

Edith Caroline (Phoebe) Glazer

John C. Hubbard Professor, College of Arts & Sciences

University of Kentucky
Lexington, KY 40506-0055
Tel: (859) 257-2198

e-mail: ec.glazer@uky.edu

PROFESSIONAL APPOINTMENTS

The University of Kentucky
Assistant Professor, 2009-2015
Associate Professor, 2015-present

EDUCATION

- 2004-2009 NIH Postdoctoral fellow, The Scripps Research Institute, La Jolla, CA.
Advisors: Prof. David B. Goodin and Prof. Harry B. Gray, Caltech.
- 1996-2003 Ph.D. University of California, San Diego.
Advisor: Prof. Yitzhak Tor
- 1993-1996 BA Williams College, Williamstown, MA.
Majors in Chemistry and English; *Cum Laude*, Honors in Chemistry
Advisor: Prof. David P. Richardson
- 1992-1993 Wellesley College, Wellesley, MA.

RESEARCH INTERESTS

- ◆ Light-activated metal complexes as anti-cancer agents
- ◆ Development of assays for cancer drug discovery
- ◆ Structure, function, and dynamics of heme enzymes
- ◆ Photophysics and photochemistry of ruthenium complexes
- ◆ Light-activated small molecule probes of protein dynamics

PROFESSIONAL ACTIVITIES

Memberships: American Chemical Society, American Association for Cancer Research, Inter-American Photochemical Society, American Society for Photobiology, Association for Women in Science, Sigma Xi

Reviewer, Journals: Nature Chemistry, Angewandte Chemie, Journal of the American Chemical Society, Inorganic Chemistry, Bioconjugate Chemistry, Journal of Inorganic Biochemistry, Bioorganic and Medicinal Chemistry, ChemMedChem, ChemComm, Organometallics, Chemical Science

PUBLICATIONS

At the University of Kentucky: (undergraduate co-authors are underlined; * indicates co-corresponding author)

- 1) Havrylyuk, D., Deshpande, M., Parkin, S., **Glazer, E. C.** "Ru(II) Complexes with Diazine Ligands: Electronic Modulation of Coordinating Group is Key to the Design of "Dual Action" Photoactivated Agents", *ChemComm*, **2018**, 54, 12487-90.

