CURRICULUM VITAE

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Education:

Ph.D., Department of Botany, Miami University, 1981
B.Sc., Department of Biology, University of Cincinnati, 1975

Professional Experience:

Professor, Departments of Biological Sciences and Chemistry, 8/01-Present
Interim Chairperson, Department of Biological Sciences, 6/99-6/00.
Moreland Family Professor of Basic Sciences, 4/99-Present.
Adjunct Professor, Department of Chemistry, Louisiana State University, 3/98-8/01.
Professor, Department of Biological Sciences, Louisiana State University, 7/97-Present.
Professor and Chairperson, Department of Microbiology, Louisiana State University, 7/95-6/97.
Visiting Professor, Department of Plant Biology, University of Illinois (sabbatical leave in the laboratory of Professor John Whitmarsh), 1/95-6/95.
Professor, Department of Plant Biology, Louisiana State University, 8/94-7/95.
Visiting Faculty, Plant Biochemistry Intensive Summer Course, MSU-DOE Plant Research Laboratory, Michigan State University, 6/94.
Associate Professor, Department of Botany, Louisiana State University, 8/90-7/94.
Director, Protein Analysis Center, College of Basic Sciences, 7/90-8/92.
Graduate Coordinator, Department of Botany, Louisiana State University, 9/89-8/92.
Assistant Professor, Department of Botany, Louisiana State University, 8/87-7/90.
Assistant Professor, Department of Chemistry, University of Southern Mississippi, 1/85-8/87.
Postdoctoral Fellow, Department of Microbiology, University of Missouri-Columbia School of Medicine, 5/84-12/84.Postdoctoral Fellow, Division of Biological Sciences, University of Missouri-Columbia, 8/81-5/84.

Teaching Fellow, Department of Botany, Miami University, 5/78-8/81.
Biology Teacher, Marian High School, Cincinnati, Ohio, 3/76-5/78.

Professional Service and Honors

Organizer, 30th Annual Midwest Photosynthesis Meeting, 11/04.
Invited Speaker, Photosynthesis and the Post-Genomic Era: From Biophysics to Molecular Biology, a Path in the Research of Photosystem II" City of Trois-Rivieres, Canada, 8/25/04.
Chairperson, "Cytochromes", Midwest Photosynthesis Conference, 10/03.
International Society of Photosynthesis Research Nominating Committee, 2003.
Chairperson, "The Proteomics of Photosynthesis", Midwest Photosynthesis Conference, 10/02.
LSU Alumni Association Faculty Excellence Award, 2002.
Associate Editor, *Photosynthesis Research*, 9/01-Present.
National Science Foundation, IGERT Full Proposal Panel, 3/01.
National Science Foundation IGERT Pre-Proposal Panel, 9/00.
Invited Speaker, Gordon Research Conference, "Photosynthesis - Biochemical Aspects", 6/99.
Editorial Committee, Annual Reviews of Plant Physiology and Plant Molecular Biology - Vol. 52, 10/98.
Discussion Leader, Gordon Research Conference, "Photosynthesis – Biochemical Aspects", 8/96.
National Science Foundation, Research Training Grant site visit team to Penn State University, 6/96.
National Science Foundation, Research Training Grant Advisory Panel, 4/96.
Basic Sciences Student Government Association Outstanding Teacher Award, 3/94.
Organizer, 19th Annual Midwest Photosynthesis Meeting, 10/93.
Invited Speaker, Gordon Research Conference, "Photosynthesis - Biochemical Aspects", 8/93.
Invited Symposia Speaker, American Society for Photobiology, Symposia entitled "Photosystem II and Oxygen Evolution", 6/93.
Department of Energy, *Ad hoc* Advisory Panel Basic Energy Biosciences, 1991.
National Science Foundation Molecular Biochemistry Program Advisory Panel, 10/90-4/94.
Editorial Board, *Plant Physiology*, 1/90-7/92.

Professional Organizations:

American Association for the Advancement of Science
American Chemical Society
American Society for Microbiology

American Society for Plant Biology
International Society for Photosynthesis Research

Research Funding:

Current Funding:

"Protein-Protein Interactions in Photosystem II." (Ms. Laurie K. Frankel, Co-PI), National Science Foundation, DMB-03-18102, 2003-2008, $721,506.00 (Includes $10,000.00) REU Supplement.

"Identification of Protein –Chloride Interactions in Photosystem II" Renewal of above (Ms. Laurie K. Frankel, Co-PI), Department of Energy, DE-FG02-98ER20310, 2004-2007, $360,000.00.

