

## Michael Gabriel Roper, Ph.D.

### Current Position:

Professor of Chemistry and Biochemistry  
Florida State University  
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### Positions:

2017 – present	Professor, Department of Chemistry and Biochemistry, Florida State University
2015 – 2018	Pfeiffer Associate Professor for Cancer Research (3-year term)
2012 – 2017	Associate Professor, Department of Chemistry and Biochemistry, Florida State University
2007 – present	Member, Molecular Biophysics Program, Florida State University
2006 – 2012	Assistant Professor, Department of Chemistry and Biochemistry, Florida State University

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### Awards:

- Mid-Career Award, American Electrophoresis Society 2018
- GAP Award, Florida State University 2016
- Pfeiffer Professorship in Cancer Research 2015
- Developing Scholar Award, Florida State University 2015
- American Chemical Society Division of Analytical Chemistry Young Investigator Award in Separation Science 2013
- First Year Assistant Professor Award, Florida State University 2007
- American Chemical Society Division of Analytical Chemistry Summer Graduate Fellowship 2002
- Roger G. and Jo Bates Fellowship, University of Florida 2002
- Eastman Chemical Fellowship in the area of Analytical Chemistry 2001
- Grinter Fellowship, University of Florida 1998 – 2000

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### Synergistic Activities:

- 2017 – present, member NIH study section Instrumentation and Systems Development
- 2016 – present, Associate Editor, *Analytical Methods*
- 2016 – present, Features Panel, *Analytical Chemistry*
- Ad hoc member, NIH study section Instrumentation and Systems Development (2015 & 2016)
- Ad hoc member, NIH study section Enabling Bioanalytical and Imaging Technologies (2011 & 2014)
- NIH special emphasis panel committee member (NIBIB/NCATS SBIR Phase II panel (2015), NIH NCI SBIR panel 288 (2012), ZEB1 OSR-D J3 S (2012), NIH NCI SBIR panel 288 (2010), ZRG1 BCMB-P (2009), ZRG1 BST-M (2009), ZRG1 BCMB-L (2008), ZRG1 BCMB-M (2008))
- National Science Foundation mail-in reviewer, Chemical Measurement and Imaging program (2014 - present)
- External reviewer (European Research Council (2015 & 2017), University of Michigan Diabetes Research Center (2015), Florida State University COFRS (2015), The University of Kansas Center for Molecular Analysis of Disease Pathways (2015), Michigan State University Cystic Fibrosis Research (2014 & 2015), Canadian Institutes of Health Research (2013), Mitacs Accelerate Internship program (2013), American Heart Association, Bioengineering 2 review panel (2009, 2010, & 2012), Review Corporation (2011), Estonian Science Foundation (2009), National Institute of Justice (2009), Natural Sciences and Engineering Research Council of Canada (2009))
- Symposium organizer (The Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, “Microfluidics-to-Mass Spectrometry” (2015), 29<sup>th</sup> International Symposium on MicroScale Bioseparations,

“Sample Preparation” (2013), Florida ACS Meeting and Exposition session organizer for Analytical Chemistry (2012), Technical Program Committee, 15<sup>th</sup> International Conference on Miniaturized Systems for Chemistry and Life Science (MicroTAS) (2011), ACS Spring Meeting symposium organizer, “Young Investigators in Analytical Chemistry” (2010),

- External PhD committee member, University of Toronto (2014), Scripps Florida (2017), University of Tasmania (2017)
- 2006 – present reviewer for *Analytical Chemistry*, *Lab on a Chip*, *Journal of the American Chemical Society*, *Langmuir*, *Electrophoresis*, *Analytical and Bioanalytical Chemistry*, *Analytica Chimica Acta*, *Analyst*, *Nature Communications*, *Nature Methods*, *Journal of Chromatography A*, *PLoS One*

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**Publications (\*undergraduate researcher):**

