

LILY L. WONG, PH.D.

Department of Ophthalmology, College of Medicine, University of Oklahoma
608 Stanton L Young Blvd, DMEI Parke Pavilion Rm 27, Oklahoma City, OK 73104
Office: 405.271.3371 Fax: 405.271.8128 E-mail: lily-wong@ouhsc.edu

POSITIONS

- **Assistant Professor of Research**, Department of Ophthalmology, University of Oklahoma Health Sciences Center (OUHSC)
- **Systems Manager**, NEI/ DMEI Cellular Imaging Core, Vision Core Grant at OUHSC (aka OU Vision CIC)

PROFESSIONAL ATTRIBUTES

- Extensive research experience in both vertebrates and invertebrates
- Expertise in immunohistochemistry and microscopy techniques
- Excellent oral and written communication skills
- Exceptional teaching and mentoring ability
- Effective managing skills
- Cross-disciplinary idea synthesizer

EDUCATION AND TRAINING

INSTITUTION AND LOCATION	DEGREE	YEAR(s)	FIELD OF STUDY
University of California, San Diego, La Jolla, CA	Postdoctoral	2000-2003	Dev. Neurobiol.
University of Pennsylvania, Philadelphia, PA	Postdoctoral	1998-2000	Dev. Biol.
The Salk Institute, La Jolla, CA	Postdoctoral	SU 1996	Dev. Biol.
University of California, San Diego, La Jolla, CA	Postdoctoral	1994-1995	Biology
University of Virginia, Charlottesville, VA	Ph.D.	1987-1994	Biology
Queen's University, Kingston, Ontario, Canada	B.Sc. Hon (I)	1983-1987	Biology

RESEARCH EXPERIENCE

07/2016 to present **Assistant Professor of Research**, University of Oklahoma, College of Medicine, Department of Ophthalmology. *supervisor: Michael M. Elliot, Ph.D.*

Research Interests: 1. Defining the role of Caveolin-1 in wound healing of the corneal epithelium and corneal stroma, 2. Understanding the role of Caveolin-1 in the vertebrate retina.

07/2013 to 06/2016 **Assistant Professor of Research**, University of Oklahoma, College of Medicine, Department of Ophthalmology. *supervisor: James F. McGinnis, Ph.D.*

Research Interests: Deciphering the cellular and molecular mechanisms of the oxidant- and antioxidant-associated effects of cerium oxide nanoparticles in the vertebrate retina. See section below for more detailed information.

10/2003 to 06/2013 **Research Instructor**. University of Oklahoma, College of Medicine, Department of Ophthalmology. *supervisor: James F. McGinnis, Ph.D.*

Nanoparticles (3-20 nm) of cerium oxide (CeO₂) possess catalytic anti-oxidative activity in cell free suspensions and *in vivo*. These nanoceria neutralize the highly reactive oxygen species (ROS) produced in our cells. Many blinding diseases including age-related macular degeneration, retinitis

pigmentosa, and diabetic retinopathy, despite different etiologies, all lead to failure of cells to maintain a non-toxic level of ROS. If chronic rise of ROS causes cell death, we hypothesize that removal of excess ROS can protect cells from dying, and can maintain cell function. We used several rodent retinal degeneration models to test this hypothesis. The goal was to use nanoceria to treat a wide range of retinal blinding diseases before more targeted and effective therapies become available.

A diverse set of methodologies were employed in these research projects, including molecular genetics, microarray gene expression analysis, cell culture, immunohistochemistry, microscopy, flow cytometry, and whole animal manipulations such as intravitreal injection, electroretinography, *in vivo* imaging using fundus camera and optical coherence tomography (OCT).

3/2000 to
09/2003

Post-doctoral Fellow. University of California, San Diego, Department of Surgery, Division of Anatomy. **supervisor: David H. Rapaport, Ph.D.**

How does our image-forming organ, the retina, achieve its cell type diversity? We used molecular and immunohistochemical techniques, microscopy and imaging to evaluate the nature of competence, an intrinsic property of retinal progenitor cells, in cell fate determination in the developing frog retina.

1/1998 to
3/2000

Post-doctoral Fellow. University of Pennsylvania, Department of Cell and Developmental Biology. **supervisor: Robert Riddle, Ph.D.**

How does an organ take up its proper form? We used retroviral mediated gene expression and somite grafting using chick embryos to determine the role of LHX genes in limb pattern formation. We used transgenic flies to determine functional similarities between vertebrate *Lhx2b* and its orthologue, *apterous*. We also isolated *Lmx1b* in *Danio rerio* using PCR.

8/1994 to
11/1995

Post-doctoral Fellow. University of California, San Diego, Biology Department. **supervisor: Richard Firtel, Ph.D.**

Main research area in the lab was to identify genes involved in cellular differentiation during multicellular development of *Dictyostelium*. We used molecular biology and immunohistochemistry to determine the role of *lagC* in cellular differentiation of *Dictyostelium*. Specific completed projects include: generation of *lagC* truncated mutants by homologous recombination, antibody production against LagC using a GST-fusion protein, antibody purification by affinity chromatography, protocol optimization of immunofluorescent cell staining using the LagC antibody, initial characterization of two developmental mutants generated by Restriction Enzyme Mediated Insertion Mutagenesis.

