Kodak Company, Rochester, NY, (Summers 1988-90). Intern.

Optical Sciences Center, University of Arizona (1991-1995). Graduate Research Assistant.

Optical Sciences Center, University of Arizona (1995-1998). Assistant Research Scientist.

Ophthalmology, University of Arizona (1998-). Assistant/Associate Professor.

Honors and Awards

Eastman Kodak Scholarship, 1987-1990.

Eastman Kodak Fellowship, 1992-1995.

Research to Prevent Blindness Career Development Award 2002-2006

Service/Outreach (for last 5 years, or period in current rank)

Local/state outreach

Optical Sciences Summer Camp Instructor

National/international outreach

Grant Reviewer National Institutes of Health, National Eye Institute

Associate Editor, Journal of Refractive Surgery

Journal Reviewer for American Journal of Ophthalmology, Computer Aided Graphical Design, Current Eye Research, Investigative Ophthalmology and Vision Sciences, Journal of Cataract and Refractive Surgery, Journal of Modern Optics, Journal of the Optical Society of America A, Optics Express and Optometry and Vision Sciences, Vision Research.

Departmental committee(s)

Research Committee

College committee(s)

Numerous oral prelim, dissertation committees for Optical Sciences and Biomedical Engineering

University committee(s)
TRIF Advisory Committee on Imaging

Publications/Creative Activity (Published or Accepted)

Scholarly books and monographs (distinguish scholarly works vs. textbooks)

J. Schwiegerling, *Field Guide to Visual and Ophthalmic Optics*, (SPIE, Washington, 2004).

Chapters in scholarly books.

W.A. Maxwell, J. Schwiegerling. "Multifocal Intraocular Lenses: Measuring Aberrations" to appear in *Transitioning to Refractive IOLs – the Art and Science*. Ed. D.F. Chang.

Schwiegerling J. The optics of wavefront technology. In: *Duane's Clinical Ophthalmology*, Eds: Tasman W, Jaeger EA. (Lippincott, Philadelphia, 2004).

Schwiegerling J. Wavefront information sampling, fitting and conversion to a correction. In: *Wavefront Customized Visual Correction: The Quest for Supervision II*. eds. Krueger RR, Applegate RA, MacRae SM. (Slack, New Jersey, 2004).

J. Schwiegerling, R.W. Snyder and S.M. MacRae "Optical Aberrations and Ablation Pattern Design", in *Customized Corneal Ablation: The Quest for Supervision*. ed: S.M. MacRae, R.R. Krueger, R.A. Applegate (Slack, New Jersey, 2001).

Refereed Journal Articles

J. Choi, J. Schwiegerling. "Optical Performance Measurement and Night Driving Simulation of ReSTOR, ReZoom, and Tecnis Multifocal Intraocular Lenses in a Model Eye." Accepted J. Refract. Surg.

P. Jain, J. Schwiegerling. "RGB Shack-Hartmann Wavefront Sensor." Accepted J. Mod. Optics

J. Schwiegerling. "Analysis of the Optical Performance of Presbyopia Treatments with the Defocus Transfer Function. J. Refract. Surg. **23**, 965-971 (2007).

E.J. Sarver, J. Schwiegerling, R.A. Applegate. "Extracting Wavefront Error from Shack-Hartmann Image Using Spatial Demodulation," J. Refract. Surg. **22**, 949-953 (2006).

J.L. Beverage, J. Schwiegerling. "A Shack-Hartmann-based Autorefractor," J. Refract. Surg. **22**, 932-937 (2006).

G. Li, D.L. Mathine, P. Valley, P. Ayras, J.N. Haddock, M.S. Giridhar, G. Williby, J. Schwiegerling, G.R. Meredith, B. Kippelen, S. Honkanen, N. Peyghambarian. "Switchable Electro-Optic Diffractive Lens with High Efficiency for Ophthalmic Applications," Proc. Natl. Acad. Sci. **103**, 6100-6104 (2006).

