

## CHRISTOPHER T. CULBERTSON

orcid.org/0000-0002-6833-3237

Kansas State University  
1212 Midcampus Drive  
213 CBC Building  
Manhattan, KS 66506  
culbert@ksu.edu  
(785) 532-6685

105 Notre Dame Cir.  
Manhattan, KS 66503  
(785) 320-6222

### Positions

2017 - present	Co-founder; Molecular Biosensing Diagnostics
2018 - present	Professor; Department of Chemistry, Kansas State University
2007 - 2018	Associate Professor; Department of Chemistry, Kansas State University
2002 - 2007	Assistant Professor; Department of Chemistry, Kansas State University
1998 - 2002	Staff Scientist; Oak Ridge National Laboratory, Oak Ridge, TN

### Professional Preparation

1988 Harvard College, Cambridge, MA	B. A. Biology (High Honors)
1991 University of West Florida, Pensacola, FL	B. S. Chemistry (High Honors)
1996 University of North Carolina at Chapel Hill, NC	Ph. D. Analytical Chemistry
<i>Doctoral Thesis Advisor:</i> Dr. James W. Jorgenson	
1996-1998 Oak Ridge National Laboratory, TN	Post-doctoral Fellow
<i>Mentor:</i> Dr. J. Michael Ramsey	

### Honors

- Stamey Award for Undergraduate Advising (2013)
- Stamey Award for Undergraduate Advising (2010)
- Distinguished Alumnus Award, The University of West Florida (2010)
- Karcher Medal, University of Oklahoma (2010)
- Masao Horiba Award (2007)
- ACS Division of Analytical Chemistry Award for Young Investigators in Separation Science (2007)
- Segebrecht Distinguished Faculty Achievement Award (2007)
- NSF CAREER Award (2006)
- Pfizer Analytical Research and Development Fellowship (1995-6)
- ACS Analytical Division Fellowship (1994-5)
- Kenan Analytical Award (1994)
- Department of Education Fellow (1992-3 and 1993-4)
- UNC-CH Graduate School Merit Fellowship (1991-1992)
- Reilly Fellowship (1991-1992)
- NSF Graduate Research Fellowship Honorable Mention (1991-2 and 1992-3).
- The American Chemical Society Undergraduate Award in Analytical Chemistry (1991)
- The Monsanto Award (1991)
- Chemistry Department Scholarship (1990-1991)
- Hugh Bancroft Scholar (1987-88)

- Harvard College Scholarship (1985-88)
- National Merit Scholarship (1984-5)
- Florida PRIDE Scholarship (1984-5)

### **Professional Activities**

- Steering Committee Member for Microfabrication and Microfluidics Core in the University of Kansas' NIH COBRE Center for Molecular Analysis of Disease Pathways. (2013-present)
- ACS/Analytical Division/ Education Committee Member; Kolthoff Award Committee Member (2013-present)
- Member of the Terry Johnson Cancer Center (2005-present)
- Organized Microfluidics Symposium at MWACS, Manhattan, KS (October 2016)
- Co-organized Analytical Chemistry Education Full day session at Fall Boston ACS meeting "Beyond Quant." Boston, MA (15-17 August 2015)
- Organized the Chaired session honoring James W. Jorgenson at ACS National Conference, Boston, MA (23-28 August 2007)
- Analytical Chemistry A-page Advisory Board (2007-2010)
- Chair of Local ACS Section, Kansas State University (2004-2005)
- Chair Elect of Local ACS Section Kansas State University (2003-2004)
- NIH Panel Reviewer, Completed service for IMST, participated in 33+ NIH review panels (2002-Present)
- NSF Panels (7) and Mail Reviewer (ad hoc) (2002-Present)
- NSERC Reviewer (2003-Present)
- Reviewer for over 20 journals including: Analytical Chemistry, Bioanalytical Chemistry, Electrophoresis, Journal of Chromatography, Langmuir, Lab-on-a-Chip, JACS, Analytical and Bioanalytical Chemistry, Nanomedicine, Nanomaterials, Sensors and Actuators B, Biofabrication, Sensors, Journal of Micromechanics and Microengineering, Applied Sciences, Analyst, Talanta, Micromachines, etc.
- Organized and co-chaired session on "Biochips and Nanorobotics" at the 7<sup>th</sup> Annual Conference for the Society for Biomolecular Screening, Baltimore, MD (9-14 September 2001)
- Organized and chaired session on "Miniaturized Separations: Smaller is Better" at FACSS: 2002, Providence, RI (October 13-17, 2002)

### **Professional Activities at Kansas State University**

#### **University Level**

- Faculty Exchange for Teaching Excellence (FETE) Board (2016-present)
- Faculty representative to KBOR Transfer and Articulation Committee (2014-present)
- Faculty Senate (2018– present)
  - College of Arts and Sciences Representative to Academic Affairs Committee (2018-present)
- Member of the Presidential Campus Planning and Development Advisory Committee (2018-present)
- KSBN committee member (2011-present)
- ACUE Facilitator (2017-present)

- American Red Cross Club Advisor (2014-present)
- College of Education – Chemistry Teacher Education Advisor (2012-present)
- SPOTLIGHT presenter (2018)
- College of Education – Chemistry Standards Review Member (2015)
- Graduate School Program Coordinator Search Committee (2014)
- Kansas Department of Education Licensure Standards Committee for College Chemistry Education Programs (2015-2017)
- Kansas Department of Education Licensure Standards Revision Committee for Chemistry Teachers (2015-2016)
- Next Generation Science Standards Career and College Readiness Committee for State of Kansas (2011-2014)
- Elementary Science Education Committee (2010 and 2012)
- NSF Career Workshop Presenter (2010)
- Associate Dean Search Committee (2010)
- Ethics Workshop Committee (2008-2010)
- Segebrect Award Committee (2007-2010)
- University Library Committee (2007)

#### **College of Arts and Sciences**

- Interdisciplinary Majors Task Force Committee member (2019-present)
- Co-Chair of Student Retention Committee (2019-present)
- Chair of College Safety Committee (2017-present)
- Diversity Committee Member (2014-present)
- Physical Sciences Committee Chair (2013-present)
- Academic Standards Committee (2013-present)
- Life Sciences Committee Member (2010-present)
- Student Fees Responsible Use Committee (2015-2016)
- Dual Degree Committee (2012-2013)

#### **Department of Chemistry**

- Lead Undergraduate Faculty Advisor (2007-present)
- Undergraduate Scholarship Committee Chair (2007-present)
- Safety Committee (2018-present)
- Undergraduate Program Committee (2007-present)
- Alumni Affairs and Outreach Committee (2017-present)
- Freshman Chemistry Readiness Committee (2009-present)
- Departmental Awards Committee (2017-present)
- Freshman Instructor Search Committee (2015, 2019)
- Chemistry Department Head Search Committee (2016)
- Chair Director of labs Search Committee (2012)
- Search Committee for Analytical Faculty (2007)

