

Curriculum Vitae for Gary V. Martinez

Primary Position

Senior Staff Scientist

Department of Cancer Imaging and Metabolism
H. Lee Moffitt Cancer Center & Research Institute
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Other Appointment

Assistant Professor

Department of Physics
University of South Florida, Tampa, Florida.

Education

B.S. 1990: Physics, CSU Long Beach, California.

Ph.D. 1997: Physical Chemistry, University of California, Santa Cruz, California.

Awards

1993-1996: NIH Predoctoral Fellowship (National Research Service Award), University of California Santa Cruz.

1997-1999: Stipend from Swedish National Research Council.

2001-2003: NIH F32 National Research Service Award (NRSA), University of Arizona.

Professional Appointments

1999-2004: Postdoctoral Fellow, Department of Chemistry, University of Arizona, Tucson, Arizona.

2004-2008: Assistant Research Scientist, Arizona Cancer Center, University of Arizona, Tucson, Arizona.

2008-Present: Scientific Lead, Imaging Biomarkers Group, Imaging and Metabolism Department, Division of Basic Sciences, H. Lee Moffitt Cancer Center & Research Institute, Tampa, Florida.

2011-Present: Assistant Professor, Department of Physics, University of South Florida, Tampa, Florida.

Personal Statement

I have been employed by the Moffitt Cancer Center as Senior Staff Scientist. My role at Moffitt is two-fold: (1) Original cancer imaging research: I oversee the Quantitative Imaging pre-clinical imaging program under the auspices of Robert J. Gillies, chair of the Department of Cancer Imaging and Metabolism. As project leader, I directly oversee and mentor new postdocs in the Cancer Imaging program, particularly in the areas of MRI/MRS, quantitative data reduction and analysis. (2) I am the manager of the Small Animal Imaging Laboratory (SAIL) with Dr. Gillies as the Scientific Director. As a cancer imaging scientist, with a training in electron paramagnetic resonance, nuclear magnetic resonance, and magnetic resonance imaging, I am thoroughly committed to the utilization of novel imaging technologies and therapies that

may have compelling clinical applications. The experimental design of the proposed work leverages pre-clinical quantitative imaging applied to the development of a novel contrast agent for molecular imaging.

As part of my responsibilities, I have been tasked with overseeing myriad postdoctoral fellows, graduate students, and undergraduate students. I take this seriously and take great pains (and ample time) to impart as much detailed imaging and scientific knowledge as possible. With this ethic, I have played a significant role in most of the preclinical MR imaging studies at Moffitt.

Hyperpolarization is technology at the Moffitt that keeps it amongst the leaders in in vivo metabolic studies worldwide. I have played a leadership role in establishing this technology at Moffitt by setting up hardware, experimental protocols, training postdoctoral fellows, writing signal/image processing code, and overseeing experiments to assure that they are being completed with high scientific standards. We have applied it to ^{13}C pyruvate to lactate conversion in lymphoma and pancreatic models and identified a ^{13}C nanodiamond agent.

I look to improving these metabolic/microenvironmental imaging methods in a manner that can be both translational and a benefit to basic research.

Extramural Service

Society and Editorial Service

Referee for NMR in Biomedicine

Referee for Magnetic Resonance in Medicine

Referee for Journal of Magnetic Resonance Imaging

Referee for Medical Physics

Professional Association Memberships

2005-Present: Member, International Society for Magnetic Resonance in Medicine

2011-Present: Member, World Molecular Imaging Society

Research Support

Pending (8th percentile)

Imaging Habitats in Sarcoma

The major goal of this project is to identify the histology underlying MRI visible "habitats" to test the hypothesis that MRI visible habitats can effectively predict and monitor therapy response, and investigate the effects of metabolic perturbations of hypoxia and thus improve response to TH-302.

