

Adrian Mark Schrell

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Education:

Florida State University, Tallahassee, FL Jan. 2011 – Dec. 2015
Ph. D. in Chemistry (GPA 3.79/4.00)
Dissertation Title: Frequency Modulation Fluorescence Detection for Multiplexing on
Microfluidic Devices

Clemson University, Clemson, SC Aug. 2006 – May 2010
B.S. in Chemistry, *Cum Laude* (GPA 3.41/4.00)

Experience:

Oakridge National Laboratory, Oakridge, TN Aug. 2019 – Present
R&D Associate Staff

- Develop embedded sensors for reactors
- Develop sensors for next-generation nuclear reactors
- Safety and thermal design for irradiated experiments in HIFR

Los Alamos National Laboratory, Los Alamos, NM May 2018 – August 2019
Post-Doctoral Researcher: Advisors – Robert F. Williams and Helen Cui (Bioscience)

- Developed methods for extraction plant based toxins and metabolites
- Identified unknown natural products *via* NMR and LC-MS
- Utilized LC-IMMS to develop unique signatures for plant based toxins, primarily cardiac glycosides and indole alkaloids
- Developed standards for measuring collisional cross-section *via* ion mobility spectrometry

Florida State University, Tallahassee, FL Jan. 2011 – Dec. 2015
Graduate Research Assistant: Advisor - Dr. Michael G. Roper

- Developed frequency modulation color blind multi-color fluorescence detection
- Developed frequency modulated infra-red mediated PCR on a glass microchip
- Investigated electrowetting on dielectrics as a platform for islet analysis
- Characterized effects of temperature in microfluidic electrophoretic immunoassays
- Developed fluorescence polarization immunoassays for simultaneous detection of insulin and glucagon
- Investigated 3D printing as a method for fabricating microfluidic devices

Clemson University, Clemson, SC May 2009 – May 2010
Undergraduate Research Assistant: Advisor - Dr. Kenneth A. Christensen

- Characterized a novel mechanism for passively operated microfluidics
- Performed time lapse fluorescence microscopy
- Cultured and maintained leukemia cell line

Dystar GmbH, Geretsreid, Germany May 2008 – Aug. 2008
Summer Research Intern

- Synthesized and tested new surfactants
- Worked on a Schlenk line performing synthetic organic chemistry
- Developed new formulations for wetting, washing and dyeing agents
- Explored an industrial synthesis for a fungicide

Skills and Techniques:

- Mass-Spectrometry
 - MALDI-TOF, ESI-Quadrupole/Triple-Quad, Linear Ion Trap, Orbitrap and Q-TOF
- Separations and Chromatography
 - HPLC, UPLC, nanoLC, SPE, and SEC for labeling and purification of proteins as well as isolation and identification of natural products
- Microfluidic design and fabrication in glass and PDMS: AutoCAD/ Illustrator for photomask and device design, spin-coating, photolithography, chemical etching, thermal bonding
- 3D Printing methods such as SLA, FDM, and Binder-jet
- Immunoassays: ELISA, fluorescence polarization assays, competitive electrophoretic immunoassays
- Coding: Expertise in LabView and MatLab, familiar with Python
- Optical techniques: fluorescence anisotropy, fluorescence microscopy, fluorimetry, UV-Vis
- DNA techniques: qPCR, gel electrophoresis
- Optical Backscatter Reflectometry
- Experience building numerous instruments from optics to electronics to the code interfacing them such as:
 - Microchip Electrophoresis
 - Infrared Real-time microchip PCR
 - Fluorescence anisotropy
 - Cellular perfusion/incubation microchips and devices
 - Digital microfluidic droplet manipulators with visual monitoring
- Specific commercial instruments with demonstrated proficiency:
 - Phenom XL (SEM/EDS)
 - Nikon TS-100/Ti-2
 - Beckman MDQ/PA-800
 - Beckman System Gold
 - Agilent 1100/1200 series HPLC
 - Waters NanoAcquity
 - Nanodrop ND-100
 - Horriba JY Fluoromax-4
 - Bruker Autoflex III MALDI-TOF
 - Waters Quatro LC Tandem MS
 - Waters Synapt G2 and G2-Si
 - Thermo LCQ Duo MS
 - Thermo LTQ XL
 - Thermo Exactive and Q Exactive
 - Bio-Rad Real-time PCR
- Software: Origin, Adobe Photoshop/Illustrator, SolidWorks/AutoCAD, ImageJ, Thermo Xcalibur, Agilent OpenLab CDS/Chemstation, Waters MassLynx, Creo, ANSYS

Awards and Synergistic Activities:

Through-hiked the Appalachian Trail (2200 miles)	2017
Congress of Graduate Students Travel Presentation Grant, Tallahassee, FL	2014
FSU Dissertation Travel Grant, Tallahassee, FL	2014
Congress of Graduate Students Travel Presentation Grant, Tallahassee, FL	2013
CASSS Travel Grant, Charlottesville, VA	2013
Congress of Graduate Students Travel Presentation Grant, Tallahassee, FL	2012
Hoffman Merit Fellowship, Tallahassee, FL	2010
Merk Index Award, Clemson, SC	2010

Publications:

Sweeny, D. C.; **Schrell, A. M.**; Petrie, C. M.; “An Adaptive Reference Scheme to Extend the Functional Range of Optical Backscatter Reflectometry in Extreme Environment” *IEEE Sensors Journal*, **2020**.