9/1988 to
5/1994

Graduate Research Assistant. University of Virginia, Biology Department. **supervisor: Paul Adler, Ph.D.**

What is the genetic basis for the orientation of a piece of tissue? We discovered that hair polarity on the *Drosophila* wing was controlled by at least six genes that function in a hierarchy. We established that Dishevelled, a downstream component in the Wnt signaling pathway, is also a component in the planar polarity pathway. The discovery of the shared component, Dishevelled, in these two signaling pathways facilitated the subsequent finding of Frizzled as one of the receptors for Wnt signaling. We developed a standard protocol to study wing hair development in *Drosophila*. We also developed a protocol to support wing disc metamorphosis *in vitro*.

CURRENT GRANT SUPPORT

Systems Manager for Cellular Imaging Core Facility of an NEI center grant: NIH 2P30EY021725: awarded to Robert E. Anderson A P30 Center Core Grant for Vision Research at OUHSC	09/2016-08/2021 \$400,000 (Direct Cost/yr)
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PAST GRANT SUPPORT

Principal Investigator for Oklahoma Center for the Advancement of Science and Technology (OCAST: HR06-012) Title: A novel therapeutic approach to protect retinal neurons	01/2008-07/2009 \$45, 000/year for two years
Co-Investigator for Oklahoma Center for the Advancement of Science and Technology OCAST: HR11-004 awarded to James F. McGinnis Title: Nanoceria Protect Rods and Cones in Degenerating Retinas	08/2011-07/2014 \$45, 000 (Direct Cost/yr)
Co-Investigator for National Eye Institute: R01EY02211 awarded to James F. McGinnis Title: Prolonged Inhibition of Pathologic Neovascularization by Catalytic Antioxidants.	02/2012-01/2016 \$421,127 (Direct Cost/yr)
Systems Manager for Cellular Imaging Core Facility of an NEI center grant: NIH P30EY021725: awarded to Robert E. Anderson A P30 Center Core Grant for Vision Research at OUHSC	09/2011-08/2016 \$400,000 (Direct Cost/yr)

US PATENT**Co-inventors:**

1. Inhibition of reactive oxygen species and protection of mammalian cells. (7347987, March 25, 2008)
2. Inhibition of reactive oxygen species and protection of mammalian cells. (7727559, June 01, 2010)
3. Inhibition of neovascularization by cerium oxide nanoparticles. (8703200, April 22, 2014)

INTERNATIONAL PATENT**Co-inventors:**

1. Inhibition of reactive oxygen species and protection of mammalian cells. (2006242541, Australia; March 22, 2012)
2. Inhibition of reactive oxygen species and protection of mammalian cells. (1879570, Europe, 2012)
3. Inhibition of neovascularization by cerium oxide nanoparticles. (2009240470, Australia; January 8, 2015)

PROVISIONAL PATENT FILED**Co-Inventor:**

NANOCERIA CARRIERS OF THERAPEUTIC AND DIAGNOSTIC AGENTS AND METHODS OF USING SAME (Application Number: 62/469,249, March 9, 2017)

PUBLICATIONS**Citations from Google Scholar:**

[HTTP://SCHOLAR.GOOGLE.COM/CITATIONS?HL=EN&USER=ZNVQHSQAAAAJ](http://scholar.google.com/citations?hl=en&user=ZNVQHSQAAAAJ)

Peer Reviewed articles:

1. **Wong, L.L.**, Pye, Q.N., Chen, L., Seal, S., McGinnis, J.F. 2015. Defining the Catalytic Activity of Nanoceria in the P23H-1 Rat, a Photoreceptor Degeneration Model. PLoS ONE 10(3): e0121977. doi:10.1371/journal.pone.0121977 (**cited 10 times**)
<http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0121977>
2. **Wong, L.L.**, Hirst, S.M., Pye, Q.N., Reilly, C.M., Seal, S., McGinnis, J.F. 2013. Catalytic Nanoceria are Preferentially Retained in the Rat Retina and are not Cytotoxic after Intravitreal Injection. PLoS ONE 8(3): e58431. (**cited 39 times**) DOI:10.1371/journal.pone.0058431
<http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0058431>