Previous Funding:

"Identification of Chloride-Binding Domains in Photosystem II" (Ms. Laurie K. Frankel, Co-PI), Department of Energy, DE-FG02-98ER20310, 2001-2004, $294,000.00.

"Protein-Protein Interactions in Photosystem II." (Ms. Laurie K. Frankel, Co-PI), National Science Foundation, DMB-99-082395, 2000-2004, $395,000.00.

"Mid-Scale Fermentation and Protein Purification Facility for the Life Sciences", Board of Regents Enhancement program (T. Bricker, P.I., R. Laine and E. Achberger, Co-PIs) 2000-2001, $153,200.

"Identification of Chloride-Binding Domains in Photosystem II" (Ms. Laurie K. Frankel, Co-PI), Department of Energy, DE-FG02-98ER20310, 1998-2001, $276,000.00.

"Protein-Protein Interactions in Photosystem II." (Ms. Laurie K. Frankel, Co-PI), National Science Foundation, DMB-96-04339, 1997-2000, $317,000.00.

"Structural Organization of Proteins on the Oxidizing Side of Photosystem II." (Ms. Laurie K. Frankel, Co-PI), National Science Foundation, DMB-93-04955, 1993-1997, $314,000.00.

"Domains on CPa-1 which Interact with Components Required for Oxygen Evolution." United States Department of Agriculture-NRICGP, AMD 91-01424, 1991-1996, $210,000.00

"Structural Organization of Proteins on the Oxidizing Side of Photosystem II." National Science Foundation, DMB- 90-06552, 1990-1994, $268,000.00.

"*In Vitro* Mutagenesis in the Large Extrinsic Loop Region of the CPa-1 Apoprotein of *Synechocystis* 6803.", United States Department of Agriculture-CRGO, 89-37262-4688, 1989-1991, $100,000.00.

"Structural Organization of Proteins on the Oxidizing Side of Photosystem II." National Science Foundation, DMB- 8606819, 1986-1989, $240,000.00.

"Molecular Biology of Chloroplast Senescence" United States-Israel Binational Science Foundation, RGA 86-00304/2, 1986-1989, Co-principle investigator with Dr. Shimon Gepstein, Technion-Israel Institute of Technology.
"Monoclonal Antibodies in the Study of Human Acidic Glycoprotein." American Cyanamid, $5000.00, 9/85-8/86.
American Society of Plant Physiologists Travel Grant to the VI International Congress on Photosynthesis, Brussels, Belgium, $1,500.00, 7/83.

Academic Enhancement Funding:

Current Funding:

"IGERT: Teaching Craft for Macromolecular Creativity." (Paul S. Russo, lead P.I., Terry M. Bricker Co-PI), National Science Foundation, IGERT 99-87603, 2000-2005 $2,700,000.00

Previous Funding:

"The Molecular Biology of Plant Growth and Development: A Colloquium" NSF-EPSCOR-LaSER, $5,000.00, 1991-1992.
"Photosynthesis Colloquium", NSF-EPSCOR-LaSER, $5,000.00, 1989-1990.
"Improvement of Academic Facilities for Molecular and Cell Biology and Biochemistry at the University of Southern Mississippi" Department of Education, $571,000.00, 1986-1988 (with 5 Co-PIs).

University Service:

Member, Faculty Senate Budget and Planning Committee
Chair, University Institutional Biological and Recombinant DNA Safety Committee
University Program Review Council
College of Basic Sciences Dean's Faculty Advisory Committee
College of Basic Sciences Promotion and Tenure Committee
College of Basic Sciences Policy and Planning Committee
College of Basic Sciences Biology Planning Committee
College of Basic Sciences Facilities Committee
Mass Spectroscopy Facility Steering Committee, Department of Chemistry
Graduate Coordinator**,** Department of Botany

Graduate Students and Postdoctoral Fellows

Graduate Students:

Dr. Gopinath Mavankal, graduated 12/89
Dr. William R. Odom, graduated 12/91
Dr. Carlos B. Queirolo, graduated 12/92
Mr. Wan Lee, 3/97-6/99
Mr. Phillip Maxwell, 6/01-6/15/02
Mr. Glen Meades, 9/1/02-Present

Postdoctoral Fellows:

