MADHAVI Z. MARTIN
Oak Ridge National Laboratory
P.O. Box 2008, MS-6038, Oak Ridge, TN 37831
Work: (865) 574-7828 Home: (865) 947-7370 E-mail: martinm1@ornl.gov

OBJECTIVE Pursue R&D in the design and testing of environmental and biological sensors specifically for chemical and biological applications.

EXPERTISE Design, fabrication, and testing of ion mobility spectrometer on a chip
Laser-induced breakdown and remote Raman spectroscopy
Time-of-flight mass spectrometry
Fabrication of microstrip line, coplanar waveguide, and coplanar stripline photoconductive, switches using silicon-on-sapphire, low-temperature GaAs, and silicon materials
Optoelectronic characterization of three terminal devices (PHEMTs, HBTs, MESFETs)
Cryogenic behavior of semiconductor devices.

EDUCATION **Ph.D. in Physics**, University of California, Los Angeles, 1992
Thesis Topic: Picosecond Optical Response of Three-Terminal Devices
M.S. in Physics, University of California, Los Angeles, 1987
M.S. in Solid-State Physics, Shivaji University, Kolhapur, India, 1982
Thesis Topic: Transport and Magnetic Properties of Amorphous Semiconductors
B.S. in Physics, University of Nagpur, India, 1980

HONORS **Senior Member of the IEEE (2019)**

Appointed to CLEO 2020 S&I13 subcommittee: Active Optical Sensing

(Community of Lasers and Electro-Optics) (2019)

Senior Member of the Optical Society of America (2017) Recognized for expertise in the application of optical methods in biological and environmental research
Journal: ***Applied Optics***
Feature issue on Laser-Induced Breakdown Spectroscopy
Editors: Jagdish P. Singh, **Madhavi Z. Martin**, and Andrzej W. Miziolek (1 Nov 2008)

Awarded Sir Frederick McMaster Fellowship by the Commonwealth Scientific and Industrial Research Organization (CSIRO) in Australia in 2007–2008 to explore the development of rapid assessment tools for characterizing the chemical and mechanical properties of wood, wood products, and woody and herbaceous biomass for biofuels applications

Appointed to the International Scientific Committee of the Laser-induced Breakdown Spectroscopy Society, 2004–present

SERDP Project of the Year Award, Co-PI of the project for continuous monitoring of smokestack emissions by LIPS, 1997–2000

Best Poster Award: International Symposium on the Science and Technology of Atomically Engineered Materials**,** Richmond VA, 1995

Graduate Opportunity Fellowship, University of California, Los Angeles, 1989–1990

Rotary Fellowship, Rotary International Foundation, 1985–1986

University Grants Commission Fellowship, India, 1983–1985, **Gold Medal** in Physics, Shivaji University, India, 1982

PATENT DISCLOSURES

US Patent No 7,251,022 was issued for "Dual Fiber Microprobe for Mapping Elemental Distributions in Biological Cells."

Invention Disclosure 0713 was filed for "Novel Method for Preparing and Encapsulating Radioactive Material Source Forms."

Patent Disclosure 1108 was filed for "Ultra-performance Detector for Chemical, Biological Warfare Agents and for Homeland Defense."

EXPERIENCE

Oak Ridge National Laboratory, Oak Ridge, Tennessee
1999–present, Staff Research Scientist
1994–1999, Research Associate

Laser-induced breakdown spectroscopy (LIBS) of rare earth elements: Research in the detection and quantification of rare earth elements in magnets and quantification of the pure rare earth compounds mixed in a carbon matrix.

LIBS of natural and engineered wood: Research in the design and evaluation of a LIBS system capable of rapid and simultaneous elemental analysis in wood.

LIBS of soil: Detection of total carbon and nitrogen in soils; heavy metal and radionuclide detection in soils.

Raman spectroscopy of soil: Characterization of soil organic matter for carbon sequestration.

Microwave heating of soil: Release of dense nonaqueous phase liquid contaminants from soil for in situ detection.

Laser-induced plasma spectroscopy: R&D of the portable toxic metal monitor for smokestack emissions and optimized for Cr, Ni, V, Hg, and Pb aerosols. Extension to solids, cellular, and soil sampling.

Laboratory-on-a-chip: Development and testing of miniature ion mobility spectrometer.

Chemical physics of ions and clusters: Laser-induced clustering of NO using time-of-flight mass spectrometry. Electron attachment to laser-excited molecules (SiH_4, H_2O, CH_4).

University of Tennessee, Knoxville, Measurement and Control Engineering Center
1992–1994, Research Associate

Optical acid sensor: Proposed and developed a non-intrusive optical method for online and remote pH measurements of strongly acidic solutions (pH < 1). Patent disclosure filed for thin film optical pH sensor.

Fiber optic Raman spectroscopy: Remote monitoring for process control on industrial-scale organic distillation column.

University of California, Los Angeles, Depts. of Physics, Electrical Engineering, and Chemistry
1986–1992

Optical and electrical properties of three-terminal devices: Used an optical picosecond network analyzer system to measure the optoelectronic response of HEMTs and HBTs (S-parameters, optical response, cryogenic temperature behavior, photoluminescence), polymer waveguides, and state-of-the-art high-frequency microwave devices fabricated by local industry (TRW, Rockwell, Hughes). Experienced in test fixture fabrication and use of spectrum and parameter analyzers and related instrumentation.

Transport properties of CuCl thin film heterostructures: Modified resistivity measurement equipment for application to high-resistivity materials and thin-film heterostructures. Designed and built a room-temperature four-probe resistivity measuring apparatus. Analyzed samples using FTIR spectroscopy.