3. Zhou, X., **Wong, L.L.** (co-first author), Karakoti, A.S., Seal, S., and McGinnis, J.F. 2011. Nanoceria Inhibit the Development and Promote the Regression of Pathologic Retinal Neovascularization in the Vldlr knockout mouse. *PLoS ONE* 6 (2): e16733. **(cited 94 times)** DOI: 10.1371/journal.pone.0016733. <http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0016733>
4. Kong, L., Cai, X., (co-first author), Zhou, X., **Wong, L.L.**, Karakoti, A.S., Seal, S., and McGinnis, J.F. 2011. Nanoceria extend photoreceptor cell lifespan in tubby mice by modulation of apoptosis/survival signaling pathways. *Neurobiology of Disease* 42: 514-523. **(cited 90 times)** <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3411120/>
5. Wong, L.L. and Rapaport, D.H. 2009. Defining Retinal Progenitor Cell Competence in *Xenopus laevis* by Clonal Analysis. *Development* 136:1707-1715. DOI: 10.1242/dev.027607. (Cover Photo for May 15, 2009, Volume 136, Issue 10; **(cited 44 times)** <http://dev.biologists.org/content/136/10.cover-expansion>
6. Joslynn G. Affleck, Katerina Neumann, **Lily Wong**, and Virginia K. Walker. 2006. The effects of methotrexate on *Drosophila* development, female fecundity, and gene expression. *Toxicol. Sci.* 89: 495-503. **(cited 39 times)** <http://toxsci.oxfordjournals.org/content/89/2/495.long>
7. O'Hara, F.P., Beck, E., Barr, L.K., **Wong, L.L.**, Kessler, D.S., and Riddle, R.D. 2005. Zebrafish Lmx1 and Lmx2 are Required for Maintenance of the Isthmic Organizer. *Development* 132(14):3163-73. **(cited 54 times)** DOI: [10.1242/dev.01898](http://dx.doi.org/10.1242/dev.01898). <http://dev.biologists.org/content/132/14/3163.short>
8. Rapaport, D.H., **Wong, L.L.**, Wood, E.D., Yasamura, D., and LaVail, M.M. 2004. Timing and Topography of Cell Genesis in the Rat Retina. *J. Comp. Neurology* 474(2): 304-324. **(cited 268 times)** DOI: 10.1002/cne.20134 <http://onlinelibrary.wiley.com/doi/10.1002/cne.20134/full>
9. Krasnow, R.E., **Wong, L.L.**, and Adler, P.N. 1995. *dishevelled* is a Component of the *frizzled* Signaling Pathway in *Drosophila*. *Development* 121: 4095-4102. **(cited 183 times)** <http://www.ncbi.nlm.nih.gov/pubmed/8575310>
10. **Wong, L.L.** and Adler, P.N. 1993. Tissue Polarity Genes of *Drosophila* Regulate the Subcellular Location for Prehair Initiation in Pupal Wing Cells. *J. Cell Biol.* 123: 209-221. **(cited 280 times)** <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2119819/?tool=pubmed>
11. Jia, Z.-P., McCullough, N., **Wong, L.**, Young, P.G. 1993. The amiloride resistance gene, *car1*, of *Schizosaccharomyces pombe*. *Mol. Gen. Genet.* 241: 298-304. **(cited 21 times)** <http://www.ncbi.nlm.nih.gov/pubmed/8246883>

Book Chapters and Reviews: non-peer reviewed

1. **Wong, L.L.** 2016. **Chapter 3.** Cerium Oxide Nanoparticles-associated Oxidant and Antioxidant Effects and Mechanism. In "Rare Earth Elements in Human and Environmental Health: At Crossroads between Toxicity and Safety", edited by Pagano, G., Pan Stanford Publishing. <https://www.crcpress.com/Rare-Earth-Elements-in-Human-and-Environmental-Health-At-a-Crossroads-between/Pagano/p/book/9789814745000> Available in November 2016.
2. **Wong, L.L.** and McGinnis, J.F. 2014. Nanoceria as bona fide Catalytic Antioxidants in Medicine: what we know and what we want to know... *Adv Exp Med Biol.* 2014;801:821-8. **(cited 12 times)** <http://www.ncbi.nlm.nih.gov/pubmed/?term=Nanoceria+as+Bona+Fide+Catalytic+Antioxidants>