Dr. Cindy Putnam-Evans, 10/89-8/93
Dr. Qiang Xu, 1/91-11/92
Dr. Perumal Vijayan, 1/93-9/94
Dr. Jituo Wu, 9/93 - 3/31/96
Dr. Carola Leuschner, 11/94-3/31/96
Dr. Jeffrey Cruz, 7/96-7/97
Dr. Igor Z. Zubrzycki, 9/97-2/98
Dr. Shulu Zhang, 10/01-8/15/03
Dr. Xiaoping Yi, 9/03-Present

Publications *(undergraduate authors are shown in* ***bol****d)****:***

69. Lowrance, J., Sutton, H., Frankel, L.K. and Bricker, T.M., "Characterization of Intergenic Suppressors of the R448S Mutant of the CP 47 Protein in Photosystem II." In preparation for *Plant Molecular Biology*.

68. Morvant, J., Wu, J., Womack, J., Sutton, H., Frankel, L.K. and T.M. Bricker, "Characterization of Mutants at Position ^{448}R in the CP 47 Protein of Photosystem II." In preparation for *Plant Molecular Biology*.

67. Bricker, T.M. and Burnap, R., "The Extrinsic Proteins of Photosystem II." Invited Review for *Photosystem II: The Water/Plastoquinone Oxidoreductase of Photosynthesis* (Wydrzynski, T. and Satoh, K., eds) Kluwer Academic Publishers, In Press.

66. Bricker, T.M., Zhang, S., Laborde, S.M., **Mayer III, P.R**., Frankel, L.K and Moroney, J.V., "The Malic Enzyme is Required for Efficient Photoautotrophic Growth in *Synechocystis* sp. PCC 6803 under Continuous Illumination but not under Diurnal Light Regimes". *Journal of Bacteriology*, 186,8144-8148 (2004).

65. Zhang, S., Laborde, S.M., Frankel, L.K. and Bricker, T.M., "Identification of Four Novel Genes Required for Efficient Photoautotrophic Growth of the Cyanobacterium *Synechocystis* sp. PCC 6803 by *In Vitro* Transposon Mutagenesis." *Journal of Bacteriology* 186,875-879 (2004).

64. Bricker, T.M. and Frankel, L.K., "Carboxylate Groups on the Manganese-Stabilizing Protein are Required for Efficient Binding of the 24 kDa Extrinsic Protein to Photosystem II". *Biochemistry* 42,2056-2061 (2003).

63. Young, A., **McChargue, M**. Bricker, T.M., Frankel, L.K. and Putnam-Evans, C., "Alterations of the Oxygen-Evolving Apparatus in an ^{305}Arg $\rightarrow$ ^{305}S Mutant in the CP43 Protein of Photosystem II from *Synechocystis* sp. PCC 6803 under Chloride-Limiting Conditions". *Biochemistry* 41,15747-15753 (2002).

62. Bricker, T.M., Young, A., Frankel, L.K., and Putnam-Evans, C., "Introduction of the ^{305}Arg $\rightarrow$ ^{305}Ser Mutation in the Large Extrinsic Loop E of the CP43 Protein of *Synechocystis* sp. PCC6803 Leads to the Loss of Cytochrome c_{550} Binding to Photosystem II". *Biochemica et Biophysica Acta* 1556,92-96 (2002).

61. Bricker, T.M. and Frankel, L.K., "The Structure and Function of CP47 and CP43 in Photosystem II" *Photosynthesis Research* 72,131-146 (2002).

60. Bricker, T. M. **Lowrance, J**., Sutton, H. and Frankel, L. K., "Alterations of the Oxygen-Evolving Apparatus in a ^{448}Arg $\rightarrow$ ^{448}S Mutant in the CP 47 Protein of Photosystem II under Normal and Low Chloride Conditions". *Biochemistry* 40,11483-11489 (2001).

59. Bricker, T.M., Prevost, M., **Vu, V**., Laborde, S.M., **Womack, J**., and Frankel, L.K., "Isolation of Lumenal Proteins from Spinach Thylakoid Membranes by Triton X-114 Phase Partitioning". *Biochemica et Biophysica Acta* 1503,350-356 (2001).

58. Li, Zhao-Liang, Bricker, T.M. and Burnap, R., "Kinetic Characterization of His-tagged PS II Indicates Little Perturbation of the Enzymatic Properties of the Complex". *Biochimica et Biophysica Acta* 1460,384-389 (2000).

57. Bricker, T.M., Green-Church, K., Limbaugh, P.A. and Frankel, L.K., "Documentation of Negatively–Stained Polyacrylamide Gels". *Analytical Biochemistry* 278,237-239 (2000).

