Marco Flores, Ph.D.

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EDUCATION AND TRAINING

National University of Engineering, Perú	B.Sc. Physics	1993
Brazilian Center for Research on Physics, Brazil	M.Sc. Physics	1996
Brazilian Center for Research on Physics, Brazil	Ph.D. Physics	2000
University of California, San Diego	Post-Doc Biophysics	2000-2004

PROFESSIONAL APPOINTMENTS

Arizona State University, Manager of the Single Crystal X-ray Diffraction Facility	2022-Present
Arizona State University, Manager at the Ultrafast Laser Facility	2018-2021
Arizona State University, Research Professional and Manager of the EPR Facility	2008-Present
Max-Planck Institute for Bioinorganic Chemistry, Germany, EU Research Fellow	2004-2008
Brazilian Center for Research on Physics, Brazil, Visiting Scientist	2004
Private University Antenor Orrego, Perú, Teaching Assistant	1991-1993

FELLOWSHIPS AND HONORS

National Science Foundation (NSF), MRI Program, Member of EPR Review Panel	2015-2017
Wolf Foundation, Israel, Special Guest to the Ceremony of the Wolf Foundation Prize	2007
European Union/Energy Network Project (SOLAR-H), Research Fellowship	2004-2008
National Institutes of Health (NIH), Postdoctoral Fellowship	2000-2004
Ministry of Education, Brazil (CAPES), Ph.D. Fellowship	1996-2000
Ministry of Education, Brazil (CAPES), M.Sc. Fellowship	1993-1996

INVITED TALKS AND ORAL PRESENTATIONS

Spin Chemistry Meeting, Padova, Italy	2026
ASU Core Facilities Symposium, Tempe, AZ	2018
George Feher Memorial Symposium, La Jolla, CA	2018
XL Encontro Nacional de Física da Matéria Condensada, Armação dos Búzios, Brazil	2017
American Chemical Society, 45th Western Regional Meeting, San Marcos, CA	2015
54th Annual Rocky Mountain Conf. on Analytical Chemistry, Copper Mountain, CO	2012
Department of Physics, University of California, San Diego, La Jolla, CA	2008
6th European Federation of EPR Groups Meeting (EFEPR-06), Madrid, Spain	2006
SOLAR-H Workshop 2006, Gelsenkirchen, Germany	2006
Department of Physics, Free University Berlin, Berlin, Germany	2005
Max-Planck Institute for Bioinorganic Chemistry, Mülheim an der Ruhr, Germany	2004
48th Annual Meeting of the Biophysical Society, Baltimore, MD	2004
School of Sciences, National University of Engineering, Lima, Perú	2000
XXIII Encontro Nacional de Física da Matéria Condensada, São Lourenço, Brazil	2000
Institute of Biophysics “Carlos Chagas Filho”, UFRJ, Rio de Janeiro, Brazil	1996
School of Sciences, National University of Engineering, Lima, Perú	1996

CURRENT COLLABORATORS

James Allen, School of Molecular Sciences, Arizona State University
Kevin Redding, School of Molecular Sciences, Arizona State University
Ryan Trovitch, The Biodesign Institute, Arizona State University
Gary Moore, The Biodesign Institute, Arizona State University
Tijana Rajh, School of Molecular Sciences, Arizona State University

RESEARCH EXPERIENCE

Arizona State University, Tempe *September 2008-Present*
My research focuses on the study of radicals, radical pairs, triplet states and transition metal complexes involved in bioenergetics and related model systems using modern electron paramagnetic resonance (EPR) techniques. I am investigating the electronic structure of metals at a metal-binding site introduced in modified bacterial reaction centers or in artificial metalloproteins (see publications 15, 26, 29 and 34). The metal-binding site is designed to mimic the one present in photosystem II, which harbors the oxygen evolving Mn cluster.

Max-Planck Institute for Bioinorganic Chemistry, Germany *November 2004-August 2008*
My research was focused on the study of the structure and function of the enzyme [NiFe] hydrogenase. This enzyme is important for future biologically based hydrogen production technology. EPR techniques were used to characterize the electronic structures of the oxidized states, Ni-A and Ni-B, to understand the inhibition of the enzyme by O_2 (see publications 12 and 13). In addition, Fourier transform infrared (FTIR) spectroscopy was used to investigate the activation process of the enzyme and its inhibition by CO (see publications 14 and 17).

University of California, San Diego *July 2000-October 2004*
I worked on the elucidation of the primary processes in photosynthetic reaction centers. The light-induced structural changes associated with the reduction of the electron acceptors (Q_A and Q_B) were investigated using EPR related techniques (see publications 4, 7, 10, 11 and 18). Furthermore, the geometry of the hydrogen bonds to $Q_A^{\bullet -}$, which is believed to define its physical properties and function, was determined by electron-nuclear double resonance (ENDOR) spectroscopy (see publications 3, 5, 6 and 8).

Brazilian Center for Research on Physics, Brazil *September 1993-June 2000*
Here I studied the ligand structure in heme proteins. EPR and ENDOR techniques were used to study the paramagnetic complex, Fe^{2+}-NO, instead of the diamagnetic complex, Fe^{2+}-O_2. The results led to a basic understanding of the electronic structure of this paramagnet and the interactions with its protein surroundings and contributed to a better understanding of the ligand binding process, NO or O_2, to the iron (see publications 1 and 2).

TEACHING EXPERIENCE

Arizona State University, Tempe *September 2008-Present*
I have trained five post-docs (see publications 19, 25, 29, 34, 45, 46 and 51) and twenty-one Ph.D. students (see publications 21 through 54) on the use of EPR and Single-Crystal XRD technologies.