Shivaji University, Physics Department
1983–1985

Transport and magnetic properties of amorphous semiconductors: Designed and built high-temperature conductivity equipment. Grew amorphous semiconductors and chalcogenide glasses; analyzed their resistivity, magnetic properties, thermoelectric power, and effects of γ-irradiation on transport properties.

PUBLICATIONS

Furches, A., D. Kainer, D. Weighill, A. Large, P. Jones, A.M. Walker, J. Romero, J.G.F.M. Gazolla, W. Joubert, M. Shah, J. Streich, P. Ranjan, J. Schmutz, A. Sreedasyam, D. Macaya-Sanz, N. Zhao, M.Z. Martin, X. Rao, R.A. Dixon, S. DiFazio, T.J. Tschaplinski, J.-G. Chen, G.A. Tuskan, and D. Jacobson. 2019. Finding new cell wall regulatory genes in Populus trichocarpa using multiple lines of evidence. Front. Plant Sci. 10: Article 1249, 08 October 2019 https://doi.org/10.3389/fpls.2019.01249. 129265

Multi-Phenotype Association Decomposition: Unraveling Complex Gene-Phenotype RelationshipsDeborah Weighill1, Piet Jones, Carissa Bleker, Priya Ranjan, Manesh Shah, Nan Zhao, Madhavi Martin, Stephen DiFazio, David Macaya-Sanz, Jeremy Schmutz, Avinash Sreedasyam, Timothy Tschaplinski, Gerald Tuskan and Daniel Jacobson. Frontiers in genetics 10, 417, 2019.

Elena Garlea, Brittany Bennett, George Powell, **Madhavi Martin**, Robert Bridges, John Leckey, "Novel Use of a Hand-Held Laser Induced Breakdown Spectroscopy Instrument to Monitor Hydride Corrosion and Microstructure Effects in Uranium," Spectrochimica Acta Part B: Atomic Spectroscopy 105651, 2019.

Madhavi Martin, Daniel Hamm, Samir Martin, Steve Allman, Gary Bell, Rodger Martin, "Micro-Laser-Induced Breakdown Spectroscopy: A Novel Approach Used in the Detection of Six Rare Earths and One Transition Metal," Minerals, 9(2), 103 (2019). https://doi.org/10.3390/min9020103 (registering DOI).

Timothy James Tschaplinski, Paul E. Abraham, Sara S. Jawdy, Lee E. Gunter, **Madhavi Z. Martin**, Nancy L. Engle, Xiaohan Yang, Gerald A. Tuskan, "The nature of the progression of drought stress drives differential metabolomic responses in Populus deltoides," Annals of Botany, mcz002, 1–10 (2019). doi: 10.1093/aob/mcz002 (IF= 4.041)

Deborah A Weighill, Piet Jones, Manesh Shah, Priya Ranjan, Wellington Muchero, Jeremy Schmutz, Avinash Sreedasyam, David Macaya-Sanz, Robert Sykes, Nan Zhao, **Madhavi Z Martin**, Stephen DiFazio, Timothy J

Tschaplinski, Gerald Tuskan, Daniel Jacobson, Pleiotropic and Epistatic Network-Based Discovery: Integrated Networks for Target Gene Discovery, bioRxiv, p. 267997 (2018), Cold Spring Harbor Laboratory.

B. N. Bennett, **M. Z. Martin**, D. N. Leonard, E. Garlea, "Calibration curves for commercial copper and aluminum alloys using handheld laser-induced breakdown spectroscopy," Applied Physics B, 124, 42 (2018). https://doi.org/10.1007/s00340-018-6909-x. (IF=1.7).

C Kristian G. Myhre, Mihir J. Mehta, **Madhavi Z. Martin**, Miting Du, "Comparison of Univariate and Multivariate Approaches for Quantitative Laser-Induced Breakdown Spectroscopy Measurements of Europium and Samarium in Aluminum Oxide," Spectrochimica Acta, Part B: Atomic Spectros, 149, 30–34, (2018). https://doi.org/10.1016/j.sab.2018.07.014 (IF = 3.18)

G. Shaw, M. Bannister, T. M. Biewer, **M. Z. Martin**, F. Meyer, B. D.Wirth, "The detection of He in tungsten following ion implantation by laser-induced breakdown spectroscopy," Applied Surface Science, 427, Part B, 695–703 (January 2018). (IF = 3.15)

Madhavi Z. Martin, David C. Glasgow, Timothy J. Tschaplinski, Gerald A. Tuskan, Lee E. Gunter, Nancy L. Engle, Ann M. Wymore, David J. Weston, "Correlating Laser-Induced Breakdown Spectroscopy (LIBS) with Neutron Activation Analysis (NAA) to determine the elemental concentration in the ionome of the Populus trichocarpa leaf," Spectrochimica Acta Part B, 138, 46–53 (2017). (IF = 3.18)

Suresh Poudel, Richard J. Giannone, Miguel Rodriguez Jr., Babu Raman, **Madhavi Z. Martin**, Nancy L. Engle, Jonathan R. Mielenz, Intawat Nookaew, Steven D. Brown, Timothy J. Tschaplinski, David Ussery, Robert L. Hettich, "Integrated omics analyses reveal the details of metabolic adaptation of Clostridium thermocellum to lignocellulose-derived growth inhibitors released during the deconstruction of switchgrass," Biotechnology for Biofuels, 10, 14 (2017). doi: 10.1186/s13068-016-0697-5 (IF= 6.4).