56. Rosenberg, C., **Christian, J.**, Bricker, T. M. and Putnam-Evans, C., "Site-Directed Mutagenesis of Glutamate Residues in the Large Extrinsic Loop of the Photosystem II Protein CP 43 Affects PS II Assembly". *Biochemistry* 38,15994-16000 (1999).

55. Frankel, L.K, Cruz, J.C. and Bricker, T.M., "The Role of Carboxylic Acid Residues on the Manganese-Stabilizing Protein in its Binding to Photosystem II". *Biochemistry* 38,14271-14278 (1999).

54. Wu, J., **Masri, N.**, Lee, W., Frankel, L.K. and Bricker, T.M., "Directed Random Mutagenesis in the Large Extrinsic Loop of the CP 47 Protein of Photosystem II". *Plant Molecular Biology* 39,381-386 (1999).

53. Knoepfle, N., Bricker, T.M., and Putnam-Evans, C., "Site-Directed Mutagenesis of the Basic Residues ^{305}R and ^{342}R in the CP 43 Protein of Photosystem II Affects Oxygen-Evolving Activity in *Synechocystis* 6803". *Biochemistry* 38,1582-1588 (1999).

52. Bricker, T.M., **Morvant, J.**, **Masri, N.**, Sutton, H. and Frankel, L.K., "Isolation of an Oxygen-Evolving Photosystem II Preparation from *Synechocystis* 6803 using a Histidine-Tagged Mutant of CP 47". *Biochemica et Biophysica Acta 1409,* 50-57 (1998).

51. Zubrzycki, I.Z., Frankel, L.K., Russo, P.S. and Bricker, T.M., "Hydrodynamic Studies on the Extrinsic "33 kDa" Protein of Photosystem II". *Biochemistry* 37,13553-13558 (1998).

50. Ghanotakis, D., Tsiotisz, S. and Bricker, T.M., "Polypeptides of Photosystem II: Structure and Function". In: *Plant Photobiology: Photosynthesis and Photomorphogenesis* (Singhal, G.S., Renger, G., Sopory S.K. Irrgang, K.-D. and Govindjee, eds.) pp. 264-291, Narosa Publishing House, New Delhi, India (1998).

49. Bricker, T.M. and Frankel, L.K., "Structure and Function of the 33 kDa Extrinsic Protein of Photosystem II". *Photosynthesis Research* 56:157-173 (1998).

48. Bricker, T.M., Putnam-Evans, C. and Wu, J., "Mutagenesis in the Study of the Structure and Function of Photosystem II". *Methods of Enzymology* 297:320-337 (1998).

47. Qian, M., Al-Khaldi, S., Putnam-Evans, C., Bricker, T.M. and Burnap, R.L., "Photoassembly of the Photosystem II $(Mn)_4$ Cluster in Site-Directed Mutants Impaired in the Binding of the Manganese-Stabilizing Protein". *Biochemistry* 36,15244-15252 (1997).

46. Putnam-Evans, C. and Bricker, T.M., "Site-Directed Mutagenesis of the Basic Residue ^{321}R to ^{321}G in the CP 47 Protein of Photosystem II Alters the Chloride Requirement for Growth and Oxygen-Evolving Activity in *Synechocystis* 6803". *Plant Molecular Biology* 34:455-463 (1997).

45. Putnam-Evans, C., Wu, J., and Bricker, T.M., "Site-Directed Mutagenesis of the CP 47 Protein of Photosystem II: Alteration of Conserved Charged Residues within Lethal Deletions in the Large Extrinsic Loop of CP 47". *Plant Molecular Biology* 32:1191-1195 (1996).

44. Wu, J., Putnam-Evans, C., and Bricker, T.M., "Site-Directed Mutagenesis of the CP 47 Protein of Photosystem II: ^{167}W in the Lumenally Exposed Loop C is Required for Photosystem II Assembly and Stability". *Plant Molecular Biology* 32,537-542 (1996).

43. Bricker, T.M. and Ghanotakis, D., "The Structure and Function of the Oxygen-Evolving Complex". In: *Advances in Photosynthesis, Vol. 4, Oxygenic Photosynthesis: The Light Reactions*, pp. 113-136, Yocum, C.F. and Ort, D.R., eds. (1996).

42. Putnam-Evans, C., Wu, J., Burnap, R. Whitmarsh, J. and Bricker, T.M., "Site-Directed Mutagenesis of the CP 47 Protein of Photosystem II Alteration of Conserved Charged Residues in the Domain ^{364}E-^{444}R". *Biochemistry* 35,4046-4053 (1996).

