

CURRICULUM VITA

Kevin E. Redding

- Address:** Departments of Chemistry and Biological Sciences
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E-mail: Kevin.Redding@mail.ua.edu
Date of Birth: February 10, 1965
Nationality: U.S.A.
Soc. Sec. #: 453-45-1167
- Education:** Stanford University, Stanford, California (1987-1993)
Ph.D. Biochemistry
Rice University, Houston, Texas (1983-1987)
B.A. Biochemistry, *summa cum laude*
- Positions:** University of Alabama (Tuscaloosa, Alabama)
Assistant Professor of Chemistry (8/16/98 – 8/15/04)
Associate Professor of Chemistry (8/16/04 – present)
Adjunct Professor of Biological Sciences (8/16/98 – present)
University of Geneva (Geneva, Switzerland)
Maître-assistant in Plant Biology Dept. (1998)
N.S.F. Plant Biology Postdoctoral Fellow (1995-1997)
Human Frontiers in Science Postdoctoral Fellow (1994)
- Grants and awards:** N.S.F. CAREER award (6/04-5/05)
N.I.H. AREA grant (8/02 - present)
D.O.E. Energy Biosciences Grant (8/00 - 8/06)
DuPont Young Professor Award (10/99 - 10/02)
N.S.F. Plant Biology Post-doctoral Fellowship (1/95-12/97)
N.S.F. Pre-doctoral Fellowship (9/87-9/90)
- Languages:** English (native), French (fluent), Spanish (adequate)

Ph.D. Advisor: Robert S. Fuller

current address: Department of Biological Chemistry
University of Michigan Medical Center
Room 5413 Medical Science I, 1301 Catherine Rd.
Ann Arbor, MI 48109-0606

Postdoc Advisor: Jean-David Rochaix

current address: Departments of Molecular Biology and Plant Biology
University of Geneva, 30 quai Ernest-Ansermet
CH1211 Geneva 4, Switzerland

Former graduate students:

Brent Boudreaux (Chem. M.S., 2000, Outstanding Thesis Award),
currently at Delsite Biotechnologies, Inc (Dallas, Tx)

John Lee Franklin (Biol. Sci. M.S., 2001), currently at University of Alabama
(Birmingham), Dept. of Pathology

Yajing Li (Chem, M.S., 2002), currently at University of Minnesota, School of Dentistry

Julius Nathan Henderson (Chem, M.S., 2002), currently at University of Oregon,
Dept. of Chemistry (PhD program)

Feifei Gu (Chemistry. Ph.D., 2005), currently a post-doctoral fellow at University of
Alabama School of Medicine (Birmingham)

Current graduate students:

M.S. candidates: none

Ph.D. candidates: Jianying Zhang, Galina Gulis, Rajiv Luthra, Bradford Bullock

Scientists with whom I have collaborated during the past 5 years:

Robert Bittl (Free Univ., Berlin), Wolfgang Bertsch (U.A.), Jacques Breton (CEA-Saclay), Klaus Brettel (CEA-Saclay), Louis-Claude Brunel (NHMFL, Tallahassee), Laurent Cournac (CEA-Cadarache), John Golbeck (Penn. State), Gary Hastings (Georgia State), Michael Hippler (University of Pennsylvania), Margaret Johnson (U.A.), Pierre Joliot (IBPC, Paris), Winfried Leibl (CEA-Saclay), Wolfgang Lubitz (Technical Univ., Berlin), Fraser MacMillan (Univ. of Frankfurt), Anna-Lisa Maniero (Univ. of Padova), Lowell Kispert (U.A.), Marcel Kuntz (CNRS, Grenoble), Jacques Ravenel (CEA-Cadarache), Gilles Peltier (CEA-Cadarache), Fabrice Rappaport (IBPC, Paris), Jean-David Rochaix (University of Geneva), A. William Rutherford (CEA-Saclay), Harriett Smith Somerville (U.A.), Russell Timkovich (U.A.), Art van der Est (Brock U.), Johan van Tol (NHMFL, Tallahassee)

