

CURRICULUM VITAE

GREGORY S. ENGEL

THE UNIVERSITY OF CHICAGO

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EDUCATION

- Ph.D. Department of Chemistry and Chemical Biology, Harvard University, June 2004
Dissertation: "Cavity Enhanced Spectroscopic Techniques for *in situ* Measurement: Pushing the Limits of Sensitivity"
- A.M. Department of Chemistry and Chemical Biology, Harvard University, June 2001
- A.B. *Summa cum Laude*, Department of Chemistry, Princeton University, June 1999
Thesis: "Cavity Ringdown Spectroscopy in a Brewster's Angle Prism Resonator"
- Certificate of Proficiency, Program in Computational and Applied Mathematics, Princeton University, June 1999

PROFESSIONAL EXPERIENCE

- Professor**, The University of Chicago, 2014-
Department of Chemistry, James Franck Institute, Institute for Biophysical Dynamics and The College
Fellow of the Institute for Molecular Engineering
- Associate Professor**, The University of Chicago, 2012-2014
Department of Chemistry, The James Franck Institute, The Institute for Biophysical Dynamics and The
College
Fellow of the Institute for Molecular Engineering
- Assistant Professor**, The University of Chicago, July 2007-2012
Department of Chemistry, The James Franck Institute, and The College
- Miller Research Fellow**, University of California, Berkeley, 2005-2007
Department of Chemistry, UC Berkeley
Physical Biosciences Division, Lawrence Berkeley National Laboratory
Two-Dimensional Femtosecond Electronic Spectroscopy of Photosynthetic Complexes in collaboration
with Prof. Graham Fleming
- Postdoctoral Research Fellow**, Harvard University, 2004-2005
Department of Engineering and Applied Science
Miniaturized Instrumentation for *in situ* Spectroscopic Measurements in Prof. James Anderson's group
- Consultant**, Institute for Defense Analysis, Alexandria, VA, 2013-present
- Technical Consultant**, NovaWave Technologies, Redwood City, CA, 2003-2007
Real time statistical analysis of high speed data streams

TEACHING EXPERIENCE

Professor, Department of Chemistry, The University of Chicago, 2007-present

Quantum Mechanics, Fall 2016

Experimental Physical Chemistry, Winter 2009, 2010, 2012, 2016

Molecular Mechanisms of Human Disease, Winter 2015 & 2016

Honors General Chemistry, Autumn 2009

Graduate Quantum Mechanics, Autumn 2007, 2008, 2010, 2012 & 2013

Graduate Modern and Nonlinear Spectroscopy, Spring 2011

General Chemistry, Autumn 2011, Winter 2013, 2014, 2015

Teaching Fellow, Department of Chemistry, Harvard University, 1999-2004

Five semesters of Undergraduate Quantum Chemistry and Mechanics

Four semesters of Undergraduate/Graduate Statistical Mechanics

One semester of Graduate Chemical Kinetics

FELLOWSHIPS, AWARDS, AND NOTEWORTHY ACHIEVEMENTS

World Economic Forum Young Scientist (one of the 50 top scientists under 40), 2017

Vannevar Bush Fellowship, 2016-2019

National Science and Engineering Faculty Fellowship, 2014-2016

FACSS Innovation Award, SciX Conference, 2013

IDA Defense Science Study Group (DSSG), 2013-2014

E. Bright Wilson Lecturer at Harvard University Chemistry Department, 2012

Llewellyn John and Harriet Manchester Quantrell Award for Undergraduate Teaching, 2012

Sloan Research Fellow, 2012

Camille Dreyfus Teacher-Scholar Award, 2012

Coblentz Award, Coblentz Society, 2012

National Academies of Science, Kavli Fellow, Japanese-American Frontiers of Science, 2010

Defense Threat Reduction Agency (DTRA) Young Investigator Award, 2010

Defense Advanced Research Project Administration (DARPA) Young Faculty Award, 2010

Presidential Early Career Award in Science and Engineering (PECASE), 2010

Searle Scholar, 2009

Air Force Office of Scientific Research (AFOSR) Young Investigator Award, 2008

Scientific American "SciAm 50" Top Leaders in Research for 2007

Dreyfus Foundation New Faculty Award 2007

Miller Institute for Research in Basic Science Fellowship (2005-2007)

EPA Science to Achieve Results (STAR) Fellowship (2003-2004)

NSF Graduate Research Fellowship (1999-2002)

