

## **Biographical Sketch: Johna Leddy, Associate Professor**

### **(i) Professional Training**

Postdoctoral Associate, Los Alamos National Laboratory, Fuel Cell Program

Ph.D. (Chemistry) The University of Texas, 1984

B.A. (Chemistry) Rice University, 1978

### **(ii) Appointments**

Associate Professor of Chemistry, University of Iowa; 1997 – Present

Assistant Professor of Chemistry, University of Iowa; 1991 – 1997

Assistant Professor of Chemistry, City University of New York and Queens College; 1986 – 1991

### **(iii) Selected Ten Highest Impact Publications (38 total) or US Patents (25 total)**

1. Johna Leddy and Luke M. Haverhals, **U.S. Patent 8,080,206 B2**: *Multicomponent Analysis of Volatile Organic Compositions in Vapor Samples*, 17 pp., 20 December 2011.
2. Johna Leddy, Angela Wolf, Drew Dunwoody, Wayne Gellett, and Murat Ünlü, **U.S. Patent 7,842,178 B2**: *Magnet Incorporated Electrically Conductive Electrodes*, 23 pp., 30 November 2010.
3. Johna Leddy and Pengcheng Zou, **U.S. Patent 7,709,115**: *Methods for Forming Magnetically Modified Electrodes and Articles Produced Thereby*, 91 pp, 4 May 2010.
4. Johna Leddy, Shelley D. Minteer, and Wayne L. Gellett, **U.S. Patent 7,585,543 B2**: *Magnetic materials and metallic particles and methods of making same*, 19 pp, 8 September 2009.
5. Johna Leddy and Luke M. Haverhals, **U.S. Patent 7,421,882**: "Breath-Based Sensors for Non-Invasive Molecular Detection", 20 pp, 9 September 2009.
6. Johna Leddy, Sudath Amarasinghe, and Lois Anne Zook, **U.S. Patent 6,479,176 B2**: *Gradient Interface Composites and Methods Therefor*, 72 pp., 12 November 2002.
7. Sudath Amarasinghe, Shelley Minteer, Lois Anne Zook, Drew C. Dunwoody; Catherine Spolar, Hachull Chung, and Johna Leddy, **U.S. Patent 6,355,166 B1**: *Magnetically Enhanced Composite Materials and Methods for Making and Using the Same*, 79 pp., March 12, 2002.
8. K. J. Oberbroeckling, D.C. Dunwoody, S.D. Minteer, and J. Leddy\_, "Density of Nafion Exchanged with Transition Metal Complexes and Tetramethyl Ammonium, Ferrous, and Hydrogen Ions: Commercial and Recast Films," *Anal. Chem.*, **74**(18) (2002) 4794-4799.
9. *Solution Manual for Electrochemical Methods*, Cynthia G. Zoski and Johna Leddy, John Wiley & Sons, 2001, SV2002-29, ISBN 0-471-40521-3.
10. L. Zook and J. Leddy\_, "Density and Solubility of Nafion: Recast, Annealed, and Commercial Films," *Anal. Chem.*, **68** (1996) 3793-3796.

### **(iv) Synergistic Activities**

1. Translational Research Efforts. Professor Leddy and her students hold 25 U.S. Patents with a similar number of pending applications. The patents are in two areas: magnetically modified electrodes, where currents are enhanced substantially across a wide range of electrochemical power storage and generation systems that include fuel cells, photovoltaics, batteries, and supercapacitors, and breath sensors for analytes such as ethanol and smoking by-products. Electrodes modified with micromagnets to increase current is a platform technology, thus far applicable across numerous electrochemical systems. Typically, electrochemical systems are enhanced 25 to 40 %. Electrochemical breath sensors for ethanol and smoking by-products allow development of ignition locks and monitoring of smoking compliance. There are 31 separate cases on file with the University of Iowa Research Foundation. Leddy works with the University of Iowa Research Foundation to establish patent protection for these evolving technologies and to develop option and license agreements for these technologies in a wide range of markets. One company has been established, VolTesla. Student participation in the patent process is both educational and ultimately promotes employment in the academic, governmental, and industrial sectors.