Publications

1. Li, Y., A. van der Est, M. Gabrielle Lucas, V.M. Ramesh, Feifei Gu, A. Petrenko, S. Lin, A.N. Webber, F. Rappaport*, and K. Redding*. (2005). Directing electron transfer within Photosystem I by breaking H-bonds in the cofactor branches. *Proc. Natl. Acad. Sci. USA*, in press.
2. Gibasiewicz, K., V.M. Ramesh, S. Lin, K. Redding, N.W. Woodbury, and A.N. Webber. Two equilibration pools of chlorophylls in the PSI core antenna. *Biophys. J.*, submitted.
3. Redding, K.* and A. van der Est. (2005). The Directionality of Electron Transfer in Photosystem I. In J. Golbeck (ed.), *Photosystem I: The Plastocyanin:Ferredoxin Oxidoreductase in Photosynthesis*. Kluwer Academic Publishers, Dordrecht.
4. F. Rappaport, B. Diner, and K. Redding. (2005). Optical measurements of secondary electron transfer in Photosystem I. In J. Golbeck (ed.), *Photosystem I: The Plastocyanin:Ferredoxin Oxidoreductase in Photosynthesis*. Kluwer Academic Publishers, Dordrecht.
5. Petrenko, A., K. Redding, and L. Kispert (2005). The influence of the structure of the radical cation dimer pair of aromatic molecules on the principal values of a *g*-tensor: DFT predictions. *Chem. Phys. Lett.* **406**, 327-331.
6. Byrdin, M., Cohen, R., Fairclough, W., Gu, F., Golbeck, J., Heathcote, P., Redding, K. and Rappaport, F. (2005) Secondary Electron Transfer In Photosystem I: What Transient Absorption Can Tell. In van der Est, A. and Bruce, D. (eds.), *Photosynthesis: Fundamental Aspects to Global Perspectives*. Allen Press, Lawrence, Kansas.
7. Gu, F., Byrdin, M., Rappaport, F., van der Est, A., MacMillan, F. and Redding, K. (2005) Mutational analysis of the two phylloquinones in Photosystem I. In van der Est, A. and Bruce, D. (eds.), *Photosynthesis: Fundamental Aspects to Global Perspectives*. Allen Press, Lawrence, Kansas.
8. Zhang, J. and Redding, K. (2005) Isolation of mutants in Photosystem I degradation. In van der Est, A. and Bruce, D. (eds.), *Photosynthesis: Fundamental Aspects to Global Perspectives*. Allen Press, Lawrence, Kansas.
9. Petrenko, A. and K. Redding* (2004). Intermolecular Electron Transfer and Exchange Integrals in Photosystem I. *Chem. Phys. Lett.* **400**, 98-103.
10. Nield, J., K. Redding and M. Hippler*. (2004). Remodeling of light harvesting protein complexes in *Chlamydomonas* in response to environmental changes. *Eukaryotic Cell* **3**, 1370-80.
11. Li, Y., M.-G. Lucas, T. Konovalova, B. Abbott, F. MacMillan, A. Petrenko, V. Sivakumar, R. Wang, G. Hastings, F. Gu, J. van Tol, L.-C. Brunel, R. Timkovich, F. Rappaport, and K. Redding* (2004). Mutation of the putative hydrogen-bond donor to P₇₀₀ of Photosystem I. *Biochemistry* **43**, 12634-47.