Dudley Herschbach Award for Teaching and Departmental Service (First Recipient, Fall 2002)

McKay Prize in Physical Chemistry, Princeton University, June 1999

Eagle Scout Award with Bronze Palm, October 1994

PROFESSIONAL MEMBERSHIPS AND SERVICE

Officer of ACS Physical Chemistry Division (2013-; chair in 2016-2017)

APS Division of Laser Science Nominating Committee (2016)

Editorial Advisory Board, Journal of Physical Chemistry (2014-2016)

Coblentz Award Selection Committee (2013-2015)

Executive Committee of the American Physical Society (APS) Division of Laser Science (2011-2014)

Co-organized QUEBS 2011 Conference in Ulm, Germany (2011)
Conference Chair and Organizer of the Midwestern Photosynthesis 2010 Conference (2010)
Executive Committee of the ACS, Biophysics Subdivision (2010-2012; Chair 2011-2012)
Affiliate of the DOE Photosynthetic Antenna EFRC at Washington Univ. of St. Louis (2010-)
Program Committee for QUEBS 2010 Conference
Co-organized Biologically Inspired Solar Light Harvesting Session of the APS March Meeting (2008)
American Chemical Society (2007-)
American Physical Society (2007-)
Optical Society of America (2004-)
Biophysical Society of America (2010-)

UNIVERSITY OF CHICAGO SERVICE

University of Chicago, College Council (elected), (2017-)
University of Chicago, Council of the University Senate (2016-)
College British and Irish Scholarships Committee (2015-)
PSD-IME Advisory Board Chair for the Industrial Associates Program (2015-)
JFI Machine Shop Committee Chair (2013-)
Physical Sciences Divisional Fundraising Committee (2013)
Biophysics Program Co-Director (2013 -)
Fellow of the Institute for Molecular Engineering (2013-)
University Board on Computing Activities and Services (2013-2016, Chairman of Board 2014-2016)
PSD Space Committee (2013)
Facilities Hiring Committee (2013)
Committee on Institutional Collaboration – Academic Leadership Program (2012-2013)
UChicago Academic Leadership Program (2012-2013)
Chemistry Teaching Matters Committee (2012-2014)
Biophysics Advancement Committee (2012-2013)
Biophysics Admissions and Recruiting Chair (2011-)
JFI Events Committee Chair (2011-)
Biophysics Program Admissions Committee (2009-)
Physical Sciences Division *ad hoc* Committee to Select New Master (2012)
JFI New Appointments Committee (2011-2013)
Chemistry Recruiting Committee (2007-2011) Chair (2007-2011)
JFI Seminar Coordinator (2009-2011)
Provost's Committee for Establishment of the Institute for Molecular Engineering (2009-2010)
JFI Website Committee (2007-2009)
JFI Secretary (2007-2008)
CPCS Building Design Committee (2008-2009)
Institute for Molecular Engineering Building Design Committee (2009-2010)

RECENT GROUP ALUMNI

Wave Wang (postdoc), now Assistant Professor, Xiamen University
Tom Jarvis (postdoc)
Graham Griffin (postdoc), now Assistant Professor, DePaul University
Elad Harel (postdoc), now Assistant Professor, Northwestern University
Gitt Panitchyankoon, Ph.D., now at Bain and Co.
Kelly A Fransted, Ph.D., now at Argonne Nat'l Laboratory

Justin Caram, Ph.D., now Assistant Professor at UCLA
Phillip Long, Ph.D., now at McKinsey and Co.
Dugan Hayes, Ph.D., now Assistant Professor at University of Rhode Island
Andrew Fidler, Ph.D., now a Director's Fellow at Los Alamos Nat'l Laboratory
Kenley Pelzer, Ph.D., now at Argonne Nat'l Laboratory
Ved Singh, Ph.D., now a postdoc at Janelia Farms
Peter Dahlberg, Ph.D., now a postdoc at Stanford University
Moirá Flanagan, Ph.D., now a postdoc at Smith College
Lili Wang, Ph.D.
Sara Wichner, S.B. now Graduate Student, UC Berkeley
Nicholas Lewis, S.B. now Graduate Student, UC Berkeley
Hunter Davis, S.B., now Graduate Student at CalTech
Tobias Gellen, S.B., now Graduate Student at NYU
Ryan McGillicuddy, S.B. now Graduate Student at Harvard
Michael Westberg Sorenson, Fulbright Fellow, S.M. to Graduate Student at Aachen
Graham Norris, S.B., now Graduate Student at ETH
Ruvim Ginzburg, S.B., researcher at University of Toronto
Thomas Gao, S.M.
Alexander Linkin, S.M.
Nanzhu Li, S.M

