

Jason R.E. Shepard, Ph.D.

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SUMMARY

- Expertise in DNA and antibody-based sensor arrays, fluorescence spectroscopy, assay development, and detection methods for Biodefense, Homeland Security, and Forensic Science applications.
- Sixteen years of post-baccalaureate laboratory experience, including two years of independent research in public health and five years in industry, with concentrations in diagnostics, genomics, instrumental analysis, and technology development.

EDUCATION

Tufts University, Ph.D.; joint degree in Chemistry and Biotechnology *December 2003*
Portland State University, M.S.; Chemistry *1999*
Siena College, B.S.; Chemistry *1992*

PROFESSIONAL AND ACADEMIC APPOINTMENTS

Assistant Professor / University at Albany; Albany, NY

Department of Chemistry

Sept. 2007–Present

- Perform independent research in biological sensing and detection applications, including diagnostics employing DNA, antibodies, live cells, and new technologies, such as high-throughput DNA analysis.
- Supervise the Forensic Chemistry undergraduate and graduate program. Lectures include Analytical Chemistry coursework, including Quantitative Analysis and Forensic Chemistry, with separate modules on UV-Vis, GC/MS, PCR, Statistics, and Microarrays, among others.
- Serve on the Department of Chemistry Graduate Committee, Undergraduate Committee and Equipment Committees; supervised the Department of Chemistry Seminar Program.

Department of Biomedical Sciences, School of Public Health

2004–2007

- Lectured for Biomedical Sciences graduate coursework, including separate modules on Biosensors, Automation, Water Surveillance and Terrorism, High-throughput Technologies, and Automated Detection Systems for Biothreat Agents.
- Served on the BMS Department recruitment committee, with admissions to attract prospective students, coordinate student orientation and aid the department's recruitment efforts.

Wadsworth Center, NYS Department of Health; Albany, NY

2004–2007

Research Scientist, Division of Infectious Disease; Biodefense Laboratory

- Conducted research on development of fiber optic and cell-based diagnostics for biological warfare agents and pathogenic microorganisms. Research involved optical analysis of bio-threat agents in the state Biodefense Laboratory as well as live-cell examination of pathogens and toxins.
- Performed technical evaluation of platforms and methodologies related to diagnostics for biodefense and Homeland Security.

Tufts University; Medford, MA

1999–2003

Graduate Research Fellow (for Prof. David R. Walt)

- Continued technical development of a microsphere-based fiber optic DNA sensor array. The microsensor platform involved fluorescence-based detection and discrimination in genomic applications, applied to bacterial strain discrimination and detection of biological pathogens.
- Dissertation: “Practical Development of a Fiber Optic Microsphere-based Oligonucleotide Array.”
- Provided management of multiple projects and research grants, including experimental design, supervision of post-doctoral and student researchers, and coordination with collaborators.
- Received special recognition awards from the department chair both for excellence in graduate research and for organizing a Chemistry Department Graduate Student Council.
- Served as a recitation teaching assistant for general chemistry (1999-2000).

Portland State University; Portland, OR

1997- 1999

- Investigated new cross-linking designs to connect DNA libraries to peptides in order to enhance inhibition of the HIV protease.
- Served as a graduate teaching assistant for organic chemistry. Responsibilities included teaching organic labs, tutoring for undergraduate students, and serving as head proctor for examinations.

Cambridge Isotope Laboratories

Process Chemist; Andover, MA

1992-1997

- Manufactured highly enriched carbon-13 and deuterated compounds for solvent, raw material, and research product applications.
- Transferred production routes into continuous processes, streamlining costs, materials, and timelines.
- Developed standard operating procedures and incorporated process modifications.
- Served as Safety Committee Advisor, providing recommendations to the Chemical Hygiene Officer on day-to-day and long-term aspects of company safety policy and procedures.