12. Petrenko, O., A.L. Maniero, J. van Tol, F. MacMillan, Y. Li, L.-C. Brunel, and K. Redding* (2004). A high-field EPR study of P_{700}^{+} in wild-type and mutant Photosystem I from *Chlamydomonas reinhardtii*. *Biochemistry* **43**, 1781-1786.
13. Konovalova, T.A., L.D. Kispert, and K. Redding* (2004). Photo- and chemically-produced phylloquinone biradicals: EPR and ENDOR study. *J. Photochem. Photobiol. A* **161**, 255-260.
14. Henderson, J.N., J. Zhang, B.W. Evans and K. Redding* (2003). Disassembly and degradation of photosystem I in an *in vitro* system is a multi-event, metal-dependent process. *J Biol Chem.* **278**, 39978-86.
15. Gibasiewicz, K., V.M. Ramesh, S. Lin, K. Redding, N.W. Woodbury, and A.N. Webber (2003). Excitonic interactions in wild type and mutant PSI reaction centers. *Biophys. J* **85**, 2547-2559.
16. Wang, R., V. Sivakumar, Y. Li, K. Redding and G. Hastings (2003). Mutation Induced Modulation of Hydrogen Bonding to P700 Studied Using FTIR Difference Spectroscopy. *Biochemistry* **42**, 9889-9897.
17. Franklin, J.L., J. Zhang and K. Redding* (2003). Use of adenyltransferase translational fusions to determine topology of thylakoid membrane proteins. *FEBS Letters* **536**, 97-100.
18. Cournac, L., Latouche, G. Cerovic, Z., Redding, K., Ravenel, J., and Peltier, G. (2002). In Vivo Interactions between Photosynthesis, Mitorespiration, and Chlororespiration in *Chlamydomonas reinhardtii*. *Plant Physiol.* **129**, 1921-1928.
19. K. Redding*, R. Bittl, F. MacMillan, C. Teutloff, F. Gu, S. Grimaldi, and B. Boudreaux. Mutational analysis of the binding sites of the phylloquinones in PS I. in *PS2001 proceedings: 12th International Congress on Photosynthesis*, CSIRO Publishing, Collingwood
20. K Gibasiewicz, VM Ramesh, S Lin, K Redding, NW Woodbury, AN Webber. (2001). Mutations of ligands to connecting chlorophylls perturbs excitation dynamics in the core antenna of PSI from *Chlamydomonas reinhardtii*. in *PS2001 proceedings: 12th International Congress on Photosynthesis*, CSIRO Publishing, Collingwood
21. P Heathcote, IP Muhiuddin, SEJ Rigby, S Carter, S Purton, F Gu, K Redding and MCW Evans. Evidence for two functional phylloquinones in Photosystem I from *Chlamydomonas reinhardtii* in *PS2001 proceedings: 12th International Congress on Photosynthesis*, CSIRO Publishing, Collingwood
22. Boudreaux, B., MacMillan, F., Teutloff, C., Agalarov, R., Gu, F., Grimaldi, S., Bittl, R., Brettel, K., and Redding, K.* (2001). Mutations in both sides of the Photosystem I reaction center identify the phylloquinone observed by electron paramagnetic resonance spectroscopy. *J. Biol. Chem.*, **276**, 37299-37306.
23. Guergova-Kuras, M., B. Boudreaux, A. Joliot, P. Joliot and K. Redding* (2001). Evidence for two active branches for electron transfer in photosystem I. *Proc. Natl. Acad. Sci.* **98**, 4437-4442.

24. Cournac, L., Josse, E.-M., Joët, T., Rumeau, D., Redding, K., J., Kuntz, M., and Peltier, G. (2000). Flexibility in photosynthetic electron transport: A newly identified chloroplast oxidase involved in chlororespiration. *Phil. Trans. Royal Soc. B*, **355**, 1447-1454.
25. Cournac, L., Redding, K., Ravenel, J., Rumeau, D., Josse, E.-M., Kuntz, M., and Peltier, G. (2000). Electron Flow between Photosystem II and Oxygen in Chloroplasts of Photosystem I-deficient Algae Is Mediated by a Quinol Oxidase Involved in Chlororespiration. *J. Biol. Chem.* **275**, 17256-17262.
26. Redding, K.*, Cournac, L., Vassiliev, I., Golbeck, J., Peltier, G., Rochaix, J.-D. (1999) Photosystem I is indispensable for photoautotrophic growth, CO₂ fixation, and H₂ evolution in *Chlamydomonas reinhardtii*. *J. Biol. Chem.*, **274**, 10466-10473.
27. Hippler, M., Redding, K. and Rochaix, J.-D. (1998) Bioenergetic pathways in *Chlamydomonas*. *Biochim. Biophys. Acta*, **1367**, 1-62.
28. Redding, K*., MacMillan, F., Leibl, W., Brettel, K., Rutherford, A.W., Breton, J. and Rochaix, J.-D. (1998) A survey of conserved histidines in the photosystem I: Methodology and analysis of the PsaB-H656L mutant. In G. Garab (ed.) *Photosynthesis: Mechanisms and Effects*. Kluwer Academic Publishers, Dordrecht, Vol. 1, pp. 591-594.
29. Leibl, W., Brettel, K., Nbedryk, E., Breton, J., Rochaix, J.-D. and Redding, K. (1998) Effect of PsaB-His656Leu mutation on optical and infrared difference spectra of P700 photooxidation. In G. Garab (ed.) *Photosynthesis: Mechanisms and Effects*. Kluwer Academic Publishers, Dordrecht, Vol. 1, pp. 595-598.
30. Redding, K*., MacMillan, F., Leibl, W., Brettel, K., Hanley, J., Rutherford, A.W., Breton, J. and Rochaix, J.-D. (1998) A systematic survey of conserved histidines in the core subunits of Photosystem I by site-directed mutagenesis reveals the likely axial ligands of P700. *EMBO J.* **17**, 50-60.
31. Redding, K* and Peltier, G. (1998) Reexamining the validity of the Z-scheme: Is photosystem I required for oxygenic photosynthesis in *Chlamydomonas*? In J.-D. Rochaix, M. Goldschmidt-Clermont and S. Merchant (eds.), *Molecular biology of Chlamydomonas: chloroplasts and mitochondria*. Kluwer Academic Publishers, Dordrecht.
32. Cournac, L., Redding, K., Bennoun, P. and Peltier, G. (1997) Limited photosynthetic electron flow but no CO₂ fixation in *Chlamydomonas* mutants lacking photosystem I. *FEBS Lett.*, **416**, 65-68.
33. Fischer, N., Stampacchia, O., Redding, K. and Rochaix, J.D. (1996) Selectable marker recycling in the chloroplast. *Mol. Gen. Genet.*, **251**, 373-380.
34. Redding, K., Brickner, J.H., Marschall, L.G., Nichols, J.W. and Fuller, R.S. (1996) Allele-specific suppression of a defective trans-Golgi network (TGN) localization signal in Kex2p identifies three genes involved in localization of TGN transmembrane proteins. *Mol. Cell. Biol.*, **16**, 6208-6217.
35. Redding, K., Seeger, M., Payne, G.S. and Fuller, R.S. (1996) The effects of clathrin inactivation on localization of Kex2 protease are independent of the TGN localization signal in the cytosolic tail of Kex2p. *Mol. Biol. Cell*, **7**, 1667-1677.