- 2) Geranimo, I., Denning, C. A., Heidary, D. K., **Glazer, E. C.***, Payne, C.* “Molecular determinants of small molecule affinity and activity of a cytochrome P450_{BM3} variant”, *Biophysical Journal*, **2018**, *115*, 1251-63.
- 3) Pillar-Little, T. J., Wanninayake, N., Nease, L., Heidary, D. K., **Glazer, E. C. ***, Kim, D. Y.* “Superior photodynamic effect of carbon quantum dots through both type I and type II pathways: Detailed comparison study of top-down-synthesized and bottom-up-synthesized carbon quantum dots”, *Carbon*, **2018**, *140*, 612-23.
- 4) Sun, Y., Heidary, D. K., Zhang, Z., Richards, C., **Glazer, E. C.** “Bacterial cytological profiling reveals the mechanism of action of anticancer metal complexes”, *Molecular Pharmaceutics*, **2018**, *15* (8), pp 3404-16. *ACS Editor's Choice*.
- 5) Havrylyuk, D., Howerton, B. S., Nease, L. A., Parkin, S., Heidary, D. K., **Glazer, E. C.** “Structure-activity relationships of anticancer ruthenium(II) complexes with substituted hydroxyquinolines”, *European J. Med. Chem.*, **2018**, *156*, 790-99.
- 6) Kohler, L., Nease, L. A., Vo, P., Garofolo, J., Heidary, D. K., Thummel, R. P.*, **Glazer, E. C.*** “Photochemical and photobiological activity of Ru(II) homoleptic and heteroleptic complexes containing methylated bipyridyl-type ligands”, *Inorg. Chem.* **2017**, *56*, 12214-23. PMID: 28949518.
- 7) **Glazer, E. C.** “Panchromatic osmium complexes for photodynamic therapy: solutions to existing problems and new questions”, *Photochem. Photobiol.* **2017**, *93*, 1326-28 (*Invited Review*). PMID: 28543667.
- 8) Zamora, A., Denning, C. A., Heidary, D. K., Wachter, E., Nease, L. A., Ruiz, J., **Glazer, E. C.** “Ruthenium-containing P450 inhibitors for dual enzyme inhibition and DNA damage”, *Dalton Trans.* **2017**, *46*, 2165-2173. PMID: 28121322.
- 9) Havrylyuk, D., Heidary, D. K., Nease, L. A., **Glazer, E. C.** “Photochemical properties and structure-activity relationships of Ru(II) complexes with pyridyl-benzazole ligands as promising anticancer agents”, *European Journal of Inorganic Chemistry*, **2017**, *12*, 1687-94. PMID: 29200939. *Very Important Paper; Back Cover*.
- 10) Heidary, D., Fox, A., Richards, C., **Glazer, E. C.**, “A high-throughput screening assay using a photoconvertable protein for identifying inhibitors of transcription, translation, or proteasomal degradation”, *SLAS Discovery*, **2017**, *22*, 4, 399-407. PMID: 28328316.
- 11) Wachter, E., Moya, D., **Glazer, E. C.**, “Combining a Ru(II) “building block” and rapid screening approach to identify DNA structure-selective “light switch” compounds” *ACS Combinatorial Science*, **2017**, *19* (2), 85-95. PMID: 28029775. *Front Cover*.
- 12) Wachter, E., Zamora, A., Heidary, D. K., Ruiz, J., **Glazer, E. C.**, “Geometry matters: inverse cytotoxic relationship for cis/trans-Ru(II) polypyridyl complexes from cis/trans-[PtCl₂(NH₃)₂]” *ChemComm*, **2016**, *52*, 1021-24. PMID: 27352966. *Back Cover*.
- 13) Geronimo, I., Denning, C. A., Rogers, W. E., Othman, T., Huxford, T., Heidary, D. K., **Glazer, E. C.**, **Payne, C. M.**, “Effect of mutation and substrate binding on the stability of Cytochrome P450_{BM3} variants”, *Biochemistry*, **2016**, *55*, 3594-606. PMID: 27267136.
- 14) Wachter, E., **Glazer, E. C.**, Parkin, S., Brock, C. P., “An exceptional 5:4 enantiomeric structure” *Acta Cryst. B* **2016**, *B72*, 223-31. PMID: 27048724.
- 15) Dickerson, M., Howerton, B. S., Bae, Y., **Glazer, E. C.**, “Light-sensitive ruthenium complex-loaded cross-linked polymeric nanoassemblies for the treatment of cancer” *J. Materials Chem. B*. **2016**, *4*, 394-408. PMID: 25249443. *Hot Paper*.

