

## CURRICULUM VITAE

### Jonathan G. Shackman

Temple University  
Department of Chemistry  
Philadelphia, PA 19122  
(215) 204-1973

### Research Interests and Specializations

Analytical Chemistry; Separation Sciences; Spectroscopy; Microcolumn Separations and Microfluidics; Electrophoresis; Immunoassays; Data Analysis; Laboratory Automation

### Education

University of Michigan	Ph.D. in Analytical Chemistry 2005: “Monitoring Hormone Release from Islets of Langerhans <i>via</i> Rapid Electrophoresis Based Immunoassays on a Microfluidic Chip” under the direction of Professor Robert T. Kennedy M.S. in Analytical Chemistry 2004
University of Florida	Candidate for Ph.D. in Analytical Chemistry Dates Attended: 08/2000 – 08/2002 Reason for leaving: Moved with advisor to MI
University of Arizona	B.S. in Biochemistry 2000; <i>magna cum laude</i> Minors in Spanish and American Indian Studies Honors Thesis: “Determination of Optical Purity Using a Dispersive Raman Spectrometer”  B.S. in Chemistry and Molecular & Cellular Biology 2000, <i>magna cum laude</i> Minors in Physics and Math Honors Thesis: “Pharmaceutical Reaction Monitoring by Raman Spectroscopy”

### Academic and Professional Appointments

Assistant Professor Temple University	2007-Present
National Research Council Post Doctoral Fellow National Institute of Standards and Technology	2005-2007
Graduate Research and Teaching Assistant University of Michigan	2003-2005
Graduate Research and Teaching Assistant University of Florida	2000-2002
Undergraduate Research Assistant University of Arizona	1998-2000

## Honors and Awards

National Research Council Post Doctoral Fellow	2005-2007
Eli Lilly and Co. Chemistry Graduate Fellowship	2004-2005
Pfizer/ACS Analytical Graduate Travel Grant	2003
Eastman Chemical Company Analytical Fellowship	2003-2004
University of Florida Teaching Assistant of the Year	2001
University of Florida Grintner Graduate Fellowship	2000-2001
University of Arizona Outstanding Graduating Senior Award	2000
University of Arizona Outstanding Chemistry Senior	2000
University of Arizona Dean's List with Distinction	1996-2000
University of Arizona Honors Organic Chemistry Outstanding Preceptor	1998
University of Arizona Parents' Association & Associated Students' Scholar	1997-2000

## Teaching and Course Development

Chemistry 8601 (Analytical Separations) – A new graduate course developed to provide students with theoretical foundations universal to most separations as well as in depth coverage of the currently most utilized methods in both academics and industry. First offered Fall 2007.

Chemistry 3103 (Techniques of Chemical Measurement I) – Upper level undergraduate course focused on quantitative analysis. The course is an introduction to the theory of analytical methodology, with particular emphasis on error analysis and chemical equilibria, as well as an introduction to spectroscopy, electrochemistry, and separations.

## Departmental Committees

Faculty Recruitment	Fall 2008-present
Graduate Admissions	Fall 2008-present
Graduate Recruitment	Fall 2007-present

## Professional Societies

Alpha Chi Sigma  
American Chemical Society – Division of Analytical Chemistry  
American Electrophoresis Society  
American Society for Engineering Education  
Society for Applied Spectroscopy

## Reviewer

*Analytica Chimica Acta, Analytical Chemistry, The Analyst, Electrophoresis, Journal of Chromatography (A&B), Lab on a Chip, Talanta*

## Students Engaged in Research

### Graduate

Paul Flanigan, IV	Spring 2009-present
Manasa Mamunooru	Spring 2008-present
Johnny Perez	Spring 2008-present
Chandni Vyas	Spring 2008-present
Nejea Davis	Fall 2007-present

### Undergraduate

Tejash Patel	Fall 2008-present
Weijia (Michelle) Tang	Fall 2008
Feba Finny	Summer 2008
Ronald Jenkins	Fall 2007-Summer 2008

## External Graduate Committees

- Stephanie Schuster (Joe. P Foley, Advisor, Drexel University), Ph.D. Fall 2007  
Adam Socia (Joe P. Foley, Advisor, Drexel University), Candidacy Summer 2009

## Publications (Hirsch Index = 12)

21. "Amino Acid Measurements from a High Conductivity Matrix by Gradient Elution Isotachopheresis." C.A. Vyas, M. Mamunooru, and J.G. Shackman. *Chromatographia*, 70 (2009), 151-156.