#### **Society Affiliations**

- American Chemical Society (1991-present)
- Sigma Xi Member (2007 – 2010)

- Alpha Chi Sigma Member (2006 – present)
- Phi Lamda Upsilon Member (2006 – present)

### Community Activities

- Rotary Club #335 (Member, 2017 – present; Board of Directors, 2019 – present)
- Manhattan High School Site Council (Member, 2012- present; Chair, 2018-2019)
- BSA Troop 223 Parent Volunteer (2014-present)
- USD383 – Yes Committee for School Bond (2018)
- Luckey Middle School Volleyball Assistant Coach, Manhattan, KS (2017-2018)
- 4-H College Hill Club Community Leader, 2004-2007

### Teaching Experience

CHM110 and CHM111 General Chemistry – summer 2013 and 2014 and Fall 2014, spring and summer 2015, Summers 2016-2019

CHM210 ZA Fall 2015, Spring and Fall semesters 2016-2019

CHM230 ZA, Spring and Fall semesters 2016-2019

CHM 200 Frontiers in Chemistry – 2012-19

CHM250 Honors Chem II – Spring odd years 2009-19

CHM 371 Chemical Analysis – Spring 2008, Fall 2009-2018

CHM 920 Chemical Separations – Spring 2004, 2005, Spring even years 2006-18

CAT Community “What’s the Matter with Matter?” 2013-2017

CHM372 Forensic Chemistry – Summer 2010, 2011, and 2012

CHM 566 Instrumental Methods of Analysis - Fall 2003-2008 Kansas State University

CHM 545 Separations – Spring 2003, Kansas State University

CHM 231 Chemistry II Recitation - Spring 2003 Kansas State University

CHM 211 Chemistry I Recitation - Fall 2002 Kansas State University

Guest Lecturer, Pharmacy 191 Pharmaceutical Analysis, Pharmacy Department UNC-CH (Fall 1993 and Fall 1995). Invited to give a guest lecture on electrophoresis and capillary electrophoresis to first year graduate students in the Department of Pharmaceutics.

Teaching Assistant, UNC-CH (Fall 1992). Responsible for instructing and evaluating first year graduate students in an electronics laboratory.

Adjunct Instructor, UWF (Spring 1991). Responsible for instructing and grading students in a first semester organic chemistry laboratory.

Teaching Assistant, UWF (Fall 1990). Responsible for assisting the laboratory instructor with introductory chemistry students.

### Dissertation, Thesis, and Undergraduate Research Advising and Mentoring

#### Ph.D. Students

Gregory Roman (2006) – Waters Chromatography, Senior Staff Scientist, Milford, MA

Amanda Meyer (2008) - Orbis Biosciences, Quality and Analytical Manager, Kansas City, MO

Pernilla Viberg (2009) - Eurofins, Evaluator, Uppsala, Sweden

Kurt Hoeman (2009) – Innospec Oil Services, Technology Lab Director, The Woodlands, Houston, TX

Scott Klasner (2010) - Retired – Has ALS

Alexander Price (2010) - The Scripps Research Institute Florida Campus, Staff Scientist, West Palm Beach, FL

Jeffery Lange (2011) - Research Specialist 2, Stowers Research Institute, Olathe, KS  
Eve Metto (2013) - University of Minnesota Duluth, Adjunct Assistant Professor  
Damith Patabadige (2017) - Oak Ridge National Lab, Post-Doc  
Kathleen Sellens (2018) - Exxon Mobil, Staff Scientist  
Jay Sibbitts – current  
Shu Jia – current  
Abigail Kreznor - current

### **Masters**

Yueping Cao (2007) – left to pursue a Statistics PhD at KSU  
Yan Li Chen (2008) – Data Scientist at Allergan  
Kevin McDaniel (2008) – Analyst at TestAmerica  
Manuja Lamabadasuriya (2009) – transferred to Washington State to get PhD  
Amita Sharma (2013)  
Amos Weldegebriel (2014) – pursued a PharmD and is now a practicing pharmacist  
Mukund Koirala (2014) – Graduate student at Wichita State University  
Samantha Stewart-James (2015) – Bureau of Criminal Apprehension, St. Paul, MN

### **Undergraduate Researchers** (51+ students from CHM, CHE, BIOCH, BIOL and EE)

Kevin Bass (CHE), Todd Seelhammer (REU), Susan Carroll (CHM), Amanda Meyer (CHM)  
Joella Wilson (CHM), Nathan Moore, Anna Clark (CHM), Kevin McDaniel (SUROP),  
Nichol Woods (CHM), Summer Steeples (CHM), Tony Kuckelman, Kristen Long (CHM),  
Glenda Hutchinson (CHM), Rashaun Wilson (CHM), Karsten Evans (BIOCH), Kayla Bell,  
Gage Brummer (BIOCH), Patrick Barney (REU), Samantha Talley (CHM), Zachary Jones  
(CHE), Dalia Camacho (CHM), Jeffrey Scott (CHM), John Daniel (CHM), Tom  
Mickelburgh (BIOCH), George Swisher (REU), Raymond Velazquez (REU), Melissa  
Pressnell (REU), Ashton Cheatham (REU), Clinton Meyers (CHM), Samantha Salmons  
(CHM), Lorin Ferris (SUROP) Aneta Kaluzikova (foreign exchange student), Riley Emley  
(CHM), Carolina Fontes (BIOL), Karter Krokstrom (CHE), Nicole McKinnon (CHM),  
Martha Floy (CHE), Joelyann Valles (SUROP student), Sophie Cook (REU), Ciara Witt  
(REU), Elijah Stowe (CHM), Chloe Alexander (CHE), Paul Meyer (CHE), Erin Meyers  
(CHM), Akquaa Anke (REU), Ben Brokesh (EE), Wolf Blaser (BIOCH), Jeremiah Shipman  
(BIOCH), Courtney Johnson (BIOCH), Nichole Ohlde (CHM).

### **Undergraduate Research**

1991 - Summer Research Student. Research Advisor: Dr. Thomas Meyer, UNC- CH.  
Synthesized trans-bis(trifluoroacetic acid) terpyridine (triphenyl phosphine) Ruthenium II  
and trans-bis(4-ethylpyridine) terpyridine (triphenyl phosphine) Ruthenium II complexes  
as precursors to asymmetric trans pyridine complexes (see publication list below).  
1990 - NSF Summer Undergraduate Research Program. Research Advisor: Dr. Leon  
Zalkow, The Georgia Institute of Technology, Atlanta, GA. Synthesized four derivatives  
of aryl 1,4-dialkylpiperazines related to GBR-12783 for use as possible cocaine  
antagonists (See publication list below).  
1988 - 1990. Laboratory technician. The Wetlands Research Laboratory, UWF.  
Responsible for analysis of estuarine water, sediment cores, and landfill leachate samples  
using various wet chemical and instrumental methods.  
1987 - NSF Summer Undergraduate Research Program and 1987-1988 Undergraduate  
Honors Thesis. Research Advisor: Dr. Rodney L. Honeycutt, Harvard College,

Cambridge, MA. Examined mitochondrial DNA variation within and among pilot whale (*Globicephala melaleuca*) pods along the northeastern coast of North America as a method for determining the social structure and the population ecology of these marine mammals. Developed a technique to isolate DNA from skin plugs taken from live animals.  
1986 - 1988. Curatorial Laboratory Assistant. New England Aquarium (Boston, MA). Responsible for assuring exhibit water quality, assisted in and performed marine mammal necropsies prepared histology samples and determined age structures of Pilot whale pods using teeth.