Abstracts: Refereed Poster Presentations

1. **Wong, L.L.**, Seal, S., McGinnis, J.F. Persistent Pre-conditioning Effects of Nanoceria after Intravitreal Injection—a Microarray Analysis. Invest. Ophthalmol. Vis. Sci. 2015 ARVO. E-Abstract: 5034.
2. **Wong, L.L.**, Seal, S., McGinnis, J.F. Kinetics of apoptotic death and oxidative damage in the retina of P23H-1 rats and the protective effects of nanoceria. Invest. Ophthalmol. Vis. Sci. 2013 ARVO. E-Abstract: 4691.
3. **Wong, L.L.**, Pye, Q.N., Chen, L., Seal, S., McGinnis, J.F. Measuring the Neuroprotective Effects of Nanoceria in the P23H-1 Rats. XVth International Symposium on Retinal Degeneration, July 16-21, 2012. Bad Goetting, Bavaria, Germany.
4. **Wong, L.L.**, Pye, Q.N., Chen, L., Cai, X., Seal, S., McGinnis, J.F. Assessing the Therapeutic Effect of Nanoceria in an Autosomal Dominant Retinitis Pigmentosa Model. Invest. Ophthalmol. Vis. Sci. 2012 ARVO. E-Abstract: 282.
5. McGinnis, J.F., Moaty, H. A., Cai, X., Hirst, S., Pye, Q., Reilly, C.M., Seal, S., **Wong, L.L.** Pharmacokinetics and Therapeutic Efficacy of Nanoceria in the Rat Retina. XIVth International Symposium on Retinal Degeneration. July 13-17, 2010. Mont-Tremblant, Quebec, Canada.
6. Cai, X., **Wong, L.L.**, Seal, S., McGinnis, J.F. Very Low Density Lipoprotein Receptor (Vldlr) Null Mice Exhibit Changes In Expression of Oxidative Stress Genes Which Are Reversed By Nanoceria. Invest. Ophthalmol. Vis. Sci. 2010 ARVO. E-Abstract: 1424.
7. **Wong, L.L.**, Yu, X, Sezate, S.A., Seal, S., McGinnis, J.F. Unique Sensitivity Of Cone Photoreceptor Precursor Tumor Cells, 661W, To Cerium Oxide Nanoparticles. Invest. Ophthalmol. Vis. Sci. 2010 ARVO. E-Abstract: 1432.
8. McGinnis, J.F., Zhou, X., Kong, L., Sezate, S., Seal, S., **Wong, L.L.** Therapeutic Treatment of Retinal Angiomatous Proliferation in the vldlr(-/-) Mutant Mouse Using Nanoceria. Invest. Ophthalmol. Vis. Sci. 2009 ARVO. E-Abstract: 1194.
9. **Wong, L.L.**, Hancin, D.M, Seal, S., Chen, J., McGinnis, J.F. Sensitivity of Cones to Intracellular Peroxide Damage and Protection by Inorganic Cerium Oxide Nanoparticles. Invest. Ophthalmol. Vis. Sci. 2008 ARVO. E-Abstract: 4786.
10. **Wong, L.L.**, Sezate, S., and McGinnis, J.F. Analysis of the Molecular Basis for Translocation/Compartmentalization of Rod Transducin-Alpha. Invest. Ophthalmol. Vis. Sci. 2007 ARVO E-Abstract: 4650.
11. **Wong, L.L.**, Sezate, S., Chen, J., and McGinnis, J.F. Development of a Heterologous *In Vitro* System and an *In Vivo* Rat Model to Study Antibody Mediated Cell Death. Invest. Ophthalmol. Vis. Sci. 2006 (47): ARVO E-Abstract: 4842.
12. Chen, J., Seal, S., Sezate, S., Ramsey, M., Elias, R., **Wong, L.L.**, Cao, W., and McGinnis, J.F. Nanoceria Particles Confer Neuroprotection in Retinal Cells *in vitro*. Invest. Ophthalmol. Vis. Sci. 2005: ARVO E-Abstract: 186.
13. **Wong, L.L.**, Chen, J., Sezate, S., Ramsey, M., Cao, W, and McGinnis, J.F. *In Vitro* Analysis of Antibody Mediated Cell Death. Invest. Ophthalmol. Vis. Sci. 2005: ARVO E-Abstract: 1169.

14. Cardenas, M.R., Momey, S., **Wong, L.L.**, Cao, W., and McGinnis, J.F. *In Vitro* model for antibody mediated death of mammalian photoreceptor cells. Invest. Ophthalmol. Vis. Sci. 2004: ARVO E-Abstract: 564.
15. Whitehead, E.A., Ehergott, J., **Wong, L.L.**, and Rapaport, D.H. The Fate of Cells Generated at or near the Termination of Cell Division in the Vertebrate Retina. Exper. Biol. Abstr. (2003).
16. **Wong, L.L.**, Wood, E.D., Yasumura, D., LaVail, M.M., and Rapaport, D.H. The Timing, Sequence, and Spatial Pattern of Cell Genesis in the Rat Retina. Invest. Ophthalmol. Vis. Sci. 2002: ARVO E-Abstract: 2681.
17. Wood, E.D., Apelian, R.G., **Wong, L.L.**, Long, J.M., and Rapaport, D.H. Cell Cycle Timing in Vertebrate Retinal Cell Genesis: G2 Interphase Lengthens with Maturity. Soc. Neurosci. Abstr. 27: 896.4 (2001).
18. **Wong, L.L.** and Rapaport, D.H. Determining the Sequence of Retinal Cell Genesis in the Frog, *Xenopus laevis*, by Clonal Analysis. Soc. Neurosci. Abstr. 27: 588.8. (2001)

Abstracts: Refereed Oral Presentations

1. **Wong, L.L.**, Barkam, S., Seal, S., McGinnis, J.F. Distinct Cellular Uptake and Clearance Patterns of Nanoceria in the Retina. Invest. Ophthalmol. Vis. Sci. 2017 ARVO. E-Abstract: 1205.
2. **Wong, L.L.**, Seal, S., McGinnis, J.F. The Apoptotic Index in a Degenerative Retina Reflects the Catalytic Activity of Nanoceria *In Vivo*. Invest. Ophthalmol. Vis. Sci. 2014 ARVO. E-Abstract: 2159.
3. **Wong, L.L.**, Pye, Q.N., Hirst, S.M., Cai, X., Reilly, C.M., Seal, S., McGinnis, J.F. Pharmacokinetics and Effects of Nanoceria in Normal and P23H Degenerative Rat Retinas. Invest. Ophthalmol. Vis. Sci. 2011 ARVO. E-Abstract: 3416.
4. **Wong, L.L.**, Kong, L., Zhou, X., Hancin, D.M, Sezate, S., Seal, S., McGinnis, J.F. Reduction of Rod Photoreceptor Cell Death in *tubby* Mutants by Inorganic Cerium Oxide Nanoparticles. Invest. Ophthalmol. Vis. Sci. 2009 ARVO. E-Abstract: 3884.
5. **Wong, L.L.** and Rapaport, D.H. **Determining Retinal Cell Birth Order in the Frog, *Xenopus laevis*, by Clonal Analysis.** Invest. Ophthalmol. Vis. Sci. 2003: ARVO E-Abstract: 4299.