Madhavi Martin, Rodger C. Martin, Steve Allman, Deanne Brice, Ann Wymore, and Nicolas Andre, Quantification of Rare Earth Elements Using Laser-Induced Breakdown Spectroscopy," Spectrochimica Acta Part B: Atomic Spectroscopy, 114, 65–73 (2015). (IF = 3.18)

Qiao Zhao, Yining Zeng, Yanbin Yin, Yunqiao Pu, Lisa A. Jackson, Nancy L. Engle, Madhavi Z. Martin, Timothy J. Tschaplinski, Shi-You Ding, Arthur J. Ragauskas, Richard A. Dixon, "Pinoresinol reductase 1 impacts lignin distribution during secondary cell wall biosynthesis in Arabidopsis" Phytochemistry Volume 112, April 2015, Pages 170-178.

Madhavi Z. Martin, R. V. Fox, A. W. Miziolek, F. C. DeLucia Jr., and Nicolas André, "Spectral Analysis of Rare Earth Elements using Laser-Induced Breakdown Spectroscopy", Proceeding of SPIE 9482- 2015, Baltimore MD, USA, April 20–24, 2015. Next-Generation Spectroscopic Technologies VIII, 94820G (June 3, 2015). doi: 10.1117/12.2178192.

T. J. Tschaplinski, J. M. Plett, N. L. Engle, A. Deveau, K. Cushman, **M. Z. Martin,** M. J. Doktycz, G. A. Tuskan, A. Brunm, A. Kohler, F. Martin, "Populus trichocarpa and Populus deltoids exhibit different metabolomics responses to colonization by the symbiotic fungus Laccaria bicolor," Mol. Plant Microbe Int. 2014. Available online. doi: 10.1094/MPMI-09-13-0286-R 27:546-556.

G. Shaw, **M. Z. Martin**, R. Martin, T.M. Biewer, "Preliminary Design of Laser-induced breakdown Spectroscopy for Proto-MPEX," Review of Scientific Instruments, 85, 11D806 (2014).

M. Z. Martin, L. E. Gunter, S. S. Jawdy, S. D. Wullschleger, C. S. Wheeler et. al., "Genetic Improvement, Sustainable Production and Scalable Small Microenterprise of *Jatropha* as a Biodiesel Feedstock," J. Bioremed. Biodeg. S4, 002 (2013). doi:10.4172/2155-6199.S4-002.

K. L. Yee, M. Rodriguez, Jr., T. J. Tschaplinski, N. L. Engle, **M. Z. Martin,** C. Fu, Z.-Y. Wang, S. Hamilton-Brehm, J. R. Mielenz, "Comparison of consolidated microbial bioprocessing conversion of genetically modified switchgrass," *Biotechnology for Biofuels*, 5**,** 81 (2013). doi:10.1186/1754-6834-5:81. (IF = 5.5)

Madhavi Z. Martin, Melanie A. Mayes, Katherine R. Heal, Deanne J. Brice, Stan D. Wullschleger, "Investigation of laser-induced breakdown spectroscopy and multivariate analysis for differentiating inorganic and organic C in a variety of soils," Spectrachimica Acta Part B, 100–107 (2013). doi: 10.1016/j.sab.2013.05.026. (IF = 3.05)

Lucie Krajcarova, Karel Novotny, Petr Babula, Ivo Provaznik, Petra Kucerova, Vojtech Adam**, Madhavi Z. Martin**, Rene Kizek, Jozef Kaiser, "Copper transport and accumulation in spruce stems (Picea abies (L.) Karsten) revealed by laser-induced breakdown spectroscopy," Int. J. Electrochem. Sci., 8, 4485–4504 (2013).

T. J.Tschaplinski, R. F. Standaert, N. L. Engle, **M. Z. Martin,** A. K. Sangha, J. M. Parks, J. C. Smith, R. Samuel, Y. Pu, A. J. Ragauskas, C. Y. Hamilton, C. Fu, Z.-Y. Wang, B. H. Davison, R. A. Dixon, J. R. Mielenz. 2012. "Down-regulation of the caffeic acid Omethyltransferase gene in switchgrass reveals a novel monolignol analog," Biotechnol. Biofuel., 5, 71 (2012). (IF = 5.5)

J. Kaiser, K. Novotný, **M. Z. Martin**, A. Hrdlička, R. Malina, M. Hartl, V. Adam, R. Kizek, "Trace elemental analysis by laser-induced breakdown spectroscopy – biological applications," Surface Science Reports, 67, 233–243 (2012). (IF = 11.7)

Madhavi Z. Martin, Steve Allman, Deanne J. Brice, Rodger C. Martin, Nicolas O. Andre, "Exploring laser-induced breakdown spectroscopy for nuclear materials analysis and *in-situ* applications," Spectrochimica Acta Part B, 74–75, 177–183 (2012). (IF = 3.05)

D. J. Weston, D. A. Pelletier, J. L. Morrell-Falvey, T. J. Tschaplinski, S. S. Jawdy, T. Y. Lu, S. M. Allen, A. Darve, S. J. Melton, **M. Z. Martin,** C. W. Schadt, J. G. Chen, X. Yang, M. J. Doktycz, G. A. Tuskan, "*Pseudomonas fluorescens* induces strain-dependent and strain-independent host plant responses in defense networks, primary metabolism, photosynthesis and fitness.," Molecular Plant-Microbe Interactions, 25(6), 765–778 (2012).