#### Publications (orcid.org/0000-0002-6833-3237)



#### Journal Articles

59. 🦋 Sibbitts, J., Sadeghi, J., Sellens, K.A., Culbertson, C.T. Improving the Accessibility of Microfluidic Based Single Cell Analysis Using Open Source/Design technologies for Streamlining Device Fabrication and Operation. *Analytical Methods*. 2018. Submitted.
58. 🦋 Kalubowilage, M., Covarrubias-Zambrano O., Malalasekera, A.P., Wendel, S.O., Wang, H., Yapa, A.S., Chlebanowski L., Toledo Y., Ortega R., Janik, K.E., Shrestha, T.B., Culbertson, C.T., Kasi, A., Williamson, S., Troyer, D.L., Bossmann, S.H. Early Detection of Pancreatic Cancers in Liquid Biopsies by Ultrasensitive Fluorescence Nanobiosensors. *Nanomedicine*, **2018**, 14(6), 1823-1832. **DOI:** 10.1016/j.nano.2018.04.020.
57. 🦋 Sibbitts, J.; Sellens, K. A.; Jia, S.; Klasner, S. A., and Culbertson, C.T. Cellular Analysis Using Microfluidics. *Anal. Chem.*, **2018**, 90(1), 65-85, **DOI:** 10.1021/acs.analchem.7b04519
56. 🦋 Maroto, R.; Zhao, Y.; Jamaluddin, M.; Popov, V.L.; Wang, H.; Kalubowilage, M.; Zhang, Y.; Luisi, J. Sun, H.; Culbertson, C.T.; Bossmann, S.H. Motamedi, M. and Brasier A.R. Effects of storage conditions on airway exosome 1 integrity for diagnostic and functional analyses. *Journal of Extracellular Vesicles*, **2017**, 6, 1359478. **DOI:** 10.1080/20013078.2017.1359478
55. 🦋 Madayar, F.R.; Basset, S.; Farooq, O.; Rothenburg, S.; Culbertson, C.T.; Jun, L. AC Dielectrophoretic Manipulation, Impedance Monitoring and Electroporation of Vaccinia Virus Using Carbon Nanoelectrode Arrays. *Electrophoresis* **2017**, 38(11), 1515-1525. **DOI:** 10.1002/elps.201600436
54. 🦋 Sadeghi, J.; Patabadige, D.E.W.; Culbertson, A.H.; Latifi, H. and Culbertson, C.T. Out-of-plane integration of a multimode optical fiber for single particle/cell detection at multiple points on a microfluidic device with applications to particle/cell counting, velocimetry, size discrimination and the analysis of single cell lysate injections. *Lab Chip* **2017**, 17, 145-155 **DOI:** 10.1039/c6lc01161f
53. 🦋 Patabadige, D.E.W.; Sadeghi, J.; Kalubowilage, M.; Bossmann, S.B.; Culbertson, A.; Latifi, H.; and Culbertson, C.T. Integration of Optical Fibers with Multilayer Microfluidic Devices for Single Cell Analysis. *Analytical Chemistry* **2016**, 88, 9920–9925. **DOI:** 10.1021/acs.analchem.6b03133.
52. 🦋 Patabadige, D.E.W.; Mickleburgh, T.; Ferris, L.; Brummer, G.; Culbertson, A. and Culbertson, C.T. High Throughput Microfluidic Device for Single Cell Analysis using

- Multiple Integrated Soft Lithographic Pumps. *Electrophoresis* **2016**, 37(10), 1337-1344 DOI: 10.1002/elps.201500557
51. Patabadige, D.E.W.; Jia, S.; Sibbitts, J.; Sadeghi, J.; Sellens, K.; and Culbertson, C.T. Micrototal Analysis Systems: Fundamental Advances and applications. *Analytical Chemistry* **2016** 88(1), 320-338. DOI: 10.1021/acs.analchem.5b04310
  50. Madiyar, FR; Saheel, B; Swisher, LZ; Culbertson, CT; Huang, X; Li, J. Integration of a nanostructured dielectrophoretic device and a surface-enhanced Raman probe for highly sensitive rapid bacteria detection. *Nanoscale* **2015**, 7(8), 3726-3736.
  49. Culbertson, CT; Mickleburgh, TG; Stewart-James, SA; Sellens, KA; Pressnall, M. Micro Total Analysis Systems: Fundamental Advances and Biological Applications. *Analytical Chemistry* **2014**, 86(1), 95–118.
  48. Metto, EC; Evans, K; Barney, P; Culbertson, AH; Gunasekara, DB; Caruso, G; Hulvey, MK; Fracassi da Silva, JA; Lunte, SM; Culbertson, CT. An Integrated Microfluidic Device for Monitoring Changes in Nitric Oxide Production in Single T-Lymphocyte (Jurkat) Cells. *Analytical Chemistry* **2013**, 85(21), 10188-10195.
  47. Madiyar, FR; Syed, LU; Culbertson, CT and Li, J. Manipulation of bacteriophages with dielectrophoresis on carbon nanofiber nanoelectrode arrays. *Electrophoresis* **2013**, 34(7), 1123-1130.
  46. Mainz, ER; Gunasekara, DB; Caruso, G; Jensen, DT; Hulvey, MK; Fracassi da Silva, JA; Metto, EC; Culbertson, AH.; Culbertson, CT.; Lunte, SM. Monitoring intracellular nitric oxide production using microchip electrophoresis and laser-induced fluorescence detection. *Analytical Methods* **2012**, 4(2), 414-420.
  45. Syed, LU, Liu, J, Price AK, Li, Y-F, Culbertson, CT, and Li, J. “Dielectrophoretic Capture of E. coli Cells at Nanoelectrode Arrays.” *Electrophoresis*, **2011**, 32(17), 2358-2365.
  44. Bani-Yaseem, AD, Kawaguchi, T, Price, AK, Culbertson, CT, and Jankowiak, R. Integrated microfluidic device for the separation and electrochemical detection of catechol estrogen-derived DNA adducts. *Anal Bioanal Chem*, **2011**, 399 519-524 (PMID 21058011)
  43. Klasner, SA, Metto, EC, Roman GT and Culbertson\*, CT. “Correction to Synthesis and Characterization of a Poly(dimethylsiloxane)-Poly(ethylene oxide) Block Copolymer for Fabrication of Amphiphilic Surfaces on Microfluidic Devices.” *Langmuir*, **2010**, 26(8) 6078 (DOI: 10.1021/la100097v).
  42. Klasner SA, Price AK, Hoeman KW, Wilson, RS, Bell, KJ, and Culbertson, CT. “Paper-based microfluidic devices for analysis of clinically relevant analytes present in urine and saliva.” *Analytical and Bioanalytical Chemistry* **2010** 397(5), 1821-1829. (PMID 20425107)
  41. Price AK, and Culbertson\*, CT. “Generation of Nonbiased Hydrodynamic Injections on Microfluidic Devices Using Integrated Dielectric Elastomer Actuators.” *Anal. Chem.* **2009** 81(21), 8942-8948 (DOI: 10.1021/ac9015837). (PMID 19817486)
  40. Lange, JJ, Collinson, MM, Culbertson, CT, and Higgins, DA. “Single Molecule Studies of Oligomer Extraction and Uptake of Dyes in Poly(dimethylsiloxane) Films.” *Anal. Chem.* **2009** 81(24), 10089-10096 (DOI: 10.1021/ac902250p) (PMID 19928808).
  39. Klasner, SA, Metto, EC, Roman GT and Culbertson\*, CT. “Synthesis and Characterization of a Poly(dimethylsiloxane)-Poly(ethylene oxide) Block Copolymer for Fabrication of Amphiphilic Surfaces on Microfluidic Devices.” *Langmuir*, **2009**, 25(17) 10390-10396 (DOI: 10.1021/la900920q). (PMID 19572528)
  38. Hoeman, KW, Roman, GT and Culbertson\*, CT. “Electrokinetic Trapping using Titania Nanoporous Membranes Fabricated using Sol-Gel Chemistry on Microfluidic Devices.” *Electrophoresis* **2009**, 30, 1-8. (PMID 19130569)




