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Summary: I am a highly skilled analytical chemist with proficiency in contact angle goniometry, Raman Spectroscopy, Infrared Spectroscopy, absorbance spectroscopy, laser micromachining, and fluorescence spectroscopy. I have demonstrated successful fundraising by obtaining grants from the National Science Foundation, National Aeronautic and Space Administration, and the Henry and Camille Dreyfus Foundation. My administrative responsibilities include managing the University of Alabama in Huntsville Louis Stokes Alliance for Minority Participation, co-coordinating the campus-wide Materials Science Program and serving as the liaison between the graduate school and minority graduate students. I have experience in budget development, building consensus between different groups and leading organizations as evidenced by serving as the Technical Chair for the Annual Meeting of the National Organization of Black Chemists and Chemical Engineers in 2013 and 2014, and serving as the president of the Alabama Academy of Science in 2013.

Education

Ph.D., Analytical Chemistry, Louisiana State University, Baton Rouge, LA January 2000
Dissertation Advisor: Steven A. Soper
Dissertation Title: "The Design, Construction, and Application of Novel Near Infrared Time-Correlated Single Photon Counting Devices"

MS, Physical Chemistry, University of Rochester, Rochester, NY May 1995

Interdisciplinary BS, Chemistry and Physics, Morehouse College, Atlanta, GA May 1991

Professional Experience

University of Alabama in Huntsville
Department of Chemistry, Huntsville, AL
Associate (tenured) Professor August 2010-Present
Assistant Professor August 2004- August 2010

Morgan State University
Department of Chemistry, Baltimore, MD
Assistant Professor January 2002-July 2004

National Institute of Standards and Technology
Analytical Chemistry Division,
Chemical Science and Technology Laboratory, Gaithersburg, MD
National Research Council Postdoctoral Associate January 2000-January 2002

Publications

Accumulation of Silicon in Cacti Native to the United States: Characterization of Silica Bodies and Cyclic Oligosiloxanes in *Stenocereus thurberi*, *Opuntia littoralis*, *Opuntia ficus-indica*, and *Opuntia stricta*, Cynthia R. Wright, **Emanuel A. Waddell**, and William N. Setzer, *Natural Products Communications*, **2014** 9 (6) 873-878

In-plane spectroscopy with optical fibers and liquid-filled APEX™ glass microcuvettes, William R Gaillard, Khalid Hasan Tantawi, **Emanuel Waddell**, Vladimir Fedorov and John D Williams, *Journal of Micromechanics and Microengineering*, **2013** 23 107001.

Reactions of Zn²⁺, Cd²⁺, and Hg²⁺ with Free Adenine, Yahia Z Hamada, Theodore Burkey, **Emanuel Waddell**, Mahesh Aitha, Nsoki Phambu, *Journal of Applied Solution Chemistry and Modeling*, **2013** 2 (2), 77-84.

In-plane spectroscopy of microfluidic systems made in photosensitive glass, Khalid Hasan Tantawi, William Gaillard, Jake Helton, **Emanuel Waddell**, Sergey Mirov, Vladimir Fedorov, John D. Williams, *Microsystem Technologies*, **2013**, 19 (2), 173-177.

Spectroscopic and potentiometric studies of the interaction of adenine with some trivalent metal ions, Yahia Z. Hamada, Jasmine T. Greene, Veronica Shields, Monique Pratcher, Shandera Gardiner, **Emanuel Waddell**, Stephen Shreeves, Anderson Sunda-Meya, and Nsoki Phambu, *Journal of Coordination Chemistry*, **2010** 63 (2), 284-295.

Surface Modification of Sylgard 184 polydimethylsiloxane by 254 nm excimer radiation and characterization by contact angle goniometry, infrared spectroscopy, atomic force and scanning electron microscopy, **Emanuel Waddell**, Stephen Shreeves, Holly Carrell, Christopher Perry, Branden Reid, and James McKee. *Applied Surface Science*, **2008**, 254 (17).