- 16) Wachter, E., Moya, D., Parkin, S., **Glazer, E. C.**, "Ruthenium complex "light switches" that are selective for different G-quadruplex structures" *Chem. Eur. J.* **2016**, *22*, 550-9. PMID: 26560887. Identified as *Hot Paper, Back Cover*.^{§§}
- 17) Magde, D.,* Magde, M. D., **Glazer, E. C.**, "So-called "Dual Emission" for ³MLCT luminescence in ruthenium complex ions: What is really happening?" *Coord. Chem. Rev.* **2016**, *306*, 2, 447-467. (D. Magde was corresponding author. Included in a special issue dedicated to Peter Ford).
- 18) Heidary, D. K., Howerton, B.S., **Glazer, E. C.**, "Coordination of quinolines to ruthenium bis-dimethyl-phenanthroline improves potency for potential antineoplastic agents", *J. Med. Chem.* **2014**, *57*, 8936-8946. PMID: 25314373.
- 19) Hidayatullah, A. N., Wachter, E., Heidary, D. K., Parkin, S., **Glazer, E. C.**, "Photoactive Ru(II) complexes with dioxinophenanthroline ligands are potent cytotoxic agents", *Inorg. Chem.* **2014**, *53*, 10030-10032. PMID: 25198057.
- 20) Dickerson, M., Sun, Y., **Glazer, E. C.**, "Modifying charge and hydrophilicity of simple Ru(II) polypyridyl complexes radically alters biological activities: old complexes, surprising new tricks", *Inorg. Chem.* **2014**, *53*, 10370-10377. PMID: 25249443.
- 21) Wachter, E., **Glazer, E. C.**, "Mechanistic study on the photochemical "light-switch" behavior of [Ru(bpy)₂dmdppz]²⁺", included in the special issue "Current Topics in Photochemistry" in *J. Phys. Chem. A* **2014**, *45*, 10474-10486. PMID: 25058448.
- 22) Heidary, D. K., **Glazer, E. C.**, "A light-activated metal complex targets both DNA and RNA in a fluorescent in vitro transcription and translation assay", *ChemBioChem* **2014**, *15*, 507-511. PMID: 24482049.
- 23) Wachter, E., Howerton, B. S., Hall, E. C., Parkin, S. **Glazer, E. C.**, "A new type of DNA "light-switch": a dual photochemical sensor and metalating agent for duplex and G-quadruplex DNA", *ChemComm* **2014**, *50*, 311-313. PMID: 24226814.
- 24) **Glazer, E. C.** "Light-activated metal complexes that covalently modify DNA", invited review, *Israel Journal of Chemistry* special issue on "Contemporary Topics in Nucleic Acids"; **2013**, *53*, 391-400.
- 25) Wachter, E., Heidary, D. K., Howerton, B. S., **Glazer, E. C.**, "Light-activated ruthenium complexes photobind DNA and are cytotoxic in the photodynamic therapy window", *ChemComm* **2012**, *48*, 9649-9651. PMID: 22908094.
- 26) Howerton, B. S., Heidary, D. K., **Glazer, E. C.** "Strained ruthenium complexes are potent light-activated anticancer agents", *J. Am. Chem. Soc.* **2012**, *134*, 8324-8327.** PMID: 22553960.
- 27) **Glazer, E. C.***, Lee, Y. T.* , Wilson, R. F., Stout, C. D., and Goodin, D. B. "Three clusters of conformational states in P450cam reveals a multi-step pathway for opening of the substrate access channel", *Biochemistry* **2011**, *50*, 693-703. PMID: 21171581. * Equal contribution.

Other Publications:

- 28) **Glazer, E. C.**, Nguyen, Y. H., Goodin, D. B., Gray, H.B. "Probing inducible nitric oxide synthase with a pterin-Ru(II) sensitizer wire", *Angew. Chem.* **2008**, *47*, 898-901.
- 29) **Glazer, E. C.**, Magde, D., Tor, Y. "Ru(II) complexes that break the rules: structural features regulating dual emission", *J. Am. Chem. Soc.* **2007**, *129*, 8544-8551.

- 30) Contakes, S. M., Nguyen, Y. H., Gray, H. B., **Glazer, E. C.**, Hays, A. M., Goodin, D. B. "Conjugates of heme-thiolate enzymes with photoactive metal-diimine wires", *Structure and Bonding*, **2007**, *123*, 177-203.
- 31) Jouvenot, D., **Glazer, E. C.**, Tor, Y. "Photodimerizable ditopic ligand", *Org. Lett.* **2006**, *8*, 1987-1990.
- 32) Udit, A. K., Belliston-Bittner, W., **Glazer, E. C.**, Nguyen, Y. H., Gillan, J. M., Hill, M. G., Marletta, M. A., Goodin, D. B., Gray, H. B. "Redox couples of inducible nitric oxide synthase", *J. Am. Chem. Soc.* **2005**, *127*, 11212-3.
- 33) **Glazer, E. C.**, Belyea, B., Tor, Y. "A simple synthesis of isotopically pure 2,2'-bipyridyl- d_8 ", *Inorg. Chem. Comm.* **2005**, *8*, 517-519.
- 34) **Glazer, E. C.**, Magde, D., Tor, Y. "Dual emission from a family of conjugated dinuclear Ru^{II} complexes", *J. Am. Chem. Soc.* **2005**, *127*, 4190-4192.
- 35) Aldrich-Wright, J., Brodie, C., **Glazer, E. C.**, Luedtke, N. W., Elson-Schwab, L., Tor, Y. "Symmetrical bisintercalating complexes based on [Ru(dpq)₂(phen)]²⁺ with high DNA affinity", *Chem. Comm.* **2004**, *8*, 1018-1019.
- 36) **Glazer, E. C.**, Tor, Y. "Ru(II) complexes of "large-surface" ligands", *Angew. Chem.* **2002**, *41*, 4022-4026.
- 37) Luedtke, N. W., Hwang, J. S., **Glazer, E. C.**, Gut, D., Kol, M., Tor, Y. "Eilatin Ru(II) complexes display anti-HIV activity and enantiomeric diversity in the binding of RNA", *ChemBioChem* **2002**, *3*, 766-771.
- 38) **Glazer, E. C.**, Tor, Y. "Chiral metal-containing polymers", *Polymer Preprints* **1999**, *40*, 513-514.
- 39) Diaz-Garcia, M. A., Wright, D., Casperson, J. D., Smith, B., **Glazer, E.**, Moerner, W. E., Sukhomlinova, L. I., Twieg, R. J. "Photorefractive properties of poly(N-vinyl carbazole)-based composites for high-speed applications", *Chemistry of Materials* **1999**, *11*, 1784-1791.