37. Price, AK., Anderson, KM. and Culbertson\*, CT. “Demonstration of an Integrated Dielectric Elastomer Actuator on a Microfluidic Electrophoresis Device.” *Lab on a Chip* **2009**, 6, 2076-2084. (DOI: 10.1039/b823465e). (PMID 19568678)
36. Hoeman, KW and Culbertson\*, CT. “A Novel, Environmentally Friendly Sodium Lauryl Ether Sulfate-, Cocamidopropyl betaine- Cocamide Monoethanolamine- Containing Buffer for MEKC on Microfluidic Devices.” *Electrophoresis*. **2008**, 24, 4900-4905. (PMID 19130569)
35. Lange JJ, Culbertson CT, Higgins DA. Single Molecule Studies of Solvent-Dependent Diffusion and Entrapment in Poly(dimethylsiloxane) Thin Films. *Anal. Chem.* **2008**, 80, 9726-9734. (PMID 19006339)
34. Price AK and Culbertson\*, CT. “Chemical Analysis of Single Mammalian Cells using Microfluidic Devices.” *Analytical Chemistry* **2007**, 79(7), 2614-2621. (PMID 17476726)
33. Roman, GT Chen, YL, Viberg, P, Culbertson, AH and Culbertson\*, CT. “Single Cell Manipulation and Analysis Using Microfluidic Devices.” *Analytical and Bioanalytical Chemistry* **2007** 387(1), 9-12 (PMID 16955261)
32. Meyer, AR, Clark, AM, Culbertson\*, CT. “The Effect of Photomask Resolution on Separation Efficiency in Microfabricated Devices.” *Lab on a Chip* **2006**, 6, 1355 – 1361. (PMID 17102849)
31. Xie, A, Roman, GT, Culbertson, CT, Higgins, DA. “Optical Microscopy Studies of Polymer/Liquid-Crystal Diffractive Optics.” *Proc SPIE* **2006** vol. 6135, 613505 (invited)
30. Roman, GT, Culbertson\*, CT. “Surface Engineering of Poly(dimethylsiloxane) Microfluidic Devices Using Sol-Gel Chemistry.” *Langmuir* **2006** 22(9) 4445-4451. (PMID 16618201)
29. Roman, GT, Carroll, S, McDaniel, KJ Culbertson\*, CT “Micellar Electrokinetic Chromatography of Fluorescently Labeled Proteins on Poly(dimethylsiloxane)-based Microchips.” *Electrophoresis* **2006**, 27 2933-2939. (PMID 16721904)
28. Roman, GT, McDaniel, KJ Culbertson\*, CT. “High Efficiency Micellar Electrokinetic Chromatography of Hydrophobic Analytes on Poly(dimethylsiloxane) Microchips.” *The Analyst* **2006** 131(2), 194-201. (PMID16440082) **HOT ARTICLE**
27. Culbertson\*, CT, Roman, GT, Tugnawat, Y, Meyer, AR, Ramsey, JM and Gonda, SR. “Microchip Separations in Reduced- and Hypergravity Environments.” *Anal. Chem.* **2005**, 77(24), 7933-7940. (PMID16351140) **Highlighted in RESEARCH FOCUS of A-PAGE MAGAZINE**
26. Roman, GT, Hlaus, T, Bass, K, Seelhammer, T, and Culbertson\*, CT. “Sol-gel Modified Poly(dimethylsiloxane) Microfluidic Devices with High Electroosmotic Mobilities and Hydrophilic Channel Wall Characteristics.” *Anal. Chem.* **2005**, 77, 1414-1422
25. Poulsen, CR, Culbertson, CT, Jacobson, SJ, and Ramsey, JM. Static and Dynamic Acute Cytotoxicity Assays on Microfluidic Devices.” *Anal. Chem.* **2005**, 77, 667-672. (PMID 15649069)
24. McClain, MA, Culbertson, CT, Jacobson, SC, and Ramsey, JM. “Microfluidic Devices for the High Throughput Chemical Analysis of Cells.” *Analytical Chemistry* **2003**, 75, 5646-5655. (PMID 14588001)
23. McKnight, TE; Melechko, AV; Guillorn, MA; Merkulov, VI; Doktycz, MJ; Culbertson, CT; Jacobson, SC; Lowndes, DH; Simpson, ML. “Effects of Microfabrication Processing on the Electrochemistry of Carbon Nanofiber Electrodes.” *Journal of Physical Chemistry B* **2003**, 107(39), 10722-10728.