CHM 494/598 Foundation of Quantitative Molecular Sciences: Spectroscopy – Guest Lecturer (Spring 2024-2026)
CHM 452 Inorganic Chemistry Laboratory – EPR and Single-Crystal XRD modules (Spring 2022-2026)
CHM 598 Bioinorganic Chemistry – Guest Lecturer (Fall 2010)

Max-Planck Institute for Bioinorganic Chemistry, Germany *November 2004-August 2008*
I was the lead researcher in the project: "FTIR and EPR studies on the catalytic intermediates and on the CO inhibited states of [NiFe] hydrogenases". My duties included the design of the experiments, the supervision of a Ph.D. student (M. E. Pandelia) and the preparation of manuscripts. The results produced two articles (see publications 14 and 17).

Brazilian Center for Research on Physics, Brazil *September 1993-June 2000*
I actively participated in the Summer School Program for undergraduates.

Private University Antenor Orrego, Perú *October 1991-April 1993*
General Physics - recitation and laboratory
Modern Physics - recitation
Electromagnetism - recitation and laboratory

GRADUATE AND POSTDOCTORAL ADVISERS

George Bemski (deceased), Brazilian Center for Research on Physics, Brazil, M.Sc. and Ph.D. Theses Adviser
George Feher (deceased), University of California, San Diego, Postdoctoral Adviser

PROFESSIONAL MEMBERSHIFTS

Sociedade Brasileira de Física
International EPR Society
American Chemical Society

PUBLICATIONS

Google scholar profile: http://scholar.google.com/citations?user=Cibq6JkAAAAJ&hl=en&oi=ao
h-index: 25, **i10-index:** 41, **g-index:** 45

Papers

1) M. Flores, E. Wajnberg and G. Bemski. "Temperature dependence of Q-band electron paramagnetic resonance spectra of nitrosyl heme proteins". *Biophys. J.* 73, 3225-3229 (1997).

2) M. Flores, E. Wajnberg and G. Bemski. "Proton electron nuclear double resonance from nitrosyl horse heart myoglobin: The role of His-E7 and Val-E11". *Biophys. J.* 78, 2107-2115 (2000).

3) M. Flores, R. A. Isaacson, R. Calvo, G. Feher and W. Lubitz. "Probing hydrogen bonding to quinone anion radicals by ^{1}H and ^{2}H ENDOR spectroscopy at 35 GHz". *Chem. Phys.* 294, 401-413 (2003).

4) M. L. Paddock, M. Flores, R. Isaacson, C. Chang, E. C. Abresch, P. Selvaduray, G. Feher and M. Y. Okamura. "$Q_B^{\bullet -}$ formed by B-branch electron transfer in reaction centers from *Rhodobacter sphaeroides*". in *Photosynthesis: Fundamental Aspects to Global Perspectives*, eds. A. van der Est and D. Bruce, vol. 1, pags. 207-209, Alliance Communications Group, Lawrence, Kansas (2005).

5) M. Flores, R. Isaacson, E. Abresch, R. Calvo, W. Lubitz and G. Feher. "Protein-cofactor interactions in bacterial reaction centers from *Rhodobacter sphaeroides* R-26: I. Identification of the ENDOR lines associated with the hydrogen bonds to the primary quinone $Q_A^{\bullet -}$". *Biophys. J.* 90, 3356-3362 (2006).

6) S. Sinnecker, M. Flores and W. Lubitz. "Protein-cofactor interactions in bacterial reaction centers from *Rhodobacter sphaeroides* R-26: Effect of hydrogen bonding on the electronic and geometric structure of the primary quinone. A density functional theory study". *Phys. Chem. Chem. Phys.* 8, 5659-5670 (2006).

7) M. L. Paddock, M. Flores, R. Isaacson, C. Chang, E. C. Abresch, P. Selvaduray and M. Y. Okamura. "Trapped conformational states of semiquinone ($D^{\bullet +}Q_B^{\bullet -}$) formed by B-branch electron transfer at low temperature in *Rhodobacter sphaeroides* reaction centers". *Biochemistry* 45, 14032-14042 (2006).

8) M. Flores, R. Isaacson, E. Abresch, R. Calvo, W. Lubitz and G. Feher. "Protein-cofactor interactions in bacterial reaction centers from *Rhodobacter sphaeroides* R-26: II. Geometry of the hydrogen bonds to the primary quinone $Q_A^{\bullet -}$ by ^{1}H and ^{2}H ENDOR spectroscopy". *Biophys. J.* 92, 671-682 (2007).

9) A. Savitsky, A. A. Dubinskii, M. Flores, W. Lubitz and K. Möbius. "Orientation-resolving pulsed electron dipolar high-field EPR spectroscopy on disordered solids: I. Structure of spin-correlated radical pairs in bacterial photosynthetic reaction centers". *J. Phys. Chem. B* 111, 6245-6262 (2007).

10) M. L. Paddock, M. Flores, R. Isaacson, C. Chang, E. C. Abresch and M. Y. Okamura. "ENDOR spectroscopy reveals light induced movement of the H–bond from Ser-L223 upon forming the semiquinone ($Q_B^{\bullet -}$) in reaction centers from *Rhodobacter sphaeroides*". *Biochemistry* 46, 8234-8243 (2007).

11) M. Flores, A. Savitsky, E. C. Abresch, W. Lubitz and K. Möbius. "Structure of radical pairs $D^{\bullet +}Q_A^{\bullet -}$ in bacterial photosynthetic reaction centers cooled to cryogenic temperatures in the dark and under illumination: A high-field EPR/PELDOR study". in *Photosynthesis. Energy from the Sun: 14th International Congress on Photosynthesis*, eds. J. F. Allen, E. Gantt, J. H. Golbeck and B. Osmond, pags. 59-63, Springer, Berlin (2008).