20. "Capillary and Microfluidic Gradient Elution Isotachopheresis Coupled to Capillary Zone Electrophoresis for Femtomolar Amino Acid Detection Limits." N.I. Davis, M. Mamunooru, C.A. Vyas, and J.G. Shackman. *Analytical Chemistry*, 81 (2009), 5452-5459.

19. "Gradient Elution Isotachopheresis with Direct Ultraviolet Absorption Detection for Sensitive Amino Acid Analysis." M. Mamunooru, R.J. Jenkins, N.I. Davis, and J.G. Shackman. *Journal of Chromatography A*, 1202 (2008), 203-211.

18. "Finite Sample Effect in Temperature Gradient Focusing." H. Lin, J.G. Shackman, and D. Ross. *Lab on a Chip*, 8 (2008), 969-978.

*Prior to Joining Temple University in Fall 2007.*

17. "Gradient Elution Isotachopheresis for Enrichment and Separation of Biomolecules." J.G. Shackman, and D. Ross. *Analytical Chemistry*, 79 (2007), 6641-6649.

16. "Temperature Gradient Focusing with Field-Amplified Continuous Sample Injection for Dual-Stage Analyte Enrichment and Separation." M.S. Munson, G. Danger, J.G. Shackman, and D. Ross. *Analytical Chemistry*, 79 (2007), 6201-6207.

15. "Counter-flow Gradient Electrofocusing." J.G. Shackman and D. Ross. *Electrophoresis*. 28 (2007), 556-571. *Invited Review*.

14. "Gradient Elution Moving Boundary Electrophoresis for High-Throughput Multiplexed Microfluidic Devices." J.G. Shackman, M.S. Munson, and D. Ross. *Analytical Chemistry*, 79 (2007), 565-571.
13. "Temperature Gradient Focusing for Microchannel Separations." J.G. Shackman, M.S. Munson, and D. Ross. *Analytical and Bioanalytical Chemistry*, 387 (2006), 155-158. *Invited Review*.
12. "Quantitative Temperature Gradient Focusing Performed Using Background Electrolytes at Various pH Values." J.G. Shackman, M.S. Munson, C-W. Kan, and D. Ross. *Electrophoresis*, 27 (2006), 3420-3427.
11. "Total Insulin and IGF-I Resistance in Pancreatic Beta Cells Causes Overt Diabetes." K. Ueki, T. Okada, J. Hu, C.W. Liew, A. Assmann, G.M. Dahlgren, J.L. Peters, J.G. Shackman, M. Zhang, I. Artner, L.S. Satin, R. Stein, M. Holzenberger, R.T. Kennedy, C.R. Kahn, and R.N. Kulkarni. *Nature Genetics*, 38 (2006), 583-588.
10. "Negative Mode Sheathless Capillary Electrophoresis Electrospray Ionization-Mass Spectrometry for Metabolite Analysis of Prokaryotes." J.L. Edwards, C.N. Chisolm, J.G. Shackman, and R.T. Kennedy. *Journal of Chromatography A*, 1106 (2006), 80-88.
9. "Microfluidic Electrophoresis Chip Coupled to Microdialysis for *In Vivo* Monitoring of Amino Acid Neurotransmitters." Z.D. Sandlin, M.S. Shou, J.G. Shackman, and R.T. Kennedy. *Analytical Chemistry*, 77 (2005), 7702-7708.
8. "LXR $\beta$  is Required for Adipocyte Growth, Glucose Homeostasis, and  $\beta$ -Cell Function." I. Gerin, V.W. Dolinsky, J.G. Shackman, R.T. Kennedy, S.H. Chiang, C.F. Burant, K.R. Steffensen, J-Å. Gustafsson, and O.A. MacDougald. *Journal of Biological Chemistry*, 280 (2005), 23024-23031.
7. "Capillary Liquid Chromatography with MS<sup>3</sup> for the Determination of Enkephalins in Microdialysis Samples from the Striatum of Anesthetized and Freely-Moving Rats." H.M. Baseski, C.J. Watson, N.A. Cellar, J.G. Shackman, and R.T. Kennedy. *Journal of Mass Spectrometry*, 40 (2005), 146-153.
6. "Perfusion and Chemical Monitoring of Living Cells on a Microfluidic Chip." J.G. Shackman, G.M. Dahlgren, J.L. Peters, and R.T. Kennedy. *Lab on a Chip*, 5 (2005), 56-63. *Cover Highlight*.
5. "*In Vivo* Monitoring of Amino Acids by Microdialysis Sampling with On-Line Derivatization by Naphthalene-2,3-Dicarboxyaldehyde and Rapid Micellar Electrokinetic Capillary Chromatography." M. Shou, A.D. Smith, J.G. Shackman, J. Peris, and R.T. Kennedy. *Journal of Neuroscience Methods*, 138 (2004), 189-197.

