JEFFREY ALLEN REIMER
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EDUCATION

PhD in Chemistry, California Institute of Technology, October 1980
BS in Chemistry with Honors, University of California Santa Barbara, 1976

EMPLOYMENT

Professor of the Graduate School, University of California at Berkeley, July 2022 - present
Professor, University of California at Berkeley, July 1994 - 2022
Faculty Scientist, Ernest O. Lawrence Berkeley National Laboratory, 1984 - present
Chair, Department of Chemical Engineering, UC Berkeley, 2006 - 2011; 2013-2022
Mercator Professor of the Deutsche Forschungsgemeinschaft, RWTH Aachen University 2006.
Associate Dean, Graduate Division, University of California, Berkeley, 2000 - 2005
Chair, Applied Science & Technology Group, University of California at Berkeley, 1999 - 2000
Assistant, Associate Professor, University of California at Berkeley, July 1982 - June 1994
Postdoctoral Fellow, IBM T.J. Watson Research Laboratories, October 1980 - August 1982

HONORS

2023 Warren K. Lewis Award of the AIChE
2022 University of California Berkeley Citation
2022 G. H. Lewis Lectureship, UC Berkeley
2015-16 Alexander von Humboldt Research Award
2013 Fellow, International Society of Magnetic Resonance
2012 EAS Award for Outstanding Achievement in Magnetic Resonance
2012-2022 C. Judson King Endowed Chair in Chemical and Biomolecular Engineering
2010 Fellow, American Physical Society
2009 Fellow, American Association for the Advancement of Science
2006-2011; 2013-2022 Warren & Katharine Schlinger Distinguished Professor, UC Berkeley
2008 Otto M. Smith Lectureship, Oklahoma State University
2002 U.C. Berkeley Distinguished Teaching Award
2002 R. W. Vaughan Lectureship, Rocky Mountain Conference on Applied Spectroscopy
2000 and 2015 Chemical Engineering Departmental Teaching Award, UC Berkeley
1998 The Donald Sterling Noyce Prize for Excellence in Undergraduate Teaching, UC Berkeley
1997-1987 AIChE Award for Chemical Engineering Excellence in Teaching, NorCal Section
1987-89 Camille and Henry Dreyfus Teacher-Scholar Award
1987 AT&T Foundation Award
1985-1990 NSF Presidential Young Investigator Award
1984 IBM Faculty Development Award

PROFESSIONAL SOCIETY MEMBERSHIPS

Amer. Association for the Advmnt. of Science
American Chemical Society
American Institute of Chemical Engineers
American Physical Society
American Society for Engineering Education

NONPROFIT ACTIVITIES

Council for Chemical Research, Executive Board, 2012-2015 (Chairman, 2015)
Franklin University Switzerland, Trustee, 2014-2023

RESEARCH ACTIVITIES

The goal of Professor Reimer's research is to generate new knowledge that will deliver environmental protection, sustainability, and fundamental insights via materials chemistry, physics, and engineering. He seeks to educate researchers who will go on to become leaders in industry, academia, and government. His group uses many different tools for his research, yet exhibit special expertise and interest in magnetic resonance (MR) spectroscopy and imaging.

PUBLICATIONS

BOOKS

Chemical Engineering Design and Analysis - An Introduction, T. Michael Duncan and Jeffrey A. Reimer, Cambridge University Press 1998; ISBN 0-521-63041-X.

Carbon Capture and Sequestration, Berend Smit, Jeffrey Reimer, Curt Oldenburg, and Ian Bourg, World Scientific Press, 2013.

Applied Spectroscopy, Jeffrey A. Reimer and Cecil R. Dybowski, Oxford University Press, scheduled for publication late 2026.

INVITED REVIEWS AND CHAPTERS

"Nuclear Magnetic Resonance Investigations of Hydrogenated Amorphous Silicon," Jeffrey A. Reimer, Jour. de Physique **42**, C4-715 (1981).

"Structural Heterogeneities in Device-Quality Amorphous Hydrogenated Semiconductors," Jeffrey A. Reimer and Mark A. Petrich, **Amorphous Silicon and Related Materials**, pps. 3-27, H. Fritzsche, Editor, World Scientific Pub. Co. 1988.

"Optical Pumping in Solid State Nuclear Magnetic Resonance," Robert Tycko and Jeffrey A. Reimer, Journal of Physical Chemistry **100** 13240 (1996).

"How is the Discipline of Chemical Engineering Changing?," in **A Century of Achievement-Vision for the Future** American Institute of Chemical Engineers press, New York (2008).

"Nuclear hyperpolarization in solids and the prospects for nuclear spintronics," Jeffrey A. Reimer **2010** Solid State Magnetic Resonance **37** 3-12.

"High Resolution NMR in Inhomogenous Fields," Vasiliki Demas, John M. Frank, Jeffrey A. Reimer, Alexander Pines, in *Single-Sided NMR*, Federico Casanova, Juan Perlo, Bernhard Blümich, *eds.* **2011**, Springer-Verlag Berlin Heidelberg.

"Development of NMR: Solid-State NMR and Materials Science, Post 1995," J. A. Reimer, in Encyclopedia of Magnetic Resonance **2012**, eds R. K. Harris and R. E. Wasylishen, John Wiley: Chichester. DOI: 10.1002/9780470034590.emrhp1084.

"Chemical Engineering Apologetics," Jeffrey A Reimer, Chapter 9 in **Chemical Engineering for the Curious,** The Curious Academic Publishing 2015, ISBN: 978-1-925128-49-9.

"Carbon capture and storage (CCS): the way forward," Mai Bui, Claire S. Adjiman, Andre Bardow, Edward J. Anthony, Andy Boston, Solomon Brown, Paul S. Fennell, Sabine Fuss, Amparo Galindo, Leigh A. Hackett, Jason P. Hallett, Howard J. Herzog, George Jackson, Jasmin Kemper, Samuel

Krevor, Geoffrey C. Maitland, Michael Matuszewski, Ian S. Metcalfe, Camille Petit, Graeme Puxty, Jeffrey Reimer, David M. Reiner, Edward S. Rubin, Stuart A. Scott, Nilay Shah, Berend Smit, J. P. Martin Trusler, Paul Webley, Jennifer Wilcox and Niall Mac Dowell, Energy & Environmental Science **2018** V 11, 1062-1176 .

JOURNAL PUBLICATIONS

1. *"Molecular Motion in Fluorocinnamates,"* J.T. Gerig, B.A. Halley and J.A. Reimer, Jour. Amer. Chem. Soc. **99**, 3579 (1977).

2. *"NMR Studies of Ortho and Meta-Fluorocinnamate-alpha-chymotrypsin Complexes,"* J.T. Gerig, B.A. Halley, D.T. Loehr and J.A. Reimer, Org. Mag. Res. **12**, 352 (1979).

3. *"Selective High Resolution Proton NMR Spectra in Solids,"* J.A. Reimer and R.W. Vaughan, Chem. Phys. Lett. **63**, 163 (1979).

4. *"Proton Magnetic Resonance Spectra of Plasma Deposited Amorphous Silicon Hydrogen Films,"* J.A. Reimer, R.W. Vaughan and J.C. Knights, Phys. Rev. Lett. **44**, 193 (1980).

5. *"Selective, Proton-Observed Heteronuclear Dipolar-Modulated Chemical Shift Spectra in Polycrystalline Solids,"* J. A. Reimer and R. W. Vaughan, Jour. Mag. Res. **41**, 483 (1980).

6. *"Silicon-29 Cross-Polarization Magic Angle Sample Spinning Spectra in Amorphous Silicon:Hydrogen Films,"* J. A. Reimer, P. DuBois Murphy, B. C. Gerstein and J. C. Knights, Jour. Chem. Phys. **74**, 1501 (1981).

7. *"Proton NMR Studies of Amorphous Plasma Deposited Films,"* J. A. Reimer, R. W. Vaughan and J. C. Knights, *Nuc. and Elec. Res. Spec. Appl. Mat. Sci.*, E. Kaufman and G. Shenoy eds., Elsevier, New York, (1981).

8. *"Proton NMR Studies of Annealed Plasma-Deposited Amorphous Si:H Films,"* J. A. Reimer, R. W. Vaughan and J. C. Knights, Solid State Comm. **37**, 161 (1981).

9. *"Proton Spin-Lattice Relaxation in Plasma Deposited Amorphous Silicon Hydrogen Films,"* J.A. Reimer, R.W. Vaughan, and J.C. Knights, Physical Review **B23**, 2567 (1981).