Control of Electroosmotic Flow in Laser Ablated and Chemically Modified Hot Imprinted Poly(ethylene terephthalate glycol) Microchannels, Alyssa C. Henry, **Emanuel Waddell**, Rubina Shreiner, and Laurie E. Locascio, *Electrophoresis*, **2002**, 23(5), 791-798.

Surface Characterization of Laser Ablated Polymers Used for Microfluidics, D.L. Pugmire, **E.A. Waddell**, R. Haasch, M.J. Tarlov, and L.E. Locascio, *Analytical Chemistry*, **2002**, 74(4), 871-878.

Chemical Mapping of Hot-Embossed and UV-laser-ablated Microchannels in Poly(methyl methacrylate) using Carboxylate Specific Fluorescent Probes. Timothy J. Johnson, **Emanuel A. Waddell**, Gary W. Kramer, Laurie E. Locascio, *Applied Surface Science*, **2001**, 181, 149-159.

High Resolution Near-IR Imaging of DNA Micro-arrays with Time-Resolved Acquisition of Fluorescence Lifetimes. **Emanuel Waddell**, Yun Wang, Wieslaw Stryjewski, Scott McWhorter, Allyssa Henry, D. Evans, Robin L. McCarley and Steven A. Soper, *Analytical Chemistry*, **2000**, 72(24), 5907-5917.

A Fiber Optic-based Time Correlated Single Photon Counting Device with Subnanosecond time resolution. **Emanuel Waddell**, Wieslaw Stryjewski, and Steven A. Soper. *Review of Scientific Instruments*. **1999**, 70(1), 32-37.

Near Infrared Heavy-Atom-Modified Fluorescent Dyes for Base Calling in DNA-Sequencing Applications Using Temporal Discrimination. James H. Flanagan, Jr., Clyde V. Owens, Sarah E. Romero, **Emanuel Waddell**, Shaheer H. Kahn, Robert P. Hammer, and Steven A. Soper. *Analytical Chemistry*. **1998**, 70(13), 2676-2684.

Selective sulfur dioxide adsorbents prepared from designed dispersions of groups IA and IIA metal oxides on alumina. S. N. R. Rao, **Emanuel Waddell**, Mark E. Mitchell, and Mark G. White. *Journal of Catalysis*. **1996**, 163(1), 176-185.

Directed Thesis

Characterization of Alabama Red Wine by HPLC and Multiple Spectroscopy Methods, Kayla Smith (December 2014)

Separation of Superparamagnetic beads with dual magnetic fields, Diana Lechuga, (May 2013)

Attachment of Escheria Coli to Polydimethylsiloxane irradiated at 254 nm, Alisa Townsend (August 2012)

Surface Modification of Polydimethylsiloxane with 254 nm irradiation: A comparative study of Hydroxyl, Carboxylic, and Fluoro-terminated Groups, Kenya Wallace, (October 2012)

Protein Patterning on UV Light-Modified Poly Methyl Methacrylate Surface, Ahmed Soliman (October 2010)

Surface Modification of Polydimethylsiloxane by Irradiation at 254nm and Effects on Electroosmotic Flow, Padma Dharmarajan (March 2010)

Irradiation of Polyethylene Terephthalate by Excimer Radiation and Surface Characterization by Contact Angle Goniometry, Infrared Spectroscopy and Electroosmotic Flow, Madhusudhan A. Narayanan (June 2009)

Surface Characterization of Poly Methyl Methacrylate Microfluidic Channels, Talitha L.L. Hampton (July 2009)

Patents

"Surface Charge Modification Within Preformed Polymer Microchannels to Modulate Flow and Fabrication of Microarrays By Laser Ablation in Preformed Microchannels" Timothy Johnson, **Emanuel Waddell**, Laurie Locascio, and David Ross. (US Patent 6,982,028)

"Chemical Modification of Substrates by Photo-Ablation under Different Local Atmospheres and Chemical Environments for the Fabrication of Microstructures". **Emanuel Waddell**, Timothy Johnson, Gary Kramer, and Laurie Locascio. (US Patent 6,703,189)