4. "High-Throughput Automated Post-Processing of Separation Data." J.G. Shackman, C.J. Watson, and R.T. Kennedy. *Journal of Chromatography A*, 1040 (2004), 273-282.
3. "Microfluidic Chip for Continuous Monitoring of Hormone Secretion from Live Cells using an Electrophoresis-Based Immunoassay." M.G. Roper, J.G. Shackman, G.M. Dahlgren, and R.T. Kennedy. *Analytical Chemistry*, 75 (2003), 4711-4717. *Accelerated Article and Cover Art*.
2. "Pharmaceutical Reaction Monitoring by Raman Spectroscopy." J.G. Shackman, J.H. Giles, and M.B. Denton. In Further Developments in Scientific Optical Imaging. The Royal Chemical Society: Cambridge 2000; pp 186-201.
1. "The Impact of Raman – The Awakening Giant of Spectroscopy – On the Pharmaceutical Industry." J.H. Giles, J.G. Shackman, and M.B. Denton. *American Pharmaceutical Review*, Winter 1999, 44-51.

### **Oral Presentations**

13. "Neurotransmitter Monitoring in Microdialysate Using Gradient Elution Isotachophoresis." C.A. Vyas, M. Mamunooru, J. Trecki, S.M. Rawls, and J.G. Shackman. Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Mar. 8-15, 2009, Chicago, IL.
12. "Gradient Elution Isotachophoresis-Capillary Zone Electrophoresis: Rapid Enrichment Meets Rapid Separation." J.G. Shackman, N.I. Davis, M. Mamunooru, C.A. Vyas. 23<sup>rd</sup> International Symposium on Microscale Bioseparations, Feb. 1-5, 2009, Boston, MA.
11. "Microfluidic Methods for Trace Biochemical Monitoring." J.G. Shackman. College of Engineering, Drexel University, Aug. 6, 2008, Philadelphia, PA. *Invited*.
10. "Microfluidic Methods for Trace Biochemical Monitoring." J.G. Shackman. Dept. of Chemistry, Juniata College, Nov. 8, 2007, Huntingdon, PA. *Invited*.
9. "Microfluidic Methods for Trace Biochemical Monitoring." J.G. Shackman. School of Pharmacy, Temple University, Oct. 26, 2007, Philadelphia, PA. *Invited*.
8. "Microfluidic Methods for Trace Biochemical Monitoring." J.G. Shackman. Dept. of Chemistry, Wilkes University, Oct. 17, 2007, Wilkes-Barre, PA. *Invited*.
7. "Gradient Elution Moving Boundary Electrophoresis for Microfluidic Separations." J.G. Shackman, M.S. Munson, and D. Ross. 21<sup>st</sup> International Symposium on Microscale Bioseparations, Jan. 14-18, 2007, Vancouver, BC, Canada.
6. "Chemical Monitoring of Living Cells Using a Microfluidic Device: Phenotype Evaluation of Null Mutations in Islets of Langerhans." J.G. Shackman, G.M. Dahlgren, J.L. Peters, R.N. Kulkarni, and R.T. Kennedy. 28<sup>th</sup> International Symposium on Capillary Chromatography & Electrophoresis, May 22-25, 2005, Las Vegas, NV.