10. *"Effects of Inert Gas Dilution of Silane on Plasma-Deposited a-Si:H Films,"* J. C. Knights, R. A. Lujan, M. P. Rosenblum, R. A. Street, D. K. Biegelsen and J. A. Reimer, Appl. Phys. Lett. **38**, 331 (1981).

11. *"Proton Magnetic Resonance Spectra of Plasma-Deposited Inorganic Thin Films,"* J. A. Reimer, R. W. Vaughan, J. C. Knights and R. A. Lujan, Jour.Vac. Sci. Tech. **19**, 53 (1981).

12. *"Proton Magnetic Resonance Studies of Microstructure in Plasma-Deposited Amorphous Silicon-Hydrogen Films,"* J. A. Reimer, R. W. Vaughan and J. C. Knights, Physical Review **B24**, 3360 (1981).

13. *"Nuclear Magnetic Resonance Investigations of Hydrogenated Amorphous Silicon,"* Jeffrey A. Reimer, Jour. de Physique **42**, C4-715 (1981).

14. *"$IrSi_{1.75}$: A New Semiconductor Compound,"* S. Peterson, J.A. Reimer, M.H. Brodsky, D.R. Cambell, F. d'Heurle, B. Karlsson and P.A. Tove, Jour. Appl. Phys. **53**, 3342 (1982).

15. *"Low Defect Density Hydrogenated Amorphous Silicon Prepared by Homogeneous Chemical Vapor Deposition,"* B.A. Scott, J.A. Reimer, R.M. Plecenik, E.E. Simonyi and W. Reuter, Appl. Phys. Lett. **40**, 973 (1982).

16. *"Efficient Visible Luminescence from Hydrogenated Amorphous Silicon,"* D.J. Wolford, B.A. Scott, J.A. Reimer and J.A. Bradley, Physica **B 117/118**, 920 (1983).

17. *"Local Bonding Configuration of Phosphorus in Doped and Compensated Amorphous Hydrogenated Silicon,"* J.A. Reimer and T. Michael Duncan, Physical Review **B27**, 4895 (1983).

18. *"Efficient Visible Photoluminescence in the Binary a-Si:H_x Alloy System,"* D.J. Wolford, J.A. Reimer and B.A. Scott, Appl. Phys.Lett. **42**, 369 (1983).

19. *"Growth and Defect Chemistry of Amorphous Hydrogenated Silicon,"* B.A. Scott, J.A. Reimer and P.A. Longeway, Jour. Appl. Physics **54**, 6853 (1983).

20. *"Homogeneous Chemical Vapor Deposition of Amorphous Semiconductor Thin Films,"* B.A. Scott, W.L. Olbricht, J.A. Reimer, B.S. Meyerson, D.J. Wolford, Jour. Non Cryst. Solids **59/60**, 659 (1983).

21. *"Homogeneous Chemical Vapor Deposition,"* B.A. Scott, W.L. Olbricht, B.A.Meyerson, J.A. Reimer, D.J. Wolford, Jour. Vac. Sci. Technol. **A2**, 450 (1984).

22. *"Low Spin Density Amorphous Hydrogenated Germanium Prepared by Homogeneous Chemical Vapor Deposition,"* J.A. Reimer, B.A. Scott, D.J. Wolford and J. Nijs, Appl. Phys. Lett. **46**,369 (1985).

23. *"The Characterization of Alkyl Intermediates on Silica-Supported Ruthenium with 13C Nuclear Magnetic Resonance Spectroscopy,"* T.M. Duncan, J.A. Reimer, P. Winslow and A.T. Bell, Jour. of Catalysis **95**,305 (1985).

24. *"Comment on "High-Resolution Proton NMR in Amorphous Si:H: Spectroscopic Direct Observation of Molecular Hydrogen and Reinterpretation of the Narrow Line,""* W.E. Carlos, J.A. Reimer, P.C. Taylor, Phys. Rev. Lett. **54**, 1205 (1985).

25. *"Multiple Quantum NMR Study of Clustering in Hydrogenated Amorphous Silicon,"* J. Baum, K.K. Gleason, A. Pines, A.N. Garroway, and J.A. Reimer, Physical Review Letters **56**, 1377 (1986).

26. *"Amorphous Hydrogenated Semiconductors,"* Jeffrey A. Reimer, Plasma Processing, *MRS Proceedings Vol. 68*, J. Coburn, R.A. Gottscho, D.W. Hess, eds., Elsevier, New York (1986).

27. *"A Silicon NMR Investigation of Amorphous Hydrogenated Silicon Nitride,"* M.A. Petrich, Rhett E. Livengood, Jeffrey A. Reimer, Dennis W. Hess, *Materials Issues in Amorphous Semiconductor Technology, MRS Proceedings Vol. 70*, D. Adler, Y. Hamakawa, A. Madan, eds., Elsevier, New York (1986).

28. *"Multiple Quantum NMR Study of Hydrogen Clustering in Amorphous Silicon,"* Karen K. Gleason, J. Baum, A.N. Garroway, A. Pines, and Jeffrey A. Reimer, *Materials Issues in Amorphous Semiconductor, MRS Proceedings Vol.70*, D. Adler, Y. Hamakawa, A. Madan, eds. Elsevier, New York (1986).

29. *"Electron Optical Characterization of Amorphous SiC:H Films,"* R. M. Fisher, J.B. Posthill, M. Sarikaya, J.A. Reimer, and M. Petrich, *MRS Proceedings 69*, 153 (1986).

30. *"Monte Carlo Simulations of Amorphous Hydrogenated Silicon Thin Film Growth,"* K.K. Gleason, K.S. Wang, M.K. Chen, J.A. Reimer, Journal of Applied Physics **61**, 2866 (1987).

31. *"Inhomogeneous Carbon Bonding in Hydrogenated Amorphous Carbon Films,"* A. Grill, B.S. Meyerson, V.V. Patel, J.A. Reimer, M.A. Petrich, Jour. of Applied Physics **61**, 2874 (1987).

32. *"An In Situ Nuclear Magnetic Resonance Probe for Studies of Adsorbed Species on Catalysts,"* G.W. Haddix, J.A. Reimer, A.T. Bell, Journal of Catalysis **106**, 111 (1987).

33. *"Hydrogen Microstructure in Amorphous Hydrogenated Silicon,"* Karen K. Gleason, Mark A. Petrich, Jeffrey A. Reimer, Physical Review **B36**, 3259 (1987).

34. *"Identification of Chemical Growth Mechanisms in Amorphous Semiconductors,"* Jeffrey A. Reimer, Michael J. McCarthy, Karen K. Gleason, Philip W. Morrison, Jr., *MRS Proceedings 95*, 209 (1987).

35. *"Light-Induced Changes of Phosphorus Bonding Configurations in Hydrogenated Amorphous Silicon,"* M. J. McCarthy and Jeffrey A. Reimer, Phys. Rev. **B36**, Rapid Communications 4525 (1987).

36. *"A Nuclear Magnetic Resonance Study of Phosphorus Doped Polycrystalline Silicon,"* Michael J. McCarthy, Bernard S. Meyerson, Jeffrey A. Reimer, Journal of Applied Physics **62**, 3665 (1987).

37. *"Catalysis over Molybdenum Carbides and Nitrides I. Catalyst Characterization,"* G.S. Ranhotra, G.W. Haddix, A.T. Bell, J.A.Reimer, Jour. of Catalysis **108**, 24 (1987).

38. *"Catalysis over Molybdenum Carbides and Nitrides II. Studies of CO Hydrogenation and C_2H_6 Hydrogenolysis,"* G.S. Ranhotra, A.T. Bell, and J.A. Reimer, Journal of Catalysis **108**, 40 (1987).

39. *"Characterization of H_2 Adsorbed on γ-Mo_2N by NMR Spectroscopy,"* G.W. Haddix, Jeffrey A. Reimer, A.T. Bell, Jour. of Catalysis **108**, 50 (1987).

40. *"A Simple Method to Study Gas Phase Reactions,"* Philip W. Morrison, Jr.and Jeffrey A. Reimer, AIChE Journal **33** 2037 (1987).

41. *"Structure and Properties of Amorphous Hydrogenated Silicon Carbide,"* Mark A. Petrich, Karen K. Gleason, and Jeffrey A. Reimer, Physical Review **B36** 9722 (1987).

42. *"Influence of Degree of Polymerization on Phase Separation And Rheology of a Thermotropic Liquid Crystal Polymer,"* Karl R. Amundson, Douglass S. Kalika, Man-Ruo Shen, Xiao-Ming Yu, Morton M. Denn, and Jeffrey A. Reimer, Molecular Crystals and Liquid Crystals **153**, 271 (1987).