12) M. Flores, A. G. Agrawal, M. van Gastel, W. Gärtner and W. Lubitz. "Electron-electron double resonance-detected NMR to measure metal hyperfine interactions: ^{61}Ni in the Ni-B state of the [NiFe] hydrogenase of *Desulfovibrio vulgaris* Miyazaki F". *J. Am. Chem. Soc*. 130, 2402-2403 (2008).

13) M. van Gastel, J. L. Shaw, A. J. Blake, M. Flores, M. Schröder, J. McMaster and W. Lubitz. "Electronic structure of a binuclear nickel complex of relevance to [NiFe] hydrogenase". *Inorg. Chem*. 47, 11688-11697 (2008).

14) M. E. Pandelia, H. Ogata, L. J. Currell, M. Flores and W. Lubitz. "Probing intermediates in the activation cycle of [NiFe] hydrogenase by infrared spectroscopy: the Ni-SI_r state and its light sensitivity". *J. Biol. Inorg. Chem.* 14, 1227-1241 (2009).

15) L. Kálmán, M. Flores, J. C. Williams and J. P. Allen. "Electronic structure of Fe^{3+} at a metal-binding site introduced in modified bacterial reaction centers". *Appl. Magn. Reson*. 37, 27-37 (2010).

16) M. L. Paddock, M. Flores, R. Isaacson, J. N. Shepherd and M. Y. Okamura. "EPR and ENDOR investigation of rhodosemiquinone in bacterial reaction centers formed by B-branch electron transfer". *Appl. Magn. Reson*. 37, 39-48 (2010).

17) M. E. Pandelia, H. Ogata, L. J. Currell, M. Flores and W. Lubitz. "Inhibition of the [NiFe] hydrogenase from *Desulfovibrio vulgaris* Miyazaki F by carbon monoxide: An FTIR and EPR spectroscopic study". *Biochim. Biophys. Acta - Bioenerg.* 1797, 304-313 (2010).

18) M. Flores, A. Savitsky, M. L. Paddock, E. C. Abresch, A. A. Dubinskii, M. Y. Okamura, W. Lubitz and K. Möbius. "Electron-nuclear and electron-electron double resonance spectroscopies show that the primary quinone acceptor Q_A in reaction centers from photosynthetic bacteria *Rhodobacter sphaeroides* remains in the same orientation upon light-induced reduction". *J. Phys. Chem. B* 114, 16894-16901 (2010).

19) Z. Deng, L. Tong, M. Flores, S. Lin, J. X. Cheng, H. Yan and Y. Liu. "High-quality manganese-doped zinc sulfide quantum rods with tunable dual-color and multiphoton emissions". *J. Am. Chem. Soc.* 133, 5389-5396 (2011).

20) M. Flores, M. Y. Okamura, J. Niklas, M. E. Pandelia and W. Lubitz. "Pulse Q-band EPR and ENDOR spectroscopies of the photochemically generated monoprotonated benzosemiquinone radical in frozen alcoholic solution". *J. Phys. Chem. B* 116, 8890-8900 (2012).

21) L. Liu, M. Flores and N. Newman. "Microwave loss in the high-performance dielectric $Ba(Zn_{1/3}Ta_{2/3})O_3$ at 4.2 K". *Phys. Rev. Lett.* 109, 257601 (2012).

22) A. Dutta, M. Flores, S. Roy, J. C. Schmitt, G. A. Hamilton, H. E. Hartnett, J. M. Shearer and A. K. Jones. "Sequential oxidations of thiolates and the cobalt metallocenter in a synthetic metallopeptide: Implications for the biosynthesis of nitrile hydratase". *Inorg. Chem.* 52, 5236-5245 (2013).

23) V. Sharma, C. Tracy, D. Schroder, M. Flores, B. Dauksher and S. Bowden. "Study and manipulation of charges present in silicon nitride films". in *Photovoltaic Specialists Conference (PVSC), 2013 IEEE 39th*, pags. 1288-1293, IEEE (2013).

24) T. K. Mukhopadhyay, M. Flores, T. L. Groy and R. J. Trovitch. "A highly active manganese precatalyst for the hydrosilylation of ketones and esters". *J. Am. Chem. Soc*. 136, 882-885 (2014).

25) L. Kuang, T. L. Olson, S. Lin, M. Flores, Y. Jiang, W. Zheng, J. C. Williams, J. P. Allen and H. Liang. "Interface for light-driven electron transfer by photosynthetic complexes across block copolymer membranes". *J. Phys. Chem. Lett*. 5, 787-791 (2014).

26) A. A. Tufts, M. Flores, T. L. Olson, J. C. Williams and J. P. Allen. "Electronic structure of the Mn-cofactor of modified bacterial reaction centers measured by electron paramagnetic resonance and electron spin echo envelope modulation spectroscopies". *Photosynth. Res.* 120, 207-220 (2014).

27) T. S. Kashey, J. B. Cowgill, M. D. McConnell, M. Flores and K. E. Redding. "Expression and characterization of cytochrome c_{553} from *Heliobacterium modesticaldum*". *Photosynth. Res*. 120, 291-299 (2014).

28) T. K. Mukhopadhyay, M. Flores, R. K. Feller, B. L. Scott, R. D. Taylor, M. Paz-Pasternak, N. J. Henson, F. N. Rein, N. C. Smythe, R. J. Trovitch and J. C. Gordon. "A new spin on cyclooctatetraene (COT) redox-activity: Low-spin iron(I) complexes that exhibit antiferromagnetic coupling to a singly reduced η^4-COT ligand". *Organometallics* 33, 7101-7112 (2014).