Rebekah J. Wagner, Margot W. Kaye, Marc D. Abrams, Paul J. Hanson, **Madhavi Martin**, "Tree-Ring Growth and Wood Chemistry Response to Manipulated Precipitation Variation for two Temperate Quercus Species," Tree-Ring Research, 68(1), 17–29 (January 2012).

N. F. Yang, N. S. Eash, J. Lee, **Madhavi Z. Martin**, "Multivariate Analysis of Laser-Induced Breakdown Spectroscopy Spectra of Soil Samples," Soil Science, 175(9), 447–452 (September 2010).

Madhavi Z Martin, Arthur J Stewart, Kimberley D Gwinn, John C. Waller, "Laser-induced Breakdown Spectroscopy used to Detect Endophyte-mediated Accumulation of Metals by Tall Fescue", Appl. Opts. vol 49 No.13 (May 1 2010) C161-C167.

Gerald A. Tuskan, Timothy J. Tschaplinski**,** Udaya Kalluri, Tongming Yin, Xiaohan Yang, Xinye Zhang, Nancy Engle, Priya Ranjan, Manojit Basu, Lee Gunter, Sara Jawdy, **Madhavi Martin**, Alina Campbell, "Genome-enabled Discovery of Carbon Sequestration Genes," DOE's Office of Scientific and Technical Information (OSTI) and is provided as a public service (April 2010).

Madhavi Z. Martin, Nicole Labbé, Nicolas André, Stan D. Wullschleger, Ronny D. Harris, Michael H. Ebinger, "Novel Multivariate Analysis for Soil Carbon Measurements Using Laser-Induced Breakdown Spectroscopy," SSSAJ Soil Science Society of America Journal, 74(1), 87–93 (January–February 2010).

A. Chatterjee, R. Lal, L. Wielopolski, **M. Z. Martin**, M. H. Ebinger, "Evaluation of Different Soil Carbon Determination Methods, "Online Publication Date: 01 May 2009, Critical Reviews in Plant Sciences.

Nicole Labbé, Isabel Maya Swamidoss, Nicolas André, **Madhavi Z. Martin**, Timothy M. Young, Timothy G. Rials, "Extraction of information from laser-induced breakdown spectroscopy spectral data by multivariate analysis," Appl. Opts., 47(31), G158–G165 (Nov. 1, 2008).

Madhavi Z. Martin, Nicole Labbé, Nicolas André, Ronny Harris, Michael Ebinger, Stan D. Wullschleger, Arpad A. Vass, "High resolution applications of laser-induced breakdown spectroscopy for environmental and forensic applications," Spectrochimica Acta Part B, 62(12), 1426–32 (2007).

Nicole Labbe, Timothy G. Rials, Stephen S. Kelley, **Madhavi Martin**, "Characterization of materials by high throughput technologies Near Infrared and Laser-Induced Breakdown Spectroscopy," ACS Symposium Series 945, pp 495–512 (2007).

M. Z. Martin, S. D. Wullschleger, C. T. Garten Jr., Anthony V. Palumbo, "Measurement of carbon for carbon sequestration and site monitoring," Laser-induced breakdown spectroscopy, Chapter 15, pp. 341–351, Ed., J. P. Singh and Surya Narayan Thakur, Elsevier Science B.V., 2007.

Madhavi Z. Martin, Stan D. Wullschleger, Arpad A. Vass, Rodger C. Martin, Henri Grissino-Mayer, "High-Resolution Laser-Induced Breakdown Spectroscopy used in Homeland Security and Forensic Applications," Bull. Las. Spectrosc. Soc. India., Special Issue No. 14, pp 23–35, 2006.

Steven D. Brown, **Madhavi Martin**, Sameer Deshpande, Sudipta Seal, Katherine Huang, Eric Alm, Yunfeng Yang, Liyou Wu, Tingfen Yan, Xueduan Liu, Adam Arkin, Karuna Chourey, Jizhong Zhou, Dorothea K. Thompson, "Cellular Response of *Shewanella oneidensis* to Strontium-Stress," Appl. Environ. Microbiol., 72(1), 890–900 (2006).

R. Singh, **M. Martin**, and N. B. Dahotre, "Influence of laser surface modification on corrosion behavior of stainless steel 316L and Ti-6Al-4V in simulated biofluid," Surface Engineering, 21(4), 297–306 (2005).

Madhavi Z. Martin, Nicole Labbe, Timothy G. Rials, Stan D. Wullschleger, "Analysis of preservative-treated wood by multivariate analysis of LIBS spectra," Spectra Chimica Acta B., 60(7–8), 1179–1185 (2005).

A. A.Vass, **Madhavi Z. Martin,** J. Synstelien, K. Collins, "Elemental Characterization of Skeletal Remains Using Laser-Induced Breakdown Spectroscopy (LIBS)," pp 307–308 in Proceedings of the American Academy of Forensic Sciences, Annual Meeting, New Orleans, LA, February 21–26, 2005.

Madhavi Z. Martin, Stan. Wullschleger, Charles T. Garten Jr., Anthony V. Palumbo, John G. Smith. "Elemental Analysis of Environmental and Biological Samples using Laser-Induced Breakdown Spectroscopy and Pulsed Raman Spectroscopy," J. Disper. Sci. and Technol., 25(5), 689–696 (2004).

A. V. Palumbo, S. Fisher, **M. Martin**, Z. Yang, J. Tarver, S. D. Wullschleger, "Application of emerging tools and techniques for measuring carbon and microbial communities in reclaimed mine soils," *Environmental Management*, Volume 33, supplement 1, 2004.

M. Martin, B. Evans, H. O'Neill, J. Woodward, “Laser-induced breakdown spectroscopy used to detect palladium and silver metal dispersed in bacterial cellulose membranes,” Appl. Optics, 42(30), 6174–6178 (2003).

