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Birthdate: July 3, 1963

Citizenship: USA

Research Interests: Biological Solid-State NMR; Protein Structure Determination; Molecular Mechanisms of Membrane Fusion; High Temperature NMR of Inorganic Materials.

Teaching Interests: Critical and Quantitative Thinking; Incorporation of Solid-State NMR into the Undergraduate Laboratory.

Education and Training:

B.A. with High Honors in Chemistry and Physics, Swarthmore College, Swarthmore, PA 1985.

Research Fellow, AT&T Bell Laboratories, Murray Hill, NJ, Summer 1992.

Research: 2D NMR Structure Determination of Organic Solids and Amorphous Polymers.

Advisor: Dr. Robert Tycko.

Ph.D. in Chemistry, The University of Chicago, Chicago, IL 1995.

Ph.D. Thesis: High-Resolution Laser Spectroscopy of Isotopic Impurity Vibrational Transitions in Solid Parahydrogen.

Advisor: Dr. Takeshi Oka.

Postdoctoral Research Fellow, National Institutes of Health, Bethesda, MD 1995 – 1997.

Research: Protein Structure Determination with Solid-State NMR Spectroscopy.

Advisor: Dr. Robert Tycko.

Awards and Honors:

- Camille and Henry Dreyfus New Faculty Award, 1998.
- NIH Fellows Award for Research Excellence, 1996.
- AT&T Ph.D. Scholar, The University of Chicago, 1991-95.
- NSF Predoctoral Fellow, The University of Chicago, 1988-91.
- McCormick Fellow, The University of Chicago, 1987-91.
- Phi Beta Kappa, Swarthmore College, 1985.
- National Merit Scholar, Swarthmore College, 1981-85.

Employment:

1985-87 Associate of the Technical Staff, The Aerospace Corporation, El Segundo, CA.

1987-95 Research and Teaching Assistant, The University of Chicago, Chicago, IL.

1995-97 Postdoctoral Research Fellow, National Institutes of Health, Bethesda, MD.

1998-2004 Assistant Professor, Department of Chemistry, Michigan State University, East Lansing, MI.

2004-2009 Associate Professor, Department of Chemistry, Michigan State University, East Lansing, MI.

2009- Professor, Department of Chemistry, Michigan State University, East Lansing, MI.

Publications:

1. N. Huarte, J. L. Nieva, S. Nir and D. P. Weliky, "Induced Perturbations and Adopted Conformations in Membranes by the HIV-1 Fusion Peptide", In *Membrane-Active Peptides: Methods and Results on Structure and Function*, M. A. R. B. Castanho, editor, M. A. R. B. Castanho, Editor, International University Line: La Jolla, 2009, pp. 565-596.
2. I. Chung, J.-H. Song, M. G. Kim, C. D. Malliakas, A. L. Karst, A. J. Freeman, D. P. Weliky, and M. G. Kanatzidis, "The Tellurophosphate $K_4P_8Te_4$: Phase-Change Properties, Exfoliation, Photoluminescence in Solution and Nanospheres", *Journal of the American Chemical Society*, **131**, 16303-16312 (2009).

