

**CURRICULUM VITAE**  
***Elizabeth R. Gaillard***  
(Updated October 25, 2013)

*Personal Data*

Date of Birth: June 8, 1963, Mobile, Alabama  
Citizenship: U.S. citizen

*Education*

1984, B.S., The Florida State University  
1990, Ph.D., The University of Texas at Austin

*Postdoctoral Training*

Research Associate, Center for Fast Kinetics Research (The University of Texas at Austin), 1991-1993  
Research Associate, Center for Photoinduced Charge Transfer (University of Rochester, NY), 1994-1996

*Professional Organizations and Societies*

Alpha Chi Sigma  
American Chemical Society  
American Society for Photobiology  
Association for Research in Vision and Ophthalmology  
Inter-American Photochemical Society

*Academic Appointments*

Visiting Assistant Professor, Southwest Texas State University, 1990-1991  
Assistant Professor (Chemistry and Biochemistry), Northern Illinois University, 1996-2002  
Faculty member, Center for Biochemical and Biophysical Studies, Northern Illinois University, 1998-present  
Senior Member of the Graduate Faculty, Northern Illinois University, 2001-present  
Assistant Professor (Biological Sciences), Northern Illinois University, 2001-2002  
Associate Professor (Chemistry and Biochemistry), 2002-present  
Associate Professor (Biological Sciences), 2002-present  
Adjunct Associate Professor of Ophthalmic Biochemistry (Ophthalmology), Columbia University, New York, NY, 2007-2012  
Faculty Associate, Women's Studies, Northern Illinois University, 2010 –  
Professor (Chemistry and Biochemistry), 2010-present  
Professor (Biological Sciences), 2010-present

*Honors*

Brautlecht Scholarship, 1983-1984, Dept. of Chemistry, FSU  
Award for Outstanding Grant Acquisitions, Graduate Council, NIU  
Member, Sigma Xi

Athena Award nominee, 2010  
Outstanding Mentor Award, NIU 2012  
Presidential Research Professor, 2013

*Fellowship and Grant Support*

1. Prevent Blindness America, Fight for Sight Program (7/1/97 – 6/30/98), \$11,000.
2. National Institutes of Health, National Eye Institute RO1 EY12344 (8/1/00–7/31/04), \$490,018.
3. NSF Departmental Multi-User Instrumentation Program “Acquisition of a LC-MS”, co-PI, 1/15/02, \$154,000.
3. Midwest Eye Banks and Transplantation Centers (9/1/02 – 8/31/03) \$14,000.
4. Midwest Eye Banks and Transplantation Centers (9/1/03 – 8/31/04) \$14,000.
5. National Institutes of Health, National Eye Institute, SBIR phase II “Time Resolved Ocular Fluorometer”, B. Ishimoto, P.I.; E.R. Gaillard, subcontract (9/1/05–8/31/07) \$122,000.
6. Silhouettes Inc., “Compelling Scientific Evidence Affecting Patient Care – The Link Between Light, Retinal Damage and Age-Related Macular Degeneration”, March-September, 2005, \$10,000
8. National Institutes of Health, National Eye Institute, SBIR phase II “Time Resolved Ocular Fluorometer”, B. Ishimoto, P.I.; E.R. Gaillard, subcontract (9/1/07–8/31/08) \$122,000.
9. Teragrid-Wide Roaming Access, NSF Grant number CHE070090T “Molecular Dynamics Studies of Alpha Crystallin”, 30,000 CPU hours (08/30/07-08/01/08).
10. National Institutes of Health, National Eye Institute, R15 “Quantization of Ocular Oxygen using a Modified Fluorotron” J. Dillon and E.R. Gaillard, co-PIs, \$350,455, 9/30/2010 – 9/29/2013.
11. National Institutes of Health, National Eye Institute, SBIR “System for Ocular Oxygen Measurement” B. Ishimoto, PI; subcontract to E.R. Gaillard, \$174,000, 10/1/2010 – 9/30/2013.