PUBLICATIONS

- Gregory D. Scholes, Graham R. Fleming, Lin X. Chen, Alán Aspuru-Guzik, Andreas Buchleitner, David F. Coker, Gregory S. Engel, Rienk van Grondelle, Akihito Ishizaki, David M. Jonas, Jeff S. Lundeen, James K. McCusker, Shaul Mukamel, Jennifer P. Ogilvie, Alexandra Olaya-Castro, Mark A. Ratner, Frank C. Spano, K. Birgitta Whaley, Xiaoyang Zhu "Utilizing Coherence to Enhance Function in Chemical and Biophysical Systems" *Nature* 543, 647–656 2017.
- L. Wang, N.E. Williams, E.W. Malachosky, J.P. Otto, D. Hayes, R.E. Wood, P. Guyot-Sionnest, and G.S. Engel, "Scalable ligand-mediated transport synthesis of perovskite nanocrystals with resolved electronic structure and sub-50fs excitonic dynamics" *ACS Nano* 11, 2689–2696 2017.
- M. Bednarz, J. Lapin, R. McGillicuddy, K.M. Pelzer, G.S. Engel, and G.B. Griffin, "Modeling Ultrafast Exciton Migration Within the Electron Donor Domains of Bulk Heterojunction Organic Photovoltaics" *J. Phys. Chem. C*, 121, 5467–5479 2017.
- L. Wang, G.B. Griffin, A. Zhang, F. Zhai, N.E. Williams, R.F. Jordan, and G.S. Engel, "Controlling quantum-beating signals in 2D electronic spectra by packing synthetic heterodimers on single-walled carbon nanotubes" *Nature Chemistry* 9, 219–225 2017.
- Y. Zhang, A. Wirthwein, F.H. Alharbi, G.S. Engel, and S. Kais., "Dark states enhance the photocell power via phononic dissipation" *Phys. Chem. Chem. Phys.* 18, 31845-31849 2016.
- M.A. Allodi, P.D. Dahlberg, R.J. Mazuski, H.C. Davis, J.P. Otto, and G.S. Engel, "Optical resonance imaging: An optical analog to MRI with sub-diffraction-limited capabilities" *ACS Photonics* 3, 2445–2452 2016.
- C. Wang*, M.L. Flanagan*, R.D. McGillicuddy, H. Zheng, A.R. Ginzburg, X. Yang, K. Moffat, and G.S. Engel, "Bacteriophytochrome Photoisomerization Proceeds Homogeneously Despite Heterogeneity in Ground State" *Biophysical Journal* 111, 2125–2134 2016.
- B.S. Rolczynski, Polina Navotnaya, H.R. Sussman and G.S. Engel, "Cysteine-mediated mechanism disrupts energy transfer to prevent photooxidation" *PNAS* 113, 8562–8564 2016