R. C. Martin, D. C. Glasgow, **M. Z. Martin**, "Applications of Californium-252 Neutron Irradiations and Other Nondestructive Methods at Oak Ridge National Laboratory," Radioanalytical Methods in Interdisciplinary Research,” Fundamentals in Cutting-Edge Applications, C. A. Laue and K. L. Nash, eds., American Chemical Society Symposium Series No. 868, chapter 7, pp 88–103 (2004).

Madhavi Martin, Stan Wullschleger, Charles Garten Jr., Anthony Palumbo, “Laser-induced Breakdown Spectroscopy for the Environmental Determination of Total Carbon and Nitrogen in Soils,” Applied Optics, 42(12), 2072–2077 (2003).

M. Z. Martin and O. R. West, In Situ Chemical Oxidation through Lance Permeation at the Portsmouth Gaseous Diffusion Plant (PORTS), Oak Ridge National Laboratory Report ORNL/TM-2002/272, Feb. 2003.

Madhavi Martin, Stan Wullschleger, Charles Garten Jr., “Laser-induced breakdown spectroscopy for environmental monitoring of soil carbon and nitrogen,” Proceedings of SPIE, Eds. Tuan Vo-Dinh and Stephanus Buttgenbach, vol. 4576, pp. 188–195 (2002).

M. Z. Martin and M. D. Cheng, “The Detection of Chromium Aerosol using Time-Resolved Laser-Induced Plasma Spectroscopy,” Appl. Spectrosc., 54(9) (2000).

M. Z. Martin, M. D. Cheng, R. C. Martin, “Aerosol Measurement by Laser-Induced Plasma Technique: A Review,” Aerosol Sci. and Technol., 31(6), 409–421 (1999).

C. S. Feigerle, **M. Z. Martin,** L. Y. Liu, J. C. Miller, (1997) “Multiphoton ionization studies of laser-induced chemistry in clusters,” pp 387–390 in N. Winograd and J. E. Parks (Eds.), *Resonance Ionization Spectroscopy 1996 – Eighth International Symposium*.

M. Z. Martin, S. R. Desai, C. S. Feigerle, J. C. Miller, “Chemistry in Clusters: Synthesis of $NO^+(N_2O_3)n$ and $NO_2^+(N_2O_3)n$ Species,” J. Phys. Chem., 100, 8170–74 (1996).

L. A. Pinnaduwage, **M. Z. Martin**, L. G. Christophorou, "Enhanced Negative Ion Formation in ArF-Laser-Irradiated Methane: Possible Implications for Plasma Processing Discharges," IEEE Trans. Plasma Sci., 35, 433–38 (1995).

A.A. Garrison, **M. Z. Martin,** “Acid-Sensing by Remote Raman Spectroscopy,” Journal of Process Analytical Chemistry, 95–98 (1995).

M. Z. Martin and A. A. Garrison, "Optical pH-Sensor - A Tool for On-line Chemical Process Control," AT-PROCESS: J. Process Anal. Chem., 127–131 (1994).

L. A. Pinnaduwage, **M. Z. Martin**, L. G. Christophorou, "Enhanced Negative Ion Formation in UV-Laser-Irradiated Silane; Implications for Plasma Deposition of Amorphous Silicon," Appl. Phys. Letters, 65, 2571–73 (1994).

L. A. Pinnaduwage, **M. Z. Martin**, L. G. Christophorou, “Enhanced Negative-Ion Formation in Arf-Laser Irradiated Methane - Possible Implications for Plasma Processing Discharges,” Contributions to Plasma Physics, 35, 433–438 (1995).

M. Z. Martin, F. K. Oshita, M. Matloubian, H. R. Fetterman, W. J. Ho, N. L. Wang, F. Chang, D. Cheung, "The Electrical and Optical Response of a Very High-Frequency AlGaAs/GaAs Heterojunction Bipolar Transistor," J. Appl. Phys., 76, 3847–49 (1994).

A. A. Garrison, **M. Z. Martin,** Fourier-Transform Raman Spectroscopy-Application to Process-Control," pp 210–211 in J. E. Bertie and H. Wieser (Eds.), 9th International Conference on Fourier Transform Spectroscopy, 1993.

M. Z. Martin, A. A. Garrison, M. J. Roberts, P. D. Hall, and C. F. Moore, "Composition monitoring by on-line remote Raman spectroscopy," Process Control and Quality, 5, 187–92 (1993); invited talk at Seventh International Forum Process Analytical Chemistry, Galvaston, Texas, Jan. 26–27, 1993.

R. C. Martin and **M. Z. Martin**, Analytical Techniques for SiC Characterization: Literature Review and Project Status, Oak Ridge National Laboratory Report ORNL/TM-12352, November 1993.

M. Z. Martin, F. K. Oshita, M. Matloubian, H. R. Fetterman, L. Shaw, K. L. Tan, "High-Speed Optical Response of Pseudomorphic InGaAs High Electron Mobility Transistors," IEEE Photonics Technology Letters, 4, 1012–14 (1992).

F. Oshita, **M. Martin**, M. Matloubian, H. Fetterman, H. Wang, K. Tan, D. Streit, "Cryogenic Performance of a Monolithic W-Band Amplifier Using Picosecond Optoelectronic Technique," IEEE Microwave and Guided Wave Letters, 2, 340–42 (1992).