43. *"Structure and Properties of Plasma-Deposited Fluorinated Silicon Nitride Thin Films,"* Rhett Livengood, Mark A. Petrich, Dennis W. Hess, and Jeffrey A. Reimer, Journal of Applied Physics **63** 2651 (1988).

44. *"Characterization of NH_3 Adsorbed on γ-Mo_2N by NMR Spectroscopy,"* G.W. Haddix, D.H. Jones, J.A. Reimer, and A.T. Bell, Jour. of Catalysis **112**, 556 (1988).

45. *"Characterization of CO Adsorbed on γ-Mo_2N by NMR Spectroscopy,"* Grant W. Haddix, Alexis T. Bell, Jeffrey A. Reimer, Catalysis Letters **1**, 207 (1988).

46. *"Structural Heterogeneities in Device-Quality Amorphous Hydrogenated Semiconductors,"* Jeffrey A. Reimer and Mark A. Petrich, **Amorphous Silicon and Related Materials**, pps. 3-27, H. Fritzsche, Editor, World Scientific Pub. Co. 1988.

47. *"Silane Pyrolysis in a Piston Reactor,"* Philip W. Morrison, Jr. and Jeffrey A. Reimer, AIChE Journal **34** 783 (1989).

48. *"NMR Studies of Model Hydrodenitrogenation Catalysis: Acetonitrile Hydrogenation on gamma-Mo_2N,"* Grant W. Haddix, Alexis T. Bell, and Jeffrey A. Reimer, Jour. Phys. Chem. **93**, 5859 (1989).

49. *"Characterization of Amorphous Hydrogenated Carbon using Solid-State Nuclear Magnetic Resonance Spectroscopy,"* Karen C. Bustillo, Mark A. Petrich, Jeffrey A. Reimer, Chemistry of Materials, **2** 202 (1990).

50. *"Oxygen-17 Nuclear Magnetic Resonance Studies of Lanthanum Strontium Copper Oxide,"* Marjorie S. Went and Jeffrey A. Reimer, Chemistry of Materials **2** 389 (1990).

51. *"A Compact, High Temperature Nuclear Magnetic Resonance Probe For Use in a Narrow-Bore Superconducting Magnet,"* Stuart B. Adler, James N. Michaels, and Jeffrey A. Reimer, Rev. Sci. Instrum. **61** 3368 (1990).

52. *"Investigation of Microstructure in poly(p-hydroxybenzoic acid/ethylene terephthalate) Using Nuclear Magnetic Resonance Spectroscopy,"* Karl R. Amundson, Jeffrey A. Reimer, Morton M. Denn, Macromolecules **24** 3250 (1991).

53. *"Anomalous etch rates of photoresist with argon dilution of CF_4-O_2 plasma afterglows,"* Milo Koretsky and Jeffrey A. Reimer, Applied Physics Letters **59** 1547 (1991).

54. *"Magnetic Resonance Studies of ammonia adsorption and decomposition on titania-supported vanadia catalysts,"* Marjorie S. Went and Jeffrey A. Reimer, Journal of the American Chemical Society **114** 5768 (1992).

55. *"Magnetic resonance studies of polypeptide adsorption on silica and hydroxyapatite surfaces,"* Veronica L. Fernandez, Morton M. Denn, Jeffrey A. Reimer, Journal of the American Chemical Society **114** 9634 (1992).

56. *"A Simple Model for the Etching of Photoresist with Plasma-Generated Reactants,"* Milo D. Koretsky and Jeffrey A. Reimer, Journal of Applied Physics, **72** 5081 (1992).

57. *"Hydrodenitrogenation of Quinoline over High Surface Area Mo_2N,"* K.S. Lee, H. Abe, J.A. Reimer, A.T. Bell, Journal of Catalysis, **139** 34 (1993).

58. *"Spin Polarized ^{129}Xe NMR Study of a Polymer Surface,"* D. Raftery, L. Reven, H. Long, A. Pines, P. Tang, and J.A. Reimer, Journal of Physical Chemistry, **97** 1649 (1993).

59. *"Comparison of the Dynamics and Orientation of Chemisorbed Benzene and Pyridene on γ-Mo_2N,"* Phillip A. Armstrong, Alexis T. Bell, Jeffrey A. Reimer, Journal of Physical Chemistry, **97** 1952 (1993).

60. *"The Effect of Electric Field Gradient Asymmetry on Motionally Averaged Spin-1 Powder Patterns,"* Phillip A. Armstrong, Alexis T. Bell, Jeffrey A. Reimer, Solid State Nuclear Magnetic Resonance, **2** 1 (1993).

61. *"Dynamic Monte Carlo Simulation of Spin-Lattice Relaxation of Quadrupolar Nuclei in Solids: Oxygen-17 in Yttria-Doped Ceria,"* Stuart B. Adler, Jacob W. Smith, Jeffrey A. Reimer, Journal of Chemical Physics **98** 7613 (1993).

62. *"Nuclear magnetic resonance studies of blends containing poly(ethylene terephthalate) (PET) and poly (p- hydroxybenzoic acid co p- hydroxynapthoic acid) (Vectra-A),"* Pei Tang, Jeffrey A. Reimer and Morton M. Denn, Macromolecules **26** 4269 (1993).

63. *"Magnetic Resonance Studies of Ethene Adsorption on Alumina-Supported Platinum Surfaces,"* Janet Griffiths, Alexis T. Bell, and Jeffrey A. Reimer, Journal of Physical Chemistry **97** 9161 (1993).

64. *"High Field Cross Polarization NMR from Laser Polarized Xenon to a Polymer Surface,"* H.W. Long, H.C. Gaede, J. Shore, C.R. Bowers, A. Pines, P. Tang, J.A. Reimer, Journal of the American Chemical Society, Note **115** 8491 (1993).

65. *"Chemical Structure and Oxygen Dynamics in $Ba_2In_2O_5$,"* Stuart B. Adler, Jeffrey A. Reimer, Jay Baltisberger, and Ulrike Werner, Journal of the American Chemical Society **116** 675 (1994).

66. *"Determination of the Al-H and H-H Internuclear Distances in ZSM-5 using NMR Spectroscopy,"* Nicholas P. Kenaston, Alexis T. Bell, and Jeffrey A. Reimer, Journal of Physical Chemistry **98** 894 (1994).

67. *"Magnetic Resonance Studies of Propene Adsorbed on Alumina-Supported Platinum Surfaces,"* Janet Griffiths, Alexis T. Bell, and Jeffrey A. Reimer, Journal of Physical Chemistry **98** 1918 (1994).

68. *"Local Structure, Vacancy Ordering, and Oxide-ion Motion in Defective Perovskites,"* Stuart B. Adler, Steven Russek, Jeffrey A. Reimer, Mark Fendorf, Angelica Stacy, Qingzhen Huang, Antonio Santoro, Jeffrey Lynn, Jay Baltisberger, Ulrike Werner, Solid State Ionics **68** 193 (1994).

69. *"Electron Paramagnetic Resonance Studies of Copper Ion-exchanged ZSM-5,"* Sarah C. Larsen, Adam Aylor, Alexis T. Bell, Jeffrey A. Reimer, Journal of Physical Chemistry **98** 11533 (1994).

70. *"High-Field Cross Polarization NMR from Laser-Polarized Xenon to Surface Nuclei,"* H.C. Gaede, Y.-Q. Song, R.E. Taylor, E.J. Munson, J.A. Reimer, and A. Pines, Applied Magnetic Resonance **8** 373-384 (1995).

71. *"An Infrared Study of NO Decomposition over Cu-ZSM5,"* Adam W. Aylor, Sarah C. Larsen, Jeffrey A. Reimer, Alexis T. Bell, Journal of Catalysis **157** 592 (1995).

72. *"An infrared study of NO reduction by CH_4 over Co-ZSM-5,"* A.W. Aylor, L.J. Lobree, J.A. Reimer, A.T. Bell, *Studies in Surface Science and Catalysis*, J.W. Hightower, W.N. Delgass, E. Iglesia, A.T. Bell, eds., **Vol 101**, 661 (1996).

73. *"Optical Pumping in Solid State Nuclear Magnetic Resonance,"* Robert Tycko and Jeffrey A. Reimer, Journal of Physical Chemistry **100** 13240 (1996).

74. *"High-Temperature ^{17}O NMR as a Probe of Electron Localization and Structure in Transition Metal Oxides,"* Stuart B. Adler and Jeffrey A. Reimer, Solid State Ionics, 1996 **91** 175.

75. *"Quantitative Solid-State NMR Spectra of CO Adsorbed from Aqueous Solution Onto a Commercial Electrode,"* Mark S. Yahnke, Benjamin M. Rush, Jeffrey A. Reimer, Elton J. Cairns, Communication, Journal of the American Chemical Society 1996 **118** 12250.

