Christine K. Payne

Chemistry and Biochemistry
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Educational Background

1998	B.S.	Chemistry	University of Chicago	Advisors: James Norris, Norbert Scherer
2003	Ph. D.	Chemistry	University of California, Berkeley	Advisor: Charles Harris

Employment History

2007-	Assistant Professor, Georgia Institute of Technology
2003-2006	Postdoctoral Fellow, Harvard University, Advisor: Xiaowei Zhuang
1998-2000	Graduate Teaching Assistant, University of California, Berkeley

Research Interests

Kinetics and mechanisms of intracellular chemical reactions
Interactions of nanoparticles with living cells
Development of new fluorescence microscopy methods

Professional Memberships and Service

2010	Chair, Biophysical Subdivision, Division of Physical Chemistry, ACS
2009	Symposium Organizer, "Single Molecule Biophysics," OSA Annual Meeting
2007-	Co-Organizer, Atlanta Area Chemical Physics (AACP) Seminar Series
2003-	Biophysical Society, member
1999-	American Chemical Society, member

Honors and Awards

2009	NIH Director's New Innovator Award
2008	ACS PROGRESS-Dreyfus Lectureship Award
2007-2010	Research Scholar Development Award; NIH
2004-2006	Ruth L. Kirschstein National Research Service Award; NIH Postdoctoral Fellowship
1998	B.S. with Honors in the College and in Chemistry, University of Chicago

Research Grants

Current	NIH Director's New Innovator Award, October 2009-September 2014, $1.5M Direct
	NIH R01 with R. Dickson (P.I.), C. Fahrni, and M. Kemp, September 2008-July 2012
Completed	NIH Research Scholar Development Award, April 2007-March 2010, $250K Direct

Teaching

Courses	Statistical Mechanics (CHEM 6481, Graduate) Spring 07 & 09, Fall 10
	Quantum Mechanics (CHEM 3412, Undergraduate) Spring 08, Fall 08, & Fall 09
REU	Jenna Tomlinson (2008, now a Ph.D. student at University of Michigan), Solaire Finkenstaedt-Quinn (2009, now an entering Ph.D. student, University of Minnesota)
B.S.	Nicole Fay (2007-2008, now a Ph.D. student at UC Berkeley), Jesse Haulk (2008), Kevin Hardin (2008-2009), Paul Park (2010), Jairo Zapata, Heather Jekot, Joshua Liu

M.S.	Melinda Ogden (2007-2009)
Ph.D.	Candace Fleischer, William Humphries
Postdocs	Ashlee St. John Iyer (2008-2009), Don-Ricardo Miller (joint with Prof. Melissa Kemp, BME, 2009-2010), Craig Szymanski, Gerard Doorley

Invited Seminars, 2007-2010

"Imaging nanoparticles in living cells: Unraveling interactions at the nano-bio interface," Functionalized Nanobiomaterials for Medical Applications, MRS Workshop, Denver, Colorado; October 6, 2010.

"Kinetics and mechanism of intracellular reactions: Probing the degradation of LDL," 2010 National Meeting of the American Chemical Society, San Francisco, California; March 24, 2010.

"Imaging dynamic events in live cells," Department of Chemistry and Biochemistry, University of Notre Dame, Notre Dame, Indiana; February 4, 2010.

"Imaging dynamic events in live cells," Department of Chemistry, Spelman College, Atlanta, Georgia; January 28, 2010.

"Imaging dynamic events in live cells," IBB Breakfast Club, Georgia Tech; January 19, 2009.

"Intracellular delivery of quantum dots for live cell imaging," NanoFANS, Nanotechnology Research Center, Georgia Tech; November 18, 2009.

"Imaging dynamic events inside living cells," Department of Chemistry and Biochemistry, Bowdoin College, Brunswick, Maine; November 6, 2009.

"Cytosolic delivery of quantum dots for live cell imaging," Structural Biology and Molecular Biophysics Symposium, Georgia Tech; July 24, 2009.

"Imaging reaction dynamics in living cells," College of Arts and Sciences Seminar, Valdosta State University, Valdosta, Georgia; April 23, 2009.

"Imaging intracellular dynamics," Department of Physics, University of Maine, Orono; April 3, 2000.

"Imaging reaction dynamics in living cells," Natural Science Seminar, New College of Florida, Sarasota, Florida; December 5, 2008.

"Pyrenebutyrate-mediated delivery of quantum dots to living cells," Southeastern Regional Meeting of the ACS, Nashville, Tennessee; November 14, 2008.

"Pyrenebutyrate-mediated delivery of quantum dots to living cells," Department of Chemistry and Biochemistry, University of Colorado, Boulder; November 5, 2008.

"Directed delivery of nanomaterials within living cells," US-North Africa Regional Workshop on Nanostructured Materials and Nanotechnology, Hammamet, Tunisia; March 18, 2008.

"Imaging reaction dynamics in living cells," Department of Chemistry and Biochemistry, San Diego State University, California; February 1, 2008.

"Role of diffusion in vesicle-mediated transport: Fluorescence correlation spectroscopy for quantitative cellular imaging," Department of Chemistry, University of Alabama, Huntsville; April 20, 2007.

Publications (* indicates Georgia Tech publication)

19.* "Cellular binding of nanoparticles in the presence of serum proteins," G.W. Doorley and **C.K. Payne**, *Chem. Commun*., accepted, (2010).

18.* "Intracellular degradation of low-density lipoprotein probed with two-color fluorescence microscopy," W.H. Humphries IV, N.C. Fay, **C.K. Payne**, *Integrative Biology*, **2**, 536-544 (2010).