29) M. Flores, T. L. Olson, D. Wang, S. Edwardraja, S. Shinde, J. C. Williams, G. Ghirlanda and J. P. Allen. "Copper environment in artificial metalloproteins probed by electron paramagnetic resonance spectroscopy". *J. Phys. Chem. B* 119, 13825-13833 (2015).

30) C. Ghosh, T. K. Mukhopadhyay, M. Flores, T. L. Groy and R. J. Trovitch. "A pentacoordinate Mn(II) precatalyst that exhibits notable aldehyde and ketone hydrosilylation turnover frequencies". *Inorg. Chem.* 54, 10398-10406 (2015).

31) B. Ferlez, J. Cowgill, W. Dong, C. Gisriel, S. Lin, M. Flores, K. Walters, D. Cetnar, K. E. Redding and J. H. Golbeck. "Thermodynamics of the electron acceptors in *Heliobacterium modesticaldum:* An exemplar of an early homodimeric type I photosynthetic reaction center". *Biochemistry* 55, 2358-2370 (2016).

32) R. Pal, B. R. Cherry, M. Flores, T. L. Groy and R. J. Trovitch. "Isolation of a bis(imino)pyridine molybdenum(I) iodide complex through controlled reduction and interconversion of its reaction products". *Dalton Trans*. 45, 10024-10033 (2016).

33) H. Ben-Daat, C. L. Rock, M. Flores, T. L. Groy, A. C. Bowman and R. J. Trovitch. "Hydroboration of alkynes and nitriles using an α-diimine cobalt hydride catalyst". *Chem. Commun*. 53, 7333-7336 (2017).

34) T. L. Olson, E. Espiritu, S. Edwardraja, E. Canarie, M. Flores, J. C. Williams, G. Ghirlanda and J. P. Allen. "Biochemical and spectroscopic characterization of dinuclear Mn-sites in artificial four-helix bundle proteins". *Biochim. Biophys. Acta - Bioenerg.* 1858, 945-954 (2017).

35) T. K. Mukhopadhyay, C. Ghosh, M. Flores, T. L. Groy and R. J. Trovitch. "Hydrosilylation of aldehydes and formates using a dimeric manganese precatalyst". *Organometallics* 36, 3477-3483 (2017).

36) D. Khusnutdinova, M. Flores, A. M. Beiler and G. F. Moore. "Synthesis and characterization of a cobalt(II) tetrakis(3-fluorophenyl)porphyrin with a built-in 4-vinylphenyl surface attachment moiety". *Photosynthetica* 56, 67-74 (2018).

37) T. K. Mukhopadhyay, N. L. MacLean, M. Flores, T. L. Groy and R. J. Trovitch. "Isolation of Mn(I) compounds featuring a reduced bis(imino)pyridine chelate and their relevance to electrocatalytic hydrogen production". *Inorg. Chem.* 57, 6065-6075 (2018).

38) D. Khusnutdinova, B. L. Wadsworth, M. Flores, A. M. Beiler, E. A. R. Cruz, Y. Zenkov and G. F. Moore. "Electrocatalytic properties of binuclear Cu(II) fused porphyrins for hydrogen evolution". *ACS Catal*. 8, 9888-9898 (2018).

39) T. K. Mukhopadhyay, M. Flores, T. L. Groy and R. J. Trovitch. "A β-diketiminate manganese catalyst for alkene hydrosilylation: Substrate scope, silicone preparation, and mechanistic insight". *Chem. Sci*. 9, 7673-7680 (2018).

40) G. Zhang, J. Wu, S. Zheng, M. C. Neary, J. Mao, M. Flores, R. J. Trovitch and P. A. Dub. "Redox-noninnocent ligand-supported vanadium catalysts for the chemoselective reduction of C=X (X = O, N) functionalities". *J. Am. Chem. Soc.* 141, 15230-15239 (2019).

41) T. T. Nguyen, J. H. Kim, S. Kim, C. Oh, M. Flores, T. L. Groy, M. H. Baik and R. J. Trovitch. "Scope and mechanism of nitrile dihydroboration mediated by a β-diketiminate manganese hydride catalyst". *Chem. Commun*. 56, 3959-3962 (2020).

42) G. Zhang, J. Wu, S. Zheng, M. C. Neary, J. Mao, M. Flores, R. J. Trovitch and P. A. Dub. Correction to "Redox-noninnocent ligand-supported vanadium catalysts for the chemoselective reduction of C=X (X = O, N) functionalities". *J. Am. Chem. Soc.* 142, 16507-16509 (2020).

43) C. Oh, J. Siewe, T. T. Nguyen, A. Kawamura, M. Flores, T. L. Groy, J. S. Anderson, R. J. Trovitch and M. H. Baik. "The electronic structure of a β-diketiminate manganese hydride dimer". *Dalton Trans*. 49, 14463-14474 (2020).

44) M. R. Mena, J. H. Kim, S. So, H. Ben-Daat, T. M. Porter, C. Ghosh, A. Sharma, M. Flores, T. L. Groy, M. H. Baik and R. J. Trovitch. "Comparing the electronic structure of iron, cobalt, and nickel compounds that feature a phosphine-substituted bis(imino)pyridine chelate". *Inorg. Chem*. 61, 6438-6450 (2022).

45) H. Kaur, R. Nsouli, G. Cerna, S. Shariati, M. Flores, E. H. Fini and L. K. G. Ackerman-Biegasiewicz. "Investigation of earth-abundant metal salts for the inhibition of asphalt-derived volatile organic compounds". *ACS Omega* 9, 22941-22951 (2024).