Pending: National Institutes of Health, National Eye Institute, R15 “Quantization of Ocular Oxygen using a Modified Fluorotron” submission date moved to Nov. 18, 2013.

*Departmental and University Committees*

1. Departmental:
  - a. Curriculum
  - b. Graduate Recruitment
  - c. Graduate Program
  - d. Library
  - e. Executive
  - f. Graduate colloquium
  - g. Faculty Search committees
  - h. Salary (Merit), Chair 2013

2. College/University:
  - a. Undergraduate Tuition Waiver
  - b. Academic Policies and Procedures
  - c. Chair, University Laser Safety Committee (2001-present)
  - d. Radiation Safety Committee
  - e. University Council Personnel Committee (2009-2010)
  - f. College Council (2009 - 2011); secretary Fall 2010 – Spring 2011
  - g. Graduate Faculty Membership Committee
  - h. Faculty Senate (2012 – 2015)
  - i. co-Director, Center for Biochemical and Biophysical Studies (2012 -present)
  - j. Research and Graduate Studies Development Council (2012 -)
  - k. Northern Illinois Research Foundation Board of Directors (2011 -2013)
  - l. Intellectual Property Committee (2012 – 2015)
  - m. WISTEM (Women Faculty in STEM) coordinator
  - n. USOAR (Undergraduate Special Opportunities in Artistry and Research) review committee
  - o. Women’s Studies Executive Committee

*Teaching Experience and Responsibilities (at Northern Illinois University)*

1. Undergraduate:
  - a. Introductory General Chemistry (CHEM 110)
  - b. General Chemistry (CHEM 210/211)
  - c. Organic Chemistry and Laboratory (CHEM 230/231)
  - d. Honors/Independent study (CHEM 498/499H, BIOS 370)
  - e. Physical Chemistry (CHEM 440/441)
  - f. Physical Chemistry Laboratory (CHEM 442/443)
2. Graduate:
  - a. Special Topics in Physical Chemistry (CHEM 600D)
  - b. Physical Biochemistry (CHEM 675)
  - c. Medical Physics (PHYS 659)
  - d. Chemical Kinetics (CHEM 642)

Mentored 6 PhD (W.S. Harper, 2002; L.A. Ervin, 2002; Z. Wang, 2005; T.E. Liggett, 2007; Hao Guo, 2008; L. Murdaugh, 2009) and 7 MS students (C. Hill, 2003; L.M.M. Keller, 2003; L. Rousseva, 2005; A. Szczurowski, 2005; S. Mandal 2008; K.-S. Suh, 2008; H. Fei, 2009). Research advisor to 56 undergraduate students. Have been awarded numerous undergraduate research apprenticeship opportunities.

Currently am mentor to 5 PhD students and 9 undergraduate students.

Served on over 70 PhD and MS examination committees.

*Other Professional Activities*

International Editorial Board Member, *J. Photochem. Photobiol. B: Biol* (1999-2002)

Associate Editor, *Photochem. Photobiol* (2006 - 2009)

Councilor, American Society for Photobiology (2006 - 2010)

Board of Directors, Inter-American Photochemical Society (2008 – 2010)

Council member, American Society for Photobiology (2008 – 2012)  
President, American Society for Photobiology (2012-2014)