- P.D. Dahlberg,* P.-C. Ting,* S.C. Massey, E.C. Martin, C.N. Hunter, and G.S. Engel, "Electronic Structure And Dynamics Of Higher-Lying Excited States In Light Harvesting Complex 1 From Rhodobacter sphaeroides" *J. Phys. Chem. A*, 120 4124–4130 2016
- M.L. Flanagan, P.D. Long, P.D. Dahlberg, B.S. Rolczynski, S.C. Massey, and G.S. Engel, "Mutations to R. sphaeroides Reaction Center Perturb Energy Levels and Vibronic Coupling but Not Observed Energy Transfer Rates" *JPC A*, 120, 1479–1487 2016
- C. She, I. Fedin, D.S. Dolzhanov, P.D. Dahlberg, G.S. Engel, R.D. Schaller, D.V. Talapin, "Red, Yellow, Green, and Blue Amplified Spontaneous Emission and Lasing Using Colloidal CdSe Nanoplatelets" *ACS Nano*. 2015.
- P.D. Dahlberg, G.J. Norris, C. Wang, S. Viswanathan, V.P. Singh and G.S. Engel , "Communication: Coherences observed in vivo in photosynthetic bacteria using two-dimensional electronic spectroscopy" *J. Chem. Phys.* 143, 101101 2015.
- V. P. Singh, M. Westberg, C. Wang, P. D. Dahlberg, T. Gellen, A. T. Gardiner, R. J. Cogdell and G. S. Engel , "Towards quantification of vibronic coupling in photosynthetic antenna complexes" *J. Chem. Phys.* 142, 212446 2015.
- Y. Zhang, S. Oh, F.H. Alharbi, G.S. Engel, and S. Kais "Delocalized quantum states enhance photocell efficiency" *Phys. Chem. Chem. Phys.* 17, 5743-5750 2015.
- M. Mohseni, Y. Omar, G.S. Engel, M.B. Plenio (Eds.), Quantum Effects in Biology, Cambridge University Press, 2014.
- D. Hayes, G.B. Griffin, and G.S. Engel, "Response to Comment on 'Engineering coherence among excited states in synthetic heterodimer systems'" *Science* 344, 1099 2014.
- H. Zheng, J.R. Caram, P.D. Dahlberg, B.S. Rolczynski, S. Viswanathan, D.S. Dolzhanov, A. Khadivi, D.V. Talapin, and G.S. Engel, "Dispersion-Free Continuum Two-Dimensional Electronic Spectrometer" *Applied Optics* 53, 1909-1917 2014.
- J.R. Caram, H. Zheng, P.D. Dahlberg, B.S. Rolczynski, G.B. Griffin, D.S. Dolzhanov, D.V. Talapin and G.S. Engel, "Exploring size and state dynamics in CdSe quantum dots using two-dimensional electronic spectroscopy" *J. Chem. Phys.* 140, 084701 2014.
- K.M. Pelzer, T. Can, S.K. Gray, D.K. Morr, and G.S. Engel, "Coherent Transport and Energy Flow Patterns in Photosynthesis under Incoherent Excitation" *J. Phys. Chem. B* 118, 2693–2702 2014.
- A.F. Fidler, V.P. Singh, P.D. Long, P.D. Dahlberg, and G.S. Engel, "Dynamic localization of electronic excitation in photosynthetic complexes revealed with chiral two-dimensional spectroscopy" *Nat. Comm.* 5, 3286 2014.
- G.B. Griffin, P.M. Lundin, B.S. Rolczynski, A. Linkin, R.D. McGillicuddy, Z. Bao, and G.S. Engel, "Ultrafast energy transfer from rigid, branched side-chains into a conjugated, alternating copolymer" *J. Chem. Phys.* 140, 034903 2014.
- J.R. Caram, H. Zheng, P.D. Dahlberg, B.S. Rolczynski, G.B. Griffin, A.F. Fidler, D.S. Dolzhanov, D.V. Talapin, and G.S. Engel, "Persistent Inter-Excitonic Quantum Coherence in CdSe Quantum Dots" *J. Phys. Chem. Lett.* 5, 196-204, 2014
- P.D. Dahlberg, A.F. Fidler, J.R. Caram, P.D. Long, and G.S. Engel, "Correction to 'Energy Transfer Observed In Live Cells Using Two-Dimensional Electronic Spectroscopy'" *J. Phys. Chem. Lett.* 4, 3977 2013.