46) J. Sinclair, M. Flores, A. M. Brugh, T. Rajh, M. Juelsholt, A. A. Riaz, C. Schlueter, A. Regoutz and C. S. Birkel. "In-depth analysis of the species and transformations during sol gel-assisted V_2PC synthesis". *Inorg. Chem*. 63, 10682-10690 (2024).

47) Y. Yang, X. F. Brun, M. H. Weber and M. Flores. "Towards standardization of hybrid bonding interface: In-depth study of dielectrics on direct bonding". in *Electronic Components and Technology Conference (ECTC), 2024 IEEE 74th*, pags. 599-605, IEEE (2024).

48) G. K. Mehta, T. T. Nguyen, M. Flores and R. J. Trovitch. "Manganese catalysed dehydrocoupling of silanes and siloxanes with ammonia to prepare oligosilazanes and polysiloxazanes". *Dalton Trans*. 53, 14272-14277 (2024).

49) Y. Yang, X. F. Brun, M. H. Weber and M. Flores. "Quantification of interfacial voids using positron annihilation spectroscopy for mechanism study on SiCN bonding and SiN bonding". *ECS J. Solid State Sci. Technol.* 13, 113002 (2024).

50) N. C. Smythe, J. Mondal, J. G. Duque, R. K. Feller, M. Flores, J. C. Gordon, N. J. Henson, M. Paz-Pasternak, F. N. Rein, B. L. Scott, R. D. Taylor and R. J. Trovitch. "Historical account of dinitrogen-bridged diiron complex synthesis using a commercial tripodal ligand". *Chem. Commun*. 61, 9908-9911 (2025).

51) G. A. Cerrón-Calle, M. Flores, M. A. Roldan, K. Flores, E. Brillas, A. J. dos Santos and S. Garcia-Segura. "Electrochemical persulfate activation for degradation of BPA using a novel self-standing CuO_x/CoO_x cathode". *Chem. Eng. J*. 519, 164960 (2025).

52) S. M. Sharafi, M. Flores, H. Appuhami and F. A. Selim. "Control of microstructure, trap levels, and trap distribution in HfO_2 films grown by atomic layer deposition". *Nanomaterials* 16, 451 (2026).

53) G. A. Cerrón-Calle, A. N. Arias-Sanchez, M. Flores, M. A. Roldan, C. M. Sánchez-Sánchez and S. Garcia-Segura. "In situ quantification of hydrogen radicals disentangles direct and hydrogen-radical-mediated pathways in green ammonia electrosynthesis from nitrate". *Angew. Chem. Int. Ed.* 65, e6942767 (2026).

54) J. Mondal, G. K. Mehta, T. Zhang, M. Flores, J. Kouvetakis and R. J. Trovitch. "Silane, germane, and stannane activation by an iron dinitrogen compound to access dimetallotetrylides". *Inorg. Chem.* 65, 23361-23366 (2026).

Abstracts

1) M. Flores, E. Wajnberg and G. Bemski. "Estudo por EPR de nitroxido de hemoglobina". *XVIII Encontro Nacional de Física da Matéria Condensada*, Caxambu, Brazil, June 1995.

2) M. Flores, E. Wajnberg and G. Bemski. "Nitrosil hemoproteínas: Um estudo por EPR em banda Q". *XIX Encontro Nacional de Física da Matéria Condensada*, Águas de Lindóia, Brazil, September 1996.

3) M. Flores, E. Wajnberg and G. Bemski. "Temperature dependence of Q-band EPR spectra of nitrosyl heme proteins". *International Symposium On Protein Condensation, In Honor of Gregorio Weber*, Rio de Janeiro, Brazil, May 1997.

4) M. Flores, E. Wajnberg and G. Bemski. "Temperature dependence of ^{1}H ENDOR of nitrosyl hemoglobin". *XX Encontro Nacional de Física da Matéria Condensada*, Caxambu, Brazil, June 1997.

5) O. C. Alves, E. Wajnberg, G. Bemski and M. Flores. "Estudos de nitrosil hemoproteínas desidratadas por ENDOR". *XX Encontro Nacional de Física da Matéria Condensada*, Caxambu, Brazil, June 1997.

6) M. Flores, E. Wajnberg and G. Bemski. "Observation of different proton conformations in nitrosyl horse heart myoglobin by electron nuclear double resonance". *XXI Encontro Nacional de Física da Matéria Condensada*, Caxambu, Brazil, June 1998.

7) M. Flores, E. Wajnberg and G. Bemski. "Angle-selected electron nuclear double resonance spectroscopy applied to nitrosyl heme proteins". *XXIII Encontro Nacional de Física da Matéria Condensada*, São Lourenço, Brazil, May 2000.

8) M. Flores, E. Wajnberg and G. Bemski. "^{14}N electron nuclear double resonance study of nitrosyl heme proteins". *XXIII Encontro Nacional de Física da Matéria Condensada*, São Lourenço, Brazil, May 2000.

9) M. Flores, E. Wajnberg and G. Bemski. "Temperature dependence of proton electron nuclear double resonance spectra of nitrosyl hemoglobin – Spectral analysis". *XXIII Encontro Nacional de Física da Matéria Condensada*, São Lourenço, Brazil, May 2000.

10) S. Sinnecker, W. Lubitz, F. Neese, F. Lendzian, R. Isaacson, M. Flores and G. Feher. "Benzosemiquinone-solvent interactions. A density functional study of electric and magnetic properties for probing hydrogen bond strengths and geometries". *Gordon Conference on Quinone and Redoxactive Amino Acid Cofactors*, Ventura, CA, January 2002.

11) W. Lubitz, R. Isaacson, M. Flores, S. Sinnecker, F. Lendzian and G. Feher. "Hydrogen bonds to quinone anion radicals studied by ^{2}H ENDOR spectroscopy and density functional calculations". *Biophys. J.* 82, 478a (2002). *46th Annual Meeting of the Biophysical Society*, San Francisco, CA, February 2002.