41. Leuschner, C. and Bricker, T.M., "Interaction of the 33 kDa Extrinsic Protein with Photosystem II: Rebinding of the 33 kDa Extrinsic Protein to Photosystem II Membranes which Contain Four, Two, or Zero Manganese per Photosystem II Reaction Center". *Biochemistry* 35,4551-4557 (1996).

40. Leuschner, C. and Bricker, T.M., "Binding of the 33 kDa Extrinsic Protein to Photosystem II Preparations which are Depleted in Manganese". In: *From Light to Biosphere, Vol. II,* pp. 325-328, Paul Mathis, ed., Kluwer Academic Press, Dordretch (1995).

39. Wu, J. and Bricker, T.M., "Tryptophan 167 in Loop C of the CP 47 Protein is Required for the Stable Assembly of Photosystem II". In: *From Light to Biosphere, Vol. II,* pp. 325-328, Paul Mathis, ed., Kluwer Academic Press, Dordretch (1995).

38. Frankel, L.K. and Bricker, T. M., "Identification of Domains on the 33 kDa Extrinsic Protein which are Shielded from NHS-Biotinylation by Intrinsic Photosystem II Components". *Biochemistry* 34,7492-7497 (1995).

37. Xu, Q. B., Nelson, J., and Bricker, T.M., "Secondary Structure of the 33 kDa Extrinsic Protein of Photosystem II: A Far-UV Circular Dichroism Study". *Biochemica et Biophysica Acta* 1188,427-431 (1994).

36. Putnam-Evans, C. and Bricker, T.M., "Site-Directed Mutagenesis of the CP 47 Protein of Photosystem II: Alteration of the Basic Residue ^{448}R to ^{448}G Prevents the Assembly of Functional Photosystem II Centers under Chloride-Limiting Conditions". *Biochemistry* 33,10770-10776 (1994).

35. Thomas, B.A., Bricker, T.M., and Klotz, A.V., "Post-Translational Methylation of Phycobilisomes and Oxygen Evolution Efficiency in Cyanobacteria". *Biochemica et Biophysica Acta* 1143,104-108 (1993).

34. Xu, Q. and Bricker, T.M., "Structural Organization of the Proteins on the Oxidizing-Side of Photosystem II: Two Molecules of the 33 kDa Manganese-Stabilizing Protein per Reaction Center". *Journal of Biological Chemistry* 267,25816-25821 (1992).

33. Putnam-Evans, C. and Bricker, T.M., "Site-Directed Mutagenesis of the CPa-1 Protein of Photosystem II: Alteration of the Basic Residue Pair ^{384,385}R to ^{384,385}G Leads to a Defect Associated with the Oxygen-Evolving Complex". *Biochemistry* 31,11482-11488 (1992).

32. Frankel, L.K. and Bricker, T.M., "Interaction of CPa-1 with the Manganese-Stabilizing Protein of Photosystem II: Identification of Domains of CPa-1 Shielded from NHS-Biotinylation by the Manganese-Stabilizing Protein". *Biochemistry* 31,11059-11064 (1992).

31. Odom, W.R. and Bricker, T.M., "Interaction of CPa-1 with the Manganese-Stabilizing Protein of Photosystem II: Identification of Domains Crosslinked by 1-Ethyl-3-(3-Dimethylaminopropyl)-Carbodiimide". *Biochemistry* 31,5616-5620 (1992).

30. Bricker, T.M., "Oxygen Evolution in the Absence of the 33 kDa Manganese-Stabilizing Protein". *Biochemistry* 31,4623-4628 (1992).

29. Mason, C.B., Matthews, S., Bricker, T.M., and Moroney, J.V., "A Simplified Procedure for the Isolation of Intact Chloroplasts from *Chlamydomonas reinhardtii*". *Plant Physiology* 97,1576-1580 (1991).

28. Jursinic, P.A., McCarthy, S.A., Bricker, T.M, and Stemler, A., "Characteristics of Two Atrazine-Binding Sites That Specifically Inhibit Photosystem II Function". *Biochemica et Biophysica Acta* 1059,312-322 (1991).

27. Odom, W.R. and Bricker, T.M., "Characterization of a Monoclonal Antibody Directed Against the D2 Protein of Spinach Photosystem II." *Photosynthetica* 24,46Ä 55 (1990).