1. Bandak, B.; Yi, L.; Roper, M. G. “Microfluidic-enabled quantitative measurements of insulin release dynamics from single islets of Langerhans in response to 5-palmitic acid hydroxy stearic acid” *Lab Chip* **2018**, doi: 10.1039/c8lc00624e.
2. 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-ESI-MS) for sample multiplexing” *Anal. Chem.* **2018**, *90*, 2414-2419.
3. 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” *Anal. Methods* **2017**, *9*, 38-45.
4. Yi, L.; Bandak, B.; Wang, X.; Roper, M. G. “Dual detection system for simultaneous measurement of intracellular fluorescent markers and cellular secretion” *Anal. Chem.* **2016**, *88*, 10368-10373.
5. McKenna, J. P.; Dhumpa, R.; Mukhitov, N.; Roper, M. G.; Bertram, R. “Glucose oscillations can activate an endogenous oscillator in pancreatic islets” *PLoS Comput. Biol.* **2016**, *12*, e1005143.
6. Schrell, A. M.; Mukhitov, N.; Roper, M. G. “Multiplexing fluorescence anisotropy using frequency encoding” *Anal. Chem.* **2016**, *88*, 7910-7915. PMID: PMC4991543
7. Schrell, A. M.; Mukhitov, N.; Yi, L.; Wang, X.; Roper, M. G. “Microfluidic devices for the measurement of cellular secretion” *Annu. Rev. Anal. Chem.* **2016**, *9*, 249-269.
8. Wang, X.; Yi, L.; Roper, M. G. “Microfluidic device for the measurement of amino acid secretion dynamics from murine and human islets of Langerhans” *Anal. Chem.* **2016**, *88*, 3369-3375.
9. Yi, L.; Wang, X.; Bethge, L.; Klussmann, S.; Roper, M. G. “Noncompetitive affinity assays of glucagon and amylin using mirror-image aptamers as affinity probes” *Analyst* **2016**, *141*, 1939-1946. PMID: PMC4783278.
10. Mukhitov, N.; Spear, J. M.; Stagg, S. M.; Roper, M. G. “Interfacing microfluidics with negative stain transmission electron microscopy” *Anal. Chem.* **2016**, *88*, 629-634. PMID: PMC4730115.
11. Roper, M. G. “Cellular analysis using microfluidics” *Anal. Chem.* **2016**, *88*, 381-394.
12. Dhumpa, R.; Truong, T. M.; Wang, X.; Roper, M. G. “Measurement of the entrainment window of islets of Langerhans by microfluidic delivery of a chirped glucose waveform” *Integr. Biol.* **2015**, *7*, 1061-1067. PMID: PMC4558223.
13. Wang, X.; Yi, L.; Guillo, C.; Roper, M. G. “Micellar electrokinetic chromatography method for measuring amino acid secretions from islets of Langerhans” *Electrophoresis* **2015**, *36*, 1172-1178. PMID: PMC4433432.
14. 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 Chip* **2015**, *15*, 823-832. PMID: PMC4304979.