12) M. Flores, E. Abresch, W. Lubitz, R. Isaacson and G. Feher. "Characterization of hydrogen bonds to $Q_A^{\bullet -}$ in reaction centers of *Rb. sphaeroides* R-26 by deuterium ENDOR". *Biophys. J.* 82, 478a (2002). *46th Annual Meeting of the Biophysical Society*, San Francisco, CA, February 2002.

13) M. Flores, R. Isaacson, W. Lubitz and G. Feher. "Determination of the number of exchangeable protons in hydrogen bonds to benzosemiquinone by EPR spectroscopy". *Biophys. J.* 84, 120a (2003). *47th Annual Meeting of the Biophysical Society*, San Antonio, TX, March 2003.

14) M. Flores, E. Abresch, W. Lubitz, R. Calvo, R. Isaacson and G. Feher. "Identification of ^{1}H ENDOR lines at 35 GHz corresponding to hydrogen bonds to $Q_A^{\bullet -}$ in RCs of *Rb. sphaeroides*". *Biophys. J.* 86, 11a (2004). *48th Annual Meeting of the Biophysical Society*, Baltimore, MD, February 2004.

15) M. Paddock, R. Isaacson, M. Flores, C. Chang, E. Abresch, G. Feher and M. Okamura. "$Q_B^{\bullet -}$ states trapped by B–branch electron transfer in reaction centers from *Rhodobacter sphaeroides* investigated by EPR and ENDOR". *13th International Congress of Photosynthesis*, Montréal, Canada, August 2004.

16) M. Paddock, M. Flores, R. Isaacson, C. Chang, G. Feher and M. Okamura. "Hydrogen bond reorientation upon $Q_B^{\bullet -}$ formation revealed by ENDOR spectroscopy in reaction centers from *Rhodobacter sphaeroides*". *Biophys. J.* 88, 204a (2005). *49th Annual Meeting of the Biophysical Society*, Long Beach, CA, February 2005.

17) M. Flores, E. Abresch, W. Lubitz, S. Sinnecker, R. Calvo, R. Isaacson and G. Feher. "Identification of the ^{1}H and ^{2}H ENDOR lines associated with the exchangeable hydrogen bonds to $Q_A^{\bullet -}$ in reaction centers from *Rb. sphaeroides* R-26". *1st Joint German/British Bioenergetics Conference, "Mechanisms of Bioenergetic Membrane Proteins: Structures and Beyond"*, Wiesbaden-Naurod, Germany, March 2005.

18) H. Ogata, M. Flores, M. van Gastel and W. Lubitz. "Single crystal ENDOR study of the Ni-A state of [NiFe] hydrogenase from *Desulfovibrio vulgaris* Miyazaki F". *8th European Biological Chemistry Conference (EUROBIC8)*, Aveiro, Portugal, July 2006.

19) M. Flores, S. Sinnecker, R. Isaacson, R. Calvo, G. Feher and W. Lubitz. "Protein-cofactor interactions in bacterial reaction centers from *Rb. sphaeroides* R-26: Characterization of the geometry of the hydrogen bonds to the primary quinone by EPR, ENDOR and DFT calculations". *XXII International Conference on Magnetic Resonance in Biological Systems (ICMRBS 2006)*, Göttingen, Germany, August 2006.

20) M. Flores, R. Isaacson, S. Sinnecker, E. Abresch, R. Calvo, W. Lubitz and G. Feher. "Protein-cofactor interactions in bacterial reaction centers from *Rb. sphaeroides* R-26: Characterization of the geometry of the hydrogen bonds to the primary quinone $Q_A^{\bullet -}$ by ^{1}H and ^{2}H ENDOR spectroscopy". *6th European Federation of EPR Groups Meeting (EFEPR-06)*, Madrid, Spain, September 2006.

21) M. Flores, A. G. Agrawal, W. Gärtner, M. van Gastel and W. Lubitz. "ELDOR-detected NMR as a powerful method to resolve metal hyperfine interactions: Application to the oxidized Ni-A and Ni-B states of the [NiFe] hydrogenase of *D. vulgaris* Miyazaki F". *11th Chianti Workshop on Magnetic Resonance, "Methods for Biomolecular Magnetic Resonance"*, Vallombrosa, Italy, June 2007.

22) J. L. Shaw, M. van Gastel, M. Flores, A. J. Blake, J. Wolowska, E. J. L. McInnes, W. Lubitz and M. Schröder. "Mixed-valence Ni(II)Ni(III) macrocyclic complexes as models for the active site of [NiFe] Hydrogenase". *13th International Conference on Biological Inorganic Chemistry (ICBIC 2007)*, Vienna, Austria, July 2007.

23) M. Flores, A. Savitsky, E. C. Abresch, W. Lubitz and K. Möbius. "Structure of radical pairs $D^{\bullet +}Q_A^{\bullet -}$ in photosynthetic reaction centers cooled to cryogenic temperatures in neutral and charge-separated states: A high-field EPR/PELDOR study". *Photosynth. Res.* 91, 155 (2007). *14th International Congress of Photosynthesis*, Glasgow, Scotland, July 2007.

24) M. Flores, A. G. Agrawal, M. van Gastel, W. Gärtner and W. Lubitz. "Electronic structure of ^{61}Ni in the oxidized states of the [NiFe] hydrogenase from *Desulfovibrio vulgaris* Miyazaki F: An EPR and ELDOR-detected NMR study". *8th International Hydrogenase Conference, "Hydrogenase and Hydrogen Production 2007"*, Breckenridge, CO, August 2007.