Book Chapters

Waddell, Emanuel. "**Laser Micromachining**", Lab-on-a-Chip Technology, Eds. Keith E. Herold and Avraham Rasooly (2009)

El-Giar, Emad, Thomas, Gloria, and Waddell, Emanuel. "**Techniques of Fabrication**", Biological Applications of Microfluidics", Ed. Gomez, Frank (2008)

Waddell, Emanuel. "**Laser Ablation as a Fabrication Technique for Microfluidic Devices**", Methods in Molecular Biology: Microfluidic Techniques; Reviews and Protocols, Ed. S. D. Minter, Humana Press, Totowa, NJ (2006).

Soper, Steven A.; Owens, Clyde; Lassiter, Suzanne; Xu, Yichuan; Waddell, Emanuel. "**DNA Sequencing Using Fluorescence Detection**", Topics in Fluorescence Spectroscopy Vol 7 (DNA Technology), Ed. J. Lackowicz, Plenum Publishers (2003) 1-65.

Soper, Steven A.; Owens, Clyde V.; Lassiter, Suzanne J.; Xu, Yichuan; Waddell, Emanuel. "**DNA Sequencing Using Fluorescence Detection**", Biomedical Photonics Handbook, Ed. T. Vo-Dinh, SPIE Press, Washington (2003).

Courses of Instruction

Lower Level Courses: Introduction to Chemistry (CH101), General Chemistry I (CH121), General Chemistry II (CH123) Fundamentals of Chemical Research Chemistry (CH193), Quantitative Analysis Lecture (CH223), Quantitative Analysis Laboratory (CH224)

Upper Level Courses: Instrumental Analysis (CH421), Special Topics: Chemical Instrumentation (CH680)

Graduate Level Courses: Vibrational Spectroscopy of Biological Systems (CH700), Methods of Chemical Analysis (CH621); Various Special Topics (CH7xx)

Summary: Utilized learning management systems, web-based instruction, process oriented inquiry learning (POGIL) in course pedagogy. Quantified student performance with standardized American Chemical Society examinations. Introduced new laboratories in quantitative chemical analysis. Managed graduate student instruction through shared goal setting (SMART).

Administrative & Leadership Experience

Principle Investigator, *Louis Stokes Alliance for Minority Participation* February 2010-Present
University of Alabama in Huntsville, Huntsville, AL

- Managed sub-contract from the University of Alabama in Birmingham in the amount of approximately \$20,000/year.
- Reported matriculation and graduation rates. Interaction with Office of Institutional Research. Reported statistical data to National Science Foundation.
- Identified a pool of applicants and awarded scholarships to recipients.
- Mentored LSAMP Scholars and managed graduate student mentors. Established Undergraduate Minority Mentoring Program.

Committee Co-Chair, *Student Instructor Evaluations* October 2014-March 2015
University of Alabama in Huntsville, Huntsville, AL

- Built consensus for university-wide questions to be used in new student instructor evaluation tool amongst college representatives, faculty senate, deans and provost office.
- Interacted with vendor, technical liaison and university representative in implementing new system which included a migration from paper based to electronic multi-platform tools.
- Met time-sensitive milestones.
- Suggested mechanisms by which to maintain student participation rates.

Acting Campus Co-Coordinator, *Materials Science Program* January 2015-Present
University of Alabama in Huntsville, Huntsville, AL

- Administered Program Exams I which are required for advancement to doctoral candidacy.
- Communicated program information to interested students. Recruited students for admission to program. Advised students with respect to selecting research advisors.
- Developed strategies for program growth.

CO-Chair, *Technical Programs, Annual Meeting of the National Organization for the Professional Advancement of Black Chemists and Chemical Engineers* September 2013 and 2014
Indianapolis, IN and New Orleans, LA

- Created and managed three day technical program comprised of approximately ninety oral talks and over one hundred poster presentations.
- Established technical symposium to cover fundamental and emerging areas of chemistry.