22. Tsouris, C, Culbertson, CT, DePaoli, DW, Jacobson, SC, de Almeida, VF, and Ramsey, JM. "Electrohydrodynamic Mixing in Microchannels." *AIChE* **2003**, 49, 2181-2186.
21. Ramsey, JD, Jacobson, SC, Culbertson, CT, and Ramsey, JM. "High-Efficiency, Two-Dimensional Separations of Protein Digests on Microfluidic Devices." *Analytical Chemistry* **2003**, 75, 3758-3764.
20. Yao, Z-H, Yoder, GL, Culbertson, CT, Ramsey, JM. "Numerical Simulation of Dispersion Generated by a 180° Turn in a Microchannel." *Chinese Physics* **2002**, 11, 226-232.
19. Culbertson, CT, Jacobson, SC, and Ramsey, JM. "Diffusion Coefficient Measurements on Microfluidic Devices." *Talanta* **2002**, 56, 365-373.
18. McClain, MA, Culbertson, CT Jacobson, SC, and Ramsey, JM. "Flow Cytometry of E. coli on Microfluidic Devices." *Analytical Chemistry* **2001**, 73, 5334-5338.
17. McKnight, TE Culbertson, CT, Jacobson, SC, and Ramsey, JM. "Electroosmotically Induced Hydraulic Pumping on Microfluidic Devices with Integrated Electrodes." *Analytical Chemistry* **2001**, 73, 4045-4049.
16. Gottschlich, N, Jacobson, SJ, Culbertson, CT, and Ramsey, JM. "Two-dimensional Electrochromatography/Capillary Electrophoresis Microchip Device." *Analytical Chemistry* **2001**, 73(11), 2669-2674.
15. Culbertson, CT, Jacobson, SC, and Ramsey, JM. "Microchip Devices for High Efficiency Separations." *Analytical Chemistry* **2000**, 72(23), 5814-5819.
14. Gottschlich, N., Culbertson, C. T., McKnight, T. E., Jacobson, S. C., and Ramsey, J. M. "Integrated Microchip-Device for the Digestion, Separation and Postcolumn Labeling of Proteins and Peptides." *Journal of Chromatography B* **2000**, 745, 243-249.
13. Liu, Y., Foote, R. S., Culbertson, C. T., Jacobson, S. C., Ramsey, R. S., and Ramsey, J. M. "Electrophoretic Separation of Proteins on Microchips." *Journal of Microcolumn Separations* **2000**, 12(7), 407-411.
12. Culbertson, C. T., Ramsey, R. S. and Ramsey, J. M. "Selective Ion Transport using Electrokinetic Pumps on Microchips." *Analytical Chemistry* **2000**, 72(10), 2285-2291.
11. Alarie, J. P., Jacobson, S. J., Culbertson, C. T. and Ramsey, J. M. "Effects of the Electric Field Distribution on Microchip Valving Performance." *Electrophoresis* **2000**, 21(1), 100-106.
10. Culbertson, C. T. and Jorgenson, J. W. "Lowering the UV Absorbance Detection Limit and Increasing the Sensitivity of Capillary Electrophoresis Using a Dual Linear Photodiode Array Detector and Signal Averaging." *Journal of Microcolumn Separations* **1999**, 11(9), 652-662.
9. Schrum, D. S., Culbertson, C. T., Jacobson, S. C. and Ramsey, J. M. "Microchip Flow Cytometry Using Electrokinetic Focusing." *Analytical Chemistry* **1999**, 71, 4173-4177.
8. Culbertson, C. T. and Jorgenson, J. W. "Separation of Fluorescently Derivatized Deuterated Isotopomers of Phenylalanine using Micellar Electrokinetic Chromatography and Flow Counterbalanced Micellar Electrokinetic Chromatography." *Journal of Microcolumn Separations* **1999**, 11(3), 175-183.
7. Culbertson, C. T. and Jorgenson, J. W. "Increasing the Resolving Power of Capillary Electrophoresis through Electroosmotic Flow Control using Radial Fields." *Journal of Microcolumn Separations* **1999**, 11(3), 167-174.
6. Culbertson, C. T., Jacobson, S. C. and Ramsey, J. M. "Dispersion Sources for Compact Geometries on Microchips." *Analytical Chemistry* **1998**, 70, 3781-3789.
5. Jacobson, S. C, Culbertson, C. T., Daler, J. E., and Ramsey, J. M. "Microchip Structures for Sub-Millisecond Electrophoresis." *Analytical Chemistry* **1998**, 70, 3476-3480.

4. Culbertson, C. T. and Jorgenson, J. W. "Lowering the UV Absorbance Detection Limit in Capillary Zone Electrophoresis Using a Single Linear Photodiode Array Detector." *Analytical Chemistry* **1998**, *70*, 2629-2638.
3. Coe, B. J., Thompson, D. W., Culbertson, C. T., Schoonover, J. R. and Meyer, T. J. "Synthesis and Photophysical Properties of Mono-(2,2' : 6',2" - Terpyridine) Complexes of Ruthenium(II)." *Inorganic Chemistry* **1995**, *34*, 3385-3395.
2. Culbertson, C. T. and Jorgenson, J. W. "Flow Counterbalanced Capillary Electrophoresis." *Analytical Chemistry* **1994**, *66*(7), 955-962.
1. Deutsch, H. M., Schweri, M. M., Culbertson, C. T., and Zalkow, L. H. "Synthesis and Pharmacology of Irreversible Affinity Labels as Potential Cocaine Antagonists: aryl 1,4 dialkylpiperazines related to GBR-12783." *European Journal of Pharmacology* **1992**, *220*(2-3), 173-180.






### Book Chapters

3.  Culbertson, C.T., Sibbitts, J., Sellens, K.A., and Jia, S. "Fabrication of Glass Microfluidic Devices." in *Methods in Molecular Biology*, vol. 1906: Microfluidic Electrophoresis: Methods and Protocols. ed. Debashis Dutta. The Humana Press, Totowa, NJ **2018** pp. 1-12. ISBN: 987-1-4939-8963-8
2.  Culbertson, C. T. "Single Cell Analysis on Microfluidic Devices" in *Methods in Molecular Biology*, vol. 339: Microchip Capillary Electrophoresis: Methods and Protocols. ed. Charles Henry. The Humana Press, Totowa, NJ **2006** pp. 203-216. ISSN:1064-3745.
1.  Jacobson\*, S.C. and Culbertson\*, C.T. "Microfluidics: Some Basics" in *Separation Methods in Microanalytical Systems* eds. Jörg P. Kutter and Yolanda Fintschenko, Marcel CRC Press, New York, **2006** pp. 19-64. ISBN 0-8247-2530-1.

### Conference Proceedings










1.  Culbertson\*, C.T. and Roman, G.T. "Surface Modification of PDMS Microfluidic Devices Using Transition Metal Sol-Gel Chemistry." In *Proceedings of μTAS 2005 Conference*. Eds. Jensen, K. F., Han, J., Harrison, D. J., and Voldman, J. Transducer Research Foundation, San Diego, CA, **2005**. ISBN 0-9743611-1-9.



