NIH R01

Role: **Co-PI**

Current:

Development of a novel and efficient hyperpolarized pH imaging scan

Magnetic Resonance Spectroscopic Imaging (MRSI) will be used to scan tumor pH within a few minutes using a sensitivity enhanced pH reporter.

Role: **PI**

Moffitt Innovative Core Project 01/01/15-12/31/15

The Physical Microenvironment in Cancer biology and Therapy

The major goal of this project is to develop an integrative, multidisciplinary research program that applies mathematical methods to the investigation of problem in tumor biology and clinical oncology.

Role: Co-Investigator

NIH 2 R01 CA077575-10A2 (PI: R. Gillies) 09/28/09-08/01/14

Causes and Consequences of Acid pH in Tumors

The major goal of this project is to further refine methods for imaging tumor pH with the goal of developing methods to measure this non-invasively in humans; to better understand how the hostile environment selects for cells that produce acid; and to better understand how inhibiting tumor-derived acid can inhibit metastases, with the goal of aiding the development of a clinical trial for this new therapy.

Completed:

U54CA143874 (PI: G. Martinez) 11/01/11-10/31/12

NIH/NCI PSOC Pilot Grant

Ablative MR Thermotherapy in Gliomas

This is a pilot study of the application of magnetic resonance hyperthermia in pre-clinical models of glioma.

Role: **PI**; Moffitt sub-award of Physical Science in Oncology U54 grant.

NRSA 1 F32 GM20901-01(PI: G. Martinez) 01/01/2001-12/31/2002.

Deuterium NMR of G-Protein Coupled Receptor Rhodopsin

Investigates the conformation of dark state rhodopsin within the membrane lipid bilayer. The major goal is to determine the conformation of rhodopsin in the dark state.

Role: **PI**

NIH R01 CA 125627-02 (PI: R. Gillies) 09/01/08-07/31/13

Imaging Biomarkers for Response to Anti-Cancer Therapy

The major goals of this project are to determine which MR imaging biomarkers are most useful for each drug, and learn whether imaging biomarker responses can differentiate between these drug classes.

Role: Co-Investigator

Extramural Seminars and Oral Presentations

1. Xiaomeng Zhang, **Gary V. Martinez**, Maria L. Garcia-Martin, Mark. Woods, A. Dean Sherry, and Robert J. Gillies. High spatiotemporal resolution pH_e mapping of a rat glioma derived from pH-dependent spin-lattice relaxivity. In Proceedings 16th Scientific Meeting, International Society for Magnetic Resonance in Medicine, Toronto, page 370, 2008.
2. **Gary V. Martinez**, Silvia Lope-Piedrafita, Emily M. Dykstra, Constantin Job, and Michael F. Brown. Solid state deuterium NMR study of the effects of sterols on membrane elasticity. In Biophysical Journal, volume 82, pages 544A–544A, 1 2002.