Abstracts: Non-refereed Poster Presentations

1. **Wong, L.L.**, Pye, Q.N., Seal, S., McGinnis, J.F. *Nanoceria Protect Rods and Cones in Degenerating Retinas.* Presented as a poster at the OCAST Health Research Conference on March 31, 2014, Oklahoma City, OK. An update on the funded project.
2. **Wong, L.L.**, Pye, Q.N., Seal, S., McGinnis, J.F. *Nanoceria Protect Rods and Cones in Degenerating Retinas.* Presented as a poster at the OCAST Health Research Conference on March 13, 2013, Oklahoma City, OK. An update on the funded project.
3. Ballard, B., **Wong, L.L.***, Sezate, S., Seal, S., Cao, S., McGinnis, J.F. Efficacy of Cerium Oxide Nanoparticles in The Protection of Retinal Photoreceptor Cell Function. NSF summer undergraduate research program. Aug 2009.

4. Seem, T., Sezate, S., **Wong, L.L.**, Seal, S., McGinnis, J.F. Expressing Mouse α -Transducin in the Presence of Cerium Oxide Nanoparticles. 2009 Summer Undergraduate Research Program. OUHSC, Graduate College.
5. Le, H., Sezate, S., **Wong, L.L.**, Seal, S., McGinnis, J.F. Effects of Nanoceria on Expression of Mouse Arrestin. 2009 Summer Undergraduate Research Program. OUHSC, Graduate College.
6. **Wong, L.L.**, Kong, L., Zhou, X., Seal, S., McGinnis, J.F. Inorganic Cerium Oxide Nanoparticles Slow Photoreceptor Cell Death in *tubby* Mice. Poster Presentation at the NIH IDEa Central States Regional Conference in Oklahoma City on May 28-29, 2009.
7. Mazariegos, D., Sezate, S., **Wong, L. L.**, McGinnis, J. F. Expressing Rod T-alpha in HEK 293-T Cells. 2008 Summer Undergraduate Research Program. OUHSC, Graduate College.
8. Spring, J., Sezate, S., **Wong, L. L.**, Seal, S., McGinnis, J. F. TERT-RPE and WERI: Nanoparticle Cytotoxicity Assay Analysis. 2008 Summer Undergraduate Research Program. OUHSC, Graduate College.
9. Hey, B., Sezate, S., **Wong, L. L.**, Seal, S., McGinnis, J. F. Rare Earth Nanoparticles: Assessment of Cell Toxicity and Viability. 2008 Summer Undergraduate Research Program. OUHSC, Graduate College.
10. Pham, L., Sezate, S., **Wong, L. L.**, McGinnis, J.F. Does the Translocation of A-Transducin Depend on its Amino Acid Sequence? 2007 Summer Undergraduate Research Program. OUHSC, Graduate College.
11. Hollrah, D.N., Sezate, S., **Wong, L. L.**, McGinnis, J.F. Participation of the Amino Third Fragment of the Rod Alpha Transducin Protein in Translocation within the Retina. 2007 Summer Undergraduate Research Program. OUHSC, Graduate College.
12. Bradford, A., Sezate, S., **Wong, L. L.**, McGinnis, J.F. Strategy for Identifying Epitopes of Rod Alpha-Transducin Involved in its Translocation in Rat Photoreceptor Cells. 2007 Summer Undergraduate Research Program. OUHSC, Graduate College.
13. Nguyen, S., **Wong, L.L.***, Sezate, S., and McGinnis, J.F. Expression of *arrestin* and *α -transducin* constructs in human embryonic kidney 293 cells. 2005 Summer Undergraduate Research. OUHSC, Graduate College.
14. Chen, J., **Wong, L.L.***, Sezate, S., Ramsey, M., Elias, R., and McGinnis, J.F. Knocking Down Rat *Recoverin* by RNAi. Poster Presentation at the 13th Annual Oklahoma Center for Neuroscience Symposium. (October 14th, 2004)

*Project mentor

Abstracts: Non-refereed Oral Presentations

1. Yu, X., **Wong, L.L.***, Sezate, S., Seal, S., McGinnis, J.F. Assessing the Dark Side of Cerium Oxide Nanoparticles in Cell Culture. 2009 Annual OU Vision Workshop at DMEI/OUHSC.

