

Michael Gabriel Roper, Ph.D.

Current Position:

Cottrell Family Professor
Department of Chemistry and Biochemistry
Florida State University
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Positions:

2022 – present	Member, Molecular Biophysics program, Florida State University
2021 – present	Cottrell Family Professor, Florida State University (3-year term)
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
2006 – 2012	Assistant Professor, Department of Chemistry and Biochemistry, Florida State University

Postdoctoral:

2003 – 2006	University of Virginia, Charlottesville, VA PI: Prof. James P. Landers
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Graduate:

1998 – 2003	University of Florida, Gainesville, FL Ph.D. Chemistry PI: Prof. Robert T. Kennedy
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Undergraduate:

1994 – 1998	University of Texas at Austin, Austin, TX B.S. Chemistry
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Awards:

- Cottrell Family Professorship 2021
- University Teaching Award (nomination), Florida State University (ineligible due to award in 2018) 2019
- Mid-Career Award, American Electrophoresis Society 2018
- Graduate Teaching Award, Florida State University 2018
- GAP Award, Florida State University 2016
- Pfeiffer Professorship in Cancer Research 2015 – 2018
- 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

Synergistic Activities:

- 2024 – 2026, President, American Electrophoresis Society
- 2020 – 2022, chair NIH study section Instrumentation and Systems Development

- 2017 – 2022, member NIH study section Instrumentation and Systems Development
- 2016 – 2023, Associate Editor, *Analytical Methods*
- 2016 – 2018, 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: ZRG1 BBT-Y (2024), ZDK1 GRB-S (2021), 05 DDK-B 1 (2020), ZDK1 GRB-M (2019); ZDK1 GRB-G (2018); 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 (Juvenile Diabetes Research Fund (2019), European Research Council (2015, 2017, 2018), 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)
- Conference Chair: 39th International Symposium on Microscale Separations and Bioanalysis (MSB 2023)
- Conference organizer: 5th International Conference on D-Amino Acid Research (IDAR) 2022; Human Islet Research Network 2022
- Symposium organizer: Herron Symposium on Golden Anniversary of FTICR-MS (2023); The Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, “Integrated Microfluidics for Quantitative Measurements of Biological Processes” (2019); The Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, “Microfluidics-to-Mass Spectrometry” (2015); 29th International Symposium on MicroScale Bioseparations, “Sample Preparation” (2013); Florida ACS Meeting and Exposition session organizer for Analytical Chemistry (2012); Technical Program Committee, 15th 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, Western Sydney University (2023), 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*

Publications (*undergraduate researcher):

1. Lee, C.; Lee, D.-K.; Wei, I.-A.; Qiu, T.; Rubakhin, S.; Roper, M. G.; Sweedler, J. V. “Relations between glucose and D-amino acids in the modulation of biochemical and functional properties of rodent islets of Langerhans” *ACS Omega* **2023**, *8*, 47723-47734. PMID: PMC10733910
2. Ogunkunle, E. O.; Davis, J. J.; Skinner, E. L.; Thornham, J.; Roper, M. G. “Analysis of D-amino acids secreted from murine islets of Langerhans using Marfey’s reagent and reversed phase LC-MS/MS” *J. Chromatogr. B* **2023**, *231*, 123928. PMID: PMC10843809
3. Davis, J. J.; Donohue, M. J.; Ogunkunle, E. O.; Eaton, W. J.; Steyer, D. J.; Roper, M. G. “Simultaneous monitoring of multiple hormones from human islets of Langerhans using solid-phase extraction-mass spectrometry” *Anal. Bioanal. Chem.* **2023**, *415*, 5671-5680. PMID: PMC10528007
4. Adeoye, D. I.; Wang, Y.; Davis, J. J.; Roper, M. G. “Automated cellular stimulation with integrated pneumatic valves and fluidic capacitors” *Analyst* **2023**, *148*, 1227-1234. PMID: PMC10023383
5. Bruce, N.; Wei, I.-A.; Leng, W.; Oh, Y.; Chiu, Y.-C.; Roper, M. G.; Bertram, R. "Coordination of pancreatic islet rhythmic activity by delayed negative feedback" *Am. J. Physiol. Endocrinol. Metab.* **2022**, *323*, E492-E502. PMID: PMC9722252