- P.D. Dahlberg, A.F. Fidler, J.R. Caram, P.D. Long, and G.S. Engel, "Energy Transfer Observed In Live Cells Using Two-Dimensional Electronic Spectroscopy" *J. Phys. Chem. Lett.* 4, 3636-3640 2013.
- A.F. Fidler, V.P. Singh, P.D. Long, P.D. Dahlberg, and G.S. Engel, "Probing Energy Transfer Events in the Light Harvesting Complex 2 (LH2) of Rhodobacter sphaeroides with Two-Dimensional Spectroscopy" *J. Chem. Phys.* 139, 155101 2013.
- A.F. Fidler and G.S. Engel, "Nonlinear Spectroscopic Theory of Displaced Harmonic Oscillators with Differing Curvatures: A Correlation Function Approach" *J. Phys. Chem. A* 117, 9444 2013.
- K.M. Pelzer, A.F. Fidler, G.B. Griffin, S.K. Gray, and G.S. Engel, "The dependence of exciton transport efficiency on spatial patterns of correlation within the spectral bath" *New J. Phys.* 15, 095019 2013.
- V.P. Singh, A.F. Fidler, B.S. Rolczynski, and G.S. Engel, "Independent phasing of rephasing and non-rephasing 2D electronic spectra" *J. Chem. Phys.* 139, 084201 2013.
- D. Hayes, G.B. Griffin, and G.S. Engel, "Engineering Coherence among Excited States in Synthetic Heterodimer Systems" *Science* 340, 1431 2013.
- A.F. Fidler, V.P. Singh, P.D. Long, P.D. Dahlberg, and G.S. Engel, "Time Scales of Coherent Dynamics in the Light-Harvesting Complex 2 (LH2) of Rhodobacter sphaeroides" *J. Phys. Chem. Lett.* 4, 1404-1409 2013.
- G.B. Griffin, S. Itthuria, A. Linkin, D.V. Talapin, and G.S. Engel, "Two Dimensional Electronic Spectroscopy of CdSe Nanoparticles at Very Low Pulse Power" *J. Chem. Phys.* 138, 014705 2013.
- K.A. Fransted, J.R. Caram, D. Hayes and G.S. Engel, "Two-Dimensional Electronic Spectroscopy of Bacteriochlorophyll a in Solution: Elucidating the Coherence Dynamics of the Fenna-Matthews-Olson Complex Using its Chromophore as a Control" *J. Chem. Phys.* 137, 125101 2012.
- E. Harel, S.M. Rupich, R.D. Schaller, D.V. Tapalin, and G.S. Engel, "Measurement of Electronic Splitting in PbS Quantum Dots by Two-Dimensional Nonlinear Spectroscopy" *Phys Rev B*, 86 075412 2012.
- A.F. Fidler, J.R. Caram, D. Hayes, and G.S. Engel, "Toward a Coherent Picture of Excitonic Coherence in the Fenna-Matthews-Olson Complex" *Journal of Physics B*, 45 154013 2012.
- J.R. Caram, A.F. Fidler, and G.S. Engel, "Excited and Ground State Vibrational Dynamics Revealed by Two Dimensional Electronic Spectroscopy" *J. Chem. Phys.* 137 024507, 2012.
- D. Hayes and G.S. Engel, "Peak shape analysis of diagonal and off-diagonal features in the 2D electronic spectra of the Fenna-Matthews-Olson complex," *Philosophical Transactions of the Royal Society A*, 370 3692-3708 2012.
- K.A. Fransted and G.S. Engel, "Probing Vibrational Dynamics of PM650 with Two-Dimensional Electronic Spectroscopy" *Chemical Physics*, 403 59-67 2012.
- K.M. Pelzer, G.R. Griffin, S.K. Gray, and G.S. Engel, "Inhomogeneous Dephasing Masks Coherence Lifetimes In Ensemble Measurements," *Journal of Chemical Physics* 136, 164508 2012.
- J.R. Caram, N.H.C. Lewis, A.F. Fidler, and G.S. Engel, "Signatures of Correlated Excitonic Dynamics in Two Dimensional Spectroscopy of the Fenna-Matthew-Olson Photosynthetic Complex," *Journal of Chemical Physics* 136, 104505 2012.
- E. Harel and G.S. Engel, "Quantum Coherence Spectroscopy Reveals Complex Dynamics in Bacterial Light Harvesting Complex 2 (LH2)" *PNAS* 109(3) 706-711, 2012