3. Y. Sun and D. P. Weliky, “ ^{13}C - ^{13}C Correlation Spectroscopy of Membrane-Associated Influenza Virus Fusion Peptide Strongly Supports a Helix-Turn-Helix Motif and Two Turn Conformations”, *Journal of the American Chemical Society*, **131**, 13228-13229 (2009).
4. W. Qiang, Y. Sun, and D. P. Weliky, “A Strong Correlation Between Fusogenicity and Membrane Insertion Depth of the HIV Fusion Peptide”, *Proceedings of the National Academy of Sciences of the U.S.A.*, **106**, 15314-15319 (2009).
5. K. Sackett, M. J. Nethercott, Y. Shai, and D. P. Weliky, “Hairpin Folding of HIV gp41 Abrogates Lipid Mixing Function at Physiologic pH and Inhibits Lipid Mixing by Exposed gp41 Constructs”, *Biochemistry*, **48**, 2714-2722 (2009).
6. W. Qiang and D. P. Weliky, “HIV Fusion Peptide and its Cross-Linked Oligomers: Efficient Syntheses, Significance of the Trimer in Fusion Activity, Correlation of β Strand Conformation with Membrane Cholesterol, and Proximity to Lipid Headgroups”, *Biochemistry*, **48**, 289-301 (2009)
7. J. Curtis-Fisk, R. M. Spencer, and D. P. Weliky, “Native Conformation at Specific Residues in Recombinant Inclusion Body Protein in Whole Cells Determined with Solid-State Nuclear Magnetic Resonance Spectroscopy”, *Journal of the American Chemical Society*, **130**, 12568-12569 (2008) – featured in *Chemical & Engineering News*, **86**, 31 (2008).
8. J. Curtis-Fisk, R. M. Spencer, and D. P. Weliky, “Isotopically Labeled Expression in *E. coli*, Purification, and Refolding of the Full Ectodomain of the Influenza Virus Membrane Fusion Protein”, *Protein Expression and Purification*, **61**, 212-219 (2008).
9. W. Qiang, M. L. Bodner, and D. P. Weliky, “Solid-State NMR Spectroscopy of HIV Fusion Peptides Associated with Host-Cell-Like Membranes: 2D Correlation Spectra and Distance Measurements Support a Fully Extended Conformation and Models for Specific Antiparallel Strand Registries”, *Journal of the American Chemical Society*, **130**, 5459-5471 (2008).
10. M. A. Gave, K. M. Johnson, M. G. Kanatzidis, and D. P. Weliky, “Improved Resolution and Detection of ^{31}P -Tl J -Couplings at 21 T in ^{31}P Magic Angle Spinning Spectra of Inorganic Compounds Containing Tl/Bi/P/S”, *Solid State Nuclear Magnetic Resonance*, **33**, 12-15 (2008).
11. M. L. Bodner, C. M. Gabrys, J. O. Struppe, and D. P. Weliky, “ ^{13}C - ^{13}C and ^{15}N - ^{13}C Correlation Spectroscopy of Membrane-Associated and Uniformly Labeled HIV and Influenza Fusion Peptides: Amino Acid-Type Assignments and Evidence for Multiple Conformations”, *Journal of Chemical Physics*, **128**, 052319 (2008).
12. Z. Zheng, W. Qiang, and D. P. Weliky, “Investigation of Finite-Pulse Radiofrequency-Driven Recoupling Methods for Measurement of Intercarbonyl Distances in Polycrystalline and Membrane-Associated HIV Fusion Peptide Samples”, *Magnetic Resonance in Chemistry*, **45**, S247-S260 (2007).
13. C. M. Gabrys and D. P. Weliky, “Chemical Shift Assignment and Structural Plasticity of a HIV Fusion Peptide Derivative in Dodecylphosphocholine Micelles”, *Biochimica et Biophysica Acta-Biomembranes*, **1768**, 3225-3234 (2007).
14. M. A. Gave, D. P. Weliky, and M. G. Kanatzidis, “New Potassium Bismuth Thiophosphates Including the Modulated $\text{K}_{1.5}\text{Bi}_{2.5}(\text{PS}_4)_3$ ”, *Inorganic Chemistry*, **46**, 11063 -11074 (2007).
15. I. Chung, J. I. Jang, M. A. Gave, D. P. Weliky, and M. G. Kanatzidis, “Low Valent Phosphorus in the Molecular Anions $[\text{P}_5\text{Se}_{12}]^{5-}$ and $\beta\text{-}[\text{P}_6\text{Se}_{12}]^{4-}$: Phase Change Behavior and Near Infrared Second Harmonic Generation”, *Chemical Communications*, 4998-5000 (2007).
16. I. Chung, C. D. Malliakas, J. I. Jang, C. G. Canlas, D. P. Weliky, and M. G. Kanatzidis, “Helical Polymer $1/\infty[\text{P}_2\text{Se}_6]^{2-}$: Strong Second Harmonic Generation Response and Phase-Change Properties of its K and Rb Salts”, *Journal of the American Chemical Society*, **129**, 14996-15006 (2007).
17. M. A. Gave, C. G. Canlas, I. Chung, R. G. Iyer, M. G. Kanatzidis, and D. P. Weliky, “ $\text{Cs}_4\text{P}_2\text{Se}_{10}$: A New Compound Discovered with the Application of Solid State and High Temperature NMR”, *Journal of Solid State Chemistry*, **180**, 2877-2884 (2007).
18. J. Curtis-Fisk, C. Preston, Z. Zheng, R. M. Worden, and D. P. Weliky, “Solid-State NMR Structural Measurements on the Membrane-Associated Influenza Fusion Protein Ectodomain”, *Journal of the American Chemical Society*, **129**, 11320-11321 (2007).
19. M. A. Gave, C. D. Malliakas, D. P. Weliky, and M. G. Kanatzidis, “Wide Compositional and Structural Diversity in the System Tl/Bi/P/Q (Q = S, Se) and Observation of Vicinal P-Tl J Coupling in the Solid State”, *Inorganic Chemistry*, **46**, 3632-3644 (2007).
20. W. Qiang, J. Yang, and D. P. Weliky, “Solid-State Nuclear Magnetic Resonance Measurements of HIV Fusion Peptide to Lipid Distances Reveal the Intimate Contact of β Strand Peptide with Membranes and the Proximity of the Ala-14-Gly-16 Region with Lipid Headgroups”, *Biochemistry*, **46**, 4997-5008 (2007).