76. *"Optically Enhanced NMR of Plastically-Deformed GaAs,"* T. Pietraβ, AA. Bifone, J. Krüger J.A. Reimer, A. Pines, Physical Review B15 1997 **55** 4050.

77. *"* ^{65}*Cu NMR Spectroscopy of Cu-exchanged ZSM-5 Catalysts,"* Sanlin Hu, Jeffrey A. Reimer and Alexis T. Bell, Journal of Physical Chemistry B 1997 **101** 1869.

78. *"The Role of Cyanide Species in the Reduction of NO by CH_4 over Co-ZSM-5,"* Lisa J. Lobree, Adam W. Aylor, Jeffrey A. Reimer, and Alexis T. Bell, Journal of Catalysis 1997 **169** 188.

79. *"NO adsorption, desorption and reduction by CH_4 over Mn-ZSM-5,"* Adam W. Aylor, Lisa J. Lobree, Jeffrey A. Reimer, and Alexis T. Bell, Journal of Catalysis 1997 **170** 390.

80. *"Oxygen Motion in Simple and Complex Oxides,"* Jeffrey A. Reimer and Stuart B. Adler, in *Solid-State NMR Spectroscopy of Inorganic Materials,* J.J. Fitzgerald, Ed., ACS Symposium Series 1999 **717** 156.

81. *"* ^{1}*H NMR Relaxation Study of Chain Motions in Fully Aromatic Thermotropic Liquid Crystalline Polymers,"* Michael Gentzler, Jeffrey A. Reimer, Morton M. Denn, Macromolecules 1997 **30** 8365.

82. *"A Multinuclear NMR Study of Enzyme Hydration in an Organic Solvent,"* Christopher S. Lee, Mathias Haake, Jonathan Dordick, Jeffrey A. Reimer, and Douglas S. Clark, Biotechnology and Bioengineering 1998 **57** 686.

83. *"Surface Enhanced NMR Using Continuous-Flow Laser-Polarized Xenon,"* Mathias Haake, Alexander Pines, Jeffrey A. Reimer, Roberto Seydoux, Communication, Journal of the American Chemical Society, 1997 **119** 11711.

84. *"Investigations of the Dispersion of Pd in H-ZSM-5,"* Adam W. Aylor, Lisa J. Lobree, Jeffrey A. Reimer, and Alexis T. Bell, Journal of Catalysis 1997 **172** 453.

85. *"Single-Input, Double-Tuned Circuit for Double Resonance NMR Experiments,"* Sanlin Hu, Jeffrey A. Reimer and Alexis T. Bell, Reviews of Scientific Instruments 1998 **69** 477.

86. *"Surface NMR Using Laser-polarized 129Xe under Magic Angle Spinning Conditions,"* E. Brunner, R. Seydoux, M. Haake, A. Pines, and J.A. Reimer, Journal of Magnetic Resonance 1998 **130** 145.

87. *"Enhancement of 13C NMR signals in solid C60 and C70 using laser-polarized xenon,"* E. Brunner, M. Haake, A. Pines, J.A. Reimer, and R. Seydoux, Chemical Physics Letters 1998 **290** 112.

88. *"Molecular Motion and Orientation Distributions in Melt-Processed, Fully Aromatic Thermotropic Liquid Crystalline Polyesters from* ^{1}*H NMR,"* Michael Gentzler, Siddharth Patil, Jeffrey A. Reimer, Morton M. Denn, Solid State Nuclear Magnetic Resonance 1998 **12** 97.

89. *"Supertransferred Hyperfine Fields at Li-7: Variable Temperature Li-7 NMR Studies of $LiMn_2O_4$-based Spinels,"* Becky Gee, Craig R. Horne, E.J. Cairns, J.A. Reimer, Journal of Physical Chemistry 1998 **102** 10142.

90. *"Optimizing the Salt-induced Activation of Enzymes in Organic Solvents: Effects of Lyophilization Time and Water Content."* Michael T. Ru, J.S. Dordick, J.A. Reimer, D.S. Clark, Biotechnology and Bioengineering 1999 **63** 233.

91. *"NO reduction by CH_4 in the presence of O_2 over Pd-H-ZSM-5."* Lisa J. Lobree, Adam W. Aylor, J.A. Reimer and A. T. Bell, Journal of Catalysis 1999 **181** 189.

92. *"Gas Flow MRI Using Circulating Laser-Polarized ^{129}Xe."* E. Brunner, M. Haake, L. Kaiser, A. Pines, and J.A. Reimer, Journal of Magnetic Resonance 1999 **138** 155.

93. *"NMR with a Continuously Circulating Flow of Laser-Polarized ^{129}Xe,"* Roberto Seydoux, Alexander Pines, Mathias Haake and Jeffrey A. Reimer, The Journal of Physical Chemistry B 1999 **103** 4629.

94. *"Structure and density of Mo and acid sites in Mo-exchanged H-ZSM5 catalysts for nonoxidative methane conversion,"* R.W. Borry, Y.H. Kim, A. Huffsmith, J.A. Reimer, E. Iglesia, The Journal of Physical Chemistry B 1999 **103** 5787.

95. *"GaAs nanostructures and films deposited by a Cu-vapor Laser,"* L.N. Dinh, S. Hayes, C. Saw, W. McLean II, M. Balooch, J.A. Reimer, Applied Physics Letters, 1999 **75** 2208.

96. *"Investigations of the State of Fe in H-ZSM-5,"* Lisa J. Lobree, In-Chul Hwang, Jeffrey A. Reimer, Alexis T. Bell, Journal of Catalysis, 1999 **186** 242-253.

97. *"An in-situ Infrared Study of NO Reduction by C_3H_8 over Fe-ZSM-5,"* Lisa J. Lobree, In-Chul Hwang, Jeffrey A. Reimer, Alexis T. Bell, Catalysis Letters 1999 **63** 233.

98. *"On the Salt-Induced Activation of Lyophilized Enzymes in Organic Solvents: Effect of Salt Kosmotropicity on Enzyme Activity,"* Michael T. Ru, Scott Y. Hirokane, Andy S. Lo, Jonathan S. Dordick, Jeffrey A. Reimer, and Douglas S. Clark, 2000 Journal of the American Chemical Society, **122** 1565.

99. *"Quantitative NMR Velocity Imaging of a Main-Chain Liquid Crystalline Polymer Flowing Through an Abrupt Contraction,"* Michael Gentzler, Yi-Q. Song, Susan J. Muller, Jeffrey A. Reimer, Rheological Acta 2000 **39** 1.

100. *"A Li-7 NMR study of lithium insertion into lithium manganese oxide spinel,"* M.C. Tucker, J.A. Reimer, E.J. Cairns, Elec. Sol. State Lett 2000 **3** 463.

101. *"Nuclear Magnetic Resonance and Voltammetry Studies of Carbon Monoxide Adsorption and Oxidation on a Carbon-Supported Platinum Fuel Cell Electrocatalyst,"* Benjamin M. Rush, Jeffrey A. Reimer, and Elton J. Cairns, Journal of the Electrochemical Society 2001 **148** A137.

102. *"Solid-State NMR Studies of Lead-Containing Zeolites,"* Heiko G. Niessen, Michelle Van Buskirk, Cecil Dybowski, David R. Corbin, Jeffrey A. Reimer, and Alexis T. Bell, Journal of Physical Chemistry B **2001** 105 2945.

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US Patent 8,614,575 B2: *"NMR, MRI, and Spectroscopic MRI in Inhomogeneous Fields,"* Vasiliki Demas, Alexander Pines, Rachel Martin, John Franck, Jeffrey Reimer.

INVITED LECTURES

"NMR Studies of Amorphous Hydrogenated Semiconductors", 1981 March Meeting of the American Physical Society.

"Magnetic Resonance Studies of Amorphous Thin Films," **9***th* International Conference on Liquid and Amorphous Semiconductors, Grenoble, France 1981.

"Magnetic Resonance Studies of Amorphous Thin Films," Colloquium, Department of Physics, University of Utah, 1982.

"Magnetic Resonance Studies of Amorphous Semiconducting Thin Films," Colloquium, Department of Chemistry, University of California at Los Angeles, 1982.

"The Chemistry and Physics of Inorganic Thin Films," Colloquium, Department of Chemistry, University of California at San Diego, 1982.

"The Preparation of Novel Thin Films Using Homogeneous Chemical Vapor Deposition", Colloquium, Xerox Palo Alto Research Center, March 28, 1983.

"Structures and Defects in Amorphous Semiconductors by Novel Applications of Solid State NMR", IBM Instruments, Inc., November 16, 1983.