26. Frankel, L.K. and Bricker, T.M., "Monoclonal Antibodies Directed Against the 33, 24, and 17 kDa Extrinsic Proteins of Spinach Photosystem II". *Current Research in Photosynthesis,* Batcheffsky, M., Ed., Vol. I, pp. 825-828, Kluwer Academic Press, Dordrecht (1990).

25. Frankel, L.K. and Bricker, T.M., "Mapping of NHS-Biotinylation Sites and the Epitope of the Monoclonal Antibody FAC2 on the Apoprotein of CPa-1". *Current Research in Photosynthesis,* Batcheffsky, M., Ed., Vol. I, pp. 639-642, Kluwer Academic Press, Dordrecht (1990).

24. Bricker, T.M., "Structure and Function of CPa-1 and CPa-2 in Photosystem II". *Photosynthesis Research* 24,1-13 (1990).

23. Frankel, L.K. and Bricker, T.M., "Epitope Mapping of the Monoclonal Antibody FAC2 on the CPa-1 Apoprotein in Photosystem II". *FEBS Letters* 257,279-282 (1989).

22. **Bass, W.T.** and Bricker, T.M., "Two-Dimensional Electrophoresis of Chloroplast Thylakoid Proteins". *Analytical Biochemistry* 171,330-338 (1988).

21. Bricker, T.M., W.R. Odom and. Queirolo, C. B., "Close Association of the 33 kDa Extrinsic Protein with the Apoprotein of CPa-1 in Photosystem II". *FEBS Letters* 231,111-117 (1988).

20. Bricker, T.M, M.J. Boyer, J. Keith, R. Watson-McKown and Wise, K.S., "Association of Lipids with Integral Surface Membrane Proteins of *Mycoplasma hyorhinis*". *Infection and Immunity* 56,295-301 (1988).

19. Bricker, T.M. and Frankel, L.K., "Use of a Monoclonal Antibody in Structural Investigations of the 49 kDa Polypeptide of Photosystem II". *Archives of Biochemistry and Biophysics* 256, 295-301 (1987).

18. Bricker, T.M. and Frankel, L.K., "Characterization of a Monoclonal Antibody Which Recognizes the 49 kDa Protein of Photosystem II". *The Proceedings of the VII International Congress on Photosynthesis.* J. Biggins, Ed., Vol. II pp. 129-132, Martinus Nijhoff Publishers, The Netherlands (1987).

17. Mavankal, G., McCain, D.C. and Bricker, T.M., "The Effects of Chloride on Paramagnetic Coupling of Manganese in Photosystem II Preparations". *The Proceedings of the VII International Congress on Photosynthesis.* J.Biggins, Ed., Vol. I pp. 661-664, Martinus Nijhoff Publishers, The Netherlands (1987).

16. Sherman, L.A., Bricker, T.M., Guikema, J.A. and Pakrasi, H.B., "The Structural and Functional Organization of the Photosynthetic Membranes of Cyanobacteria". *Cyanobacteria: Current Research*, Fay, E. and Van Baalen, Eds., pp. 1-33, Elsevier Press, Netherlands (1987).

15. Bricker, T.M., Guikema, J.A., Pakrasi H.B. and Sherman, L.A., "The Polypeptides of Cyanobacterial Photosynthetic Membranes". *Encyclopedia of Plant Physiology: Photosynthetic Membranes, New Series* (Stahlein, L.A. and C.J. Arntzen, eds.) Springer Verlag, Berlin (1986).

14. Mavankal, G., McCain, D.C. and Bricker, T.M., "Effects of Chloride on Paramagnetic Coupling of Manganese in Calcium Chloride-Washed Photosystem II Preparations". *FEBS Letters* 202:235-239 (1986).

13. Mavankal, G., McCain, D.C and Bricker, T.M., "Effects of Trypsin and Calcium Chloride on Signal II in Oxygen-Evolving PS II Preparations". *Biochemical and Biophysical Research Communications* 134:272-278 (1986).

12. Metz, J.G., Bricker T.M. and Seibert, M., "The ^{14}C-Azidoatrazine Photoaffinity Technique labels a 34 kDa Protein in Scenedesmus which Functions on the Oxidizing Side of Photosystem II". *FEBS Letters* 185:191-196 (1985).

11. Bricker, T.M., Pakrasi H.B. and Sherman, L.A., "Characterization of a Photosystem II Core Preparation Isolated From Spinach by a Simplified Method". *Archives of Biochemistry and Biophysics* 237:170-176 (1985).