- A.F. Fidler, E. Harel, P.D. Long, and G.S. Engel, "Two-Dimensional Spectroscopy Can Distinguish Between Homogenous and Inhomogeneous Dephasing of Zero-Quantum Coherences," *Journal of Physical Chemistry A* **116**(1) 282-289 2012.
- G. Panitchayangkoon, D.V. Voronine, D. Abramavicius, J.R. Caram, N.H.C. Lewis, S. Mukamel, and G.S. Engel, "Direct Evidence of Quantum Transport in Photosynthetic Light Harvesting Complexes." *PNAS*, **108**(52) 20908-20912 2011.
- J.R. Caram and G.S. Engel, "Extracting Dynamics of Excitonic Coherences in Congested Spectra of Photosynthetic Light Harvesting Antenna Complexes," *Faraday Discussions*, **153**(1) 93-104 2011.
- G. S. Engel, "Quantum Coherence in Photosynthesis." *Procedia Chemistry*. **3**(1) 222-231 2011.
- D. Hayes and G.S. Engel, "Robustness of electronic coherence in the Fenna-Matthews-Olson complex to vibronic and structural modifications." *Faraday Discussions* **150**, 459-469 2011.
- E. Harel, P.D. Long, and G.S. Engel, "Single-shot Ultrabroadband Two-dimensional Electronic Spectroscopy of the Light-harvesting Complex LH2" *Opt. Lett.* **36**:9 1665-1667 2011
- A.F. Fidler, E. Harel, G. S. Engel, "Dissecting Hidden Couplings Using Fifth-Order Three-Dimensional Electronic Spectroscopy." *J. Phys. Chem. Lett.* **1**, 2876-2880 2010.
- E. Harel, A.F. Fidler, and G.S. Engel, "Single-Shot Gradient-Assisted Photon Echo Electronic Spectroscopy" *J. Phys Chem. A*. **115**:16 3787-3796 2011
- D. Hayes, G. S. Engel, "Extracting the excitonic Hamiltonian of the Fenna-Matthews-Olson complex using three-dimensional electronic spectroscopy." *Biophysical Journal*, **100**:8 2043-2052 2011.
- E. Harel, A. Fidler, and G.S. Engel, "Real-time mapping of electronic structure with single-shot two-dimensional electronic spectroscopy." *PNAS*, **107**:16444-16447 2010.
- D. Hayes, G. Panitchayangkoon, K.A. Fransted, J.R. Caram, J. Wen, K.F. Freed and G.S. Engel. "Dynamics of electronic dephasing in the Fenna-Matthews-Olson complex." *New J. Phys.* **12**:065042 2010.
- G. Panitchayangkoon, D. Hayes, K.A. Fransted, J.R. Caram, E. Harel, J. Wen, R.E. Blankenship, and G.S. Engel. "Long-lived quantum coherence in photosynthetic complexes at physiological temperature." *PNAS*, **107**:12766-12770 2010.
- A.V. Turchyn, V. Brüchert, T.W. Lyons, G.S. Engel, N. Balci, D.P. Schrag, and B. Brunner, "Kinetic oxygen isotope effects during dissimilatory sulfate reduction: A combined theoretical and experimental approach." *Geochimica et Cosmochimica Acta* **74** 2011-2024 2010.
- D.S. Sayres, E.J. Moyer, T.F. Hanisco, J.M. St. Clair, F.N. Keutsch, A. O'Brien, N.T. Allen, L. Lapsen, J.N. Demusz, M. Rivero, T. Martin, M. Greenberg, C. Tuozzolo, G.S. Engel, J.H. Kroll, J.B. Paul JB, and J.G. Anderson. "A new cavity based absorption instrument for detection of water isotopologues in the upper troposphere and lower stratosphere." *Rev. Sci. Inst.* **80**(4) 044102 2009.
- E.L. Read, G.S. Schlau-Cohen, G.S. Engel, T. Georgiou, M.Z. Papiz, and G.R. Fleming. "Pigment Organization and Energy Level Structure in Light-Harvesting Complex 4: Insights from Two-Dimensional Electronic Spectroscopy." *J. Phys Chem. B*, **113**(18) 6495-6504 2009
- E.J. Moyer, D.S. Sayres, G.S. Engel, J.M. St. Clair, F.N. Keutsch, N.T. Allen, J.H. Kroll, and J.G. Anderson. "Design Considerations in high-sensitivity off-axis integrated cavity output spectroscopy." *Applied Physics B – Lasers and Optics*, **92**(3) 467-474 2008.