"Structure and Defects in Amorphous Semiconducting Thin Films: New Applications of Solid State Nuclear Magnetic Resonance", The Aerospace Corporation, November 28, 1983.

"Amorphous Semiconductors: New Frontiers", Colloquium, Department of Chemical Engineering, Stanford University, February 8, 1984.

"Structure and Defects in Amorphous Semiconducting Thin Films: New Applications of Solid State NMR", Eastman Kodak Research Laboratories, March 30, 1984.

"Multiple Quantum NMR Studies of a-Si:H", March Meeting of the American Physical Society, 1985.

"NMR Studies of Amorphous Semiconductors", Gordon Conference on Magnetic Resonance, June 1985.

"Hydrogen and Microstructure in Amorphous Thin Film Semiconductors", NATO Summer Institute on Hydrogen in Solids, September, 1985.

"Magnetic Resonance of Thin Film Semiconductors", March Meeting of the American Physical Society, 1986.

"Amorphous Semiconductors: Poems, Prayers, and Promises", Colloquium, Stauffer Chemical Company, March 11, 1986.

"Amorphous Hydrogenated Semiconductors", Spring Meeting of the Materials Research Society, 1986.

"Nuclear Magnetic Resonance Of Solid State Electronic Materials", Gordon Conference on The Chemistry of Electronic Materials, June 1986.

"Magnetic Resonance Studies of Solids, Thin Films, and Surfaces", Colloquium, Department of Chemical Engineering, Colorado School of Mines, November, 1986.

"NMR Studies of Polymers, Semiconductors, and Surfaces", Colloquium, Raychem Corporation, February 1987.

"Identification of Chemical Growth Mechanisms in Amorphous Semiconductors", Spring Meeting of the Materials Research Society, April 1987.

"NMR Studies of Structure and Defects in Amorphous Semiconductors", Colloquium, Xerox Palo Alto Research Center, July 1987.

"NMR Studies of Solids, Thin Films, and Surfaces", Colloquium, Department of Chemical Engineering, University of California at San Diego, October 1987.

"Magnetic Resonance Studies of Thin Film Semiconductors", Colloquium, Department of Chemistry, University of California at Santa Barbara, January, 1988.

"NMR Studies of Solids, Thin Films, and Surfaces", Colloquium, Department of Chemical Engineering, Iowa State University, September 1988.

"On NMR and Chemical Engineering Research", Colloquium, Department of Chemical Engineering, University of California at Berkeley, October 1988.

"NMR Studies of the Structure of Plasma-Deposited Silicon-Carbide, Silicon-Nitride, and Diamond-Like Carbon", IBM Almaden Research Center, February 1989.

"NMR Studies of Solids, Thin Films, and Surfaces", Colloquium, Department of Chemical Engineering, Purdue University, February 1989.

"Nuclear Magnetic Resonance in Chemical Engineering Research: The History, The Promise, and The Practice", Colloquium, Department of Chemical Engineering, University of Wisconsin, March, 1989.

"NMR Studies of Model Hydrodenitrogenation Catalysis", Plenary Lecture, *X* National Meeting on Catalysis, INTEVEP, Caracas, Venezuela, May, 1989.

"Magnetic Resonance Studies of Polymers and Catalytic Surfaces", Colloquium, Department of Chemical Engineering, University of California at Santa Barbara, September, 1989.

"On the Application of Solid-State NMR to the Study of Polymers", Invited Lecture, 1989 Annual Meeting of the American Institute of Chemical Engineers, November, 1989.

"NMR Studies of Molecules Reacting on Catalytic Surfaces", Colloquium, Department of Chemical Engineering, MIT, November, 1989.

"NMR Studies of Small Molecules Adsorbed on Bulk Metals", Invited Lecture, 177th Meeting of the Electrochemical Society, Montreal, May, 1990.

"Solid State NMR and Materials Chemistry", Colloquium, Raychem Corporation, July 1990.

"Application and Development of NMR Spectroscopy Towards the Study of Materials and Materials Processing", Physical Chemistry Colloquium, Stanford University, November, 1990.

"Magnetic Resonance Studies of Issues in Electronic Materials Processing," Colloquium, Department of Chemical Engineering, Cornell University, September, 1991.

"Gas Phase Magnetic Resonance Studies of Plasma Processes," XVIII Meeting of the Federation of Analytical Chemistry and Spectroscopy Societies, Anaheim, October 1991.

"NMR of Ceramics," Materials Science and Engineering Department, Cornell University, April 1993.

"NMR Studies of Polymer Interfaces and Surfaces," Exxon Research, October 1993.

"Innovative Studies with Solid-State Nuclear Magnetic Resonance Spectroscopy," Colloquium, Chemistry Department, University of Delaware, December 1993.

"Is NMR a Useful Tool in Surface Science and Catalysis?," Colloquium, Chemistry Department, Texas A&M University, April, 1994.

"Designing Ceramics for Atomic Conductivity: Theory, Simulation, and NMR Experiments," Colloquium, Raychem Corporation, Menlo Park, Ca, September 1994.

"Atomic Motion in Solids: Theory, Simulation and Experiments," Colloquium, Department of Chemistry, University of Illinois Chicago Circle, November 1994.

"The Battle for Meaningful NMR Signals in Materials Chemistry," Experimental NMR Conference, Boston, MA April 1995.

"The Application of Solid State NMR Towards Issues in Materials Chemistry," Invited Lecture, 31st Annual ACS Western Regional Meeting and 4th Annual San Diego Biotech Symposium, October, 1995.

"Magnetic Resonance in Catalysis," Invited Lecture, 1995 Annual Meeting of the American Institute of Chemical Engineers, Miami Beach, FL November 1995.

"The Scholarship of Teaching," Keynote Address, 1995 Fall Orientation Conference for Graduate Student Instructors, Berkeley, CA.

"Atomic, Molecular, and Fluid Motion via Magnetic Resonance," Colloquium, Department of Chemical Engineering, Stanford University, May 1996.

"Atomic, Molecular, and Fluid Motion via Magnetic Resonance," Colloquium, Department of Chemical Engineering, University of California at Davis, May 1996.

"NMR Studies of Catalytic Surfaces and Reactions," Invited Lecture, 29*th* ACS Great Lakes Regional Meeting, May, 1996.

"Examination of the Mobility of Oxygen in Metal Oxides by ^{17}*O NMR,"* Invited Lecture, National American Chemical Society Meeting, Orlando FL August 1996.

"MRI Studies of Polymer Rheology in Contraction Flow," Golden Gate Polymer Forum, Asilomar, CA, April 1997.

"NMR of CO Adsorbed from Aqueous Solution Onto a Commercial Fuel Cell Electrode,", Invited Lecture, 39*th* Rocky Mountain Conference on Analytical Chemistry and Applied Spectroscopy, August, 1997.

"NMR Studies of Catalysis and Electrocatalysis," Colloquium, Department of Chemistry, University of California at Davis, October 1997.

"NMR Imaging of Axisymmetric Contraction Flows of Liquid Crystalline Polymer Solutions," XXIV Meeting of the Federation of Analytical Chemistry and Spectroscopy Societies, Providence, October 1997.

"Pedagogoical Mentorship: The Role of Faculty in Preparing Graduate Students to Teach," 6th American Association for Higher Education Conference on Faculty Roles and Rewards, Orlando, FL January, 1998.

"NMR Studies of Commercial Fuel Cell Electrodes," 215th National Meeting of the American Chemical Society, Dallas, TX, April 1998.

"NMR and Chemical Engineering: A Hammer Looking for Nails?", Colloquium, Department of Chemical Engineering, University of Delaware, March 1999.

"NMR and voltammetric investigation of carbon monoxide adsorption and oxidation on carbon-supported platinum-based electrocatalysts," 217th National Meeting of the American Chemical Society, Anaheim CA, March 1999.

"Magnetic Resonance Studies of Electrochemical Systems", Colloquium, Department of Chemical Engineering, Case Western University, April 1999.

"Magnetic Resonance Studies of Surfaces: Structure, Dynamics, and Reaction", Colloquium, Department of Chemistry, University of Washington, May 1999.

"Batteries, Membranes and Fuel Cells: An Atomistic Perspective via NMR", Colloquium, DuPont Central Research, Wilmington, DE July 1999.

"Materials for Electrochemical Devices: An Atomistic Perspective via NMR", Colloquium, Department of Chemistry, University of Iowa, October 1999.

"NMR Studies of Electrochemical Systems", Colloquium, Department of Chemistry, University of Minnesota, January 2000.

"NMR Velocity Imaging of a Liquid Crystalline Polymer Flowing Through an Abrupt Contraction,", Invited Lecture, 219*th* Annual Meeting of the American Chemical Society, San Francisco, CA March 2000.