10. Bricker, T.M. and Sherman, L.A., "Triton X-114 Phase Fractionation Analysis of the Thylakoid Membranes of *Anacystis nidulans* R2". *Archives of Biochemistry and Biophysics* 235:204-211 (1984).

9. Metz, J.G., **Ulmer, G.,** Bricker T.M. and Miles, D., "Purification of Cytochrome b-559 from Photosystem II Preparations of Spinach and Maize". *Biochemica et Biophysica Acta* 725:203-209 (1983).

8. Bricker, T.M., Metz, J.G. Miles D. and Sherman, L.A., "Biochemical Characterization of a Highly Active Oxygen-Evolving Photosystem II Preparation from Maize". *Biochemica et Biophysica Acta* 724:447-455 (1983).

7. Bricker, T.M. and Sherman, L.A., "Triton X-114 Phase Fractionation of Maize Thylakoid Membrane Proteins in the Investigation of Thylakoid Membrane Topology". *FEBS Letters* 149:197-202 (1982).

6. Bricker, T.M. and Newman, D.W., "Changes in the Chlorophyll-Proteins and Electron Transport Activities of Soybean Cotyledon Chloroplasts During Senescence". *Photosynthetica* 16:239-244 (1982).

5. Bricker, T.M. and Newman, D.W., "The Chlorophyll-Proteins of Soybean Cotyledon Chloroplasts". *Zeitschrift fur Pfanzenphysiologie* 104:91-96 (1981).

4. Frankel, L.K., Bricker T.M. and Eshbaugh, W.H., "Comparison of Stylar Polypeptides from Self- and Cross-Pollinations in *Petunia hybrida* L.". *Incompatibility* 13:125-129 (1981).

3. Bricker, T.M. and Newman, D.W., "Quantitative Changes in the Chloroplast Thylakoid Polypeptide Complement During Senescence". *Zeitschrift fur Pflanzenphysiologie* 98:339-346 (1980).

2. Debonte, L.R., Vaughn, K., Bricker T.M. and Wilson, K.G., "Photosystem Complex Deficiency in the Citrine Mutant of Tomato". *Photosynthetica* 12:332-335 (1980).

1. Dalgarn, D., Miller, P.D., Bricker, T.M., Speer, N., Newman D.W. and Jaworski, J.G., "Galactosyl Transferase Activity of Chloroplast Envelopes from Senescent Soybean Cotyledons". *Plant Science Letters* 14:1-6 (1979).

Research Interests

Introduction

Elucidation of the functional properties and structural organization of membrane protein complexes is one of the central objectives of current biochemical investigation. Biological membranes are involved in virtually every aspect of cellular organization and activity. One of the most intriguing aspects of membrane function is its role in the mediation of energy transduction in photosynthetic organisms. Light energy, which is the product of a most violent physical process, fusion, is transformed into biological energy equivalents utilized by the photosynthetic cell. The photosynthetic process provides both the carbohydrate which lies at the base of virtually all food chains and, as a byproduct, all of the atmospheric oxygen utilized by heterotrophic organisms. Recently, much effort has been directed towards understanding the structure, function, and assembly of the membrane protein complexes involved in the photosynthetic light reactions. While much progress has been made in the understanding of these processes, the structural organization of the proteins in PS II, the mechanisms involved in protein processing, membrane insertion, cofactor assembly, and regulation of photosynthetic electron transport remain poorly understood.

Our ongoing research seeks to further elucidate the structural organization of proteins associated with Photosystem II (PS II) in higher plants. Protein-protein interactions among the structural components of the photosystem are being studied using biochemical and molecular tools. First, the interaction of the manganese-stabilizing protein (MSP) with the 24 kDa protein is being examined. Chemical modification of the MSP when it is associated with PS II membranes dramatically affects the ability of the 24 kDa protein to bind to PS II. We are determining if the binding inhibition of the 24 kDa protein is due to charge neutralization or steric interference. Additionally, the location of the modified residues are being mapped by MS/MS. Second, the effects of chemical modification on the 24 and 17 kDa proteins with respect to protein binding and function is being determined and the location of the modified residues are being mapped. Third, the role of the observed heterogeneity in the extrinsic subunits of PS II with respect to structure and function of the photosystem is being examined. In *Arabidopsis* each of the extrinsic proteins of PS II are encoded by two genes. T-DNA insertion lines which are available for a number of these genes are being examined. For genes which have no T-DNA insertional lines available (*psb*O-1 and *psb*P-1), RNAi constructs are being constructed and will be introduced into *Arabidopsis* to suppress the expression of these gene products. The phenotypes of these plants will be examined with respect to PS II function, assembly and stability under control and stress conditions. In addition to this genetic approach, biochemical reconstitution studies examining the function of the two *psb*O proteins is being performed. Finally, we are seeking to identify protein components which interact with PS II in both the *Arabidopsis* and *Synechocystis* systems.