15. Wang, X.; Yi, L.; Schrell, A. M.; Mukhitov, N.; Roper, M. G. "Microfluidics-to-mass spectrometry: A review of coupling methods and applications" *J. Chromatogr. A* **2015**, *1382*, 98-116. PMID: PMC4318794.
16. Mukhitov, N.; Yi, L.; Schrell, A. M.; Roper, M. G. "Optimization of a microfluidic electrophoretic immunoassay using a Peltier cooler" *J. Chromatogr. A* **2014**, *1367*, 154-160. PMID: PMC4252761.
17. Dhumpa, R.; Truong, T. M.; Wang, X.; Bertram, R.; Roper, M. G. "Negative feedback synchronizes islets of Langerhans" *Biophys. J.* **2014**, *106*, 2275-2282. PMID: PMC4052280.
18. Wang, X.; Roper, M. G. "Measurement of DCF fluorescence as a measure of reactive oxygen species in murine islets of Langerhans" *Anal. Methods* **2014**, *6*, 3019-3024. PMID: PMC4061712.
19. Schrell, A. M.; Roper, M. G. "Frequency-encoded laser-induced fluorescence for multiplexed detection in infrared-mediated quantitative PCR" *Analyst* **2014**, *139*, 2695-2701. PMID: PMC4013171.
20. Lomasney, A. R.; Lian, Y.; Roper, M. G. "Simultaneous monitoring of insulin and islet amyloid polypeptide secretion from islets of Langerhans on a microfluidic device" *Anal. Chem.* **2013**, *85*, 7919-7925. PMID: PMC3770151.
21. Zhang, X.; Dhumpa, R.; Roper, M. G. "Maintaining stimulant waveforms in large volume microfluidic cell chambers" *Microfluid. Nanofluid.* **2013**, *15*, 65-71. PMID: PMC3828119.
22. Dhumpa, R.; Roper, M. G. "Temporal gradients in microfluidic systems to probe cellular dynamics: A review." *Anal. Chim. Acta* **2012**, *743*, 9-18. PMID: PMC3428035.
23. Baker, C. A.; Roper, M. G. "Online coupling of digital microfluidic devices with mass spectrometry detection using an eductor with electrospray ionization" *Anal. Chem.* **2012**, *84*, 2955-2960. PMID: PMC3310327.
24. Yu, Y.; Li, B.; Baker, C. A.; Zhang, X.; Roper, M. G. "Quantitative polymerase chain reaction using infrared heating on a microfluidic chip" *Anal. Chem.* **2012**, *84*, 2825-2829. PMID: PMC3310344.
25. Duong, C. T.; Roper, M. G. "A microfluidic device for the automated derivatization of free fatty acids to fatty acid methyl esters" *Analyst* **2012**, *137*, 840-846.
26. Zhang, X.; Daou, A.; Truong, T. M.; Bertram, R.; Roper, M. G. "Synchronization of islets of Langerhans by glucose waveforms" *Am. J. Physiol. Endocrinol. Metab.* **2011**, *301*, E742-E747. PMID: PMC3191549.
27. Guillo, C.; Truong, T. M.; Roper, M. G. "Simultaneous capillary electrophoresis competitive immunoassay for insulin, glucagon, and islet amyloid polypeptide secretion from mouse islets of Langerhans" *J. Chromatogr. A*, **2011**, *1218*, 4059-4064. PMID: PMC3109176.
28. Baker, C. A.; Bulloch\*, R.; Roper, M. G. "Comparison of separation performance of laser-ablated and wet-etched microfluidic systems" *Anal. Bioanal. Chem.* **2011**, *399*, 1473-1479. PMID: PMC3026912.
29. Zhang, X.; Grimley, A.; Bertram, R.; Roper, M. G. "Microfluidic system for generation of sinusoidal glucose waveforms for entrainment of islets of Langerhans" *Anal. Chem.* **2010**, *82*, 6704-6711. PMID: PMC2921651.
30. Cao, L.; Zhang, X.; Grimley, A.; Lomasney, A. R.; Roper, M. G. "Microfluidic multi-analyte gradient generator" *Anal. Bioanal. Chem.* **2010**, *398*, 1985-1991. PMID: PMC2998889.
31. Baker, C.; Roper, M. G. "A continuous-flow, microfluidic fraction collection device" *J. Chromatogr. A* **2010**, *1217*, 4743-4748. PMID: PMC2923460.
32. Lomasney, A. R.; Guillo, C.; Sidebottom, A. M.; Roper, M. G. "Optimization of capillary electrophoresis conditions for a glucagon competitive immunoassay using response surface methodology" *Anal. Bioanal. Chem.* **2009**, *394*, 313-319. PMID: PMC2667558.
33. Zhang, X.; Roper, M. G. "Microfluidic perfusion system for automated delivery of temporal gradients to biological cells" *Anal. Chem.* **2009**, *81*, 1162-1168. PMID: PMC2921651.