17.* "Pyrenebutyrate leads to cellular binding, not intracellular delivery, of polyarginine quantum dots," A.E. Jablonski, T. Kawakami, A.Y. Ting, **C.K. Payne**, *J. Phys. Chem. Lett.,* **1**, 1312-1315 (2010).

x.* "Pyrenebutyrate-mediated delivery of quantum dots across the plasma membrane of living cells," A.E. Jablonski, W.H. Humphries IV, **C.K. Payne**, *J. Phys. Chem. B*, **113**, 405-408 (2009). Withdrawn. The conclusions drawn from the data in this manuscript were incorrect. A full discussion can be found in Publication #17.

16.* "Imaging gene delivery with fluorescence microscopy," **C.K. Payne**, *Nanomedicine*, **2**, 847-860 (2007).

15.* "Cellular binding, motion, and internalization of synthetic gene delivery polymers," G.T. Hess, W.H. Humphries IV, N.C. Fay, and **C.K. Payne**, *Biochim. Biophys. Acta, Mol. Cell Res.*, **1773**, 1583-1588 (2007).

14. "Internalization and trafficking of cell surface proteoglycans and proteoglycan-binding ligands," **C.K. Payne**, S.A. Jones, C. Chen, and X. Zhuang, *Traffic*, **8**, 389-401 (2007).

13. "Photo-induced β-hydrogen elimination and radical formation with $CpW(CO)_3(CH_2CH_3)$: Ultrafast IR and DFT studies," E.A. Glascoe, M.F. Kling, J.E. Shanoski, R.A. DiStasio Jr., **C.K. Payne**, B.V. Mork, T.D. Tilley, and C.B. Harris, *Organometallics*, 26, 1424-1432 (2007).

12. "Temperature-dependent UV-Vis spectral changes in hydrogen- and deuterium-bonded photosynthetic reaction centers of Rhodobacter sphaeroides," A.E. Ostafin, J.A. Popova, **C.K. Payne**, H. Mizukami, J.R. Norris, *Photosynthetica*, **44**, 433-438 (2006).

11. "Nanophotonic light sources for fluorescence spectroscopy and cellular imaging," O. Hayden and **C.K. Payne**, *Ang. Chem. Int. Ed*., **44**, 1395-1398 (2005).

10. "Ultrafast infrared mechanistic studies of the interaction of 1-hexyne with Group 6 hexacarbonyl complexes," J.E. Shanoski, **C.K. Payne**, M.F. Kling, E.A. Glascoe, and C.B. Harris, *Organometallics*, **24**, 1852-1859 (2005).

9. "Ultrafast UV pump/IR probe studies of C-H activation in linear, cyclic, and aryl hydrocarbons," M.C. Asplund, P.T. Snee, J.S. Yeston, M.J. Wilkens, **C.K. Payne**, H. Yang, K.T. Kotz, H. Frei, R.G. Bergman, and C.B. Harris, *J. Am. Chem. Soc.* **124**, 10605-10612 (2002).

8. "Intramolecular rearrangements on ultrafast timescales: Femtosecond infrared studies of ring slip in (η^1-C_5Cl_5)$Mn(CO)_5$," **C.K. Payne**, P.T. Snee, H. Yang, K.T. Kotz, L.L. Schafer, T.D. Tilley, and C.B. Harris, *J. Am. Chem. Soc.* **123**, 7425-7426 (2001).

7. "Dynamics of photosubstitution reactions of $Fe(CO)_5$: An ultrafast infrared study of high spin reactivity," P.T. Snee, **C.K. Payne**, S.D. Mebane, K.T. Kotz, and C.B. Harris, *J. Am. Chem. Soc.* **123**, 6909-6915 (2001).

6. "Femtosecond infrared study of the dynamics of solvation and solvent caging," H. Yang, P.T. Snee, K.T. Kotz, **C.K. Payne**, and C.B. Harris, *J. Am. Chem. Soc.* **123**, 4204-4210 (2001).

5. "Triplet organometallic reactivity under ambient conditions: An ultrafast UV pump/IR probe study," P.T. Snee, **C.K. Payne**, K.T. Kotz, H. Yang, and C.B. Harris, *J. Am. Chem. Soc.* **123**, 2255-2264 (2001).

4. "Ultrafast infrared studies of ligand rearrangement at coordinatively saturated transition metal centers," K.T. Kotz, H. Yang, P.T. Snee, **C.K. Payne**, and C.B. Harris, in Ultrafast Phenomena XII, Eds. T. Elsaesser, S. Mukamel, M.M. Murnane, and N.F. Scherer (Springer-Verlag, Berlin Heidelberg, 2000) p. 636.

3. "Femtosecond infrared studies of ligand rearrangement reactions: silyl hydride products from Group 6 carbonyls," K.T. Kotz, H. Yang, P.T. Snee, **C.K. Payne**, and C.B. Harris, *J. Organomet. Chem.* **596**, 183-192 (2000).

2. "Ultrafast infrared studies of the reaction mechanism of silicon-hydrogen bond activation by η^5-$CpV(CO)_4$," P.T. Snee, H. Yang, K.T. Kotz, **C.K. Payne**, and C.B. Harris, *J. Phys. Chem. A* **103**, 10426-10432 (1999).

1. "Femtosecond infrared studies of a prototypical one-electron oxidative-addition reaction: Chlorine atom abstraction by the $Re(CO)_5$ radical," H. Yang, P.T. Snee, K.T. Kotz, **C.K. Payne**, and C.B. Harris, *J. Am. Chem. Soc.* **121**, 9227-9228 (1999).