36. Firmenich, A.A. and Redding, K. (1993) An efficient procedure for multiple transformations of yeast in parallel. *Biotechniques*, **14**, 712-718.
37. Wilcox, C.A., Redding, K., Wright, R. and Fuller, R.S. (1992) Mutation of a tyrosine localization signal in the cytosolic tail of yeast Kex2 protease disrupts Golgi retention and results in default transport to the vacuole. *Mol. Biol. Cell*, **3**, 1353-1371.
38. Franzusoff, A., Redding, K., Crosby, J., Fuller, R.S. and Schekman, R. (1991) Localization of components involved in protein transport and processing through the yeast Golgi apparatus. *J. Cell Biol.*, **112**, 27-37.
39. Redding, K., Holcomb, C. and Fuller, R.S. (1991) Immunolocalization of Kex2 protease identifies a putative late Golgi compartment in the yeast *Saccharomyces cerevisiae*. *J. Cell Biol.*, **113**, 527-538.
40. Auger, E.A., Redding, K.E., Plumb, T., Childs, L.C., Meng, S.Y. and Bennett, G.N. (1989) Construction of lac fusions to the inducible arginine- and lysine decarboxylase genes of *Escherichia coli* K12. *Mol. Microbiol.*, **3**, 609-620.
41. Hamilton, S.L., Yatani, A., Hawkes, M.J., Redding, K. and Brown, A.M. (1985) Atrotoxin: a specific agonist for calcium currents in heart. *Science*, **229**, 182-184.

Presentations given (since starting at UA)

August, 2005	8 th International Phycological Congress (Durban, South Africa), invited speaker
July, 2005	Gordon Conference (Photosynthesis: Biochemical Aspects), invited speaker
October, 2004	30 th Annual Midwest Photosynthesis Meeting (Marshall, IN), plenary speaker, 4 poster presentations
August, 2004	Twelfth International Photosynthesis Congress (Montréal, Canada), 3 poster presentations & discussion session leader
June, 2004	International Photobiology Congress (Jeju, S. Korea), invited speaker
July, 2003	National Photobiology Congress (Baltimore), invited speaker
June, 2003	Gordon Conference (Photosynthesis: Biophysical Aspects), poster presentation
May, 2003	Photosystem I Workshop (Berlin, Germany), invited speaker
November, 2002	Southeast Regional Meeting of the American Chemical Society (Charleston SC), oral presentation
June, 2002	Tenth International Conference on the Cell and Molecular Biology of Chlamydomonas (Vancouver), session convener and poster presenter
November, 2001	Symposium on Protein-Cofactor Interactions in Biological Processes (Berlin, Germany), invited speaker
September, 2001	Southeast Regional Meeting of the American Chemical Society (Savannah, GA), 3 poster presentations
August, 2001	Eleventh International Photosynthesis Congress (Brisbane, Australia), 3 poster presentations
July, 2001	National Photobiology Congress (Chicago), invited speaker
July, 2000	International Photobiology Congress (San Francisco), invited speaker
June, 2000	Gordon Conference (Photosynthesis: Biophysical Aspects), poster presentation
May, 2000	Ninth International Conference on the Cell and Molecular Biology of Chlamydomonas (Amsterdam), invited speaker and session chairman
June, 1999	Gordon Conference (Photosynthesis: Biochemical Aspects), invited speaker
August, 1998	Tenth International Photosynthesis Congress (Budapest), poster presentation