21. Z. Zheng, R. Yang, M. L. Bodner, and D. P. Weliky, "Conformational Flexibility and Strand Arrangements of the Membrane-Associated HIV Fusion Peptide Trimer Probed by Solid-State NMR Spectroscopy", *Biochemistry*, **45**, 12960-12975 (2006).
22. I. Chung, A. L. Karst, D. P. Weliky, and M. G. Kanatzidis, "[P₆Se₁₂]⁴⁻: A Phosphorus-Rich Selenophosphate with Low-Valent P Centers", *Inorganic Chemistry*, **45**, 2785-2787 (2006).
23. O. Palchik, R. G. Iyer, C. G. Canlas, D. P. Weliky, and M. G. Kanatzidis, "K₁₀M₄M₄'S₁₇ (M = Mn, Fe, Co, Zn; M' = Sn, Ge) and Cs₁₀Cd₄Sn₄S₁₇: Compounds with a Discrete Supertetrahedral Cluster", *Z. Anorg. Allg. Chem.*, **630**, 2237-2247 (2004).
24. R. Yang, M. Prorok, F. J. Castellino, and D. P. Weliky, "A Trimeric HIV-1 Fusion Peptide Construct Which Does Not Self-Associate in Aqueous Solution and Which Has Fifteen-Fold Higher Membrane Fusion Rate", *Journal of the American Chemical Society*, **126**, 14722-14723 (2004).
25. C. M. Wasniewski, P. D. Parkanzky, M. L. Bodner, and D. P. Weliky, "Solid-State Nuclear Magnetic Resonance Studies of HIV and Influenza Fusion Peptide Orientations in Membrane Bilayers Using Stacked Glass Plate Samples", *Chemistry and Physics of Lipids*, **132**, 89-100 (2004).
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27. I. Chung, C. G. Canlas, D. P. Weliky, and M. G. Kanatzidis, "APSe₆ (A = K, Rb, and Cs): Polymeric Selenophosphates with Reversible Phase-Change Properties", *Inorganic Chemistry*, **43**, 2762-2764 (2004).
28. M. L. Bodner, C. M. Gabrys, P. D. Parkanzky, J. Yang, C. A. Duskin, and D. P. Weliky, "Temperature Dependence and Resonance Assignment of ¹³C NMR Spectra of Selectively and Uniformly Labeled Fusion Peptides Associated with Membranes", *Magnetic Resonance in Chemistry*, **42**, 187-194 (2004).
29. R. J. DiCosty, D. P. Weliky, S. J. Anderson, and E. A. Paul, "¹⁵N-CPMAS Nuclear Magnetic Resonance Spectroscopy and Biological Stability of Soil Organic Nitrogen in Whole Soil and Particle-Size Fractions", *Organic Geochemistry*, **34**, 1635-1650 (2003).
30. J. Yang and D. P. Weliky, "Solid State Nuclear Magnetic Resonance Evidence for Parallel and Antiparallel Strand Arrangements in the Membrane-Associated HIV-1 Fusion Peptide", *Biochemistry*, **42**, 11879-11890 (2003).
31. C. G. Canlas, R. B. Muthukumar, M. G. Kanatzidis, and D. P. Weliky, "Investigation of Longitudinal ³¹P Relaxation in Metal Selenophosphate Compounds", *Solid State Nuclear Magnetic Resonance*, **24**, 110-122 (2003).
32. C. G. Canlas, M. G. Kanatzidis, and D. P. Weliky, "³¹P Solid State NMR Studies of Metal Selenophosphates Containing [P₂S₆]⁴⁻, [P₄S₁₀]⁴⁻, [PSe₄]³⁻, [P₂Se₇]⁴⁻, and [P₂Se₉]⁴⁻ Ligands", *Inorganic Chemistry*, **42**, 3399-3405 (2003).
33. C. M. Gabrys, J. Yang, and D. P. Weliky, "Analysis of Local Conformation of Membrane-Bound and Polycrystalline Peptides by Two-Dimensional Slow-Spinning Rotor-Synchronized MAS Exchange Spectroscopy", *Journal of Biomolecular NMR*, **26**, 49-68 (2003).
34. R. Yang, J. Yang, and D. P. Weliky, "Synthesis, Enhanced Fusogenicity, and Solid State NMR Measurements of Cross-Linked HIV-1 Fusion Peptides", *Biochemistry*, **42**, 3527-3535 (2003).
35. J. Yang, P. D. Parkanzky, M. L. Bodner, C. G. Duskin, and D. P. Weliky, "Application of REDOR Subtraction for Filtered MAS Observation of Labeled Backbone Carbons of Membrane-Bound Fusion Peptides", *Journal of Magnetic Resonance*, **159**, 101-110 (2002).
36. K. K. Rangan, P. N. Trikalitis, C. Canlas, T. Bakas, D. P. Weliky, and M. G. Kanatzidis, "Hexagonal Pore Organization in Mesosstructured Metal Tin Sulfides Built with [Sn₂S₆]⁴⁻ Clusters", *Nano Letters*, **2**, 513-517 (2002).
37. J. A. Aitken, C. Canlas, D. P. Weliky, and M. G. Kanatzidis, [P₂S₁₀]⁴⁻: A Novel Polythiophosphate Anion Containing a Tetrasulfide Fragment", *Inorganic Chemistry*, **40**, 6496-6498 (2001).
38. J. Yang, C. M. Gabrys, and D. P. Weliky, "Solid State Nuclear Magnetic Resonance Evidence for an Extended Beta Strand Conformation of the Membrane-Bound HIV-1 Fusion Peptide", *Biochemistry*, **40**, 8126-8137 (2001).
39. J. Yang, P. D. Parkanzky, B. A. Khunte, C. G. Canlas, R. Yang, C. M. Gabrys, and D. P. Weliky, "Solid State NMR Measurements of Conformation and Conformational Distributions in the Membrane-Bound HIV-1 Fusion Peptide", *Journal of Molecular Graphics and Modelling*, **19**, 129-135 (2001).
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41. D. P. Weliky, A. E. Bennett, A. Zvi, J. Anglister, P. J. Steinbach, and R. Tycko, "Solid State NMR Evidence for an Antibody-Dependent Conformation of the V3 Loop of HIV-1 gp120", *Nature Structural Biology*, **6**, 141-145 (1999).
42. A. E. Bennett, D. P. Weliky, and R. Tycko, "Quantitative Conformational Measurements in Solid State NMR by Constant Time Homonuclear Dipolar Recoupling", *Journal of the American Chemical Society*, **120**, 4897-4898 (1998).