2. Elected Offices and Participation in Professional Societies. Professor Leddy has been elected to offices in the Electrochemical Society and the Society for Electroanalytical Chemistry. Leddy serves as Secretary (2008 – 2012) for the Electrochemical Society, an organization of 9000 members worldwide. During her tenure as Secretary, she has overseen the permanent staff increase by 25 % to 25; the number of Societal publications increase from two to four; the oversight structure of Societal finances change in comply with the new regulations for non-profit societies; and the organization of biannual meetings of which four out of the last eight meeting have broken attendance records with over 3000 participants. As Secretary, Leddy has chaired the Ways and Means Committee and the Meeting Committee and served on the Publications Committee and Subcommittee, the Editorial Boards, the Finance Committee, and the Board of Directors. For the Society for Electroanalytical Chemistry, an organization of 400 members, Leddy has served on the Board of Directors, Chaired the Finance Committee, the Treasurer (2002-2010), and is currently President (2011-2013).
3. Books. Professor Leddy coauthored the Solution Manual for the graduate level electrochemistry text, *Electrochemical Methods* with Cindy Zoski (ISBN 0-471-40521-3). *Electrochemical Methods* by Allen J. Bard and Larry R. Faulkner is the best regarded and most rigorous text in the field. Leddy was the editor of *Historical Perspectives on the Evolution of Electrochemical Tools* (ISBN 1-56677-383-0); Vanysek and Birss were Associate Editors. Christina Bock and Leddy compiled the *Directory of Electrochemical Energy Solutions* for the first Electrochemical Energy Summit (ISBN 978-1-56677-910-4). Currently, Leddy has joined Alanah Fitch, Ingrid Fritsch, Carol Korzeniewski, and Shelley Minteer to develop an electrochemistry text for the novice electrochemist, *Electrochemical Systems: Their Analysis and Their Applications*, for Wiley. Finally, a book, *Electrochemical Characterization of Thin Films* is in development based on Leddy's graduate course, Electrochemistry of Polymer Films.
4. Editorial Board for Scientific Journals and Federal Review Panels. Professor Leddy is on the editorial boards for the following journals: *The Journal of the Electrochemical Society*, *ECS Journal of Solid State Science and Technology*, *ECS Electrochemistry Letters*, *ECS Solid State Letters*, *ECS Transactions*, and *Critical Reviews in Analytical Chemistry*. Leddy has also served on several review panels for the National Science Foundation that include fuel cells.
5. University Committees. Faculty Senate, Faculty Assembly, Research Council (2004 – 2010, 2012-2015, Chair 2006-2007), Parking and Transportation, Campus Planning

#### **(v) Collaborators & Other Affiliations**

1. **Co-Authors and collaborators (past 4 years):** Edward Gillan (Chemistry, University of Iowa); Shelley Minteer (University of Utah); Jack Kosek (Giner, Inc.); William Leddy (Znovation, LLC); Alanah Fitch (Loyola University of Chicago); Ingrid Fritsch (University of Arkansas); Carol Korzeniewski (Texas Tech University); Stephen Maldonado (University of Michigan); Chris Apblett (Sandia National Laboratories)
2. **Graduate and Postdoctoral Advisor:** Allen J. Bard, Professor, Norman Hackerman Welch Regents Chair, The University of Texas, Department of Chemistry, and Nicholas E. Vanderborgh, Los Alamos National Laboratories, Fuel Cell Program.
3. **Thesis Advisor and Postgraduate-Scholar Sponsor: over the past five years:** Perry Motsegood (Argonne National Labs, 2012), Garrett Lee (University of Utah, Minteer, 2012), Timothy Paschkewitz (Pine Instruments, 2012), Chester Duda (2012), Heung Chan Lee (University of Texas, Bard, de Nora Foundation Fellowship in Electrochemistry, 2011), Stephanie A. Schmidt (Fiberight, AMCS, 2010), Luke Haverhals (Naval Academy, 2008), Murat Unlu (DuPont, 2008), Chaminda Hettige (Oakland University, 2008), Jessica Jewett Reed (Iowa State University, 2012 MS). Currently, Krysti Knoche, Emily Mrugacz, and Jeffrey Landgren (AMCS). Prior to 2007, group members include Shelley Minteer (Ph.D. 2000, USTAR Professor, University of Utah), Lois Anne Zook (Ph.D. 1996, Associate Professor, Muskingum University), Stephen Maldonado (B.S. with Thesis 2001, Assistant Professor, University of Michigan), John Watkins (B.S. with Thesis 1998, named one of 10 Most Brilliant Innovators by Popular Mechanics 2009)

**Total Number of Graduate Students Either Advised to Degrees or Currently: 32**

**Total Number of Postdoctoral Scholars Advised: 4**

**Undergraduates: 61** with 8 Honors Theses