Grants & proposals

Past grants

"New Tools for Bioengineering: Mutants in Membrane Protein Degradation", PI, \$15,000, School of Mining and Energy Development (U.A.), 5/01/99 – 4/30/00

"Mutational analysis of Photosystem I", PI, (\$75,000/ 3yr), DuPont Young Professor Award, 10/01/99 – 9/30/02

"A Combined Genetic, Biochemical, and Biophysical Analysis of the A₁ Phylloquinone Binding Site of Photosystem I from Green Plants", PI (\$281,000), U.S. Dept. of Energy (Energy Bio-sciences) DE-FG02-00ER15097, 8/15/00-8/14/03

"Purchase of a Departmental Nanosecond Transient Absorption Spectrometer", co-PI (L. Kispert, PI; other co-PI's: M. Bakker, S. Blackstock, D. Nickles), \$90,530, National Science Foundation, Div. of Chemistry, 8/01/00 – 7/31/03

"Engineering electron flow within photosynthetic reaction centers", PI, \$16,437, School of Mining and Energy Development (U.A.), 5/01/01 – 4/30/02

"Acquisition of a High-Field (W-Band) Electron Paramagnetic Resonance Spectrometer for Chemistry and Physics at the University of Alabama", co-PI (L. Kispert, PI; other co-PIs: C. Alexander, M. Bakker, J. Vincent), \$352,677, Major Research Instrumentation grant, National Science Foundation, 10/01/00 - 9/30/03

"Disassembly and degradation of Photosystem I", PI (\$133,361), National Institutes of Health AREA (Academic Research Enhancement) grant, 8/1/02 - 3/31/05

Current grants

"A Combined Genetic, Biochemical, and Biophysical Analysis of the A₁ Phylloquinone Binding Site of Photosystem I from a Green Alga", PI (\$300,000), U.S. Dept. of Energy (Energy Bio-sciences) DE-FG02-00ER15097, 8/15/03 - 8/14/06

"Acquisition of a Fourier Transform (X-Band) Electron Paramagnetic Resonance Spectrometer", co-PI (J. Thrasher, PI; other co-PIs: L. Kispert, M. Bakker, J. Vincent), \$310,965, Chemical Instrumentation grant, National Science Foundation, 2/01/04 - 1/31/07

"Manipulating directionality of electron transfer within type 1 photosynthetic reaction centers", PI (\$671,000), National Science Foundation (CAREER) MCB-0347935, 6/1/04-5/31/09

"Disassembly and degradation of Photosystem I", PI (\$201,677), National Institutes of Health AREA (Academic Research Enhancement) renewal proposal, submitted 4/1/05-3/31/07

Pending proposals

“Advanced EPR analysis of radical from heme proteins” Co-PI (T. Kononova, PI; \$277,900 / 2 yr), NIH (Exploratory/Development Research Grant), submitted 2/05

"2006 Beckman Scholars Program", lead PI (\$173,700 / 3 yr), Arnold & Mabel Beckman Foundation, submitted 10/05

Service

Served on following university committees:

University Biosafety Committee

University Radiation Safety Committee

Served as a reviewer for the following journals:

Biophysical Journal, Biochemistry, Journal of Biological Chemistry, Plant Cell, Plant Physiology, Photosynthesis Research, Journal of Physical Chemistry

Reviewed grant proposals for these agencies:

U.S. Dept. of Energy, U.S. Dept. of Agriculture, National Science Foundation, Research Corporation, Israel Science Foundation

November, 2003 DOE study panel (Energy Biosciences)

April, 2004 NSF study panel (Molecular Biochemistry)

March, 2005 DOE study panel (Hydrogen program)

Co-organizer (with Prof. Sergei Savikhin, Purdue) of the 31st Annual Midwest/Southeast Photosynthesis Conference (Oct. 28-30, 2005; Turkey Run, Indiana)