"NMR Imaging of a Liquid Crystalline Polymer Flowing Through an Abrupt Contraction,", Invited Lecture, 42*nd* Rocky Mountain Conference on Analytical Chemistry and Applied Spectroscopy, August, 2000.

"Real-time Wood Chip Moisture Content by Magnetics," Invited Lecture, DOE/Office of Industrial Technologies Sensors and Controls Meeting, New Orleans, LA June 2001.

"Optical Pumping in Semiconductors," Colloquium, Institute for Physical and Theoretical Chemistry, University of Bonn, Germany, August 2001.

"Optical Pumping in GaAs Materials: Unexplained Phenomenology," Invited Lecture, 14th Conference of the International Society of Magnetic Resonance, Rhodes, Greece August 2001.

"Spectroscopic Studies of Electrode Materials: Analyzing the Lithium Superhighway," Colloquium, Department of Chemistry, Georgetown University, March 2002.

"Through the electrons, darkly," 2002 Vaughan Lecture, 44^{th} Annual Rocky Mountain Conference on Analytical Chemistry, July 2002.

"The Existential Joy of the Unpaired Electron," Colloquium, North Carolina State University, March 28, 2003.

"Exploiting the Electron-Nuclear Hyperfine Interaction," Invited Lecture, Experimental NMR Conference (ENC), April 3, 2003.

"The Long Distance Love Affair between Electrons and Nuclei." Colloquium, University of Minnesota, April 22, 2003.

"The Existential Joy of the Unpaired Electron," Colloquium, Washington-Area NMR Group, May 16, 2003.

"Energy from Batteries and Fuel Cells: Traffic and Parking Problems in the Atomic Commute," Colloquium, St. Louis Area NMR Discussion Group, St. Louis Section of the American Chemical Society, February, 2004.

"Energy from Batteries and Fuel Cells: Traffic and Parking Problems in the Atomic Commute," Colloquium, IBM Almaden Research Center, February, 2004.

"Energy from Batteries: Parking Problems in the Atomic Commute," Colloquium, Department of Chemical Engineering, Stanford University May 2004.

"Optical pumping in bulk GaAs," Invited Talk, 229th National American Chemical Society Meeting, San Diego, CA March 2005.

*"SQUID-Detected MR Elastography in Microtesla Fields,"*Invited Lecture, 4th Annual Colloquium on Mobile NMR, Perugia, Italy, September 2005.

"NMR in Chemical Engineering," Invited Colloquium, Macromolecular Chemistry Institute, RWTH Aachen, Germany, October 2005.

"Magnetic Resonance and the design and Analysis of Macromolecular Systems Governed by Physical and Chemical Rates," Colloquium, Max Plank Institute for Polymer Research, Mainz, Germany, January 2006.

"The Quest for Cold NMR in Hot Applications: Optical Pumping for Sensitivity Enhancement," Colloquium, Max Plank Institute for Polymer Research, January, 2006.

"Magnetic Resonance and Studies of Systems Governed by Physical and Chemical Rates," Institut für Technische und Makromolekulare Chemie RWTH-Aachen, April 2006.

"NMR Studies of Electrochemical Systems," Colloquium, Department of Chemistry, University of Delaware, April 19, 2006.

"Solid State NMR Studies of Electrochemical Systems," Colloquium, Universität Leipzig, Fakultät für Physik und Geowissenschaften Institut für Experimentelle Physik I, May 30, 2006.

"NMR Studies of Materials," Invited Talk, 2006 Fall MRS Meeting, Boston, MA

"NMR of Electrochemical Systems" Colloquium, Department of Chemical Engineering, City College of New York, Feb 5, 2007

"Nuclear Spintronics," Invited Talk, 40th Canadian Society of Chemistry National Meeting, Winnipeg, CA May 2007

"NMR Assessment of Polymer Mechanical Properties: Portable NMR and elastomeric moduli?," Invited Talk, 7th International Conference on Magnetic Resonance Resonance Microscopy, Aachen, Germany September 2007.

"Physical and Chemical Rates from NMR Spectroscopy and Imaging," Colloquium, University of Texas, Austin, January 2008.

"NMR Relaxation Phenomena: From Enzyme Activity to Nuclear Spintronics," Otto M. Smith Lectureship, Oklahoma State University, April 2008.

"Characterizing Electrocatalysts and Electrocatalysis: 13C and 195Pt NMR Studies of PEM Fuel Cell Materials," St. Louis Area NMR Users Group, Washington University, April 2008.

"Do Protein Dynamics Govern Biocatalysis?" Invited Speaker, 50th Rocky Mountain Conference on Analytical Chemistry, Breckeneridge, CO July 2008.

"Spin is at the Core of Chemical Engineering," Colloquium, School of Chemical and Biomolecular Engineering, Georgia Tech University, October 2008.

"Putting the Right Spin on Chemical Engineering," Colloquium, Chemical and Environmental Engineering, UC Riverside, October 2008.

"Spin Control for Engineers," Colloquium, Department of Chemical Engineering, UC Santa Barbara, April 2009.

"Fuel Cell Electrocatalysis," Invited Speaker, 51st Rocky Mountain Conference on Analytical Chemistry, Aspen, CO July 2009.

"Hyperpolarized ^{13}C NMR in Diamond via Optical Pumping," Invited Speaker, 10th International Conference on Magnetic Resonance Microscopy, West Yellowstone, Montana, September 2009.

"Electrons in Solids: Chemical Applications of Ultra Low Resolution NMR," Colloquium, Department of Chemistry, Yale University October 2009.

"Spin Control for Engineers," Colloquium, Department of Chemical Engineering, University of Florida, February 2010.

"Optical Nuclear Pumping in Bulk Semiconductors," Colloquium, National High Magnetic Field Laboratory, Florida State University, February 2010.

"Spin Control for Engineers," Colloquium, Applied Science and Technology, University of California Berkeley, April 2010.

"Optical Nuclear Hyperpolarization in Semiconductors," Invited Lecture, World-Wide Magnetic Resonance Conference, Florence, IT July 2010.

"Magnetic Resonance in Catalysis: Methods and Applications to Energy Storage and Generation," Invited Lecture, 6*th* European Federation of Catalysis Summer School, Izmir, Turkey September 2010.

"Optical Generation of Large Nuclear Spin Polarization," Invited Lecture, 39*th* Southeastern Magnetic Resonance Conference, Gainesville, FL October 2010.

"Spin Control for Engineers - A Nobel History," Colloquium, Department of Chemical Engineering, Purdue University, November 2010.

"Proton-conducting rare earth phosphates for fuel cell applications," Invited Lecture, International Chemical Congress of Pacific Basin Societies, December 2010.

"Energy Storage and Utilization, Fuel Cells and Li Batteries," Invited Lecture, "Energy Challenges for Advanced Materials and Processes- EnCAMP 2011", Cappadocia, Turkey. May 2011.

"Spin Control Without the Politics," Colloquium, Department of Chemistry, New York University, September 2011.

"Optical Re-writable Patterns of Nuclear Magnetization in Gallium Arsenide," Invited lecture, 53*rd* ENC, Miami, Florida, April 2012.

"NMR Characterization of Metal-Organic Frameworks for Carbon Capture," Invited Lecture, Department of Energy Basic Energy Sciences Separations and Analysis Meeting, April 2012 Annapolis, Maryland.

"Spin in the Chemical Sciences," Colloquium, Department of Chemical and Biomolecular Engineering, Zhejiang University, Hangzhou, China June 2012.

"Spin in the Chemical Sciences," Colloquium, Department of Chemical Engineering, Beijing University of Chemical Technology, Beijing, China June 2012.

"Spin in the Chemical Sciences," Colloquium, Department of Chemical Engineering, East China University of Science and Technology, Shanghai, China June 2012.

"Carbon Capture, NMR, and MOF's," Invited lecture, 54^{th} Annual Rocky Mountain Conference on Analytical Chemistry, Copper Mountain CO July 2012.

"High Throughput Combinatorial Chemistry with the ACT MOUSE," Invited lecture, The NMR Symposium at RWTH Aachen University, November 2012.

"NMR: Rich in History, Rich in Application," Award Lecture, Eastern Analytical Society Award for Outstanding Achievements in Magnetic Resonance, Somerset, NJ November 2012.

"NMR: From Analytical Chemistry to Nuclear Spintronics," Colloquium, Department of Chemistry and Biochemistry, University of Delaware, April 2013.

"NMR: From Analytical Chemistry to Nuclear Spintronics," Colloquium, Department of Chemical Engineering, Drexel University, April 2013.