- E.L. Read, G.S. Schlau-Cohen, G.S. Engel, J. Wen, R.E. Blankenship, G.R. Fleming, "Visualization of Excitonic Structure in the Fenna-Matthews-Olson Photosynthetic Complex by Polarization-Dependent Two-Dimensional Electronic Spectroscopy" *Biophysical Journal*, **95**, 847-856, 2008
- T. Mancal, L. Valkunas, E.L. Read, G.S. Engel, T.R. Calhoun, G.R. Fleming, "Electronic coherence transfer in photosynthetic complexes and its signatures in optical spectroscopy," *Spectroscopy—An International Journal*, **22**, 2-3:199-211, 2008.
- Y.-C. Cheng, G.S. Engel, G.R. Fleming, "Elucidation of population and coherence dynamics using cross-peaks in two-dimensional electronic spectroscopy," *Chem. Phys.* **341**, 285-295 2007
- E.L. Read, G.S. Engel, T.R. Calhoun, T.K. Ahn, T. Mancal, R.E. Blankenship, and G.R. Fleming, "Cross-Peak Specific Two Dimensional Electronic Spectroscopy." *PNAS*, **104**(36): 14203–14208 2007.
- G.S. Engel, E.L. Read, T.R. Calhoun, T.K. Ahn, T. Mančál, R.E. Blankenship, and G.R. Fleming, "Two Dimensional Fourier Transform Electronic Spectroscopy: Evolution of Cross Peaks in the Fenna-Matthews-Olson Complex," Ultrafast Phenomena XV: Proceedings of the 13th International Conference, Springer, 2007.
- G.S. Engel, T.R. Calhoun, E.L. Read, T.K. Ahn, T. Mancal, Y.-C. Cheng, R.E. Blankenship, and G.R. Fleming, "Evidence for wavelike energy transfer through quantum coherence in photosynthetic complexes." *Nature* **446**, 782-786, 2007.
- G.S. Engel and E.J. Moyer, "Herriott Cell Design: Accounting for Spherical Aberration and Thin Lens Approximations" *Optics Letters*, **32**(6) 704-706 2007.
- G.S. Engel, W. Drisdell, F.N. Keutsch, E.J. Moyer, and J.G. Anderson, "Integrated Cavity Output Spectroscopy (ICOS) detection of CO at 1.57 μm : Ultrasensitive absorption spectroscopy in a passive cavity" *Applied Optics*, **45**(36) 9221-9229 2006.
- D.A. Bruzewicz, M. Boncheva, A. Winkleman, J.M. St. Clair, G.S. Engel, and G.M. Whitesides, "Biomimetic fabrication of 3D structures by spontaneous folding of tapes," *Journal of the American Chemical Society*, **128**(29): 9314-9315, 2006
- J.R. Anderson, O. Cherniavskaya, I. Gitlin, G.S. Engel, L. Yuditsky, and G.M. Whitesides, "Analysis by capillary electrophoresis of the kinetics of charge ladder formation for bovine carbonic anhydrase," *Analytical Chemistry*, **74**(8):1870-1878, 2002
- J.J. Kirkland, F.A. Truszkowski, C.H. Dilks, and G.S. Engel, "Superficially porous silica microspheres for fast high-performance liquid chromatography of macromolecules," *Journal Of Chromatography A*, **890**(1):3-13, 2000
- G.S. Engel, E.J. Moyer, F.N. Keutsch and J.G. Anderson, "Innovations in Cavity Enhanced Laser Absorption Spectroscopy: Using *in situ* Measurements to Probe the Mechanisms Driving Climate Change," *NASA Earth Science Technology Conference (ESTC 2003) proceedings*, College Park, Maryland, 2001.

INVITED TALKS

- American Chemical Society National Meeting, San Francisco, CA, April 2017
- American Physical Society March Meeting, New Orleans LA, March 2017
- Cambridge University, November 2016
- DoD Basic Research Seminar, Washington D.C., October 2016
- Colorado State University, Fort Collins CO, September 2016
- ACS Fall Meeting, Philadelphia, August 2016

QEERI, Doha Qatar, June 2016
Plenary Speaker, 1st Annual Southwest Ultrafast Conference, Austin, Texas, June 2016
DOE Quantum Coherence Meeting, April 2016
ACS Spring Meeting, San Diego, April 2016
IBS Center for Molecular Spectroscopy and Dynamics, Seoul, Korea, October 2015
Illinois State University, October 2015
Johns Hopkins University, September 2015
ACS Fall Meeting, August 2015
QUEBS 2015, Florence, Italy, July 2015
UC Berkeley, May 2015
Michigan State University, March 2015
Cambridge University, March 2015
Plenary Lecture, Light Harvesting Processes 2015, Banz, Germany (March 2015)
McGill University, February 2015
Georgia Tech, February 2015
University of North Texas, January 2015
ACS Fall Meeting, San Francisco, August 2014
Atomic and Molecular Interactions, Gordon Research Conference July 2014
Stanford Dow Lecture, May 2014
FermiLab National Laboratory, April 2014
Pittsburg Quantum Institute, University of Pittsburgh, March 2014
Ohio State University, March 2014
Phi Lamda Upsilon Lecture, Kansas State Univeristy, March 2014
Caltech Chemical Physics Student-Invited Seminar, February 2014
Northwestern University, January 2014
Columbia University, October 2013
Plenary Lecture, SciX Conference, Innovation Award Lecture, October 2013
Dynamics in Biology, Beijing China, August 2013
QUEBS 2013, Vienna, Austria, July 2013
McElvain Student-Invited Lecture, University of Wisconsin, March 2013
Plenary Lecture, 72nd Okazaki Conference, Institute for Molecular Science, Okazaki, Japan, January 2013
E. Bright Wilson Prize Lecture, Harvard University, December 2012
Rice University, October 2012
Quantum Biology Meeting, University of Surrey, UK September 2012
ACS Fall Meeting, Philadelphia, August 2012
Gordon Conference on Electronic Spectroscopy and Dynamics, July 2012
Plenary Lecture, International Molecular Spectroscopy Conference, Columbus, Ohio, June 2012
Plenary Lecture, Phonons and Fluctuations workshop, Barcelona, Spain, May 2012
Searle Foundation, April 2012
University of Illinois, Chicago, April 2012
ACS Spring Meeting, San Diego, March 2012
Brigham Young University, February 2012
University of Colorado, Boulder, November 2011
Princeton University Chemistry Department, November 2011
The University of Pennsylvania, Chemistry Department, October 2011
ACS Autumn Meeting, Denver, August 2011