*Project mentor

ORAL PRESENTATIONS

1. Invited seminar speaker at the Vision Club of the Department of Ophthalmology, OUHSC, Oklahoma City, OK on Oct 08, 2015. Title: **Deciphering the Cellular and Molecular Mechanisms of Cerium Oxide Nanoparticles in Biological Systems.**
2. Invited seminar speaker at the Department of Physiology, OUHSC, Oklahoma City, OK on January 19, 2012. Title: **Treating Retinal Neovascularization with Nanoceria in a Rodent Model.**
3. Oral presentation at the Southwest Regional Center for the Study of Retinal Degenerative Diseases meeting of Foundation Fighting Blindness on Oct 15, 2011. Title: **Retention of Catalytic Nanoceria in the Mammalian Retina and their Therapeutic Effects.**
4. Invited seminar speaker at the Vision Club of the Department of Ophthalmology, OUHSC, Oklahoma City, OK on Aug 16, 2011. Title: **Oxidative Stress/Retinal Diseases/Nanoceria: How are they linked?**
5. Invited seminar speaker at the Eye Institute of the University of Hong Kong on Aug 12, 2010. Title: **Treating Blinding Eye Diseases with Cerium Oxide Nanoparticles.**
6. Invited Presentation at the monthly meeting for the National Eye Institute Core Grant for Vision Science at UCSD/The Scripps Research Institute, April 2003. Title: **Clonal Analysis of Cell Birth Order in the Developing Frog Retina.**
7. Invited Presentation at the monthly meeting for the National Eye Institute Core Grant for Vision Science at UCSD/The Scripps Research Institute, June 2001. Title: **Determining the Sequence of Retinal Cell Genesis in the Frog, *Xenopus laevis*, by Clonal Analysis”.**

TEACHING EXPERIENCE

A. OU Vision Imaging Core Facility Teaching

I design and conduct training classes on brightfield, epi-fluorescence, and confocal microscopy, as well as flow cytometry for vision researchers. Each training session consisted of 2.5 hours for brightfield, 2.5 hours for epi-fluorescence using the Nikon Eclipse 800 microscope system, 10 hours for the Olympus FV500 or FV1200 confocal systems, and 4 hours for the Beckman Coulter Epics XL 4 color flow cytometer. In July 2011, the cytometer was no longer part of the imaging core facility. The training program for cytometry also ended at that time. In February 2013, an Olympus FV1200 confocal system and an Olympus MacroView system were added to our facility. The FV1200 orientation training includes three hours on-demand video training, one hour hands-on and one hour practice segments. The basic MacroView training includes one hour hands-on and one hour practice segments. Trainees are approved as authorized users only after they have demonstrated their competency in proper usage of the equipment. In 2013, the imaging core facility became a fee-for-service facility; since then, I also train researchers in other disciplines of research on campus. In July 2016, the FV500 was decommissioned; confocal training has been exclusively on the FV1200 system. In order to demonstrate and improve the effectiveness of the training programs, I have designed course evaluations for these classes. I started collecting post course evaluations in July 2015.

New users trained to use OU Vision imaging core facility equipment per calendar year

	Olympus Confocal	Nikon E800	Beckman Cytometer	Olympus MacroView	Contact Hours
2004	8	Not tracked	9	N/A	Not tracked
2005	10	2	2	N/A	45
2006	22	0	3	N/A	78

2007	10	4	5	N/A	57
2008	3	8	3	N/A	43
2009	10	12	6	N/A	52
2010	14	16	5	N/A	59
2011	10	14	3	N/A	54
2012	15	11	N/A	N/A	66
2013	10	6	N/A	16	63
2014	*12	2	N/A	0	56.5
2015	*7	4	N/A	2	49.25
2016	*5	8	N/A	2	46.5
2017	#5	1	N/A		24.5
Total	141	88	36	20	693

N/A: equipment not available in the imaging core facility

*includes FV500 and FV1200 training

#FV1200 training only

Since 2004, I have taught 285 individuals in over 690 hours to effectively use the equipment in the OU Vision Imaging Core Facility.

Samples of course evaluations:

1. *Bright field and epifluorescence Imaging Course Report Link:*
https://ouhsc.qualtrics.com/WRReport/?RPID=RP2_0Ptejvm1sfnfkMd&P=CP
2. *FV500 confocal training Course Report Link:*
https://ouhsc.qualtrics.com/WRReport/?RPID=RP2_8c9MBxTBveQ5nvv&P=CP

B. Graduate level teaching at OUHSC:

I have been the lecturer for the imaging portion of the Methods course for the Neuroscience Program at OUHSC since 2007.

In 2013, I co-taught in one of the journal clubs for first year graduate students.

OCNS 5411	2007	4.0 contact hours
OCNS 5411	2008	4.0 contact hours
OCNS 5411	2010	4.0 contact hours
OCNS 5411	2012	4.0 contact hours
OCNS 5411	2013	3.0 contact hours
GPIBS journal club	2013	4.0 contact hours
OCNS 5411	2014	3.0 contact hours
OCNS 5411	2015	3.0 contact hours
OCNS 5411	2016	3.0 contact hours

Adjunct moderator for the Neurobiology of Diseases, a Neuroscience graduate course

OCNS 6503	Fall 2004
OCNS 6503	Fall 2006
OCNS 6503	Fall 2008

C. Teaching Assistant at the University of Virginia:

Introductory biology lab course, 200 level	Spring semester 1988
Drosophila genetics lab course, 400 level	Fall semester 1993
Introductory biology lab course, 200 level	Spring semester 1994
Marine Biology/Coral Reef Ecology Field Course, San Salvador, Bahamas	May 13-28, 1996

OTHER TEACHING EXPERIENCE

Taught sea kayaking and kayak rolling

Taught CPR and first aid classes for the American Red Cross

MENTORING EXPERIENCE

Since 1999, I have mentored 18 students.

