

# Christine K. Payne

Chemistry and Biochemistry  
Georgia Institute of Technology  
Atlanta, GA 30332-0400

Phone: (404) 385-3125  
Fax: (404) 385-6057  
[christine.payne@chemistry.gatech.edu](mailto:christine.payne@chemistry.gatech.edu)

## 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  
Delivery and targeting of nanoparticles in 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) Spring 07 & 09 Quantum Mechanics (CHEM 3412) 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), Jairo Zapata, Heather Jekot, Paul Park, Joshua Liu

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

**Invited Seminars, 2007-2010**

"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.\* "Intracellular degradation of low-density lipoprotein probed with two-color fluorescence microscopy," W.H. Humphries IV, N.C. Fay, **C.K. Payne**, *Integrative Biology*, submitted (2010).
- 18.\* "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).
- 17.\* "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).
- 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  $\beta$ -hydrogen elimination and radical formation with  $\text{CpW}(\text{CO})_3(\text{CH}_2\text{CH}_3)$ : 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  $(\eta^1\text{-C}_5\text{Cl}_5)\text{Mn}(\text{CO})_5$ ," **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  $\text{Fe}(\text{CO})_5$ : 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  $\eta^5$ -CpV(CO)<sub>4</sub>," 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)<sub>5</sub> radical," H. Yang, P.T. Snee, K.T. Kotz, **C.K. Payne**, and C.B. Harris, *J. Am. Chem. Soc.* **121**, 9227-9228 (1999).