QUEBS 2011, Ulm Germany August 2011
Faraday Discussions, "Coherence and Control in Chemistry," Leeds England, July 2011
Photosynthesis Gordon Conference, Davidson College, North Carolina, June 2011
Excited State Processes in Electronic and Bio Nanomaterials, Los Alamos/Santa Fe, June 2011
Theo Murphy Royal Society Meeting, "Quantum-Coherent Energy Transfer," Chicheley, UK, April 2011
University of Southern California Chemistry Department, March 2011
ACS Spring Meeting, Anaheim, March 2011
Faraday Discussions, "Frontiers of Spectroscopy," Basel, Switzerland, March 2011
Washington University of St. Louis, Chemistry Department and EFRC, March 2011
Northwestern University, Chemistry Department, February 2011
Progress in Quantum Electronics, Snowbird, Utah, January 2011
DARPA QUBE Program Meeting, October 2010
Keynote Speaker, Workshop on Quantum Biology, Capri Italy, October 2010
Solvay Conference on Quantum Biology, Brussels Belgium, October 2010
MIT, Chemistry Department, September 2010
University of Michigan, September 2010
FermiLab National Laboratory, August 2010
5th International Conference on Coherent Multidimensional Spectroscopy, August 2010
Gordon Conference, "Electronic Processes in Organic Materials," July 2010
AFOSR Molecular Dynamics Meeting, May 2010
Center for NanoScale Materials, Argonne National Laboratory, May 2010
University of Oregon, Chemistry Department, April 2010
MIT Excitonics Center, November 2009
Federation of Analytical Chemistry and Spectroscopy Societies, October 2009.
Workshop on Quantum Effects in Biological Systems, Lisbon Portugal, July 2009
Argonne National Laboratory, April 2009
University of Missouri, Chemistry Department, April 2009
Purdue University, Physics Department, February 2009
DARPA Quantum Effects in Biology Meeting, Arlington, VA, November 2008
Midwestern Photosynthesis Conference, Turkey Run, IN, October 2008
DePauw University, Chemistry Department, Greencastle, IN, October 2008
American Chemistry Society Meeting, New Orleans, LA, April 2008
University of Illinois, Urbana Champaign, Chemistry Department, February 2008
Princeton University, Physics Department, February 2008
Biophysical Society of America, Baltimore, MD, March 2007
Western Photosynthesis Conference, Asilomar, CA, January 2007

POPULAR PRESS COVERAGE HIGHLIGHTS

C&E News, "An Optical Analog to MRI", April 2017
Science Daily, "Technique Unlocks Design Principles of Quantum Biology," April 2013
Wired Magazine, "More Evidence Found for Quantum Physics in Photosynthesis" December 2011
Wired Magazine, "Leafy Green Coherence: Quantum Physics Fuels Photosynthesis" July 2010
Quoted in Wired Magazine, "Everywhere in a Flash: The Quantum Physics of Photosynthesis" February 2010
Quoted in Scientific American, "Shining a Light on Plants' Quantum Secret to Boost Photosynthesis" February 2010
Technology Review, "Best of the Arxiv 2/6/2010" February 2010
"Quantum Secrets of Photosynthesis" Two part television series aired on LA Area Cable, Dec 2008