6. Wang, Y.; Adeoye, D. I.; Wang, Y. J.; Roper, M. G. "Increasing insulin measurement throughput by fluorescence anisotropy imaging immunoassays" *Anal. Chim. Acta* **2022**, *1212*, 339942. PMID: PMC9437875
7. Ogunkunle, E. O.; Donohue, M. J.; Steyer, D. J.; Adeoye, D. I.; Eaton, W. J.; Roper, M. G. "Small molecules released from islets of Langerhans determined by liquid chromatography – mass spectrometry" *Anal. Methods* **2022**, *14*, 2100-2107. PMID: PMC9159447
8. Arcidiacono, A.; Robb, A. J.; Masitas, R. A.; Salpage, S. R.; McLeod, G. M.; Chen, J.; Ogunsolu, O. O.; Roper, M. G.; Hanson, K. "Inhibited interlayer electron transfer in metal ion linked multilayers on mesoporous metal oxide films" *J. Photochem. Photobiol.* **2022**, *9*, 100088.
9. Eaton, W. J.; Roper, M. G. "A microfluidic system for monitoring glucagon secretion from human pancreatic islets of Langerhans" *Anal. Methods* **2021**, *13*, 3614-3619. PMID: PMC8375491
10. Knoll, P.; D'Silva, D. S.; Adeoye, D. I.; Roper, M. G.; Steinbock, O. "Fibrous bundles in biomorph systems: Surface-specific growth and interaction with microposts" *ChemSystemsChem*, **2021**, *3*, e20000061.
11. Zaffran, V. D.; Gupta, S.; Sathe, S. K.; Roper, M. G. "Effect of deglycosylation on immunoreactivity and in vitro pepsin digestibility of major cashew (*Anacardium occidentale* L.) allergen, Ana o 1" *J. Food Sci.* **2021**, *86*, 1144-1152. PMID: 33580498
12. Donohue, M. J.; Filla, R. T.; Steyer, D. J.; Eaton, W. J.; Roper, M. G. "Rapid liquid chromatography-mass spectrometry quantitation of glucose-regulating hormones from human islets of Langerhans" *J. Chromatogr. A* **2021**, *1637*, 461805. PMID: PMC7845746
13. Wang, Y.; Adeoye, D. I.; Ogunkunle, E. O.; Wei, I. A.; Filla, R. T.; Roper, M. G. "Affinity capillary electrophoresis: A critical review of the literature from 2018 to 2020" *Anal. Chem.* **2021**, *93*, 295-310. PMID: 33185441
14. Beasley, S.; Sullenberger, T.; Crotty, K.; Ailani, R.; D'Orio, C.; Evans, K.; Ogunkunle, E. O.; Roper, M. G.; Kumar, S. S. "D-serine mitigates cell loss associated with temporal lobe epilepsy" *Nat. Commun.* **2020**, *11*, 4966. PMID: PMC7532172
15. Adablah, J. E.; Wang, Y.; Donohue, M.; Roper, M. G. "Profiling glucose-stimulated and M3 receptor-activated insulin secretion dynamics from islets of Langerhans using an extended-lifetime fluorescence dye" *Anal. Chem.* **2020**, *92*, 8464-8471. PMID: PMC7304439
16. Leng, W.; Evans, K.; Roper, M. G. "A microfluidic platform integrating pressure-driven and electroosmotic-driven flow with inline filters for affinity separations" *Anal. Methods* **2019**, *11*, 5768-5775. PMID: PMC6980329
17. Mukhitov, N.; Adablah, J. E.; Roper, M. G. "Gene expression patterns in synchronized islet populations" *Islets* **2019**, *11*, 21-32. PMID: PMC6548476
18. Adams, A. G.; Bulusu, R. K. M.; Mukhitov, N.; Mendoza-Cortes, J. L.; Roper, M. G. "Online measurement of glucose consumption from HepG2 cells using an integrated bioreactor and enzymatic assay" *Anal. Chem.* **2019**, *91*, 5184-5190. PMID: PMC6472493
19. Evans, K.; Wang, X.; Roper, M. G. "Chiral micellar electrokinetic chromatographic separation for determination of L- and D-primary amines released from murine islets of Langerhans" *Anal. Methods* **2019**, *11*, 1276-1283. PMID: PMC6502259
20. Adablah, J. E.; Vinson, R.; Roper, M. G.; Bertram, R. "Synchronization of pancreatic islets by periodic or non-periodic muscarinic agonist pulse trains" *PLoS One* **2019**, *14*, e0211832. PMID: PMC6364940
21. 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**, *18*, 2873-2882. PMID: PMC6133761