Madhavi Z. Martin, D. K. Shuh, R. S. Williams, R. M. Ostrum, "Transport Properties and Infrared Spectra of CuCl Thin Films," J. Appl. Phys., 67, 3097–3101 (1990).

B. D. Muragi, **M. J. Zope,** J. K. Zope, "Mechanism for Nonlinear IV Behavior and the Temperature-Dependence of Threshold Switching in the Se-Te-Sn System M," Appl. Phys. A-Materials Science & Processing, 46(4), 299–303 (August 1988).

Madhavi Zope, B. D. Muragi, and J. K. Zope, "Electrical Conductivity Measurements in a Ge-Se-Tl System," J. Non-Crystalline Solids, 103, 195–200 (1988).

Madhavi J. Zope and J. K. Zope, "Effect of γ-Irradiation on Non-Linear I-V Behaviour and Thermoelectric Measurements in Amorphous Semiconducting As-Se-Te System," J. Non-Crystalline Solids, 74, 47–55 (1985).

Madhavi J. Zope and J. K. Zope, "Nonlinear I-V Behaviour and Thermoelectric Measurements in Amorphous Semiconducting As-Te-I System," Indian J. Pure & Appl. Physics, 23, 68–70 (1985).

Madhavi J. Zope and J. K. Zope, "Nonlinear I-V Behaviour and Conductivity Measurements in Amorphous Semiconducting Ge-As-Te System," J. Mat. Sci. Lett., 3, 850–52 (1984).

PRESENTATIONS

Madhavi Martin, Nicolas Andre, Deanne Brice, Nikki Labbe, "Switchgrass and Woody Biomass Elemental characterization using Laser-induced Breakdown Spectroscopy" (Invited Talk), EMSLIBS 2019, Brno, Chech Republic, September 8-13, 2019.

Madhavi Martin, Nicolas Andre, Deanne Brice, Nikki Labbe, “Inorganic Characterization of Switchgrass Biomass using Laser-induced Breakdown Spectroscopy” (invited talk), LIBS 2018, Atlanta, GA, October 21–26, 2018.

Madhavi Z. Martin, Brittany Bennett, Elena Garlea, “Evaluation of Corrosion on Materials at the Y-12 Nuclear Security Complex using Hand-Held Laser-Induced Breakdown Spectroscopy” (invited talk), EMSLIBS 2017.

Madhavi Martin, David Glasgow, Timothy Tschaplinski, Gerald A. Tuskan, Lee E. Gunter, Nancy Engle, Ann Wymore, David J. Weston, “Correlating Laser-Induced Breakdown Spectroscopy and Neutron Activation Analysis for Resolving the Spatial Variation in the Populus Trichocharpa Leaf ionome,” Frontiers in Biorefining, St. Simon Island, GA, November 8–11, 2016.

Madhavi Martin, David Glasgow, Timothy Tschaplinski, Gerald Tuskan, Lee Gunter, Nancy Engle, Ann Wymore, David Weston, “Correlating Laser-Induced Breakdown Spectroscopy and Neutron Activation Analysis for Resolving the Spatial Variation in the Ionome of the Populus Trichocarpa Leaf, ” (invited talk), LIBS 2016, Chamonix France, Sept. 12–16, 2016.

Madhavi Z. Martin, R. V. Fox, A. W. Miziolek, F. C. DeLucia Jr., Nicolas André, “Spectral Analysis of Rare Earth Elements Using Laser-Induced Breakdown Spectroscopy,” SPIE-DSS-2015, Baltimore MD, April 20–24, 2015.

Madhavi Martin, Rodger C. Martin, Steve Allman, Ann Wymore, Deanne Brice, “Quantification of Rare Earth Elements Using Laser-Induced Breakdown Spectroscopy” (invited talk), LIBS 2014, Beijing, China, Sept. 8–12, 2014.

G. Shaw, **M.Z. Martin**, R. Martin, T.M. Biewer “Preliminary Design of Laser-induced Breakdown Spectroscopy for Proto-MPEX,” contributed paper published as part of the Proceedings of the 20th Topical Conference on High-Temperature Plasma Diagnostics, Atlanta, GA, June 2014.

Madhavi Z. Martin, Steve Allman, Deanne J. Brice, Rodger C. Martin, Nicolas O. Andre, “Nuclear Materials Analysis Using Laser-Induced Breakdown Spectroscopy for National Security Applications,” Indo-US workshop on Spectroscopy: Application to National Security, January 18–20, 2013 (invited talk), Banaras Hindu University, Varanasi India.

Madhavi Z. Martin, Melanie A. Mayes, Katherine Heal, Deanne J. Brice, Stan D. Wullschleger, “Differentiating soil carbon into organic and inorganic components using laser induced breakdown spectroscopy,” LIBS2012 (invited talk), Luxor, Egypt, September 29–October 4, 2012.

Madhavi Z. Martin, Rodger C. Martin, Keith J. Leonard, James H. Miller, Joshua E. Schmidlin, Gary L. Bell Nicolas O. Andre, Nikki Labbe, “3-D Elemental Mapping of Biological and Non-biological Materials Using Laser-Induced Breakdown Spectroscopy,” EMSLIBS 2011 (invited talk), Izmir, Turkey, Sept 11–15, 2011.

Madhavi Z. Martin, Steve Allman, Rodger C. Martin, Nicolas O. Andre, Nikki Labbe, “Using Laser-Induced Breakdown Spectroscopy for Nuclear Materials Analysis for *in-situ* Applications,” NASLIBS 2011 (invited talk), Clearwater FL, July 18–20, 2011.