"Panelist, Workshop on Undergraduate Chemistry Education", Chemical Sciences Roundtable, National Academy of Sciences, Washington D.C. May 2013

"NMR Distance measurements, along with molecular simulations, act as blunt instrument for ascertaining linker distributions in metal-organic frameworks," Invited Lecture, Euromar 2013 Conference, Crete, Greece June 2013.

"Photo-induced Nuclear Spin Dynamics in GaAs, Invited Lecture, 8th Alpine Conference on Solid-State NMR, Chamonix FR September 2013.

"A Molecular View of Metal-Organic Frameworks for Carbon Capture, Colloquium, Department of Chemical Engineering, Middle Eastern Technical University, Ankara Turkey, October 2013

"Nuclear hyperpolarization: The Quest for Ultra-High Sensitivity NMR, Quantum Computing, and Nuclear Spintronics, Colloquium, Department of Chemistry, Bilkent University, Ankara Turkey October 2013.

"NMR: Spin without the Politics" Colloquium, Department of Chemical Engineering, Arizona State University, February 2014.

"Carbon Capture with Metal Organic Frameworks" Colloquium, Department of Chemistry, University of California Santa Barbara, May 2014.

"Nuclear hyperpolarization: The Quest for Ultra-High Sensitivity NMR, Quantum Computing, and Nuclear Spintronics" Colloquium, Institute for Terahertz Science and Technology, University of California Santa Barbara, May 2014.

"The Chemical Enterprise through the Lens of Science Fiction" Invited Lecture, 2014 Annual Meeting of the Council for Chemical Research, Alexandria VA May 2014

"Hyperpolarization in Diamond: Panoply of Phenomenology, A Paucity of Percipience," Invited lecture, Euromar 2014 Conference, Zurich, Switzerland, July 2014.

"What NMR Can Tell us About MOFS," Invited lecture, 4th International Conference on Metal Organic Frameworks and Open Framework Compounds, Kobe, Japan, September 2014.

"Mentoring of Students by Faculty," Invited panelist and speaker, The Cambridge Roundtable on Science, Art, and Religion, Harvard University, October 7, 2014.

"Carbon Capture with Metal Organic Frameworks" Colloquium, Department of Chemical and Biomolecular Engineering, University of Notre Dame, November 11, 2014.

"What NMR Can Tell Us About Metal Organic Frameworks," Invited Lecture, National Magnetic Resonance Society of India, Amritsar March 2015.

"What NMR Can Tell Us About Metal Organic Frameworks," Invited Lecture, Experimental NMR Conference, Asilomar, CA April 2015.

"The Existential Joy of Nuclear Spin," Plenary lecture, International Conference on Magnetic Resonance Microscopy, Munich Germany August 2015.

"Clouds and Cooperativity in Metal Organic Frameworks," Invited Lecture, International Society of Magnetic Resonance, Shanghai, China August 2015.

"From Shakespeare to snow: A Changing Climate and An Appropriate Response," Colloquium, Department of Chemistry, Zhejiang University, Hangzhou, China September 2015.

"Our Changing Climate-And our Response," Invited Lecture, Transregional Collaborative Research Centre 32, University of Cologne October 2015.

"Carbon Capture, Metal Organic Frameworks, and Surprises," Colloquium, Department of Chemical Engineering, University of Michigan, November 2015.

"What NMR Can Tell Us About Metal Organic Frameworks," Colloquium, Laboratory of Molecular Simulation, Institut des Sciences et Ingénierie Chimiques, Ecole Polytechnique Fédèrale de Lausanne (EPFL), Sion, Switzerland November 2015.

"NMR in Engineering Science," Colloquium, Institut des Sciences et Ingénierie Chimiques, Ecole Polytechnique Fédèrale de Lausanne (EPFL)Lausanne, Switzerland.

"Benvolio knew it, and now we live it: our changing climate," University Lecture, Franklin University, Lugano, Switzerland, November 2015.

"Nuclear hyperpolarization: The Quest for Nuclear Spintronics and Ultra-High Sensitivity Magnetic Resonance," Colloquium, Institut für Physik Johannes Gutenberg-Universität, Mainz, Germany December 2015.

"Carbon Capture," Invited Lecture, Pro2Pro NMR Symposium, RWTH Aachen University, Germany, December 2015.

"Metal Organic Frameworks: Structure, Dynamics, Cooperativity," Invited lecture, Hokkaido University - UC Berkeley Joint Symposium on Chemical Sciences and Engineering, Hokkaido University, Sapporo Japan, January 2016.

"High Field DNP in Diamond without Microwaves," Invited lecture, Department of Chemistry, Cambridge University, Cambridge UK February 2016.

"Hyperpolarization in Diamond: High Field DNP without Microwaves," Invited Speaker, Department of Chemistry, Zhejiang University, Hangzhou China March 2016.

"Nuclear hyperpolarization: The Quest for Nuclear Spintronics and Ultra-High Sensitivity Magnetic Resonance, Invited colloquium, Leibniz-Institut fur Polymerforschung, Dresden Germany April 2016.

"NMR in Engineering Science," Gesellschaft Deutscher Chemiker (GDCh) Colloquium, Technical University Dresden, April 2016.

"Physical Chemistry in Metal Organic Frameworks," Colloquium, Department of Chemistry, University of Liverpool April 2016.

"NMR and Materials Chemistry in Metal Organic Frameworks," Invited Lecture Zing Conference on Developments and Applications of Solid State NMR to Materials Science, Chemistry and Engineering Conference, Varna Bulgaria May 2016.

"Carbon Capture and Sequestration-Our Response to a Changing Climate," Gesellschaft Deutscher Chemiker (GDCh) Colloquium, RWTH Aachen University, Aachen, Germany May 2016.

"Benvolio knew it, and now we live it: our changing climate," Institute lecture of the RWTH Faculty Club, Aachen, Germany June 2016.

"NMR Present and Future: From Metal-Organic Frameworks to Hyperpolarized Diamond," Colloquium, Institute of Microstructure Technology, Karlsruhe Institute of Technology, Karlsruhe, Germany June 2016.

"Optical Pumping of nuclear spins in diamond and GaAs," Colloquium, Department of Physics, Technical University Dortmund, Germany June 2016.

"Grand Challenges in Nanoporous Framework Materials," Invited speaker, ACalNet Workshop 2016, Aachen Germany June 2016.

"Our Climate and My Response: NMR and Metal-Organic Frameworks," Colloquium, Institute for Molecules to Materials, Raboud University, Nijmegen, Netherlands June 2016.

"Converting Light into Hyperpolarization via Artificial Atoms in Semiconductors," Invited lecture, International Workshop on Solid State Nuclear Magnetic Resonance, Lanzhou China August 2016.

"My Response to our Changing Climate: NMR and Metal-Organic Frameworks," Colloquium, Department of Chemical and Biomolecular Engineering, University of Wisconsin, November 2016.

"Teaching, Research, and Assessment at UC Berkeley," Institute Lecture, Guru Nanak Dev University, Amritsar, India December 2016.

"Carbon Capture Apologetics and a Role for Metal-Organic Frameworks," Chemistry Colloquium, Weizmann Institute Rehovot Israel January 2017.

"Spin Hyperpolarization in Bulk Diamond," Chemistry Seminar, Weizmann Institute Rehovot Israel January 2017.

"Carbon Capture Apologetics and a Role for Metal-Organic Frameworks," Chemistry Colloquium, San Francisco State University, March 2017.

"Scientific Evidence that Demands a Verdict: Our Changing Climate," Senior Humanities Program Lecture, The American School in Switzerland (TASIS), March 2017.

"Carbon Capture Apologetics and a Role for Metal-Organic Frameworks," Philip W. Morrison Lecture, Case Western Reserve University, Cleveland OH April 2017.

"Disorder and Flexibility: Are MOFs More Like Proteins than Catalysts?," Invited Lecture, 100th Canadian Chemistry Conference and Exhibition, Toronto CA May 2017.

"An Atomistic View of Ion and Molecule Transport in Solids, **Paul Callaghan Plenary Lecture**, International Society for Magnetic Resonance Conference 2017, Quebec City, July 2017.

"Relaxometry and Diffusometry of Small Molecules in MOFs," Invited Lecture, International Society for Magnetic Resonance Microscopy, Halifax CA August 2017.

"Solid State NMR of Metal Organic Frameworks," Invited Lecture, 10th Alpine NMR Conference, Chamonix FR September 2017.

"Physical Chemistry in Metal Organic Frameworks," Colloquium, Advanced Materials Characterization Division, National Institute of Standards and technology (NIST) Gaithersburg, MD September 2017.

"My Response to our Changing Climate: NMR and Metal-Organic Frameworks," Colloquium Department of Chemical and Biological Engineering, Colorado School of Mines, Golden, CO October 2017.