22. 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. PMID: 29356503
23. 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. PMID: PMC5407318
24. 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. PMID: PMC5089909
25. 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. PMID: PMC5082885
26. Schrell, A. M.; Mukhitov, N.; Roper, M. G. "Multiplexing fluorescence anisotropy using frequency encoding" *Anal. Chem.* **2016**, *88*, 7910-7915. PMID: PMC4991543
27. 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.
28. 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.
29. 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.
30. 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.
31. Roper, M. G. "Cellular analysis using microfluidics" *Anal. Chem.* **2016**, *88*, 381-394.
32. 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.
33. 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.
34. 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.
35. 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.
36. 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.
37. 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.
38. 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.
39. 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.

40. 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.
41. Zhang, X.; Dhumpa, R.; Roper, M. G. "Maintaining stimulant waveforms in large volume microfluidic cell chambers" *Microfluid. Nanofluid.* **2013**, *15*, 65-71. PMID: PMC3828119.
42. 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.
43. 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.
44. 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.
45. 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.
46. 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.
47. 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.
48. 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.
49. 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.
50. 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.
51. Baker, C.; Roper, M. G. "A continuous-flow, microfluidic fraction collection device" *J. Chromatogr. A* **2010**, *1217*, 4743-4748. PMID: PMC2923460.
52. 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.
53. 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.
54. Baker, C. A.; Duong, C. T.; Grimley, A.; Roper, M. G. "Recent advances in microfluidic detection systems" *Bioanalysis*, **2009**, *1*, 967-975. PMID: PMC2856342.
55. Roper, M. G.; Guillo, C. "New technologies in affinity assays to explore cellular communication" *Anal. Bioanal. Chem.* **2009**, *393*, 459-465. PMID: PMC2605775.
56. Guillo, C.; Roper, M. G. "Affinity assays for detection of cellular communication and biomarkers" *Analyst* **2008**, *133*, 1481-1485. PMID: PMC2597362.
57. 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.
58. 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.

59. 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.
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61. 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.
62. 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.
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64. 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.
65. 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.
66. Roper, M. G.; Easley, C. J.; Landers, J. P. "Advances in polymerase chain reaction on microfluidic chips" *Anal. Chem.* **2005**, *77*, 3887-3894.
67. 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^{2+} -ATPase (SERCA)-2B and -3" *Diabetes* **2004**, *53*, 1517-1525.
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69. Roper, M. G.; Qian, W-J.; Zhang, B. B.; Kulkarni, R. N.; Kahn, C. R.; Kennedy, R. T. "Effect of the insulin mimetic L-783,281 on intracellular $[Ca^{2+}]$ and insulin secretion from pancreatic β -cells" *Diabetes* **2002**, *51*, S43-S49.
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