25) H. Ogata, M. Flores, M. van Gastel and W. Lubitz. "Single crystal ENDOR study of the Ni-A state of [NiFe] hydrogenase". *8th International Hydrogenase Conference, "Hydrogenase and Hydrogen Production 2007"*, Breckenridge, CO, August 2007.

26) M. E. Pandelia, H. Ogata, M. Flores, C. Laurich, L. Currell and W. Lubitz. "FTIR study on the photosensitive catalytic intermediates and on the CO inhibited state of [NiFe] hydrogenase from *Desulfovibrio vulgaris* Miyazaki F". *8th International Hydrogenase Conference, "Hydrogenase and Hydrogen Production 2007"*, Breckenridge, CO, August 2007.

27) K. Möbius, A. Savitsky, A. A. Dubinskii, M. Flores and W. Lubitz. "Orientation resolving W-band high-field PELDOR study on the structure of charge-separated radical pairs $D^{\bullet+}Q_A^{\bullet-}$ in photosynthetic reaction centers". *41st Annual International Meeting of the Electron Spin Resonance Group of the Royal Society of Chemistry, "Advanced Techniques and Applications"*, London, England, April 2008.

28) M. Flores, M. L. Paddock, E. C. Abresch, M. Y. Okamura and W. Lubitz. "ENDOR spectroscopy shows that Q_A remains in the same orientation upon reduction in reaction centers from *Rhodobacter sphaeroides*". *Biophys. J.* 96, 238a-239a (2009). *53rd Annual Meeting of the Biophysical Society*, Boston, MA, February 2009.

29) K. Möbius, A. Savitsky, A. A. Dubinskii, M. Flores and W. Lubitz. "Orientation resolving high-field PELDOR for probing transient radical-pair conformations in photosynthesis". *7th European Federation of EPR Groups Meeting*, Antwerp, Belgium, September 2009.

30) J. Sarrou, Z. Khan, M. Flores and K. Redding. "Spectroscopic evidence supporting the presence of a semiquinone anion radical in the electron transfer chain of reaction centers from *Heliobacterium modesticaldum*". *19th Western Photosynthesis Conference*, Pacific Grove, CA, January 2010.

31) M. Flores, R. Isaacson, J. Shepherd, M. Paddock and M. Okamura. "ENDOR spectrum of the protonated rhodosemiquinone in bacterial reaction centers". *Biophys. J.* 98, 173a (2010). *54th Annual Meeting of the Biophysical Society*, San Francisco, CA, February 2010.

32) K. Möbius, A. Savitsky, A. A. Dubinskii, M. Flores and W. Lubitz. "Probing light-induced conformational changes of transient radical-pair states in photosynthesis by high-field EPR methods". *The 12th International Symposium on Spin and Magnetic Field Effects in Chemistry and Related Phenomena*, Noordwijk, The Netherlands, May 2011.

33) K. Möbius, A. Savitsky, A. Dubinskii, M. Flores and W. Lubitz. "Conformational changes during primary photosynthesis as studied by orientation resolving pulse dipolar EPR spectroscopy". *8th European Federation of EPR Groups Meeting*, Frankfurt am Main, Germany, August 2011.

34) M. Flores, T. L. Olson, J. C. Williams and J. P. Allen. "Electronic structure of Mn bound to modified bacterial reaction centers". *8th European Federation of EPR Groups Meeting*, Frankfurt am Main, Germany, August 2011.

35) T. L. Olson, D. Wang, S. Edwardraja, M. Flores, G. Ghirlanda and J. P. Allen. "Characterization of metal binding peptides: Mimics of the Mn_4Ca cluster binding site of Photosystem II". *Photosynthesis Gordon Research Conference*, Davidson, NC, July 2012.

36) M. Flores, M. Y. Okamura, J. Niklas, M. E. Pandelia and W. Lubitz. "Probing the electronic structure of monoprotonated semiquinone radicals by ENDOR spectroscopy and density functional theory: The magnetic resonance properties of the hydroxyl proton". *54th Annual Rocky Mountain Conference on Analytical Chemistry*, Copper Mountain, CO, July 2012.

37) D. Wang, S. Shinde, C. Simmons, M. Flores, H. Yan, G. Ghirlanda and J. P. Allen. "Design of metal binding peptides for electrochemical cells". *22nd Western Photosynthesis Conference*, Pacific Grove, CA, January 2013.

38) N. Newman, L. Liu, A. Matusevich and M. Flores. "Mechanism of microwave loss in practical high performance dielectrics". *Electronic Materials and Applications 2013*, Orlando, FL, January 2013.

39) V. Sharma, C. Tracy, D. Schroder, M. Flores, B. Dauksher and S. Bowden. "Study and manipulation of charges present in silicon nitride films". *39th IEEE Photovoltaic Specialists Conference*, Tampa, FL, June 2013.

40) T. Olson, S. Edwardraja, M. Flores, G. Ghirlanda and J. P. Allen. "Enzymatic activity of a Mn-binding peptide". *16th International Congress on Photosynthesis Research*, Saint Louis, MO, August 2013.

41) D. Wang, S. Shinde, C. Simmons, M. Flores, H. Yan, G. Ghirlanda and J. P. Allen. "Design of metal binding peptides for electrochemical cells". *16th International Congress on Photosynthesis Research*, Saint Louis, MO, August 2013.

42) T. K. Mukhopadhyay, T. M. Porter, M. Flores, R. K. Feller, B. L. Scott, R. D. Taylor, M. Paz-Pasternak, N. J. Henson, F. N. Rein, N. C. Smythe, J. C. Gordon and R. J. Trovitch. "Preparation of low-valent iron complexes for dinitrogen activation". *246th American Chemical Society National Meeting & Exposition, "Chemistry in Motion"*, Indianapolis, IN, September 2013.