"Optical Pumping of nuclear spins in diamond and GaAs," Physical Chemistry Seminar, Department of Chemistry, University of Washington, Seattle WA December 2017.

"Why, and How, I would like to Decarbonize the Air, Chemistry seminar, University of Windsor, Windsor, ON CA January 2018.

"NMR & Metal-Organic Frameworks, ChE Seminar, Northeastern University February 2018.

"Reaction and Transport within Metal-Organic Frameworks, Keynote Lecture, The 14th International Bologna Conference on Magnetic Resonance in Porous Media (MRPM14), Gainesville, FL USA February 2018.

"NMR Assessment of structure and dynamics within metal organic frameworks." Invited lecture, 255^{th} ACS National Meeting, New Orleans, USA March 2018.

"Capturing CO_2 with metal organic frameworks." Invited lecture, 255^{th} ACS National Meeting, New Orleans USA March 2018.

"Carbon Capture and MOFs: A Role for SSNMR." Invited lecture, EUROMAR, Nantes, France June 2018.

"Liquid and Gas Diffusion in Metal-Organic Frameworks" Invited lecture, 59^{th} Annual Rocky Mountain Conference on Analytical Chemistry, Snowbird, Utah July 2018.

"NMR and the Grand Challenges in MOF Research" Invited lecture, 6^{th} SMARTER Conference, Ljubljana, Slovenia 2018.

"Introduction to Carbon Capture" Invited lecture, Kuwait Foundation for the Advancement of Science, Kuwait City, Kuwait October 2018.

"How are we to think about climate change?" Invited lecture, Biola University School of Science, Technology, and Health, January 2019.

"Our Changing Atmosphere: Evidence that demand a Verdict?" Institute Lecture, NYU Abu Dhabi, September 17, 2019. Available at https://youtu.be/QeqDfDD4xbg

"NMR and the Grand Challenges of Metal-Organic Frameworks" Seminar, Department of Chemistry, NYU Abu Dhabi September 17, 2019.

"Our Changing Atmosphere: Evidence that demand a Verdict?" Summer for Science Cal Public Lecture, Sept 21, 2019.

"NMR and the Grand Challenges of Metal-Organic Framework" Colloquium, Chemistry Department, Nanjing University, Nanjing, China October 10, 2019.

"NMR and the Grand Challenges of Metal-Organic Frameworks," Colloquium, and *"Optical pumping of nuclear spins in diamond and GaAs,"* seminar, Physics Department, East China Normal University, Shanghai, China October 11, 2019.

"Optical pumping of nuclear spins in diamond and GaAs," Physical Chemistry Colloquium, Peking University, Beijing, China October 14, 2019.

"NMR and the Grand Challenges of Metal-Organic Frameworks," Seminar, School of Materials Science and Engineering & National Institute for Advanced Materials, Nankai University, Tianjin, China October 16, 2019.

"Optical pumping of nuclear spins in diamond and GaAs," Seminar, Chemistry Department, Zhejiang University, Hangzhou, China, October 18, 2019.

"NMR and the Grand Challenges of Metal-Organic Frameworks," Physical Chemistry Colloquium, MIT, Boston MA November 5, 2019

"Optical pumping of nuclear spins in diamond,"' Seminar, Chemistry Department MIT, Boston MA November 6, 2019.

"NMR and the Grand Challenges of Metal-Organic Frameworks," Colloquium, Department of Chemical Engineering, Columbia University, New York NY November 19, 2019.

"Our Changing Atmosphere: Evidence that demand a Verdict?," Seminar, Department of Chemical Engineering, Columbia University, New York NY November 19, 2019.

"NMR and the Grand Challenges of Metal-Organic Frameworks," Colloquium, Department of Chemistry, Western University Ontario, London, Ontario January 8, 2020.

"NMR and the Grand Challenges of Metal-Organic Frameworks," Colloquium, Department of Chemical Engineering, South Dakota School of Mining and Technology, Rapid City, SD January 28, 2020.

"NMR and the Grand Challenges of Metal-Organic Frameworks," Colloquium, Department of Chemistry, Virginia Institute of Mining and Technology, Rapid City, SD February 7, 2020.

"NMR and the Grand Challenges of Metal-Organic Frameworks," Invited talk, *NMR of Materials* Symposium, ACS Fall Meeting and Expo, August 2020.

"NMR and the Grand Challenges of Metal-Organic Frameworks," Invited talk, MOF 2020, Dresden, DE September, August 2020.

"NMR and the Grand Challenges of Metal-Organic Frameworks," Chemistry Colloquium, Louisiana State University, October 2020.

"Our Changing Atmosphere: Evidence that Demands a Verdict," Berkeley Ecosystems Alumni Lecture, https://www.berkeleyecosystems.com/pastevents, April 2021

"Evidence that Demands a Verdict," Berkeley Palmer Lecture (invited) First Presbyterian Church Berkeley, April 9, 2021 (https://www.youtube.com/watch?v=e67rLME0fH0)

"Our Changing Atmosphere: Carbon, Consequences, and Capture," Weizmann Institute Sustainability & Energy Research Forum July 26 2021.

"Exploiting Landau-Zener Crossings from Athermal Electrons for Nuclear Hyperpolarization," Invited Lecture 2021 International Society for Magnetic Resonance Conference, August 23, 2021.

*"Our Changing Atmosphere: Evidence that demands a Verdict,"*Plenary Lecture, 8th National Catalysis Conference (online) September 9 2021, Ankara Turkey.

*"The Molecular Perspective on Carbon Capture,"*Chemical Engineering Colloquium, City University of New York, September 20, 2021.

"NMR Probes Carbon Capture Materials," invited lecture, 18th NMR Users Meeting of the Associacao de Usuarios de Resssonancia Magnetica Nuclear, Brasilia Brazil (online) November 18, 2021

"The Molecular Perspective on Carbon Capture," Leipzig Spin Resonance Colloquium, online, December 1, 2021.

"The Molecular Perspective on Carbon Capture," Colloquium, Department of Chemistry, Oregon State University, April 21, 2022.

"The Molecular Perspective on Carbon Capture," Colloquium, Department of Chemical Engineering, University of California Santa Barbara, May 25. 2022.

"The Molecular Perspective on Carbon Capture," Banquet speaker, CARA BASF Annual Meeting, University of California Berkeley, July 7, 2022.

"A molecular view of adsorption within porous materials, with particular attention to CO2," Plenary Lecture, Magnetic Resonance in Porous Media Conference, Hangzhou, China (remote), August 23, 2022.

"The Molecular Perspective on Carbon Capture," Invited lecture, Instituto de Ciencia y Tecnologa del Carbono (INCAR), CSIC, Oviedo, Spain September 27, 2022.

"The Molecular Perspective on Carbon Capture," Invited lecture, The Novo Nordisk Foundation CO2 Research Center, October 12, 2022.

"When the Chemical Bond is Not Enough," Gilbert N. Lewis Lecture, UC Berkeley, CA October 18, 2022.

"A Molecular View of carbon capture in porous materials," Invited lecture, Intercontinental Magnetic Resonance Conference on Methods and Applications, ICONS6 (online), January 25-27, 2023.

"Commencement Speaker,", College of Chemistry UC Berkeley, May 17, 2023.

"Placing our CCUS Work in Context; Lessons from Public Lectures," Keynote speaker, 2023 Carbon Capture Utilization and Storage Gordon Research Seminar, May 27 2023, Switzerland.

"A Molecular View of Carbon Capture on Surfaces," Plenary Speaker, 2023 Euromar Conference, Glasgow, Scotland July 10, 2023.

"A Molecular View of Carbon Capture with NMR," Invited Lecture, Fall 2023 ACS Meeting, San Francisco, CA, August 15, 2023.

"Carbon is Changing our Planet: Consequences and Actions," Keynote Speaker, National Presbyterians for Earth Care Conference, Online and in person, Berkeley, CA Sept 22, 2023.

"A Molecular View of Carbon Capture," Keynote Address, Gordon Conference on Gas Separations, January 2024 Galveston, TX.

"Carbon and Energy: A Call for Justice," Colloquium, Dept Chem. and Biomolec. Engr, UC Berkeley February 2024.

"Carbon Capture in Porous Materials," Invited Speaker, NMR2 Conference, March 2024 Albuquerque N.M.

"Does a Molecular View of Carbon Capture Matter?" Invited speaker, Dream reactions of CO2: Capture, conversion, and beyond, Novo Nordisk Foundation, September 2024 Hillerød, Denmark

"Our children, our students," Invited lecture, AIChE Meeting November 2024 San Diego CA.