1. Mentored a senior high school student from the Oklahoma School of Science and Mathematics in a year-long mentorship program (2016-2017). **Evaluation link:**
https://ouhsc.qualtrics.com/WRReport/?RPID=RP2_agFWNvQssgILXGB&P=CP
2. Mentored a high school student from the Oklahoma School of Science and Mathematics in summer 2016. **Evaluation link:**
https://ouhsc.qualtrics.com/WRReport/?RPID=RP2_5d9zgaZoMZNTZc1&P=CP
3. Co-mentored three summer undergraduate students, one high school student, and a medical student (2009).
4. Co-mentored a medical student who volunteered in the lab (Feb-Mar 2008).
5. Co-mentored three summer undergraduate students (2007 and 2008).
6. Mentored a first year graduate rotation student (2005) and a summer undergraduate student (2005).
7. Mentored a graduate student and a postdoc (2003-2004).
8. Co-mentored two undergraduate, and one high school students (2002-2003).
9. Co-mentored a summer student (1999).

SUPERVISING EXPERIENCE

I am the Systems Manager of the OU Vision Imaging Core Facility since 2003.

Supervise one histologist	From July 2015 to Present
Supervised two histologists	From July 2014 to June 2015
Supervised one histologist	From July 2013 to July 2014
Supervised three histologists	From June 2012 to Jan 2013
Supervised two histologists	From 2004 to 2012
Supervised one imaging technician	From 2004 to 2005

I have continually trained and supervised research lab personnel since 2000.

PROFESSIONAL SERVICE

CORE FACILITY MANAGEMENT at OUHSC:

I am the Systems Manager of the OU Vision Imaging Core Facility since 2003.

Major Responsibilities:

The imaging core facility has two components: the microscopy/imaging division, and the histology division.

- I oversee the daily operation of both and ensure the proper function of each piece of equipment in the facility.
- I maintain a highly-valued and sought-after training program in the usage of our imaging equipment. I have trained over 280 vision researchers including graduate students, lab technicians, faculty members, and visiting scholars on the OUHSC campus in the proper usage of the microscope/imaging systems in our facility (detailed information provided in the Teaching Experience section) since 2004.
- I provide assistance to users during office hours to resolve their imaging problems. For example, in 2016, I provided assistance to 50 users on an average of 19 minutes per session. The onsite assistance enables researchers to resolve imaging problems immediately so they can continue data collection without delay.
- I provide consultations to users for histology, immunohistochemistry, and imaging questions.
- I maintain usage records for our histology service and imaging equipment. Insights gathered from these quantitative data collected on usage, training, and on-site assistance, as well as histology services is critical for successful equipment and core facility grant applications. For example, in 2015, I assisted in the applications of two facility grants: Presbyterian Health Foundation Equipment grant and the NEI P30 Vision Core Facility grant. Both grants were funded.

Capital Improvement Projects in the Imaging Core Facility:

In 2011, with the completion of DMEI facility expansion, our imaging facility needed to move to its new location in the Parke Pavilion. I negotiated the amount of space needed and designed the space and specification to house the histology lab, and the rest of the equipment which included a cryostat, an Olympus FV500 confocal system, a Nikon E800 Imaging system, and two imaging review stations.

In 2013, I planned and oversaw the expansion of our imaging core facility as a result of a successful bid for a P30 center grant supplement. I led the remodeling project of the existing facility space to accommodate the addition of an Olympus FV1200 confocal system and an Olympus MacroView MVX10 system.

In 2015, I spearheaded another image core facility upgrade. This equipment upgrade also involved room remodeling for housing new equipment placement and equipment functionality enhancement. These included the design of a new bench top and cabinet for a Leica TP 1020 tissue processor in the processor room, and re-positioning of the now fully automated MVX10 MacroView Imaging system onto a stone table top to isolate vibration from the room.

In all these capital improvement projects, I was the team leader in the recommendation of equipment selection best suited for our imaging core facility. I was in charge of selecting the placement of the equipment, the design of the space, and HVAC requirement for the equipment. I also implemented and conducted training programs for the new pieces of equipment.

In 2017, our facility got the approval to install a 4-LED fluorescence illumination system to replace the mercury arc lamp for the Nikon E800 imaging system. To complement the upgrade, I also recommended the purchase of a far red filter cube to expand the detection of far red fluorescent dyes using this system. I completed the hardware upgrade in July 2017.

COMMITTEE:

Member of the Institutional Animal Care and Use Committee (IACUC) at Dean A. McGee Eye Institute 2008-2013

Member of the Women in Eye and Vision Research (WEAVR) Silent Auction Committee (a program under the Association for Research in Vision and Ophthalmology (ARVO) Foundation for Eye Research) 2010-2015

Updated on 8/1/2017

<http://www.mei.org/lily-l-wong-phd>

Member of the WEAVR Leadership Committee (a program under the ARVO Foundation for Eye Research)

2014-2017

2017-2019

Member of WiSDMH* Coordinating Committee/Interest Group

2014-

**Women in Science, Dentistry, Medicine and Health*

<http://www.ouhsc.edu/facdev/Programs/WISDMH/Resources.aspx>

Member of the Speaker 2018 Committee for the Faculty Senate

2017-

AD HOC MEMBER:

Moderator for an oral presentation session at the annual ARVO meeting 208 - Retina/RPE 1 May 8, 2017 from 8:30 AM to 10:15 AM

2017

AD HOC REVIEWER FOR SCIENTIFIC JOURNALS

- Journal of Neuroscience Research
- PLoS ONE
- Nano Research
- Environmental Toxicology
- Experimental Eye Research
- Nanotoxicology
- Environmental Science: Nano
- Investigative Ophthalmology and Visual Science
- Journal of Histotechnology

LOCAL SERVICE

I gave a presentation entitled, ”**Responsibility for Humans and Science--- bringing justice using knowledge gained by scientific inquiry**”, at the Aug 12, 2012 meeting of the Collaborative Opportunities Group.