### *Publications*

A. Original, peer reviewed articles:

1. Foster, B.; Gaillard, E.; Mathur, N.; Pincock, A.L.; Pincock, J.A.; Sehmbe, C. Substituent effects on homolytic versus heterolytic photocleavage of (1-naphthylmethyl)trimethylammonium chlorides *Can. J. Chem.* 1987, *65*, 1599.
2. Fox, M.A.; Cardona, R.; Gaillard, E.R. Photoactivation of metal oxide surfaces: Photocatalyzed oxidation of alcohols by heteropolytungstates. *J. Am. Chem. Soc.* 1987, *109*, 6347.
3. Fox, M.A.; Gaillard, E.R.; Chen, C.C. Photochemistry of stable free radicals. The photochemistry of perchlorotriphenylmethyl radical. *J. Am. Chem. Soc.* 1987, *109*, 7088.
4. Gaillard, E.R.; Fox, M.A.; Wan, P. A kinetic study of the photosolvolysis of 9-fluorenone. *J. Am. Chem. Soc.* 1989, *111*, 2180.
5. Atherton, S.J.; Dillon, J.; Gaillard, E.R. A pulse radiolysis study of the reactions of 3-hydroxykynurenine and kynurenine with oxidizing and reducing radicals. *Biochem. Biophys. Acta* 1993, *1158*, 75-82.
6. Atherton, S.J.; Dillon, J.; Gaillard, E.R. A pulse radiolysis study of the reactions of 3-hydroxykynurenine and kynurenine with oxidizing and reducing radicals. *Biochem. Biophys. Acta* 1993, *1158*, 75-82.
7. Gaillard, E.R.; Atherton, S.J.; Eldred, G.; Dillon, J. Photophysical studies on human retinal lipofuscin. *Photochem. Photobiol.* 1995, *61*, 448-453.
8. Roberts, J.E.; Atherton, S.J.; Gaillard, E.R.; Dillon, J. Age related changes in the human lens as monitored by the detection of porphyrin excited states. *Photochem. Photobiol.* 1995, *62*, 339-341.
9. Dillon, J.; Gaillard, E.R.; Bilski, P.; Chignell, C.; Reszka, K. The photochemistry of the retinoids as studied by steady state and pulsed methods. *Photochem. Photobiol.* 1996, *63*, 680-685.
10. Chen, L.; Farahat, M.S.; Gaillard, E.R.; Farid, S.; Whitten, D.G. Photoinduced electron transfer double-fragmentation: An oxygen mediated radical chain process in the co-fragmentation of pinacol donors with carbon tetrachloride. *J. Photochem. Photobiol. A: Chemistry* 1996, *95*, 21-25.
11. Mutz, M.W.; McLendon, G.W.; Wishart, J.F.; Gaillard, E.R.; Corin, A.F. Conformational dependence of electron transfer across *de novo* designed metalloproteins. *Proc. Natl. Acad. Sci. USA* 1996, *93*, 9521-9526.
12. Gaillard, E.R.; Whitten, D.G. Photoinduced electron transfer bond fragmentations. *Acc. Chem. Res.* 1996, *29*, 292-297.
13. Mandal, K.; Gaillard, E.R.; Dillon, J. Photochemistry of retinal as studied by steady state and pulsed methods. *Invest. Ophthalmol. Vis. Sci.* 1996, *37*, 798.
14. Whitten, D.G.; Farahat, M.S.; Gaillard, E.R. Time resolved fluorescence and transient spectroscopy in determining photochemical and photophysical channels in reacting systems in solution and microheterogeneous media. *Photochem. Photobiol.* 1997, *65*, 23-32.