- J. Schwiegerling, "Blue-Light Absorbing Lenses and Their Effect on Scotopic Vision," *J. Cataract Ref. Surg.* **32**, 141-144 (2006).
- J. Schwiegerling, "Recent Developments in Pseudophakic Dysphotopsia," *Curr. Opin. Ophthalmol.* **17**, 27-30 (2006).
- J. Schwiegerling, "Modal Reconstruction Methods with Zernike Polynomials," *J. Refract. Surg.* **21**, S552-S557 (2005).
- J. Schwiegerling, "Gaussian weighting of ocular wavefront measurements," *J. Opt. Soc. Am. A* **21**, 2065-2072 (2004).
- J. Schwiegerling, "Scaling Zernike Polynomials to Different Pupil Sizes," *J. Opt. Soc. Am. A.* **19**, 1937-1945 (2002).
- J. Schwiegerling, R.W. Snyder, J.H. Lee, "Wavefront and Topography: Keratome-induced Corneal Changes Demonstrate that Both are Needed for Custom Ablation," *J. Refract. Surg.* **18**, S584-588 (2002).
- J.M. Miller, R. Anwaruddin, J. Straub, J. Schwiegerling, "Higher Order Aberrations in Normal, Dilated, Intraocular Lens, and Laser In Situ Keratomileusis Corneas," *J. Refract. Surg.* **18**, :S579-83 (2002).
- J.M. Miller, J. Schwiegerling, H.L. Hall, T. Surachatkumtonekul, "Detection of Improper Fixation in MTI Photoscreening Images," *J. AAPOS* **5**, 35-43 (2001).
- J. Schwiegerling, "Theoretical Limits to Visual Performance," *Surv. Ophthalmol.* **45**, 139-146 (2000).
- J. Schwiegerling, R.W. Snyder, "Eye Movement during Laser In Situ Keratomiluesis," *J. Cataract Refract. Surg.* **26**, 345-351 (2000).
- S.M. MacRae, J. Schwiegerling, R. Snyder, "Customized Corneal Ablation and Super Vision," *J. Refract. Surg.* **16**, S230-S235 (2000).
- J. Schwiegerling and R. W. Snyder, "Corneal Ablation Patterns to Correct for Spherical Aberration in Photorefractive Keratectomy," *J. Cataract Refract. Surg.* **26**, 214-221 (2000).
- J. Schwiegerling and R.W. Snyder, "Optical Issues in Keratoplasty Patients," *Operative Techniques Cat Ref Surg.* **2**, 85-88 (1999).
- J. Schwiegerling and R.W. Snyder, "Visual Performance Modeling Following RK, PRK, and Lasik Demonstrates the Need for Improved Treatment Algorithms," *Ophthalmic Prac.* **17**, 66-70 (1999).
- S. MacRae, J. Schwiegerling and R.W. Snyder, "Customized and Low Spherical Aberration Corneal Ablation Design," *J. Refract. Surg. (suppl)* **15**, S246-S248 (1999).
- J. Schwiegerling and R.W. Snyder, "Custom Photorefractive Keratectomy Ablations for the Correction of Spherical and Cylindrical Refractive Error and Higher Order Aberrations," *J. Opt. Soc. Am. A*, **15**, 2572-2579 (1998).

J. Schwiegerling, "Cone Dimensions in Keratoconus using Zernike Polynomials," *Optom. Vis. Sci.*, **74**, 963-969 (1997).

J. Schwiegerling and J.E. Greivenkamp, "Using Corneal Height Maps and Polynomial Decomposition to Determine Corneal Aberrations," *Optom. Vis. Sci.*, **74**, 906-916 (1997).

J. Schwiegerling and J.E. Greivenkamp, "Keratoconus Detection Based on Videokeratographic Height Data," *Optom. Vis. Sci.*, **73**, 721-728 (1996).

J. Schwiegerling, J.E. Greivenkamp, J.M. Miller, R.W. Snyder and M.L. Palmer, "Optical Modeling of Radial Keratotomy Incision Patterns," *Am. J. Ophthalmol.*, **122**, 808-817 (1996).

*J.E. Greivenkamp, M.D. Mellinger, R.W. Snyder, J.T. Schwiegerling, A.E. Lowman and J.M. Miller, "Comparison of Three Videokeratoscopes in Measurement of Toric Test Surfaces," *J. Refract. Surg.*, **12**, 229-239 (1996).

*J. Schwiegerling and J.E. Greivenkamp, "Visual System Modeling: Putting the Pieces Together," in "Optics in 1995," *Opt. and Phot. News* **6**, 36-37 (December 1995).

*J.E. Greivenkamp and J. Schwiegerling, "Modeling Soft Contact Lenses in Raytrace Code," *OSA Engineering & Laboratory Notes, Opt. and Phot. News* **6** (1995) and *Appl. Opt.* **34**, 8076-8077 (1995).