PUBLICATIONS & PRESENTATIONS

Peer Reviewed Publications

1. Walling, M.A.; Novak, J.A.; **Shepard, J.R.E.** Quantum Dots for Live Cell and *In Vivo* Imaging. *Int. J. Mol. Sci.* **2009**, *10*, 441-491.
2. **J. R. E. Shepard**, Polychromatic Microarrays: Simultaneous Multicolor Array Hybridization of Eight Samples, 2006, *Analytical Chemistry*, *78*, 2478-2486.
3. **J. R. E. Shepard**, Y. Danin-Poleg, Y. Kashi, and D. R. Walt, Array-based Binary Analysis for Bacterial Typing, 2005, *Analytical Chemistry*, *77*, 319-326.
4. **J. R. Epstein**, J. A. Ferguson, K-H. Lee and D. R. Walt, Combinatorial Decoding: An Approach for Universal DNA Array Fabrication, 2003, *JACS*, *125*(45), 13753-13759.
5. **J. R. Epstein** and D. R. Walt, Fiber Optic Arrays: A Universal Platform for Sensing, *Chemistry Society Reviews*, 2003, *32*, 203-214.
6. **J. R. Epstein** and D. R. Walt, High-density, Microsphere-based Fiber Optic DNA Microarrays, *Biosensors and Bioelectronics*, 2003, *18*, 541-546.
7. **J. R. Epstein**, M. Lee and D. R. Walt, High-density Fiber Optic Genosensor Microsphere Array Capable of Zeptomole Detection Limits, *Analytical Chemistry*, 2002, *74*, 1836-1840.
8. **J. R. Epstein**, I. Biran and D. R. Walt, Fluorescence-based Nucleic Acid Detection and Microarrays, *Analytical Chimica Acta*, 2002, *469*, 3-36.

Book Chapters

1. **J. R. E. Shepard**, In *Oligonucleotide Array Sequence Analysis*; M.K. Moretti and L.J. Rizzo, Eds., Nova Publishers, "Oligonucleotide Arrays in Forensic DNA Testing", 2008, 469-490.
2. **J. R. E. Shepard**, C. Egan, and N.M. Cirino, In *Handbook of Biosurveillance*. Wagner, M., Moore, A., Aryel, R. Eds.; Academic Press, "Water Biosurveillance", (2006) p. 143-159.
3. **J.R. Epstein**, et al., In *Advanced Microfabricated Sensors*; Kordal, R., Usmani, A. M., Law, W. T. Eds.; ACS, "Randomly-ordered High-density Fiber Optic Microsensor Array Sensors", (2002), 129-148.
4. C.L. Schauer, S.E. Stitzel, M.S. Fleming, **J.R. Epstein**, and D.R. Walt, In *Biosensors (2/e): A Practical Approach*; Cooper, J. M. and Cass, T. Eds.; Oxford Press, "Fiber Optic Biosensors", (2004) 131-153.

Proceedings

1. **J. R. E. Shepard**, "A fiber optic microarray for the detection of pathogenic microorganisms" Proc. of SPIE-The Intl. Soc. for Optical Engineering, *Defense, Security, and Sensing*, 2009, in press.
2. **J. R. Epstein** and D. R. Walt, "High-density Fiber Optic Biosensor Arrays" Proc. of SPIE-The Intl. Soc. for Optical Engineering, *Fiber Optic Sensor Technology and Applications* 2001, 89-95.
3. L. Song, **J. R. Epstein**, et al., "Microsphere-based DNA Biosensor Arrays" Proc. of SPIE-The Intl. Soc. for Optical Engineering, *Photonics East Showcasing the Age of Light*, 2003, 5269: 28.
4. L. Song, **J. R. Epstein**, et al., "Microsphere-based DNA Biosensors" Proc. of SPIE-The Intl. Soc. for Optical Engineering, *Chemical and Biological Point Sensors for Homeland Defense* 2004, 183-191.