Research Funding

Research and Engineering Apprenticeship Program (US Army Education Outreach Program), Measurement of Antioxidants in Coffee

Award: \$4000

Duration: June – July 2015

Cross College Faculty Research Program, “*Fabrication of a PDMS Viscometer for Biological Fluids*”, University of Alabama in Huntsville

Award: \$5000

Duration: October 2014 – October 2015

Cross College Faculty Research Program, “*Nanohole Enhanced Surface Enhanced Raman Spectroscopy*”, University of Alabama in Huntsville

Award: \$5000

Duration: October 2013 – October 2014

American Chemical Society, Project SEED, “*Measurement of Antioxidants in Coffee*”

Award: \$5500

Duration: Summer 2012-14

National Science Foundation, “*Louis Stokes Alliance for Minority Participation (LSAMP): Alabama LSAMP Student Transitions (sub award)*”;

Award: \$98,952

Duration: September 2011-August 2015

Academy of Applied Sciences, Research Apprenticeship Program, “*Modification of Polymer Substrates by Excimer Radiation*”

Award: \$2,800

Duration: June – July, 2010-2013

American Chemical Society, Project SEED, “*Microwave Assisted Organic Chemistry*”

Award: \$5000

Duration: Summer 2009-10

Academy of Applied Sciences, Research Apprenticeship Program, “*Fabrication of Microfluidic Devices using Off-the-Shelf Consumer Products*”

Award: \$2,800

Duration: June – July, 2007-2009

Jet Propulsion Laboratory, Minority Education Initiative and Public Outreach Office, “*Laser Driven Microthrusters*”

Award: \$46,000

Duration: August 2003 – August 2006

The Camille and Henry Dreyfus Faculty Start-up Grant Program for Undergraduate Institutions, “*Surface Modification of Polymer Substrates via Laser Ablation under Different Chemical Atmospheres*”

Award: \$20,000

Duration: August 2002 - July 2007

The National Science Foundation Major Research Instrumentation Grant Program: Instrument Development and Acquisition, “*Development of a New In-Situ Near Infrared Raman Probe Laser Ablation System for Chemistry Research*”

Award: \$404,686

Duration: August 2002 - July 2006

National Institute of Standards and Technology, Exploratory Research Program, “*High Throughput Screening of PCR Amplified Genetically Modified DNA Using Microhotplate Array Sensors and Surface Enhanced Raman Detection*”

Award: \$50,000

Duration: September 2001-August 2002

Selected Presentations

Keynote Speaker, Louis Stokes Alliance for Minority Participation, Mississippi Alliance Fall Meeting, Jackson State, Jackson, MS, February 2014.

“Surface Modification of Polymer Substrates by Excimer Radiation”, (Invited Seminar), Department of Chemistry, Morehouse College, Atlanta, GA. November 2011.

“Surface Modification of Polymer Substrates by Excimer Radiation”, (Invited Seminar), Department of Chemistry, University of the South, Sewanee, TN. November 2010.

“Surface Modification of Polymer Substrates by Excimer Radiation”, (Invited Seminar), Department of Chemistry, University of Memphis, Memphis, TN. October 2008.

“Surface Modification of Polymer Substrates by Excimer Radiation”, (Talk), National Meeting of the American Chemical Society, Atlanta, GA. March 2006

“Laser Ablation of Polymer Substrates: A Biotechnology and Materials Science Overview”, Department of Chemistry, George Mason University, Fairfax, VA. March 2005 (Invited Speaker)

“Laser Ablation of Polymer Substrates: A Biotechnology and Materials Science Overview”, (Talk), Southeast Regional Meeting of the American Chemical Society, Memphis, TN. November 2005

“Laser Ablation of Polymer Substrates: A Biotechnology and Materials Science Overview”, Department of Chemistry, Tuskegee University, Tuskegee, AL. October 2005 (Invited Speaker)

“Laser Ablation of Polymer Substrates: A Biotechnology and Materials Science Overview”, (Invited Speaker), Wilson Dam Section of the American Chemical Society, Florence, AL. September 2005

“Laser Etching of Plastic Microfluidic Systems”, Invited Speaker, Plenary Session, National Organization of Black Chemists and Chemical Engineers, New Orleans, LA. March 2002.