Scientific Abstracts/Poster Presentations

1. Longitudinal MR Microscopy at 7T of Human Derived Osteosarcoma Mouse Models – An Early Assessment of Drug Response. Parastou Foroutan, Jenny M Kreamling, Damon Reed, Mark C Lloyd, Soner Altiok, Gary V Martinez, and Robert J Gillies, In Proceedings of the International Society for Magnetic Resonance in Medicine, Salt Lake City, Utah, USA, 2013.
2. Imaging Biomarkers: A Comparison of Hyperpolarized ^{13}C Magnetic Resonance Imaging at 7 T for Correlation of Therapy-Induced Alterations in T2 intensity, ADC and Tumor Volume in Ewing's Sarcoma Xenografts, Parastou Foroutan, Christopher L Cubitt, Jillaina L Menth, Damon Reed, Marilyn M Bui, David L Morse, Douglas G Letson, Daniel Sullivan, Robert J Gillies, and Gary V Martinez, In Proceedings of the International Society for Magnetic Resonance in Medicine, Salt Lake City, Utah, USA, 2013.
3. Rapid ex vivo imaging of PIII prostate to bone tumor with SWIFT-MRI, Ihor Luhach, Djaudat Idiyatullin, Conor Lynch, Curt Corum, Gary V. Martinez, Michael Garwood, and Robert Gillies, In Proceedings of the International Society for Magnetic Resonance in Medicine, Salt Lake City, Utah, USA, 2013.
4. Use of hyperpolarized ^{13}C -MRS to monitor tumor response to Sorafenib treatment, in comparison with diffusion weighted- MRI. Lionel Mignon, Prasanta Dutta, Gary Martinez, Parastou Foroutan, Robert Gillies, and Benedicte Jordan, In Proceedings of the International Society for Magnetic Resonance in Medicine, Salt Lake City, Utah, USA, 2013.
5. In Silico Electromagnetic Simulation of a Murine Glioma Model at 7T MRI Conditions. Rey, J. I.; Moros, E. G.; Gillies, R. J.; Martinez, G. V. In Proceedings of the International Society for Magnetic Resonance in Medicine, Melbourne, Australia, 2012.
6. Imaging Biomarkers: A Comparison of Hyperpolarized ^{13}C MRS and Diffusion-Weighted MRI. Zhang, X.; Dutta, P.; Martinez, G.; Rajeshkumar, N V.; Le, A; Maitra, A; Dang, C. V.; Gillies, Robert J. In Proceedings of the International Society for Magnetic Resonance in Medicine, Melbourne, Australia, 2012.
7. Development and In-Vivo Magnetic Resonance Imaging of Polymer Micelles Targeted to the Melanoma-Specific Marker MC1R. Barkey, N. M.; Preihs, C.; Cornell, H. H.; Martinez, G.; Sill, K. N.; Carie, A.; Vagner, J.; Sessler, J. L.; Gilles, R. J.; Morse, D. L. In Proceedings of the International Society for Magnetic Resonance in Medicine, Melbourne, Australia, 2012.
8. Distinguishing Sensitive and Resistant Early Therapy Response of Pancreatic Tumor Xenografts Using ^{13}C -MRS of Hyperpolarized Pyruvate. Prasanta Dutta, G. V. Martinez, N.V. Rajesh Kumar, Anne Le, A. Maitra, Chi V. Dang and Robert J. Gillies, In Proceedings of the International Society for Magnetic Resonance in Medicine, Melbourne, Australia, 2012.
9. In-vivo Assessment of LDH-A Inhibition in Pancreatic Tumor Xenografts using Hyperpolarized ^{13}C -Pyruvate MRS. Prasanta Dutta, N.V. RajeshKumar, Anne Le, G. V. Martinez, A. Maitra, Chi V. Dang and Robert J. Gillies, World Molecular Imaging Congress (WMIC), September 05-08, 2012, Dublin, Ireland.
10. Validation of the in-vivo Assessment of LDH-A Inhibition in Pancreatic Tumor Xenografts using ^{13}C -MRS of Hyperpolarized Pyruvate. Prasanta Dutta, N.V. RajeshKumar, Anne Le, G. V. Martinez, A. Maitra, Chi V. Dang and Robert J. Gillies, 3rd Int'l Workshop on Hyperpolarized Carbon-13, July 25-27, 2012, University of Pennsylvania, Philadelphia.