15. Dillon, J.; Zheng, L.; Merriam, J.C.; Gaillard, E.R. The optical properties of the anterior segment of the eye: implications for cortical cataract. *Exp. Eye Res.* 1999, 68, 785.
16. Dillon, J.; Zheng, L.; Merriam, J.C.; Gaillard, E.R. Transmission spectra of light to the mammalian retina. *Photochem. Photobiol.* 2000, 71, 225.
17. Mandal, K.; Dillon, J.; Gaillard, E.R. Heat and concentration effects on the small heat shock protein,  $\alpha$ -crystallin. *Photochem. Photobiol.* 2000, 71, 470-475.
18. Gaillard, E.R.; Zheng, L.; Merriam, J.C.; Dillon, J. Age related changes in the absorption characteristics of the primate lens. *Invest. Ophthalmol. Vis. Sci.* 2000, 41, 1454-1459.
19. Harper, W.; Gaillard, E.R. Studies of all-trans retinal as a photooxidizing agent. *Photochem. Photobiol.* 2001, 73, 71-76.
20. Ervin, L.; Dillon, J.; Gaillard, E.R. Photochemically modified  $\alpha$ -crystallin: A model system for aging in the primate lens. *Photochem. Photobiol.* 2001, 73, 685-691.
21. Ragauskaitė, L.; Heckathorn, R.C.; Gaillard, E.R. Environmental effects on the photochemistry of A2-E, a component of human retinal lipofuscin. *Photochem. Photobiol.* 2001, 74, 483-488.
22. Heckathorn, R.C.; Dillon, J.; Gaillard, E.R. Synthesis and purification of 3-hydroxykynurenine-O- $\beta$ -glucoside, a primate lens UV filter, and its application in a two step assay for  $\beta$ -glucosidase activity. *Anal. Biochem.* 2001, 299, 78-83.
23. Gould, I.R.; Boiani, J.A.; Gaillard, E.R.; Goodman, J.L.; Farid, S. Intersystem crossing in charge-transfer excited states. *J. Phys. Chem. A* 2003, 107, 3515-3524.
24. Harper, W.S.; Gaillard, E.R. A photochemical study of (E,E,E,E)-2-[9-(2-hydroxyethyl)imino-3,7-dimethyl-1,3,5,7-decatrien-1-yl]-1,3,3-trimethylcyclohexene, a derivative of all-trans-retinal and ethanolamine. *Photochem. Photobiol.* 2003, 78, 298-305.
25. Schweitzer, D.; Hammer, M.; Schweitzer, F.; Schenke, S.; Gaillard, E.R. Evaluation of time resolved autofluorescence images of the ocular fundus. *Prog. Biomed. Optics and Imaging, SPIE* 2003, 5141, 8-17.
26. Avalle, L.B.; Wang, Z.; Dillon, J.; Gaillard, E.R. Observation of A2E oxidation products in human retinal lipofuscin. *Exp. Eye Res.* 2004, 78, 895-898.
27. Dillon, J.; Zheng, L.; Merriam, J.C.; Gaillard, E.R. Transmission of light to the aging human retina: possible implications for age related macular degeneration. *Exp. Eye Res.* 2004, 79, 753-759.
28. Schweitzer, D.; Hammer, M.; Schweitzer, F.; Anders, R.; Doebbecke, T.; Schenke, S.; Gaillard, E.R. In vivo measurement of time resolved autofluorescence at the human ocular fundus. *J. Biomed. Optics* 2004, 9, 1214-1222.
29. Dillon, J.; Wang, Z.; Avalle, L.B.; Gaillard, E.R. The photochemical oxidation of A2E results in the formation of a 5,8,5',8'-bisfuranoid oxide. *Exp. Eye Res.* 2004, 79, 537-542.
30. Gaillard, E.R.; Avalle, L.B.; Keller, L.M.M.; Wang, Z.; Reszka, K.; Dillon, J. A mechanistic study of the photooxidation of A2E, a component of human retinal lipofuscin. *Exp. Eye Res.* 2004, 79, 313-319.