“One-Step Laser Ablation and Surface Modification of Polymer Substrates for the Fabrication of Microfluidic Devices”, Invited Speaker, SmallTalk Conference of the Association of Lab Automation, San Diego, CA. August 2001.

“Laser Ablation of Polymer Substrates for the Fabrication of Microfluidic Devices” (Poster), National Meeting of the American Chemical Society, Washington, DC. August 2000.

“A Novel Near-IR Time Correlated Single Photon Counting Scanning Device for DNA Sequencing Applications”(Poster), Gordon Research Conference in Analytical Chemistry, New England College, Henniker, NH August 1999.

“A Multi-Channel Fiber Optic Based Time Correlated Single Photon Counting Instrument for On-Line Lifetime Measurements in Capillary Electrophoresis”(Talk), Pittsburgh Conference, New Orleans, LA. March 1998.

Professional Development

Participant, Pardee RAND Graduate School Summer Faculty Workshop July 2013
Santa Monica CA

- Developed a preliminary proposal directed towards policy and analysis of K-8 participation in STEM.
- Discussed policy analysis, design, development and implementation.
- Developed preliminary merit badge for Boy Scouts of America for public policy.

Graduate, Wood Badge S9-113 Greater Alabama Council of Boy Scouts of America Fall 2013

- Developed organizational and personal vision statements related to organization improvement, personal growth and diversity.
- Discussed and received instruction with respect to stages of team development and project planning.
- Lead the Greater Alabama Council Spring National Youth Leadership Training Course. Leadership included budget management, recruitment of participants, and staff leadership.
- Developed framework for a policy merit badge.

Awards and Distinctions

Co-Chair, Student Instructor Evaluation Committee, UAHuntsville, Fall 2014

Member, Search Committee, Vice President of Student Affairs, UAHuntsville, Summer 2014

Member, Search Committee, Dean, College of Nursing, UAHuntsville, Spring 2014

Member, Graduate Council, UAHuntsville, Fall 2012-Summer 2014

Member, Department of Chemistry, Graduate Program Committee

Participant, Pardee RAND Graduate School Summer Faculty Workshop, July 2013

National Role Model Faculty Mentor Award, Minority Access Incorporated, September 2013

Chair, Technical Abstracts, 40th Annual Meeting of the National Organization for the Professional Advancement of Black Chemists and Chemical Engineers (NOBCCChE)

President, Alabama Academy of Science, Spring 2012-2013

District Award of Merit Boy Scouts of America, February 2013

Dean's Service Award, College of Science, UAHuntsville, April 2012

Chemistry Chair, Alabama Academy of Science, 2009-2011

Member, Dean's Leadership Scholarship Committee, Spring 2011

Member, Strategic Plan Campus Brand Committee, UAHuntsville, Fall 2008

Member, Vice President of Enrollment Services Search Committee, UAHuntsville, Fall 2007

Reviewer, Microfluidics and Nanofluidics

Reviewer, Journal of Agricultural and Food Chemistry

Reviewer, Journal of Photochemistry and Photobiology; A

Reviewer, Polymer International

Reviewer, International Journal for Environmental Research and Public Health

Reviewer, Journal of Laser Micro and NanoEngineering

Reviewer, American Chemical Society Petroleum Research Fund

Reviewer, IEEE Transactions on Automation Science and Engineering

Reviewer, National Science Foundation Major Research Instrumentation, Chemistry Panel

Reviewer, National Science Foundation SBIR Biotechnology Technical Review Panel

Reviewer, National Science Foundation, Chemical Measurements and Imaging Panel

Member, NOBCCChE, 1995-Present.

Member, American Chemical Society, 1993-Present.