

## **Emanuel A. Waddell, Ph. D.**

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**Summary:** I currently serve as a Program Officer at the National Science Foundation where I manage portfolios in the Historically Black Colleges and Universities Undergraduate Program (HBCU-UP) and Centers for Research Excellence in Science and Technology (CREST). Previously I served as the Associate Dean of the College of Science at the University of Alabama in Huntsville. I was responsible for managing course scheduling, accreditation, course approvals, curriculum changes, personnel, academic advising, outreach and retention in the College of Science. I participated in hiring of department chairs and budgeting process for the college. I managed the University of Alabama in Huntsville Louis Stokes Alliance for Minority Participation (2010-2019), coordinated the campus-wide Materials Science Program and served as the liaison between the graduate school and minority graduate students through administration of the Adriel D. Johnson, Sr. Fellowship (2010-2019). I have experience in budget development, building consensus between different groups and leading organizations as evidenced by serving as the president of the National Organization of Black Chemists and Chemical Engineers (2016-2018) and serving as the president of the Alabama Academy of Science in 2013. I have demonstrated successful fundraising by obtaining grants from the National Science Foundation, National Aeronautics and Space Administration, and the Henry and Camille Dreyfus Foundation which has resulted in over 1 million dollars of grants and contracts.

### **Education**

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**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

## **Administrative & Leadership Experience**

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### Program Officer, Human Resources Division

**National Science Foundation**, Alexandria, VA

July 2019 – Present

- Managed Historically Black Colleges and Universities – Undergraduate Programs (HBCU-UP) portfolio of approximately
- Managed Centers for Research Excellence in Science and Technology (CREST) portfolio of approximately \$
- Assisted with management of Hispanic Serving Institutions portfolio.
- Responsible for communicating to Principle Investigators

### Associate Dean, College of Science

**University of Alabama in Huntsville**, Huntsville, AL

August 2015 – July 2019

- Directed advising in College of Science. Lead transition to paperless environment. Streamlined registration process.
- Managed advising team consisting of two advisers and one academic coordinator.
- Provided leadership for undergraduate and graduate course approvals, course changes and scheduling.
- Interacted with seven department chairs of graduate and undergraduate programs.
- Assisted in leadership of approximately 1300 students.
- Assisted in increasing retention rates from freshman to sophomore year.
- Responsible for SACSCOC accreditation process in College of Science.

### Principle Investigator, Louis Stokes Alliance for Minority Participation

**University of Alabama in Huntsville**, Huntsville, AL

February 2010-June 2019

- Managed budgets from lead institution that range \$20,000 to \$60,000/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

**University of Alabama in Huntsville**, Huntsville, AL

October 2014-March 2015

- 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.

#### President

### **National Organization for the Professional Advancement of Black Chemists and Chemical Engineers**

July 2017–October 2019

- Provided public persona for Organization. Interacted with members and key external stakeholders (Industry, other non-profits, government and universities).
- Led transition to term limited presidential leadership team.

#### Coordinator, Materials Science Program

**University of Alabama in Huntsville**, Huntsville, AL

October 2015–July 2019

- 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 and implemented program growth through re-establishing collaboration with the UAH College of Engineering, University of Alabama at Birmingham and the University of Alabama.

#### Co-Chair, Technical Programs, Annual Meeting of the National

September 2013 and 2014

### **Organization for the Professional Advancement of Black Chemists and Chemical Engineers**

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.

#### **Professional Experience**

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### **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

**Research and Program Funding (\$1,065, 377)**

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**National Science Foundation**, “Intergovernmental Personnel Act”

Award: \$  
Duration: July 2019 – June 2021

**National Science Foundation**, “Increasing Underrepresented Minorities in STEM: The 45th Annual National Organization of Black Chemists and Chemical Engineers (NOBCChE) Conference”

Award: **\$70,847**  
Duration: July 2018 – March 2019

**National Science Foundation**, “*Collaborative Research NSF INCLUDES: South East Alliance for Persons with Disabilities in STEM (SEAPD-STEM)*”

Award: **\$5191**  
Duration: October 2016 – March 2019

**National Science Foundation**, “*Louis Stokes Alliance for Minority Participation (LSAMP): Sustainability of Best Practices for STEM Education and Research.*”

Award: **\$410, 448**  
Duration: September 2016 – August 2021

**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

## **Representative Publications** (<https://orcid.org/0000-0003-1117-4084>)

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Tantawi, K., Musa, Y., Dowd, S., Kamali, R., **Waddell, E. A.**, & Williams, J. (2018). Using microstructures of gold-coated photodefinable glass as substrates for surface enhanced Raman spectroscopy. In *Abstracts of Papers of the American Chemical Society*. American Chemical Society.

Surface Free Energy Determination of APEX Photosensitive Glass, William R Gaillard, **Emanuel Waddell**, John D Williams, *Micromachines* 2016 7 (3), 34

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 (10), 107001.

In-plane spectroscopy of microfluidic systems made in photosensitive glass, Tantawi, K.H., Gaillard, W., Helton, J., **Waddell, E.**, Mirov, S., Fedorov, V., Williams, J.D., *Microsystem Technologies*, Volume 19, Issue 2, 2013, Pages 173-177

Reactions of Zn<sup>2+</sup>, Cd<sup>2+</sup>, and Hg<sup>2+</sup> 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.

UV laser micromachining of polymers for microfluidic applications, **EA Waddell**, LE Locascio, GW Kramer, *JALA: Journal of the Association for Laboratory Automation*, **2002**, 7 (1), 78-82

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**

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*Thermal and Mechanical Properties of Carbon Nanotube Polymer Composites*, Enrique Jackson (June 2016)

*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**

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*"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**

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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**

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*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)

*Online Course:* Introduction to Physical Science Research (SCI199)

**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). Created a fully online course that introduced the University of Alabama in Huntsville College of Science to graduates of Mach III Space Camp.

## **Selected Presentations**

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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**

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

- 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 48 youth participants, and staff leadership of approximately 20 adults and youth.
- Developed framework for a policy merit badge.
- Four Bead Recipient.

## **Awards and Distinctions**

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*President, National Organization for the Professional Advancement of Black Chemists and Chemical Engineers, June 2017 – Present*

*Reviewer, Department of Chemistry at the University of Memphis, Spring 2017*

*Co-Chair, Student Instructor Evaluation Committee, UAH, Fall 2014*

*Member, Search Committee, Vice President of Student Affairs, UAH, Summer 2014*

*Member, Search Committee, Dean, College of Nursing, UAH, Spring 2014*

*Member, Graduate Council, UAH, Fall 2012-Summer 2014*

*Member, Chief Information Officer Search Committee, UAH, April - October 2017*

*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, 40<sup>th</sup> Annual Meeting of the National Organization for the Professional Advancement of Black Chemists and Chemical Engineers (NOBCCHE)*

*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, UAH, April 2012*

*Chemistry Chair, Alabama Academy of Science, 2009-2011*

*Member, Dean's Leadership Scholarship Committee, Spring 2011*

*Member, Strategic Plan Campus Brand Committee, UAH, Fall 2008*

*Member, Vice President of Enrollment Services Search Committee, UAH, Fall 2007*

*Reviewer, Microfluidics and Nanofluidics*

*Reviewer, Journal of Agricultural and Food Chemistry*

*Reviewer*, Journal of Photochemistry and Photobiology; A

*Reviewer*, Polymer International

*Reviewer*, Micromachines

*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.