11. ^{13}C MRS of Hyperpolarized Pyruvate to Assess Xenografted Tumor Response to Therapy Based on LDH-A Inhibition. Prasanta Dutta, G. V. Martinez, N.V. RajeshKumar, Anne Le, A. Maitra, Chi V. Dang and Robert J. Gillies, International Workshop on Hyperpolarized Carbon-13, March 21-22, 2012, University of California San Francisco.
12. P. Dutta, G. Martinez, Anne Le, N.V. Rajeshkumar, A. Maitra, R. A. Gatenby, C.V. Dang, and R. J. Gillies. ^{13}C MRS/I of Hyperpolarized Pyruvate to Assess Xenografted Tumor Response to Therapy Based on LDH-A Inhibition. In proceedings of 17th International Biophysics Congress (Oct. 30-Nov. 03, 2011), Beijing, China.
13. P. Dutta, G. Martinez, A. Le, C.V. Dang, R. A. Gatenby, and R. J. Gillies. ^{13}C MRS/I of Hyperpolarized Pyruvate to Assess Xenografted Tumor Response to Therapy Based on LDH-A Inhibition World Molecular Imaging Congress (September 7-10, 2011), San Diego, California.
14. P. Dutta, G. Martinez, Anne Le, C.V. Dang, R. A. Gatenby, and R. J. Gillies. Using Hyperpolarized Pyruvate to Assess Lymphoma Tumor Response to Therapy Based on LDH-A Inhibition Frontiers in Biomedical Imaging Science III conference (June 13-16, 2011) at Vanderbilt University, Nashville, Tennessee.
15. Gary V. Martinez, Maria Luisa Garcia-Martin, Xiaomeng Zhang, and Robert J. Gillies. Dynamic contrast reagent induced differences in transverse relaxation and susceptibility shift observed by echo planar spectroscopic imaging. In Proceedings of the ISMRM , 2007.
16. Xiaomeng Zhang, Gary V Martinez, Maria Luisa Garcia-Martin, Natarajan Raghunand, Dezheng Zhao, and Robert J. Gillies. High resolution pH_e imaging of tumors. In Proceedings of the ISMRM , 2007.
17. Gary V. Martinez, Maria Luisa Garcia-Martin, Gregory S. Karczmar, Jeffrey R. Alger, Nikhil Rajguru, and Robert J. Gillies. Lineshape and susceptibility in a rat glioma monitored by echo planar spectroscopic imaging. In Proceedings of the ISMRM , 2006.
18. T. Mehnert, R. Bittman, Gary V. Martinez, M. F. Brown, F. Kamp, and K. Beyer. In Biophysical J. , volume 88, pages 70A–71A, 1, 2005.
19. Silvia Lope-Piedrafita, Gary V. Martinez, and Michael F. Brown. Dynamical membrane stiffening by cholesterol on the mesoscale probed by deuterium NMR relaxation. In Biophysical Journal, volume 86, pages 31A–31A, 1 2004.
20. Gary V. Martinez, Emily M. Dykstra, Silvia Lope-Piedrafita, Horia I. Petrache, and Michael F. Brown. Lanosterol and cholesterolinduced variations in bilayer elasticity studied by deuterium NMR and x-ray diffraction. In Biophysical Journal, volume 86, pages 200A–200A, 1 2004.
21. Gary V. Martinez, Emily M. Dykstra, Silvia Lope-Piedrafita, and Michael F. Brown. Bilayer elasticity and its implications for the evolution of sterols as determined by ^2H solid state NMR. In Biophysical Journal, volume 84, pages 379A–379A, 2 2003.
22. Emily M. Dykstra, Gary V. Martinez, Silvia Lope-Piedrafita, and Michael F. Brown. Solid-state deuterium NMR study of the effect of cholesterol and lanosterol on membrane elasticity. In Abstracts of Papers of the American Chemical Society , volume 223, pages 375–CHED, 2002.