43. Y. Zhang, T. J. Byers, M.-C. Chan, K. E. Kerr, D. P. Weliky, and T. Oka, "High Resolution Infrared Spectroscopy of $J=1$ H₂ in Parahydrogen Crystals", *Physical Review B*, **58**, 218-233 (1998).
44. R. Tycko, D. P. Weliky, and A. E. Berger, "Investigation of Molecular Structure in Solids by Two-Dimensional NMR Exchange Spectroscopy with Magic Angle Spinning", *Journal of Chemical Physics*, **105**, 7915-7930 (1996).
45. D. P. Weliky and R. Tycko, "Determination of Peptide Conformations by Two-Dimensional Magic Angle Spinning NMR Exchange Spectroscopy with Rotor Synchronization", *Journal of the American Chemical Society*, **118**, 8487-8488 (1996).
46. D. P. Weliky, K. E. Kerr, T. Momose, T. Byers, Y. Zhang, and T. Oka, "High-Resolution Infrared Spectroscopy of Isotopic Impurity $Q_1(0)$ Transitions in Solid Parahydrogen", *Journal of Chemical Physics*, **105**, 4461-4481 (1996).
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51. D. P. Weliky, G. Dabbagh, and R. Tycko, "Correlation of Chemical Bond Directions and Functional Group Orientations in Solids by Two-Dimensional NMR", *Journal of Magnetic Resonance A* **104**, 10-16 (1993).
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53. C. J. Pursell and D. P. Weliky, "Pure Rotational Transitions in the ν_3 State of Methane", *Journal of Molecular Spectroscopy*, **153**, 303-306 (1992).
54. C. J. Pursell and D. P. Weliky, "Infrared-Microwave Double Resonance Spectroscopy of CHF₃ Using a Color Center Laser", *Journal of Molecular Spectroscopy*, **143**, 251-257 (1990).
55. C. J. Pursell, D. P. Weliky, and T. Oka, "Collision-Induced Double Resonance Studies of HN₂⁺ and HCN", *Journal of Chemical Physics*, **93**, 7041-7048 (1990).
56. W. C. Ho, C. J. Pursell, D. P. Weliky, K. Takagi, and T. Oka, "Infrared-Microwave Double Resonance Spectroscopy of Molecular Ions: HN₂⁺", *Journal of Chemical Physics*, **93**, 87-93 (1990).
57. C. J. Pursell, D. P. Weliky, W. C. Ho, K. Takagi, and T. Oka, "Observation of Direct and Collision-Induced Double Resonance of a Molecular Ion", *Journal of Chemical Physics*, **91**, 7997-7999 (1989).