31. Wang, Z.; Paik, D.C.; del Priore, L.V.; Gaillard, E.R. Nitrite modified extracellular matrix proteins deleteriously affect retinal pigment epithelial cell function and viability: a comparison study with non-enzymatic glycation mechanisms. *Curr. Eye Res.* 2005, 30, 691-702.
32. Sunderlin, L.S.; Ryzhov, V.; Keller, L.M.M.; Gaillard, E.R. Measuring basicities of amino acids using an ion trap mass spectrometer: A physical chemistry laboratory experiment. *J. Chem. Ed.* 2005, 82, 1071-1073.
33. Avalle, L.B.; Dillon, J.; Gaillard, E.R. Action spectrum for singlet oxygen production by human retinal lipofuscin. *Photochem. Photobiol.* 2005, 81, 1347-1350.
34. Wang, Z.; Dillon, J.; Gaillard, E.R. Antioxidant Properties of Melanin in RPE cells. *Photochem. Photobiol.* 2006, 82, 474-479.
35. Guo, H.; Zheng, C.; Gaillard, E.R. Structure prediction of the RPE65 protein. *J. Theor. Biol.* 2006, 242, 117-122.
36. Wang, Z.; Keller, L.M.M.; Dillon, J.; Gaillard, E.R. Oxidation of A2E results in the formation of highly reactive aldehydes and ketones. *Photochem. Photobiol.* 2006, 82, 1251-1257.
37. Wang, Z.; Paik, D.C.; Dillon, J.; Gaillard, E.R. Tyrosine nitration site specificity identified by LC/MS in nitrite-modified collagen type IV. *Exp. Mol. Medicine.* 2007, 39, 74-83.
38. Guo, H.; Zheng, C.; Gaillard, E.R. Computational studies for the structure and function of mRPE65. *J. Theor. Biol.* 2007, 245, 312-318.
39. Widomska, J.; Raguz, M.; Dillon, J.; Gaillard, E.R.; Subczynski, W.K. Physical properties of the lipid bilayer membrane made of the calf lens lipids: EPR spin labeling studies. *Biochem. Biophys. Acta: Biomembranes* 2007, 1768, 1454-1465.
40. Sun, K.; Cai, H.; Tezel, T.; Paik, D.; Gaillard, E.R.; Del Priore, L.V. Bruch's membrane aging decreases phagocytosis of outer segments by retinal pigment epithelium. *Mol. Vis.* 2007, 21, 2310-2319.
42. Rouseva, L.A.; Gaillard, E.R.; Paik, D.C.; Merriam, J.C.; Ryzhov, V.; Garland, D.L.; Dillon, J.P. Oxindolealanine in age-related human cataracts. *Exp. Eye Res.* 2007, 85, 861-868.
43. Raguz, M.; Widomska, J.; Dillon, J.; Gaillard, E.R.; Subczynski, W.K. Characterization of lipid domains in reconstituted porcine lens membranes using EPR spin labeling approaches. *Biochem. Biophys. Acta* 2008, 1778, 1079-1090.
44. Liggett, T.E.; Griffiths, T.D.; Gaillard, E.R. Isolation and characterization of a spontaneously immortalized bovine retinal pigmented epithelium cell line. *BMC Cell Biology*, 2009, (doi:10.1186/1471-2121-10-33).
45. Murdaugh, L.; Dillon, J.; Gaillard, E.R. Modifications to the basement membrane protein, laminin, by glycolaldehyde and A2E: model system for age related changes to Bruch's membrane. *Exp. Eye Res.*, 2009, 89, 187-192.
46. Raguz, M.; Widomska, J.; Dillon, J.; Gaillard, E.R.; Subczynski, W.K. Physical Properties of the Lipid Bilayer Membrane made of Cortical and Nuclear Bovine Lens Lipids: EPR Spin-Labeling Studies. *Biochem Biophys Acta* 2009, 1788, 2380-2388.