Madhavi Martin, Steve Allman, Rodger C. Martin, “Nuclear Materials Analysis using Laser-Induced Breakdown Spectroscopy”, LIBS 2010, (Invited Talk), Memphis, TN, September 13–17, 2010.

Madhavi Z. Martin, Arpad A.Vass, Nicole Labbe, Nicholas Andre, “Laser-Induced Breakdown Spectroscopy for Data Collection, and Multivariate Analysis, in Forensic and Environmental Applications,” NASLIBS 2009 (invited talk), New Orleans, LA, July 13–15, 2009.

Madhavi Martin, “Laser-induced breakdown spectroscopy: Fundamentals and selected applications,” 7th International SAOT Workshop on Optical Metrology, Absorption and Emission Spectroscopy, 2009 (invited talk) Erlangen, Germany, July 15–16, 2009.

Madhavi Z. Martin, Timothy J. Tschaplinski, Nicole Labbe, Simon Potter, "Assessing Biofuels Individually and by Phenotyping of Woody Biomass: Chemical Quantification by Laser-Induced Breakdown Spectroscopy and Near-Infrared Spectroscopy,” LIBS 2008 (invited talk), Berlin, Germany, Sept. 22–26, 2008.

Madhavi Z. Martin, Justin Baba, Paul Hanson, Jerry Tuskan, Rebekah Wagner, Nicole Labbé, Nicolas André, “Synergistic Approach of Using WoodCAT and Laser-Induced Breakdown Spectroscopy for High-Throughput, Data Collection, and Analysis of Biomass,” NASLIBS (invited talk), New Orleans, LA, October 8–10, 2007.

Madhavi Martin, Nicole Labbé, Nicolas André, Timothy G. Rials, “A High-Resolution Laser-Based Technique for Quantifying the Elemental Composition of Wood: Applications in Biomass Characterization,” SWST-2007 (invited talk), Knoxville, TN, June 10–14 2007.

M. Z. Martin, S. D. Wullschleger, A.A. Vass, R. D. Harris, M. H. Ebinger, T. G. Rials, N. Labbe, “High-Resolution Applications of Laser-Induced Breakdown Spectroscopy for Environmental and Forensic Samples Related to Homeland Security Applications,” LIBS 2006 (invited talk), Montreal, Canada, Sept. 5–8, 2006.

Madhavi Z. Martin, Stan D. Wullschleger, Nicole Labbe, Timothy Rials, “High-resolution applications of Laser-induced breakdown spectroscopy for Forensic and environmental applications,” PITTCON 2006 (invited talk), Orlando, FL, March 13–17, 2006.

Madhavi Martin, Stan D. Wullschleger, Nicole Labbe, Nicolas Andre, Timothy G. Rials, “A High-Resolution Laser-Based Technique for Quantifying the Elemental Composition of Wood: Applications in Forest Fire Ecological Response,” Central Hardwood Conference 2006, Knoxville, TN, February 27–March 1, 2006.

Madhavi Z. Martin, Stan D. Wullschleger, Arpad Vass, “High-Resolution Applications of Laser-induced Breakdown Spectroscopy for Homeland Security and Forensic Applications,” First Indo-US Workshop on Spectroscopy (invited talk), Varanasi, India, Jan. 9–12, 2006.

Madhavi Z. Martin, Stan D. Wullschleger, Arthur J. Stewart, John G. Smith, Timothy G. Rials, Nicole Labbe, “High-throughput and High-Resolution applications of Laser-induced breakdown spectroscopy for environmental samples,” PACIFICHEM 2005 (invited talk), Honolulu, Hawaii, December 15–20, 2005.

Madhavi Z. Martin, Stan D. Wullschleger, Timothy G. Rials, Nicole Labbe, **“**Developing Laser-Induced Breakdown Spectroscopy as a High Throughput Technique for Quantifying the Elemental Composition of Wood,” The Third International Conference on Laser Induced Plasma Spectroscopy and Applications, 28 September–1 October 2004 Torremolinos (Málaga).

Madhavi Z. Martin, Stan D. Wullschleger, Arthur J. Stewart, John G. Smith, Timothy G. Rials, Nicole Labbe, "High Throughput Elemental Detection in Environmental Samples using Laser-Induced Breakdown Spectroscopy," Gordon Research Conference on laser interaction with matter (by invitation only), Andover, NH, August 1–6, 2004.

Madhavi Martin, Stan Wullschleger, Charles Garten Jr., Anthony Palumbo, Olivia West, John Smith, Barbara Evans, Hugh O'Neill, Jonathan Woodward, “Detection of Elements from Environmental and Biological Samples using Laser-Induced Breakdown Spectroscopy,” presented at the 77th Colloid and Surface Science Symposium at Georgia Tech, June 15–18, 2003.

Madhavi Z. Martin, Stan Wullschleger, Anthony Palumbo, Olivia West, John Smith, Barbara Evans, Hugh O’Neill, Jonathon Woodward, "Applications of Laser-Induced Breakdown Spectroscopy to Environmental and Biological Sample Analysis," invited talk at Pittcon '2003, the Pittsburgh Conference & Exposition on Analytical Chemistry & Applied Spectroscopy, Orlando, FL, March 9–14, 2003.

A. V. Palumbo, **M. Martin,** Z. Yang, J. Tarver, S. Fisher, W. Lee Daniels, S. Wullschleger, “Development of measurement techniques for carbon and microbial communities in mine soil,” USDA Symposium on Natural Resource Management to Offset GHG Emissions, Raleigh, NC, November 2002.