### Patents (8 issued, 5 applications)

13.  Motamedi, M.; Bossmann, S.H.; Culbertson, C.T. and Troyer, D. "Nanosensors and Methods for Detection of Biological Markers" U.S. Application Number 16/088,407 filed in US, Sept. 25, 2018
12.  Culbertson, C.T., Bossmann, S.H. "Microfluidics-based Nanobiosensors" U.S. Application Number 62/424,224 November 2016.
11.  Culbertson, C.T., Latifi, H., Patabadige, D.E.W., Sadeghi, J., "Simplifying the Integration of Detection/Interrogation Points on a Microfluidic Device Using Fiber Optics." U.S. Application Number 62/365,843 July 2016.
10.  Bossmann, S.H., Brasier, A.R., Culbertson, C.T., Motamedi, M/, Troyer, D.L. "Methods and Systems for Collecting, Processing, Profiling, and Multisense Detection of Biological Markers within a Biological Sample." U.S. Application Number 62/313,511 March 2016
9.  Culbertson, C.T. "Integrated Dielectric Elastomeric Actuators (IDEAs) for the construction of Microfluidic Valves and Pumps." U.S. Application Number 62/312,978 March 2016

8. Gonda, SR; von Gustedt-Gonda, I; Chang, RC; Starly, B; Culbertson, C; Holtorf, HL; Sun, W; Leslie, J. "Microorgan Device." U.S. Patent No. 8,580,546.
7. Gonda, SR; von Gustedt-Gonda, I; Chang, RC; Starly, B; Culbertson, C; Holtorf, HL; Sun, W; Leslie, J. "Microorgan Device." U.S. Patent No. 8,343,740.
6. Jacobson, S. C., Ramsey, J. M., Culbertson, C. T., Whitten, W. B., and Foote, R. S. "Methods for Forming Small-Volume Electrical Contacts and Material Manipulations with Fluidic Microchannels," U.S. Patent No. 8,083,915.
5. Jacobson, S. C., Ramsey, J. M., Culbertson, C. T., Whitten, W. B., and Foote, R. S. "Methods for Forming Small-Volume Electrical Contacts and Material Manipulations with Fluidic Microchannels," U.S. Patent No. 7,931,790.
4. Jacobson, S. C., Ramsey, J. M., Culbertson, C. T., Whitten, W. B., and Foote, R. S. "Methods for Forming Small-Volume Electrical Contacts and Material Manipulations with Fluidic Microchannels," U.S. Patent No. 7,909,973.
3. Culbertson, C. T.; Jacobson, S. C.; McClain, M. A.; Ramsey, J. M. "Microfluidic Systems and Methods of Transport and Lysis of Cells and Analysis of Cell Lysate" U.S. Patent No. 7,419,575.
2. Culbertson, C. T.; Jacobson, S. C.; McClain, M. A.; Ramsey, J. M. "Microfluidic Systems and Methods of Transport and Lysis of Cells and Analysis of Cell Lysate" U.S. Patent No. 6,783,647.
1. Jacobson, S. C., Ramsey, J. M., Culbertson, C. T., Whitten, W. B., and Foote, R. S. "Methods for Forming Small-Volume Electrical Contacts and Material Manipulations with Fluidic Microchannels," U.S. Patent No. 6,685,809 (Issued 3 February 2004).



## Presentations

1.  Culbertson, C.T. Enhancing the Information of Single Cell Analysis in Microfluidic Devices Using Optical Fiber Bridges For The Analysis Of Reactive Nitrogen Species And Kinases. LACE 2018, Mendoza, Argentina Dec 1-4, **2018**.
2.  Culbertson, C.T. Microfluidic Devices for the Analysis of Single Cells. SCIX2018, October 21-26, **2018**.
3.  Culbertson, C.T. Biosensors: Multiple Transduction Architectures for Practical Applications in Food. IFT 2018 Chicago, IL. July 15-18 **2018**.
4.  Culbertson, C.T. Enhancing the Information Content of Single Cell Analysis on Microfluidic Devices using Optical Fiber Bridges (and other stuff). ABADRU USDA-ARS, Manhattan, KS April 18, **2018**.
5.  Culbertson, C.T. Enhancing the Information Content of Single Cell Analysis on Microfluidic Devices using Optical Fiber Bridges for the Analysis of Kinases. University of Kansas, Lawrence, KS April 16, **2018**.
6.  Culbertson, C.T. Enhancing the Information Content of Single Cell Analysis on Microfluidic Devices using Optical Fiber Bridge. MWACS October 18-20, **2017** Lawrence, KS.
7.  Culbertson, C.T. Incorporating Current Events into Chemical Analysis. MWACS October 18-20, **2017** Lawrence, KS.
8.  Culbertson, C.T. Enhancing the Information Content of Single Cell Analysis on Microfluidic Devices using Optical Fiber Bridge. FACSS SciX October 8-13, **2017** Reno, NV.
9.  Culbertson, C.T. Single Cell Analysis on Microfluidic Devices. Pittcon **2017** March 5-




- 9, 2017, Chicago, IL.
10.  Culbertson, C.T. Single Cell Analysis on Microfluidic Devices. MWACS 2016 October 26-28, **2016**, Manhattan, KS.
  11.  Culbertson, C.T. Enhancing the Information Content of Single Cell Analysis on Microfluidic Devices using Fiber Optic Bridges. HPLC 2016 June 19-24, **2016**, San Francisco, CA.
  12.  Culbertson, C.T. Integrated Microfluidic Devices for Single Cell Analysis. 15th Asia Pacific International Symposium on Microscale Separations and Analysis (APCE2015), 15-18 November **2015**, Tainan, Taiwan. **KEYNOTE SPEAKER**
  13.  Culbertson, C.T. Rapid Single Cell Analysis on Microfluidic Devices using Integrated Pumps. Pittcon, March 10-13, **2015**, New Orleans, LA.
  14.  Culbertson, C.T. Novel Microfluidic Devices for the Rapid Analysis of Single Cells. Wichita State University, September 30, **2015**, Wichita, KS.
  15.  Culbertson, C.T. Integrated Microfluidic Devices for Single Cell Analysis, Missouri Western State University, October 7, **2015**, St. Joseph, MO.
  16.  Culbertson, C.T. Teaching Tips from Chemistry. K-State STEM teaching seminar. November 6, **2015**.
  17.  Culbertson, C.T. Kansas Core Outcomes Program. Kansas College Chemistry Teachers Conference. Manhattan, KS. 11-12 April 2014.
  18.  Culbertson, C.T. K-State Teach. NSF Noyce Conference. Washington, D.C. 18-20 June 2014.
  19.  Culbertson, Christopher; Metto, Eve; Gunasekara, Dulan; Lunte, Susan. Measuring Nitric Oxide Production in Single Cells on Microfluidic Devices. SCIX 2014, Reno, NV. 28 September – October 3, 2014.
  20.  Culbertson, Christopher. Using Gradients to Optimize Electrophoretic Separations. SCIX 2014, Reno, NV. 28 September – October 3, 2014.
  21.  Spears, J. and Culbertson, C.T. Next Generation Science Standards. MidWest Noyce Conference. Omaha, NE 4 October 2014.
  22.  Culbertson, Christopher; Metto, Eve; Gunasekara, Dulan; Lunte, Susan. Single Cell Analysis on Microfluidic Devices. Silicon Prairie International Microfluidics Symposium 2014, Lawrence, KS. 1 November 2014.
  23.  Culbertson, C.T.; Metto, E. C.; Gunasekara, D.B. and Lunte, S.M. Integrated Microfluidic Devices for Monitoring Nitric Oxide Production in Single Cells. 37<sup>th</sup> International Symposium on Capillary Chromatography. May 12-16, 2013.
  24.  Culbertson, C. T., Surface Plasmon Resonance Detection in Microfluidic Devices. In *PittCon*, Orlando, FL, 2012.
  25.  Culbertson, C. T.; Metto, E. C.; Brummer, G.; Culbertson, A. H.; Lunte, S. M.; Gunakesera, D. B., Measuring Nitric Oxide Production in Single Cells on Microfluidic Devices. In *PittCon*, Orlando, 2012.
  26.  Culbertson, C. T.; Metto, E. C.; Lunte, S. M.; Gunakesera, D. B., Single Cell Analysis on Microfluidic Devices. In *SCIX*, Kansas City, 2012.
  27.  Gunasekara, D. B.; Pichetsurnthorn, P.; Santos, D. M.; Grigsby, R. J.; Culbertson, C. T.; Lunte, S. M. In *Microchip Electrophoresis with Electrochemical Detection for Monitoring Reactive Nitrogen Species*, American Chemical Society: 2012; pp MWRM-414.