Scientific Presentations/Invited Talks

1. Northeastern Association of Forensic Scientists, West Harrison, NY; "Forensic DNA Analysis, The STR and the SNP", **J.R. E. Shepard**, October 2, 2008.
2. New York State Department of Criminal Justice Services, Albany, NY; "Forensic DNA Analysis", **J.R. E. Shepard**, June 20, 2008.
3. Merck Research Laboratories, Rahway, NJ; "Quantum Dot-Based Diagnostics of Bio-threat agents", **J.R. E. Shepard**, March 20, 2006.
4. PITTCON, Orlando, FL; "A Quantum Dot-Based Microarray for Multiplexed Detection of Bio-agents", **J.R. E. Shepard**, March 16, 2006.
5. PITTCON, Orlando, FL; "A Quantum Dot-based Microarray for High-Throughput Multiplexed Detection", **J.R. E. Shepard**, March 1, 2005.
6. Nanobiotechnology Center Seminar Series, Cornell University, Ithaca, NY; "A Fiber Optic Biosensor Applied to Bio-terror Agents", **J.R. E. Shepard**, Sept. 28, 2004.
7. Northeast Biodefense Center, Annual Meeting, Lake George, NY; "Fiber Optic Arrays for Bio-agent Detection", **J.R. E. Shepard**, Sept. 20, 2004.
8. Microscopy and Microanalysis 2004, Savannah, GA "Fiber Optics Arrays: A Universal Platform for Sensing", **J.R. E. Shepard**, August 5, 2004.
9. Society of Toxicology, Salt Lake City, UT; Genomic and Proteomic Array Formats on the Cutting-Edge, "Fiber Optic Microarrays", **J. R. Epstein** and D. R. Walt, March 8, 2003.
10. Optics and Photonics in Homeland Security, Alexandria, VA, "Fiber Optic Arrays: A Platform for Detecting Chemical and Biological Agents.", **J. R. Epstein** and D. R. Walt, December 11, 2002.
11. Gordon Conference Workshop (Mycotoxins/Phycotoxins), Medford, MA, "Randomly Ordered High Density Microsphere and Cell-based Arrays", **J. R. Epstein**, I. Biran, and D.R. Walt, June 22, 2001.
12. PITTCON, New Orleans, LA; "Randomly Ordered High Density Fiber Optic Microsphere-based Arrays", **J. R. Epstein** and D. R. Walt, March 18, 2002.
13. PITTCON, New Orleans, LA; "Optical Imaging Fiber Based, Single Cell Live Arrays: A New Platform for Biosensing and Cell Based HTS", **J. R. Epstein**, I. Biran, and D. Walt, March 18, 2002.

14. SPIE Fiber Optic Sensor Technology and Applications, Boston, MA; "High-density Fiber Optic Biosensor Arrays", **J. R. Epstein** and D. R. Walt, October 30, 2001.

Additional Wadsworth Center Presentations

1. Lab Week, "A Quantum Dot Microarray for High-Throughput Multiplexed Detection", April, 2005.
2. Pathogenesis Seminar Series, "High(er) Throughput, Beyond Red to Green Multiplexing", June, 2005.
3. SUNY BMS Dept. Annual Retreat, "Multiplexed Fiber Optic Biological Analysis", Oct. 11th, 2005.
4. Molecular Techniques: A Wet Workshop, "Biosensors and Emerging Technologies", Oct. 27th, 2005.

Abstracts

1. D.R. Walt, S.E. Stitzel, **J.R. Epstein**, S. Bencic, A.P.K. Leung, Book of Abstracts 224th ACS National Meeting Boston, MA, August 18-22. "Optical Fiber Microarrays for Chem/Bio Detection".
2. D. R. Walt, **J. R. Epstein**, et al. Book of Abstracts 220th ACS Natl Meeting Washington, D.C., August 19, 2000. "High-density Optical Micro and Nano Arrays for Genomics and Proteomics".

Posters

1. ASM Biodefense, Washington, D.C, **J.R.E. Shepard**, "A Quantum Dot Fiber Optic Microarray for Multiplexed Detection of *Bacillus anthracis* and *Clostridium botulinum*", February 16, 2006.
2. ASM Intl. Meeting, British Columbia, Canada, Y. Danin-Poleg, **J.R.E. Shepard**, et al., "MNR-MLST for Typing of Bacterial Pathogens Based on Optic Fiber Microarray", May 11, 2005.
3. Biotechniques Live, Boston, MA, L. Song, **J.R. Epstein**, and D.R. Walt, "Microsphere-based Fiber-optic DNA Arrays", March 5, 2003.

Articles/Interviews

1. Life Experience: UAlbany Students Train for a Forensic Career; UAlbany Feature Web Article 2007.
2. Multireporter Microarray. *Analytical Chemistry, Research Profile*, 78(9), p. 2875, May 2006.
3. New Strategy for Zeptomole Detection. *Analytical Chemistry, Apages*, 74(9), p. 247A, May 2002.
4. Decoding DNA: Fused Fiber Taper Provides Fast DNA Analysis. *OE Magazine*, 1, p.20, Dec. 2001.
5. Fiberoptic Arrays 'Sniff Out' Bio Threats. *Laser Focus World*, 39(3), p. S1-S6, March 2003.
6. Optical Fibers Test DNA. *Photonics Spectra*, p. 41, April 2003.