*J. Schwiegerling, J.E. Greivenkamp and J.M. Miller, "Representation of Videokeratographic Height Data with Zernike Polynomials," *J. Opt. Soc. Am. A*, **12**, 2105-2113 (1995).

*J.E. Greivenkamp, J. Schwiegerling, J.M. Miller and M.D. Mellinger, "Visual Acuity Modeling Using Optical Raytracing of Schematic Eyes," *Am. J. Ophthalmol.*, **120**, 227-240 (1995).

□ **Media**

Videotapes - J. Schwiegerling. "Applications of Zernike Polynomials" Video Short Course

□ **Scholarly Presentations (Since 2005)**

J. Schwiegerling, J. Choi, "Optical Performance Testing of the Alcon SN6AD3 Aspheric Apodized Diffractive Multifocal IOL" Oral Presentation at the ESCRS Annual Meeting, September, 2007, Stockholm, Sweden.

J. Schwiegerling, B. Au, R.W. Snyder, "Accuracy and Repeatability of Pachymetry Measurements with the Oculus Pentacam," Poster Presentation at the ARVO Annual Meeting, May 6-May 10, 2007, Fort Lauderdale, Florida.

J. Schwiegerling, J. Choi, X. Ye, "Visual Quality of Night Time Scenes with Diffractive and Zonal Refractive Multifocal IOLs," Oral Presentation at the ASCRS Annual Meeting, April 27- May 2, 2007. San Diego, California.

J. Schwiegerling, "Comparison of Methods for Providing Multifocal Optics," and "Ocular Wavefront Error Representation (ANSI Standard)" at the 8th International Congress of Wavefront Sensing and Aberration-Free Refractive Correction. Santa Fe, New Mexico. February 22-25, 2007.

J. Schwiegerling, R.W. Snyder, G. Steward, "Comparing Corneal Topography from the Oculus Pentacam and the Humphrey Atlas," Oral Presentation at the ARVO Annual Meeting, April 30-May 4, 2006, Fort Lauderdale, Florida.

J. Schwiegerling, "IOL Quality Index Incorporating Chromatic and Monochromatic Aberrations," Oral Presentation at the ASCRS Annual Meeting, March, 2006, San Francisco, CA.

J. Schwiegerling, "Handheld Shack Hartmann Wavefront Sensor," and "History of Shack-Hartmann Wavefront Sensing" at the 7th International Congress of Wavefront Sensing and Aberration-Free Refractive Correction. Paradise Island, Bahamas, January 27-29, 2006.

J. Schwiegerling, "Performance of Spherical and Aspheric Intraocular Lenses," Oral Presentation at the American Academy of Ophthalmology Annual Meeting, October, 2005, Chicago, Illinois.

J. Schwiegerling, "Generalization of the Zernike Polynomials to a Discretely Sampled Cartesian Grid: Application to Ophthalmic Surfaces," Oral Presentation at the OSA Annual Meeting, October 16-20, 2005, Tucson, AZ.

J. Schwiegerling, P. Jain, E.M. Harvey, V. Dobson, J.M. Miller, "Measurement of Cylindrical Error in a Native American Population with a Shack-Hartmann Sensor," Poster Presentation at the ARVO Annual Meeting, May 1-5, 2005, Fort Lauderdale, Florida.

J. Schwiegerling, "Image Contrast in the Presence of Scatter: AcrySof Versus Natural Materials," Oral Presentation at the ASCRS Annual Meeting, April, 2005, Washington DC.

J. Schwiegerling, "Modal Reconstruction Methods: Pros and Cons," at the 6th International Congress of Wavefront Sensing and Aberration-Free Refractive Correction. Athens, Greece February 10-13, 2005.

Grants and Contracts (Current)

Federal

Snapshot Retinal Imaging Polarimeter	PI	20%	NEI	\$282,536
AACDAT	subI	10%	NEI	

Industry

Corneal Biometry Device	PI	17%	Positive EyeD	\$41,031
Chromatic & Diffraction Analyses	PI	5%	Alcon Laboratories	\$41,166
Testbed for Pixelated Optical Devices	PI	7.5%	PixelOptics	\$126,318
Model Eye Testing of Multifocal IOLs	PI	5%	Alcon Laboratories	\$11,551
Aberration Theory of Multifocal IOLs	PI	5%	Alcon Laboratories	\$20,358