43) T. L. Olson, L. Kuang, S. Lin, M. Flores, Y. Jiang, W. Zheng, H. Liang, J. C. Williams and J. P. Allen. "Characterization of robust and flexible proteopolymer membranes supporting light-driven electron transfer by embedded reaction centers". *Photosynthesis Gordon Research Conference*, West Dover, VT, August 2014.

44) J. P. Allen, T. L. Olson, E. Espiritu, M. Flores, C. Simmons, S. Edwardraja, G. Ghirlanda and J. C. Williams. "Design of dinuclear manganese cofactors for bacterial reaction centers". *Photosynthesis Gordon Research Conference*, Waltham, MA, June 2015.

45) M. Flores, T. L. Olson, D. Wang, S. Edwardraja, S. Shinde, J. C. Williams, G. Ghirlanda and J. Allen. "Characterization of metal-ligand interactions in artificial metalloproteins using electron paramagnetic resonance spectroscopy". *American Chemical Society, 45th Western Regional Meeting*, San Marcos, CA, November 2015.

46) R. Pal, M. Flores, T. Groy and R. Trovitch. "Molybdenum (I) oxidation state: Preparation, characterization, and reactivity of bis(imino)pyridine Mo complexes". *251st American Chemical Society National Meeting & Exposition, "Computers in Chemistry"*, San Diego, CA, March 2016.

47) M. Flores, T. L. Olson, E. Espiritu, S. Edwardraja, E. Canarie, J. C. Williams, G. Ghirlanda and J. P. Allen. "Dinuclear Mn-sites in artificial four-helix bundle proteins: Biochemical and spectroscopic characterization". *XL Encontro Nacional de Física da Matéria Condensada*, Armação dos Búzios, Brazil, August 2017.

48) G. F. Moore, B. L. Wadsworth, D. Khusnutdinova, M. Flores, A. M. Beiler, E. A. R. Cruz, Y. Zenkov and J. M. Urbine. "Homogeneous and heterogeneous porphyrin architectures for electrocatalysis". *235th Electrochemical Society Meeting*, Dallas, TX, May 2019.

49) M. Flores, G. Zhang, J. Wu, S. Zhang, M. C. Neary, R. J. Trovitch, J. Mao and P. A. Dub. "EPR and DFT studies of a redox non-innocent ligand supported vanadium catalyst for chemoselective reduction of C=X (X = O, N) functionalities". *XIth Conference of European Federation of EPR Groups (EFEPR)*, Bratislava, Slovakia, September 2019.

50) B. L. Wadsworth, A. M. Beiler, D. Khusnutdinova, E. A. R. Cruz, N. D. P. Nguyen, D. Nishiori, J. M. Urbine, A. S. Reyes, Y. Zenkov, B. Johnston, M. Flores and G. F. Moore. "Parallels between enzyme catalytic efficiency and (photo)electrosynthetic performance". *2nd Frontiers in Photochemistry Conference*, Nassau, Bahamas, February 2020.

51) M. Flores, M. R. Mena, J. H. Kim, S. So, H. Ben-Daat, T. M. Porter, C. Ghosh, A. Sharma, T. L. Groy, M. H. Baik and R. J. Trovitch. "EPR and DFT studies of iron, cobalt, and nickel compounds that feature a phosphine-substituted bis(imino)pyridine chelate". *62nd Rocky Mountain Conference on Magnetic Resonance*, Denver, CO, July 2023.

52) Y. Yang, X. F. Brun, M. Flores and M. Weber. "Towards standardization of hybrid bonding interface: In-depth study of dielectrics on direct bonding". *74th IEEE Electronic Components and Technology Conference*, Denver, CO, May 2024.

53) M. Flores, C. Oh, J. Siewe, T. T. Nguyen, A. Kawamura, T. L. Groy, J. S. Anderson, R. J. Trovitch and M. H. Baik. "Study of the electronic structure of a β-diketiminate manganese hydride dimer catalyst". *The 18th International Symposium on Spin and Magnetic Field Effects in Chemistry and Related Phenomena*, Kobe, Japan, September 2024.

54) M. Flores, T. T. Nguyen, J. H. Kim, S. Kim, T. L. Groy, M. H. Baik and R. J. Trovitch. "EPR and DFT studies of the first manganese catalyst for nitrile dihydroboration". *The 21st European Magnetic Resonance Congress (EUROMAR 2025)*, Oulu, Finland, July 2025.

55) J. Granstrom, A. Khmelnitskiy, M. Flores and K. Redding. "Investigation of the secondary acceptor in the Heliobacterial reaction center using site-directed mutagenesis". *Photosynthesis Gordon Research Conference*, Newry, ME, July 2025.

56) M. Flores, J. Mondal, G. K. Mehta, J. Kouvetakis and R. J. Trovitch. "A Dinitrogen-bridged diiron complex: Synthesis of dimetallotetrylenes via activation of silane, germane, and stannane". *46th International Conference on Coordination Chemistry,* Odense, Denmark, June 2026.

57) J. S. Chavan, G. K. K. Mehta, J. Mondal, M. Flores, J. Kouvetakis and R. J. Trovitch. "Small molecule activation by a dinitrogen-bridged iron compound". *272nd American Chemical Society National Meeting & Exposition,* Chicago, IL, August 2026.

58) M. Flores, J. Granstrom, A. Khmelnitskiy and K. Redding. "Is there direct electron transfer from A_0 to F_X in the reaction center from *Heliobacterium modesticaldum*?". *The 19th International Symposium on Spin and Magnetic Field Effects in Chemistry and Related Phenomena*, Padova, Italy, September 2026.