34. Baker, C. A.; Duong, C. T.; Grimley, A.; Roper, M. G. "Recent advances in microfluidic detection systems" *Bioanalysis*, **2009**, *1*, 967-975. PMID: PMC2856342.
35. Roper, M. G.; Guillo, C. "New technologies in affinity assays to explore cellular communication" *Anal. Bioanal. Chem.* **2009**, *393*, 459-465. PMID: PMC2605775.
36. Guillo, C.; Roper, M. G. "Affinity assays for detection of cellular communication and biomarkers" *Analyst* **2008**, *133*, 1481-1485. PMID: PMC2597362.
37. Tierno, P.; Reddy, S. V.; Roper, M. G.; Jofansen, T. H.; Fischer, T. M. "Transport and separation of biomolecular cargo on paramagnetic colloidal particles in a magnetic ratchet" *J. Phys. Chem. B* **2008**, *112*, 3833-3837.
38. Guillo, C.; Roper, M. G. "Two-color electrophoretic immunoassay for simultaneous measurement of insulin and glucagon content in islets of Langerhans" *Electrophoresis*, **2008**, *29*, 410-416.
39. Roper, M. G.; Easley, C. J.; Legendre, L. A.; Humphrey, J. A. C.; Landers, J. P. "Completely non-contact temperature control and sensing on a microfluidic chip" *Anal. Chem.* **2007**, *79*, 1294-1300.
40. Easley, C. J.; Karlinsey, J. M.; Bienvenue, J. M.; Legendre, L. A.; Roper, M. G.; Feldman, S. H.; Hughes, M. A.; Hewlett, E. L.; Merkel, T. J.; Ferrance, J. P.; Landers, J. P. "A fully-integrated microfluidic genetic analysis system with sample in-answer out capability" *Proc. Natl. Acad. Sci., USA* **2006**, *103*, 19272-19277.
41. Roper, M. G.; Frisk\*, M. L.; Oberlander\*, J. P.; Ferrance, J. P.; McGrory, B. J.; Landers, J. P. "Extraction of C-reactive protein from serum on a microfluidic chip" *Anal. Chim. Acta* **2006**, *569*, 195-202.
42. Yue, G. E.; Roper, M. G.; Balchunas, C.; Pulsipher\*, A.; Coon, J. J.; Shabanowitz, J.; Hunt, D. F.; Landers, J. P.; Ferrance, J. P. "Protein digestion and phosphopeptide enrichment on a glass microchip" *Anal. Chim. Acta* **2006**, *564*, 116-122.
43. Legendre, L. A.; Bienvenue, J. M.; Roper, M. G.; Ferrance, J. P.; Landers, J. P. "A simple, valveless microfluidic sample preparation device for extraction and amplification of DNA from nanoliter-volume samples" *Anal. Chem.* **2006**, *78*, 1444-1451.
44. Yue, G. E.; Roper, M. G.; Jeffery, E. D.; Easley, C. J.; Balchunas\*, C.; Landers, J. P.; Ferrance, J. P. "Glass microfluidic devices with thin membrane voltage junctions for electrospray mass spectrometry" *Lab Chip* **2005**, *5*, 619-627.
45. Easley, C. J.; Legendre, L. A.; Roper, M. G.; Wavering, T. A.; Ferrance, J. P.; Landers, J. P. "Extrinsic Fabry-Perot interferometry for noncontact temperature control of nanoliter-volume enzymatic reactions in glass microchips" *Anal. Chem.* **2005**, *77*, 1038-1045.
46. Roper, M. G.; Easley, C. J.; Landers, J. P. "Advances in polymerase chain reaction on microfluidic chips" *Anal. Chem.* **2005**, *77*, 3887-3894.
47. Kulkarni, R. N.; Roper, M. G.; Dahlgren, G. M.; Kauri, L. M.; Kahn, C. R.; Kennedy, R. T. "Islet secretory defect in insulin receptor substrate 1 null mice is linked with reduced calcium signaling and expression of sarco(endo)plasmic reticulum Ca<sup>2+</sup>-ATPase (SERCA)-2B and -3" *Diabetes* **2004**, *53*, 1517-1525.
48. Roper, M. G.; Shackman, J. G.; Dahlgren, G. M.; Kennedy, R. T. "Microfluidic chip for continuous monitoring of hormone secretion from live cells using an electrophoresis-based immunoassay" *Anal. Chem.* **2003**, *75*, 4711-4717.
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50. German, I.; Roper, M. G.; Kalra, S. P.; Rhinehart, E.; Kennedy, R. T. "Capillary liquid chromatography of multiple peptides with on-line capillary electrophoresis immunoassay detection" *Electrophoresis* **2001**, *22*, 3659-3667.

51. Aspinwall, C. A.; Qian, W-J.; Roper, M. G.; Kulkarni, R. N.; Kahn, C. R.; Kennedy, R. T. "Roles of insulin receptor substrate-1, phosphatidylinositol 3-kinase, and release of intracellular  $\text{Ca}^{2+}$  stores in insulin-stimulated insulin secretion in  $\beta$ -cells" *J. Biol. Chem.* **2000**, *275*, 22331-22338.