PATENTS AND OTHER RESEARCH RELATED ACCOLADES

***JACS communication 2012* Highlighted in *Chemical and Engineering News*, "Turning on ruthenium to kill cancer cells", *Science and Technology, Latest News*, May 9, 2012; "Ruthenium switches on to kill cancer cells", *Science and Technology, Concentrates*, May 21, 2012; highlighted on several medical websites.**

##*ChemBioChem paper 2014* Highlighted on the Thermo Fisher website as an application of the Pierce Human *In Vitro* Protein Expression system.

§§ *Chem. Eur. J. paper 2016* Highlighted on *ScienceDaily* and other websites.

"Light-activated compounds", U.S. Patent No. 9,290,528, issued 3/22/2016.

GRANTS RECEIVED

- 1) PI, "Photo-active ruthenium complexes as selective, modular metallo-chemotherapeutics," American Cancer Society Institutional Research Grant, \$15,000, July 2010-June 2011.
- 2) PI, "Light-activated ruthenium complexes as a new class of selective and modular chemotherapeutic agents," Pardee Foundation, \$118,000, March 2011-May 2012.
- 3) PI, "Ruthenium complex scaffolds for the creation of targeted chemotherapeutics," American Cancer Society Research Scholar Grant, \$715,000, January 2013-December 2016.

- 4) PI, "Light-responsive ruthenium compounds for applications in disease", National Institutes of Health, \$1,412,735, August, 2014-July, 2019.
- 5) "Powering the Kentucky bioeconomy for a sustainable future", Contributing Investigator, National Science Foundation, \$20,000,000, July 2014-June 2019.
- 6) Co-PI, "MRI: Acquisition of a single-crystal diffractometer for chemistry and materials research", National Science Foundation, \$268,193 August 2016-July 2019.
- 7) PI, "Metals in Medicine Gordon Research Conference", National Institutes of Health, \$15,000, June, 2018.

TRAINING FACULTY MEMBER

- 1) University of Kentucky Cancer Nanotechnology Training Center (supported by the NCI/NIH and part of the National Cancer Institute Alliance for Nanotechnology in Cancer (5R25CA153954)).
- 2) University of Kentucky "Training in Drug Abuse Related Research" (supported by NIDA/NIH T32 DA016176).

TEACHING EXPERIENCE

University of Kentucky:

Fall, 2009-present

- ◆ Biological Chemistry II (CHE 552).
- ◆ DNA Structure, Damage, and Cancer (CHE 580); this was a new specialty course.
- ◆ Advanced Inorganic Chemistry (CHE 510).
- ◆ Sophomore Organic Chemistry (CHE 230-002, 230 student class size).
- ◆ Biological Chemistry Seminar (CHE 776)
- ◆ Graduate Chemistry Seminar (CHE 776); this is a new 3 credit specialty course focused on scientific communication.
- ◆ Guest Lecturer, Biochemistry I (CHE 550), Pharmaceutical Science (PHS 633)

University of California, San Diego, La Jolla, California:

Lecturer, Winter, 2008-Spring, 2009

- ◆ Taught Sophomore Organic Chemistry (Chem 140A and 140B, 350 student class size). Developed the curriculum and taught an Introductory Chemistry for non-majors (Chem 15).