5. "Chemical Monitoring of Living Cells Using a Microfluidic Device: Automated Real-Time Phenotype Evaluation of Islets of Langerhans." J.G. Shackman and R.T. Kennedy. Analytical Division, National Institute of Standards and Technology, Mar. 23, 2005, Gaithersburg, MD. *Invited*.
4. "Chemical Monitoring of Live Cells Using a Microfluidic Device: Real-Time Detection of Insulin Secretion." J.G. Shackman, G.M. Dahlgren, J.L. Peters, and R.T. Kennedy. Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Mar. 8-11, 2004, Chicago, IL.
3. "Microfluidic Device for Assaying Insulin Secretion from Islets of Langerhans." J.G. Shackman, M.G. Roper, and R.T. Kennedy. 26<sup>th</sup> International Symposium on Capillary Chromatography & Electrophoresis, May 18-22, 2003, Las Vegas, NV.
2. "Determination of Enantiomeric Purity Using a Dispersive Raman Spectrometer." J.G. Shackman and M.B. Denton. Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, May 12-17, 2000, New Orleans, LA.
1. "Monitoring Reactions of Importance to the Pharmaceutical Industry by Raman Spectroscopy." J.G. Shackman, J.H. Giles, and M.B. Denton. Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Mar. 7-12, 1999, Orlando, FL.

#### **Poster Presentations**

10. "Microfluidic Coupling of Gradient Elution Isotachopheresis and Capillary Zone Electrophoresis." J.G. Shackman, N.I. Davis, M. Mamunooru, and C.A. Vyas. Gordon Research Conference on the Physics & Chemistry of Microfluidics, Jun. 28-Jul. 3, 2009, Lucca (Barga), Italy.
9. "Single Capillary Gradient Elution Isotachopheresis Coupled to Capillary Zone Electrophoresis for Trace Amino Acid Analyses." N.I. Davis, M. Mamunooru, and J.G. Shackman. Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Mar. 8-15, 2009, Chicago, IL.
8. "Development and Optimization of Gradient Elution Isotachopheresis for Sensitive Direct Measurements of Amino Acids in a Biological Matrix." M. Mamunooru, N.I. Davis, R.J. Jenkins, and J.G. Shackman. Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Mar. 8-15, 2009, Chicago, IL.
7. "Single Capillary Gradient Elution Isotachopheresis Coupled to Capillary Zone Electrophoresis for Trace Amino Acid Analyses." N.I. Davis, M. Mamunooru, and J.G. Shackman. 9<sup>th</sup> Annual Graduate Student and 4<sup>th</sup> Annual Undergraduate ACS Poster Sessions, Jan. 22, 2009, Philadelphia, PA.

6. "Neurotransmitter Monitoring in Microdialysate Using Gradient Elution Isotachopheresis." C.A. Vyas, M. Mamunooru, and J.G. Shackman. 9<sup>th</sup> Annual Graduate Student and 4<sup>th</sup> Annual Undergraduate ACS Poster Sessions, Jan. 22, 2009, Philadelphia, PA.
5. "Gradient Elution Isotachopheresis with Direct Ultraviolet Absorption Detection for Sensitive Amino Acid Analysis." M. Mamunooru, R.J. Jenkins, N.I. Davis, and J.G. Shackman. 9<sup>th</sup> Annual Graduate Student and 4<sup>th</sup> Annual Undergraduate ACS Poster Sessions, Jan. 22, 2009, Philadelphia, PA.
4. "Rapid Enrichment and Sensitive Ultraviolet Detection of Ascorbic Acid by Gradient Elution Isotachopheresis." N.I. Davis, M. Mamunooru, and J.G. Shackman. 8<sup>th</sup> Annual Graduate Student and 4<sup>th</sup> Annual Undergraduate ACS Poster Sessions, Jan. 24, 2008, Philadelphia, PA.
3. "Discontinuous Buffer Systems in Counter-Flow Electrofocusing Techniques for Enhanced Analyte Enrichment." J.G. Shackman, M.S. Munson, G. Danger, and D. Ross. 31<sup>st</sup> International Symposium on Capillary Chromatography and Electrophoresis, Nov. 29-30, 2007, Albuquerque, NM.
2. "Electrophoretic Separations in Small Spaces: Gradient Elution Moving-Boundary Electrophoresis (GEMBE)." J.G. Shackman, and D. Ross. 10<sup>th</sup> International Conference on Miniaturized Systems for Chemistry and Life Sciences, Nov. 5-9, 2006, Tokyo, Japan.
1. "Chemical Monitoring of Living Cells Using a Microfluidic Device." J.G. Shackman, G.M. Dahlgren, J.L. Peters, and R.T. Kennedy. 228<sup>th</sup> American Chemical Society National Meeting, Aug. 22-26, 2004, Philadelphia, PA.