23. Katherine A. H. Wildman, Gary V. Martinez, Michael F. Brown, and Ayyalusamy Ramamoorthy. Solid state NMR studies of LL37 peptide-lipid interactions in membranes. In *Biophysical Journal*, volume 82, pages 468A–468A, 1 2002.
24. Gary V. Martinez, Silvia Lope-Piedrafita, Emily M. Dykstra, and Michael F. Brown. Membrane elasticity in the presence of cholesterol and detergents studied by solid state deuterium NMR spectroscopy. In *Biophysical Journal*, volume 80, pages 533A–533A, 1 2001.
25. Yin Wang, Ana V. Botelho, Gary V. Martinez, and Michael F. Brown. Bilayer lipids govern the conformational energetics of rhodopsin in visual excitation. In *Biophysical Journal*, volume 80, pages 605A–606A, 1 2001.
26. Gary V. Martinez, Wayne R. Fiori, and Glenn L. Millhauser. Site-Specific Isotopically Labeled ¹³C Vibrational Difference Spectroscopy Gives Insight Into Amide-I' Band Frequency Assignments In Helical Peptides. In *Biophysical Journal*, volume 66, pages A65–A65, 2 1994.
27. Wayne R. Fiori, Gary V. Martinez, and Glenn L. Millhauser. Length Dependence in Alanine-Based Peptides the ₃₁₀-Helix To Alpha-Helix Transition. In *Biophysical Journal*, volume 64, pages A378–A378, 2 1993.
28. Gary V. Martinez and Glenn L. Millhauser. Alpha-Helices And ₃₁₀-Helices In Aqueous-Solution May Readily Be Distinguished Using FTIR Spectroscopy. In *Biophysical Journal*, volume 64, pages A378–A378, 2 1993.

Patent Applications

Gillies, R.J., Morse, D.L., Silva, A.S., Ibrahim-Hashim, A.A., Gatenby, R.A., Martinez, G.V. Method of Raising Intratumoral pH_e and Acid-Mediated Invasion. PCT/US2010/05799 Patent Filed 11/24/2010.

Martinez, G.V., Zhang, X., Gillies, R.J., Garcia, M.L. Inductive MRI Thermotherapy. US 61/412,231 provisional patent filed 11/10/2010.

Teaching Experience & Mentoring

Postdoctoral Mentoring

2011–2014	Jose Rey, Ph.D., H. Lee Moffitt Cancer Center & Research Institute
2009–2014	Prasanta Dutta, Ph.D., H. Lee Moffitt Cancer Center & Research Institute
2010–1012	Parastou Foroutan, Ph.D., H. Lee Moffitt Cancer Center & Research Institute
2010–2012	Xiaomeng Zhang, Ph.D., H. Lee Moffitt Cancer Center & Research Institute
2010–2012	Ihor Luhach, Ph.D., H. Lee Moffitt Cancer Center & Research Institute
2009–2011	Natalie Barkey, Ph.D., H. Lee Moffitt Cancer Center & Research Institute
2009–2011	Heather Cornnell, Ph.D., H. Lee Moffitt Cancer Center & Research Institute

Graduate Student Mentoring

2013–Present	Roha Afzal (Ph.D.) Department of Biomedical Engineering, University of South Florida.
2005–2008	Xiaomeng Zhang (Ph.D.) Department of Biomedical Engineering, University of Arizona.
2004–2005	Nikhil Rajguru, (M.S.), Department of Computer and Electrical Engineering, University of Arizona
2001–2003	Silvia Lope-Piedrafita (M.S.), Department of Physics, University of Arizona

Undergraduate Student Mentoring

- 2000–2003 Emily Dykstra (B.S.), Department of Chemistry, University of Arizona
2002–2003 Janeth Castro-Sanchez (B.S.), Department of Chemistry, University of Arizona.

University Course Teaching

- 1991–1997 Teaching Assistant, Department of Chemistry, University of California Santa Cruz: Quantum Mechanics, Physical Chemistry, Physical Chemistry Lab, General Chemistry.
2009–2010 MRI Lecture, Cancer Imaging Course, Cancer Imaging Program, H. Lee Moffitt Cancer Center
2009–2010 Pre-clinical Imaging Biomarker Program Lecture, Cancer Imaging Course, Cancer Imaging Program, H. Lee Moffitt Cancer Center
2010–2011 MRI Lecture, Cancer Imaging Course, Cancer Imaging Program, H. Lee Moffitt Cancer Center
2010–2011 Pre-clinical Imaging Biomarker Program Lecture, Cancer Imaging Course, Cancer Imaging Program, H. Lee Moffitt Cancer Center