28. Metto, E. C.; Sharma, A.; Culbertson, A. H.; Evans, K.; Gunakesera, D. B.; Culbertson, C. T.; Lunte, S. M. In *Demonstration of rapid single cell analysis on simple microfluidic devices: A study nitric oxide production in Jurkat cells*, American Chemical Society: 2011; pp MWGL-408.
29. Metto, E. C.; Talley, S. J.; Patabadige, D. R. E. W.; Kanost, M.; Michel, K.; Sellens, K. A.; Culbertson, C. T. In *Isolation and analysis of insect proteins involved in the innate immune response system*, American Chemical Society: 2012; pp MWRM-301.
30. Syed, L. U.; Madiyar, F. R.; Liu, J.; Price, A. K.; Li, Y.-f.; Culbertson, C. T.; Li, J. In *Using Dielectrophoresis for Reversible Capture and Release of E. coli cells at Micropatterned Nanoelectrode Arrays*, American Chemical Society: 2011; pp MWGL-432.
31. Culbertson, C.T. and Price, A.K. "Microfluidic Devices for the Analysis of Single Cells" Texas Tech University, 12 November 2010.
32. Culbertson, C.T. and Price, A.K. "Developing Novel Functional Elements on Microfluidic Devices using Integrated Dielectric Actuators (IDEAs)" MidWest ACS Conference 2010, Wichita, KS. 29 October 2010.
33. Culbertson, C.T. and Price, A.K. "Small Volume Biological Sampling, Fluid Handling, and High Efficiency Separations, on Microfluidic Devices" Missouri Western State University, 29 September 2010.
34. Culbertson, C.T. and Price, A.K. "Small Volume Biological Sampling, Fluid Handling, and High Efficiency Separations, on Microfluidic Devices" University of Oklahoma, 1 April 2010.
35. Culbertson, C.T. and Price, A.K. "Using Integrated Dielectric Actuators (DA) on Microfluidic Devices for Injections, Mixing, and Pumping" PittCon, 4 March 2010.
36. Culbertson, C.T., Meyer, A.R., and Lamabadasuriya, M. "Developing Novel Analytical Methods to Sample and Identify Aphid Salivary Proteins." MWACS Regional Meeting, Iowa City, IA, 23-24 October 2009.
37. Culbertson, C.T. "Small Volume Biological Sampling, Fluid Handling, and High Efficiency Separations, on Microfluidic Devices." University of North Texas, Denton, TX. 2 October 2009.
38. Culbertson, C.T. and Price, A.K. "Integrating Dielectric Elastomer Actuators into Microfluidic Devices to Generate Injections that Significantly Reduce Electrokinetic Injection Bias." Pittcon 2009, Chicago, IL. 9 March 2009.
39. Culbertson, C.T., Price, Alexander A. and Anderson Kristen M. "Demonstration off an Integrated Dielectric Elastomeric Actuator on a Microfluidic Electrophoresis Device." MWACS Regional Meeting, Kearney, NE, 9 October 2008.
40. Culbertson, C.T. "Addressing Small Volume Sampling Challenges." The Danish Technical University, Copenhagen, Denmark 23 May 2008.
41. Culbertson, C.T. and Price Alexander K. "Manipulation of electroosmotic Flow on Microfluidic Devices through the Application of an External Electric Field." HPLC 2008, Baltimore, MD. 14 May 2008.
42. Culbertson, C.T. "Addressing Small Volume Sampling Challenges." University of Illinois at Urbana Champagne, IL 25 April 2008.
43. Culbertson, C.T. "Microfluidic Devices for Cellular Analysis on Earth and On-Orbit." Missouri University of Science and Technology, Rolla, MO 21 April 2008.
44. Culbertson, C.T., Meyer, A.R., Lamabadasuriya, M., Reeck G.R., Reese, J.C. Campbell P.R., Edwards, O. "Developing Novel Analytical Methods to Sample and



- Identify Aphid Salivary Proteins.” Arthropod Genomics Symposium, Kansas City, MO 11 April 2008.
45.  Culbertson, C.T. “Small Volume Biological Sampling, Fluidic Handling, and High Efficiency Separations on Microfluidic Devices.” Georgia Institute of Technology, Atlanta, GA, CA 11 March 2008.
  46.  Culbertson, C.T. and Reeck, G.R. “Using Novel Analytical Techniques to Address Limited Volume Sampling Challenges in Biology.” Functional Genomics Consortium, Manhattan, KS 5 March 2008.
  47.  Culbertson, C.T. “Microfluidic Devices for the Analysis of Cells and Limited Volume Biological Fluids.” LabAutomation 2008, Palm Springs, CA 28 January 2008.
  48.  Culbertson, C.T. “Microfluidic Devices for Bioanalytical Chemistry.” University of West Florida, Pensacola, FL. 8 December 2007.
  49.  Culbertson, C.T. “Microfluidic Devices for Bioanalytical Chemistry.” Florida State University, Tallahassee, FL. 6 December 2007.
  50.  Culbertson, C.T. “Microfluidic Devices for Limited Volume Biological Sampling Challenges.” 2007 MidWest ACS Conference, Kansas City, MO. 8 November 2007.
  51.  Culbertson, C.T. “Microfluidic Devices for Chemical and Biochemical Analysis.” Truman State University, Kirksville, MO. 28 September 2007.
  52.  Culbertson, C.T. “Application of External Electric Fields for Controlling Fluid Flows on Microfluidic Devices.” 232<sup>nd</sup> ACS National Meeting, Boston, MA. 21 August 2007.
  53.  Culbertson, C.T. Microfluidic Devices for Chemical and Biochemical Analysis.” University of Michigan, Ann Arbor, MI. 8 March 2007.
  54.  Culbertson, C.T. “Microfluidic Devices for Analytical Chemistry” PittCon 2007, Chicago, IL. 28 February 2007.
  55.  Culbertson, C.T. “Novel Separation, Preconcentration and Purification Strategies using Solgel Chemistry on Microfluidic Devices.” Microscale Bioseparations 2007. Vancouver, CA. 13-18 January 2007.
  56.  Culbertson, C.T. “Microfluidic Devices for Bioanalytical Applications.” Society of Analytical Chemists of Pittsburgh, Pittsburgh, PA. 7 January 2007.
  57.  Culbertson, C.T. “Microfluidic Devices for Cellular analysis on Earth and on-Orbit” Fort Hayes State University. 27 November 2006.
  58.  Culbertson, C.T. “Microfluidic Devices for Cellular analysis on Earth and on-Orbit” University of Nebraska at Kearny. 17 November 2006.
  59.  Culbertson, C.T. “Microfluidic Devices for Cellular analysis on Earth and on-Orbit” Glaxo Smith Kline. 24 October 2006.
  60.  Culbertson, C.T. “Microfluidic Devices for Chemical and Biochemical Measurements.” University of North Carolina, 23 October 2006.
  61.  Culbertson, C.T. “Microfluidic Devices for Chemical and Biochemical Measurements.” KSU Physics Department. 13 October 2006.
  62.  Culbertson, C.T., Roman G.T., Klasner, S.A., McDaniel K. “Strategies for Improving Separations on PDMS-based Microfluidic Devices” FACSS Orlando, FL 27 September 2006.
  63.  Culbertson, C.T. “Microfluidic Devices for Cellular Analysis on Earth and on-Orbit” Colorado State University, 6 September 2006.