We are also continuing our studies seeking to identify the binding domains for the chloride which participates in photosynthetic oxygen evolution. We hypothesize that the manganese-stabilizing protein in concert with the other extrinsic proteins of the photosystem and the extrinsic loop of CP47 cooperate to form the chloride-sequestering domain functioning in oxygen evolution. A combination of physiological, biochemical and molecular approaches are being used in these studies. First, further *in vivo* characterization of CP47 mutants which have an altered affinity for chloride in support of photoautotrophic growth and oxygen evolution activity is being performed. These studies include experiments on R448Q, R448K and K321G. We are examining the loss of PS II function when these mutants are placed in a low chloride environment and its reactivation upon chloride addition. Steady state oxygen evolution, flash oxygen yield analysis and S state lifetimes are being performed during the chloride depletion/reconstitution time course. We are also determining if the mutations at position 448R and 321K affect the same or different processes by production and characterization of the double mutant R448S,K321G. Second, the analysis of the chloride depletion and reactivation kinetics *in vitro* with His-tagged PS II preparations isolated from control and mutant strains is being examined. These studies will allow us to directly test the 1-site, 2-state hypothesis for chloride-binding to Photosystem II in the cyanobacterial system and allow us to assess the chloride affinity of the mutants. Finally, directed random mutagenesis is being used to introduce mutations into the *psb*O and *psb*V genes. After reintroduction of these altered genes into *Synechocystis*, mutants that exhibit altered chloride requirements for photoautotrophic growth and oxygen evolution will be isolated and characterized. This will allow the identification of residues on these proteins required for chloride sequestration and maintenance at the oxygen-evolving site.

The studies which I have described above have been generously funded by the National Science Foundation, the United States Department of Agriculture and the Department of Energy.

Statement of Administrative Philosophy

I have dealt with administrators for my entire academic career. I have seen dynamic, effective administrators and weak ineffectual ones. This is the common experience of all faculty members at all institutions. The good administrators inevitably have had a number of shared attributes.

First, it is absolutely essential to be a good listener. Everyone has something to contribute. It is insufficient to pay lip service to this concept, to say "my door is always open", when in fact your mind is closed. It is necessary to seek out opinions and advice from other administrators, faculty, students and. This is particularly important when they disagree with your views. Often, their alternative viewpoint is, in fact, correct.

Second, fix it, if and only if, it's broken. I do not believe in micromanaging staff or faculty. Most of these individuals have far more experience in doing their particular job than I do. Additionally, there are many essentially equally efficient paths for performing any task. It is best to allow an individual to choose the path with which she or he is most comfortable. If, however, something is broken, it must be corrected accurately and quickly.

Third, always tell the truth to your faculty. Sometimes they don't want to hear it, but it is absolutely imperative that they always know exactly where you stand.

Fourth, compete and compete to win. Life in academia **is** competition. Resources are **always** limited. This is true for the individual seeking research support, a department requiring space or additional faculty, and the college and university striving to maintain excellence in an atmosphere of diminishing state and federal support. The best way to compete is to be prepared (for the worst **and** the best scenarios), to know your competitors, and to be decisive.

Research and Teaching at Major Universities

It is clear that a balance must be struck between the teaching and research elements which constitute the bulk of our professional responsibilities. It is insufficient to be merely an excellent researcher **or** an excellent teacher -- both facets must be addressed. Gone are the days when tenure and promotion decisions were based solely on research accomplishments; teaching must and should be a major criterion for advancement within the university context. It is clear that if either our teaching or our research mission is left unfulfilled we are not providing our clients (i.e. our students and community) sufficient return for their dollar. It must be pointed out that teaching occurs at many venues and levels. The undergraduate classroom is one such venue as are the graduate and postgraduate teaching which occurs in the laboratory.

My own approach, for both research and teaching, is to be demanding, rigorous and fair. My classroom teaching is excellent and I approach it with vigor and enthusiasm. I feel that if challenged, many, perhaps most students respond positively and they will seek to excel. I am always available to students (both those formally in a class or my laboratory and any and all others), and feel that access is a critical component of the mentor-student interaction.

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