Sweeny, D. C.; **Schrell, A. M.**; Petrie, C. M.; “Metal-embedded fiber optic sensor packaging and signal demodulation scheme towards high-frequency dynamic measurements in harsh environment” *Sensors and Actuators A: Physical*, **2020**.

Glieberman, A. L.; Pope, B. D.; Zimmerman, J. F.; Liu, Q.; Ferrier, J. P.; Kenty, J. H. R.; **Schrell, A. G. M.**; Mukhitov, N.; Shores, K. L.; Tepole, A. B.; Melton, D. A.; Roper, M. G.; Parker, K. K.; “Synchronized Stimulation and Continuous Insulin Sensing in a Microfluidic Human Islet on a Chip Designed for Scalable Manufacturing” *Lab on a Chip*, **2020**, 19, 2993 – 3010.

Filla, R. T.; **Schrell, A. M.**; Coulton, J. B.; Edwards, J. L.; Roper, M. G.; “Frequency-Modulated Continuous Flow Analysis Electrospray Ionization Mass Spectrometry (FM-CFA-ESA-MS) for Multiplexing Sample Analysis by Mass Spectrometry” *Analytical Chemistry*, **2018**, 90, 2414 – 2419.

Schrell, A. M.; Mukhitov, N.; Yi, L.; Adablah, J. E.; Menezes, J.; Roper, M. G.; “Online fluorescence anisotropy immunoassay for monitoring insulin secretion from islets of Langerhans” *Analytical Methods*, **2016**, 9, 38 – 45.

Schrell, A. M.; Mukhitov, N.; Roper, M. G.; “Multiplexing fluorescence anisotropy using frequency encoding” *Analytical Chemistry*, **2016**, 88, 7910 – 7915.

Schrell, A. M.; Mukhitov, N.; Yi, L.; Wang, X.; Roper, M. G.; “Microfluidic Devices for the Measurement of Cellular Secretion” *Annual Reviews of Analytical Chemistry*, **2016**, 9, 249 - 269.

Yi, L.; Wang, X.; Dhumpa, R.; **Schrell, A. M.**; Mukhitov, N.; Roper, M. G.; “Integrated perfusion and separation systems for entrainment of insulin secretion from islets of Langerhans” *Lab on a Chip*, **2015**, 15, 823 – 832.

Schrell, A. M.; Roper, M. G.; “Frequency-encoded laser induced fluorescence for multiplexed detection in infrared mediated quantitative PCR” *Analyst*, **2014**, 139, 2695 – 2701.
(Selected as HOT Article in Analyst and Cover)

Wang, X.; Yi, L.; Mukhitov, N.; **Schrell, A. M.**; Dhumpa, R.; Roper, M. G.; “Microfluidics-to-mass spectrometry: A review of coupling methods and applications” *Journal of Chromatography A*, **2014**, 1382, 98 – 116.

Mukhitov, N.; Yi, L.; **Schrell, A. M.**; Roper, M. G.; “Optimization of a microfluidic electrophoretic immunoassay using a Peltier cooler” *Journal of Chromatography A*, **2014**, 1367, 154 – 160.

Conference Oral Presentations:

Schrell, A. M.; Mukhitov, N.; Roper, M. G.; “Frequency-Encoded Polarization Immunoassays for Multi-Analyte Determinations” Pittcon, New Orleans, LA 2015

Schrell, A. M.; Roper, M. G.; “Frequency Encoded Fluorescence for the Reduction of Optical Complexity in Microfluidic Devices” Pittcon, Chicago, IL 2014

Schrell, A. M.; Roper, M. G.; “Frequency Modulated Fluorescence Detection for Multiplexed Analysis in Microfluidic Devices” Microscale Bioseparations, Charlottesville, VA 2013

Schrell, A. M.; Lomasney, A. R.; Roper, M. G. “Color-blind Detection of Glucose-Regulating Hormones in a Microfluidic Device” Pittcon, Orlando, FL 2012

Teaching Experience:

Mentored undergraduate research assistants, 2013 - 2015

Teaching Assistant, 2010 – 2012, General Chemistry Recitation and Organic Chemistry Lab

Supplemental Instruction Leader, 2007 – 2009, Bi-weekly recitations for general chemistry students