Madhavi Martin, Barbara Evans, Hugh O’Neill, Jonathan Woodward, **“**Laser-Induced Breakdown Spectroscopy Used to Detect Palladium metal Dispersed in Cellulose Membranes,” presented at Laser-Induced Plasma Spectroscopy and Applications (LIBS2002) conference, Caribe Royale, Lake Buena Vista, FL, Sept. 24–28, 2002.

Madhavi Martin, Stan Wullschleger, Charles Garten Jr., Anthony Palumbo, Barbara Evans, Hugh O'Neill, Jonathan Woodward, “Environmental and biological applications of Laser-induced breakdown spectroscopy,” presented at the Workshop on Advances in Laser Technology and Applications, Redstone Arsenal, AL, August 21–22, 2002.

T. E. Byrne, **M. Z. Martin**, G. W. Kabalka, M. K. Khan, “An Analysis of Boron Compounds Using Laser Microprobe,” 10th International Congress on Neutron Capture Therapy, Essen, Germany, Sept. 8–13, 2002.

Madhavi Martin, Stan Wullschleger, “An Overview of the Current Technologies used in the Environmental Monitoring of Soil Carbon,” Proc. International Symposium on Environmental and Industrial Sensing, Oct. 28– Nov. 2, 2001, Boston, MA, SPIE Vol. 4574.

Cheng, M. D., **M. Z. Martin**, T. Wainman, “A Field Portable Monitor for Real-Time Measurement of Elements on Aerosols,” Annual Symposium of SERDP Program, Crystal City, Washington, DC, Nov. 29–Dec. 3, 1999.

M. Z. Martin, M. D. Cheng, “Laser-Induced plasma spectroscopy (LIPS): A tool for in situ spectroscopic characterization of aerosol mercury and chromium,” CLEO/QELS Meeting, Baltimore, MD, May 23–28, 1999.

M. Z. Martin, M. D. Cheng, “Detection of Chromium and Mercury in Aerosols Using Laser-Induced Plasma Spectroscopy: Wavelength and Buffer Gas Dependence,” APS Centennial Meeting, Atlanta, GA, March 20–26, 1999.

M. D. Cheng, **M. Z. Martin,** “Real-Time Measurement of Fine Particles and Trace Elements by Means of Laser-Induced Plasma Spectroscopic Technique” (invited talk), Conference on Air Quality, Mercury, Trace Elements, and Particulate Matter, McLean, VA, Dec. 1–4, 1998.

Jun Xu, Chung-Yi Kung, **Madhavi Martin**, William B. Whitten, J. Michael Ramsey, "Studies of Miniature Ion Mobility Spectrometer," International Conference on Ion Mobility Spectrometry, Hilton Head, SC, September 14–18, 1998.

M. Z. Martin, L. Liu, C. S. Feigerle, J. C. Miller, "Multiphoton Ionization Studies of Laser-Induced Chemistry in Clusters," Resonance Ionization Spectroscopy Meeting, State College, PA, June 30–July 5, 1996.

M. Z. Martin, S. R. Desai, C. S. Feigerle, J. C. Miller, "Laser-Induced Chemistry within Clusters," presented at Laser Applications to Chemical and Environmental Analysis," Orlando, FL, March 20–22, 1996.

M. Z. Martin, S. R. Desai, C. S. Feigerle, J. C. Miller, "Laser Ionization Mass Spectrometry of $(N_xO_y)_n$ Clusters," presented at the International Symposium on the Science and Technology of Atomically Engineered Materials, Richmond, VA, October 30–November 4, 1995 (winner of Best Poster Award).

L. A. Pinnaduwage, **M. Z. Martin**, L. G. Christophorou, "Efficient Negative Ion Formation in UV-Laser-Irradiated Silane; Implications for Plasma Deposition Applications," presented at the 47th Annual Gaseous Electronics Conference, Washington, DC, October 18–21, 1994.

A. A. Garrison, **M. Z. Martin**, M. J. Roberts, "Raman Spectroscopy - Academic Laboratory to the Process," presented at Pittcon '94, the Pittsburgh Conference & Exposition on Analytical Chemistry & Applied Spectroscopy, Chicago, IL, February 28–March 4, 1994.

A. A. Garrison, **M. Z. Martin**, "Fourier transform Raman spectroscopy - application to process control," Proc. 9th International Conference on Fourier Transform Spectroscopy, August 23–27, 1993, Calgary, Alberta, Canada, SPIE Vol. 2089, 210–11.

M. Martin, F. Oshita, M. Matloubian, H. Fetterman, "Picosecond Optoelectronic Characterization of AlGaAs/GaAs HBT at Cryogenic Temperatures," pp 391–394 in Proceedings of the 1991 International Semiconductor Device Research Symposium, Charlottesville, VA, December 4–6, 1991.

F. Oshita, **M. Martin**, M. Matloubian, H. Fetterman, “Picosecond Testing of Three-Terminal Devices,” National Center for Integrated Photonic Technology, Second Workshop, Lake Arrowhead, CA, November 11–12, 1991.

F. Oshita, **M. Martin**, M. Matloubian, H. Fetterman, “Picosecond Optoelectronic Testing,” Jet Propulsion Laboratory Conference on Optical Applications to Microwave and Millimeter-Wave Systems, Pasadena, CA, October 8, 1991.

H. R. Fetterman, M. Matloubian, D. V. Plant, **M. Martin**, F. Oshita, “Picosecond Testing and Evaluation of Three-Terminal Devices” (invited talk), pp 11–12 in IEEE LEOS 1991 Summer Topical Meeting on Optical Millimeter-Wave Interactions, Newport Beach, CA, July 24–26, 1991.