47. Murdaugh, L.S.; Wang, Z.; Del Priore, L.V.; Dillon, J.; Gaillard, E.R. Age-Related Accumulation of 3-nitrotyrosine and nitro-A2E in Human Bruch's Membrane. *Exp. Eye Res.* 2010, 90, 564-571.
48. Hosmane, N.; Dash, B.; Satapathy, R.; Gaillard, E.R.; Maguire, J. Carborane-Appended C3-Symmetrical Extended  $\pi$ -Systems: Synthesis and Properties. *J. Am. Chem. Soc.* 2010, 132, 6578-6587.
49. Murdaugh, L.S.; Avalle, L.B.; Mandal, S.; Dillon, J.; Simon, J.D.; Gaillard, E.R. Compositional Studies of Human RPE Lipofuscin. *J. Mass Spectrom.* 2010, 45, 1139-1147.
49. Murdaugh, L.S.; Mandal, S.; Dillon, J.; Simon, J.D.; Gaillard, E.R. Compositional Studies of Human RPE Lipofuscin: mechanisms of molecular modifications. *J. Mass Spectrom.* 2011, 46, 90-95.
50. Gaillard, E.R.; Merriam, J.; Zheng, L.; Dillon, J. Transmission of Light to the Young Primate Retina: Possible Implications for the Formation of Lipofuscin. *Photochem. Photobiol.* 2011, 87, 18-21.
51. Dash, B.P.; Satapathy, R.; Gaillard, E.R.; Norton, K.M.; Maguire, J.A.; Chug, N.; Hosmane, N.S. Enhanced p-Conjugation and Emission via Icosahedral Carboranes: Synthetic and Spectroscopic Investigation. *Inorg. Chem.* 2011, 50, 5485-5493.
52. Schweitzer, D.; Gaillard, E.R.; Dillon, J.; Mullins, R.; Russell, S.; Hoffman, B.; Peters, S.; Hammer, M.; Biskup, C. Time-resolved autofluorescence imaging of human donor retina tissue from donors with significant extramacular drusen. *Invest. Ophthalmol. Vis. Sci.* 2012, 53, 3376-3386.
53. Thao, M.T.; Renfus, D.J.; Dillon, J.; Gaillard, E.R. A2E mediated photochemical modification to fibronectin and its implications to age related changes in Bruch's membrane. *Photochem. Photobiol.* 2013, in press.
54. Thao, M.T.; Perez, D.; Dillon, J.; Gaillard, E.R. Measuring the viscosity of whole human lens using a fiber optic oxygen sensing system. *Mol. Vis.*, 2013, in press
55. Thao, M.; Gomez, A.; Dillon, J.; Gaillard, E.R. Modifications to the glycoproteins, fibronectin and laminin, via non-enzymatic nitration: a model for inflammation. *Exp. Eye Res.* 2013, submitted.
56. Karumanchi, D.K.; Vega, M.; Dillon, J.; Gaillard, E.R. Fluorescence lifetimes of lens proteins as biomarkers for early diagnosis of diabetes related ocular diseases. *Invest. Ophthalmol. Vis. Sci.* 2013, submitted.

#### B. Books and Book Chapters:

1. "A Kinetic Study of Several Reactions Involving Excited State Sigma Bond Cleavages," E.R. Gaillard, Ph.D. Thesis, University of Texas at Austin, **1990**.
2. "Chemistry laboratory manual for non-science majors," B.J. Yager, C.H. Banks and E.R. Gaillard, American Press, Boston, MA, **1991**.
3. "Age-related Changes in RPE Lipofuscin Leads to Hydrophobic Polymers" in *Oxidative Stress in the Retina and Choroid*, Robert Stratton, Ed., part of the

series “Oxidative Stress in Applied Basic Research and Clinical Practice, Humana (Springer) Publishing, **2012**.

C Reports and Patents:

1. “Time resolved absorption techniques,” B.R. Arnold, M. Farahat, M., E.R. Gaillard, I.R. Gould and D.G. Whitten, Report submitted to the National Science Foundation from the joint US-Latin American Workshop, Foz do Igaussu, Brazil, May 24-27, **1996**.
2. “Therapeutic Uses of Glutathione Mimics”, Elizabeth R. Gaillard and James P. Dillon, US Patent and Trademark Office, US Dept. of Commerce, Publication number US-2009-0005349-A1, **Jan. 1, 2009**.
3. “Biomarkers of Inflammation in Bruch’s Membrane of the Human Retina”, Elizabeth R. Gaillard and James P. Dillon, US Patent and Trademark Office, US Dept. of Commerce, Provisional patent number 12/753,394, **Apr. 2, 2010**.
4. “Timed Release of Substances to Treat Ocular Disorders”, Elizabeth R. Gaillard, James P. Dillon, Timothy Hagen, Tao Xu and Jason Friedrichs, US Patent and Trademark Office, US Dept. of Commerce, Provisional patent number 61/640,557, **Apr. 30, 2012**.