SERVICE

Departmental:

Graduate Student Recruitment Committee	2009-2013, 2018
Graduate Program Committee	2010-2011
Faculty Search Committee	2010-11, 2015-16
Seminar Committee	2011-2014
Chair, Naff Symposium	2011-2012
Biological Chemistry Cume Coordinator	2012-2015, 2016-2017
Chair, Undergraduate Poster Competition	2013-2014
Building and Safety Committee	2014-2015
Awards Committee, currently Chair	2014-present
Faculty Advisor for the Society of Postdoctoral Scholars	2015-present
Website Committee	2015-present
Executive Committee	2016-2018

College:

Staff Faculty Collegiality Committee	2015-present
Research and Scholarship Strategic Plan Implementation Committee	2016-present

University wide:

RFP Committee for Scientific Purchasing	2011-2015
Research and Scholarship Strategic Plan Implementation Committee	2015-present
Institutional Reviewer, American Cancer Society	2016-present
College of Pharmacy Faculty Search	2018

National:

NIH Reviewer, BCMB (Ad hoc)	2018
NIH Reviewer, CSR Anonymization Study	2018
NIH Reviewer, SBCA (Ad hoc)	2018
NIH Reviewer, RTB Study Section (Ad hoc)	2015-2017
NSF Study Section Member	2016-2018
National Academies of Science, Engineering and Medicine	
NRC Research Associateship Program Reviewer	2016-present
ACS Bioinorganic Subdivision Chair	2016-2017
ACS Inorganic Division Member at Large	2018-present
Session Moderator, Gordon Research Conference on Metals in Medicine	2016
Vice-Chair, Gordon Research Conference on Metals in Medicine	2016-2018
Chair, Gordon Research Conference on Metals in Medicine	2018-2020
Advisory Board, Chemical Society Reviews	2016-present

INVITED TALKS

Colleges and Universities:

San Diego State University, Bowling Green State University, Ohio University, West Virginia State University, West Virginia Tech, University of Iowa, Purdue University, University of California, San Diego, The Scripps Research Institute, California Institute of Technology, California State University, Los Angeles, University of Texas, Arlington, Virginia Tech, University of British Columbia, Simon Fraser University, University of Alabama, Medical University of South Carolina, Trinity University, University of Murcia, Spain, The Ohio State University, University of Dayton.

Conferences:

20th International Symposium on the Photophysics and Photochemistry of Coordination Compounds, July 2013; 23rd Inter-American Photochemical Society Meeting, January, 2014; Gordon Research Conference on Metals in Medicine, invited seminar in the “New Frontiers: Early Career Investigators Selected from Abstracts” section, June, 2014. 2015: National ACS Meeting, March, 2015, Pacificchem, December, 2015, American Society for Photobiology, May, 2016, 42nd International Conference on Coordination Chemistry, July, 2016; Summer School on Photochemistry at the Holland Research School of Molecular Chemistry, 2016; Photopharmacology Symposium at the University Medical Center Groningen, The Netherlands, 2017; CanBIC, Perry Sound, Canada, 2017; Symposium on The Triplet Excited State in Inorganic Chemistry, National ACS Meeting, 2017; American Society for Photobiology, May, 2018, EuroBIC, June, 2018; 2nd International Symposium on Photopharmacology, November, 2018.

COMMITMENT TO DIVERSITY AND INCLUSION

I am strongly committed to creating an inclusive and diverse community within my laboratory and department. This has been implemented through active recruitment of members of underrepresented groups in science and providing training in recognizing and overcoming bias in both the classes I teach and my mentoring interactions. The students and scientists in the Glazer Laboratory have been 60% female and 25% members of minority groups.