I volunteered in the interview committee for the admission of the Oklahoma School of Science and Mathematics (OSSM) Class of 2017 on April 23, 2016.

I was one of 20 volunteer faculty members to participate in the 2016 Investigative Research Scholars Mentorship Program for the Oklahoma School of Science and Mathematics (June 6 to June 24, 2016).

I volunteered as an interviewer for the 2016 Mock College Interview Practice for OSSM seniors on Oct 10, 2016.

I am a volunteer faculty participating in a year-long research mentorship program for the Oklahoma School of Science and Mathematics (Aug 2016-May 2017).

I am a board member for Carpenter Square Theatre, an Oklahoma City, OK regional not-for-profit theatre. (since January 2017)

I am one of the founding members of the Neighbors of Mayfair West Neighborhood Association (NMWNA) which was incorporated in July 2017.

I am the Event Committee Chair of the NMWNA since July 2017.

PROFESSIONAL MEMBERSHIPS

American Association for the Advancement of Science

Since 1992

OUHSC COMMUNITY GROUP

Member of the Collaborative Opportunities Group (COG) 2010-2015
web link: <http://dwulab.com/cog/>

AWARDS AND HONORS

- 1984 Wallace Near Scholarship, Queen's University
- 1985 James H. Rattray Scholarship in Science, Queen's University
- 1986 James H. Rattray Scholarship in Science, Queen's University
- 1986 Helen McLeod Reeve Scholarship, Queen's University
- 1987 Honors with Class I, B.Sc., Queen's University
- 1987 Medal in Biology, Queen's University
- 1987 Cellular & Molecular Biology Fellowship, University of Virginia
- 1990 "Best Student Poster" Award at the Southeast Regional Developmental Biology Conference, Charlottesville, VA
- 1992 Scholarships from the Biology Department, University of Virginia, and MBL to attend the Physiology Course at the Marine Biological Laboratory, Woods Hole, MA
- 1999 Postdoctoral Fellowship from the Pennsylvania Muscle Institute, Philadelphia, PA
- 2001 Scholarship from the Cold Spring Harbor Laboratory for attending the course on Cell & Developmental Biology of *Xenopus*
- 2009 Cover art for Development, May 15, 2009, Volume 136, Issue 10
- 2009 Cover Photo for the 4th Annual OU Vision Workshop Program Book
- 2016 A winner in the Cyagen Biosciences' "Smart is the new sexy" photo contest—an effort to re-brand the idea of “Being Smart” in our society

PROFESSIONAL DEVELOPMENT

Attended the NewsTrain workshop by Associated Press Media Editors (APME) on March 4, 2017 in Norman, Oklahoma.

Attended the “Oklahoma City SBIR Road Tour 2-Day Conference” sponsored by Oklahoma Center for the Advancement of Science and Technology (OCAST) on June 30-July 1, 2016 in Oklahoma City, Oklahoma.

Attended the 2016 Qualtrics Insight Summit on Feb 17-18, 2016, in Salt Lake City, Utah.

Completed the Fundamental of Metamorph Workshop on June 17-18, 2014, in Downingtown, PA.

Attended a 2-day communication skill-building workshop hosted by the National Science Foundation for Oklahoma science researchers, entitled, “Science: Becoming the Messenger” in Norman, Oklahoma. May 24-25, 2011. The day 2 portion was by invitation only.

Attended a course on Electrophysiology of Vision: Conference and Hands-on Training on March 3-5, 2010 Sponsored by Texas Tech University Health Sciences Center, El Paso, TX. Organized by Neal Adams, M.D.

Attended the Summer Symposium for the National Society for Histotechnology, June 15-16, 2009 (Special emphasis on alternative processing reagents, cryotomy, and standardization and quality control of immunohistochemistry).

Updated on 8/1/2017

<http://www.mei.org/lily-l-wong-phd>

Completed Gross Anatomy and Human Embryology courses with first year medical students (Fall 2004).

University of Oklahoma, Health Sciences Center, College of Medicine.

Attended a specialty course on 'Preparing Professional Faculty' (2001) and a course on 'Scientific Communication' (2002). University of California, San Diego.

Cold Spring Harbor Laboratory Course on Cell & Developmental Biology of *Xenopus*

April 21st to May 1st, 2001, led by Ken Cho, Ph.D. and Jan Christian, Ph.D.

Workshop: Developmental Biology Teaching Lab. Darling Marine Center, University of Maine,

June 1997, led by Leland Johnson, Ph.D.

Workshop: Physiology. Marine Biological Laboratory, Woods Hole, MA, June---July, 1992