64.  Culbertson, C.T. and Roman, G.T. "High Efficiency Micellar Electrokinetic Chromatography of Hydrophobic Analytes on Poly(dimethylsiloxane) Microchips." PittCon 2006, Orlando, FL 12-17 March 2006.
65.  Culbertson, C.T. "Synthesis, characterization, and testing of novel block copolymers as substrate materials for the fabrication of microfluidic devices." Pacificchem, Honolulu, HI., 18 December 2005.
66.  Culbertson, C.T. "Microfluidic Devices for Cellular Analysis on Earth and on orbit." Drexel University, Philadelphia, PA., 18 November 2005.
67.  Culbertson, C.T. "Microfluidics: High Efficiency Separations, Channel Coatings, and Space Applications." University of Kansas, Lawrence, KS., 2 November 2005.
68.  Culbertson, C.T., Roman, G.T., Meyer, A.R., Chen, Y., Viberg, P., Hoeman, K., and Klasner, S.A. "Microfluidic Devices for the Analysis of Limited Volume Biological Samples." 41<sup>st</sup> Midwest Regional ACS Meeting, Joplin, MO., 27-28 October 2005.
69.  Culbertson, C.T. and Roman, G.T. "Surface Modification of PDMS Microfluidic Devices Using Transition Metal Sol-Gel Chemistry." Ninth International Conference on Miniaturized Systems for Chemistry and Life Sciences, Boston, MA. October 9-13, 2005.
70.  Culbertson, C.T. and Lookhart, G.L. "Rapid and Automated Analysis of Wheat Gliadin Proteins for Varietal Identification and Quality Assessment Using a Portable Microfluidic Device." 2005 AACC International Annual Meeting. Orlando, FL. September 11-14, 2005.
71.  Culbertson, C. T. "Microfluidic Devices for Chemical and Biochemical Analysis." Southwest Missouri State University, Springfield, MO, April 11, 2005.
72.  Culbertson, C. T. "Novel Materials and Applications for Microfluidic Devices." Sandia National Laboratory, Livermore, CA, 21-22 March 2005.
73.  Culbertson, C. T., Roman, G.T., Tugnawat, Y., Ramsey, J. M. and Gonda S. R. "Microfluidic Devices for Chemical and Biochemical Analysis in Microgravity." 2005 NASA Cell Science Conference, Galveston, TX, February 23-25, 2005.
74.  Culbertson, C.T. and Roman G.T. "Novel Materials for the Coating of Microfluidic Devices." Pittcon2005, Orlando, FL, February 27-March 4 2005.
75.  Culbertson, C.T. and Roman G.T. "Using Sol-gel Chemistry to Improve Separations on Microfluidic Devices." MSB 2005, 18<sup>th</sup> International Symposium on Microscale Bioseparations, New Orleans, LA February 12-17, 2005.
76.  Culbertson, C. T., Roman, G. T. Hlaus, T., Bass, K. and Seelhammer T. "Sol-gel Modified Poly(Dimethylsiloxane) Microfluidic Devices with High Electroosmotic Mobilities and Hydrophilic Channel Wall Characteristics." HPLC 2004, Philadelphia, PA June 13-18, 2004.
77.  Culbertson, C. T., Roman, G. T. Hlaus, T., Bass, K. and Seelhammer T. "Novel Materials for the Fabrication of Microfluidic Devices." 27th International Symposium on Capillary Chromatography, Riva del Garda, Italy, May 31-June 4, 2004.
78.  Culbertson, C. T., Roman, G. T. Hlaus, T., Bass, K. and Seelhammer T. "Novel Materials for the Fabrication of Polymeric Microfluidic Devices." Pittcon 2004, Chicago, IL Mar 7-12, 2004.
79.  Culbertson, C. T. Tugnawat, Y., Meyer, A., and Roman, G. T. "Lab-on-a-Chip Devices for Extraterrestrial Environments: Microfluidics in Microgravity." NASA Cell Science Conference 1004, Palo Alto, CA Feb 26-28, 2004.

80.  Culbertson, C. T., and Roman, G. T. "Rapid Prototyping of Microfluidic Devices using Laser Photoplotting Photomasks." FACSS 2003, Ft. Lauderdale, FL Oct 19-23, 2003.
81.  Culbertson, C. T., Tolley, L. T., Ramsey, J.M., and Gonda, S.R. "Lab-on-a-Chip Devices for Extraterrestrial Environments: Microfluidics in Microgravity." FACSS 2003, Ft. Lauderdale, FL Oct 19-23, 2003.
82.  Culbertson, C.T. "Microfluidic Devices for Chemical and Biochemical Analysis." Kansas State University, Department of Chemical Engineering, Manhattan, KS September 25, 2003.
83.  Culbertson, C.T. "Microfluidic Devices for Chemical and Biochemical Analysis." Kansas State University, Department of Biochemistry, Manhattan, KS August 27, 2003.
84.  Culbertson, C. T., Tolley, L. T., Ramsey, J.M., and Gonda, S.R. "Lab-on-a-Chip Devices for Extraterrestrial Environments: Microfluidics in Microgravity." 26<sup>th</sup> International Symposium on Capillary Chromatography and Electrophoresis Las Vegas, Nevada. May 18-22, 2003.
85. Ramsey, J. M., Culbertson, C. T., McClain, M. A., Tolley, L. T., Gonda, S. R., and Jacobson, S. J. "Microfluidic Devices for the Chemical Analysis of Single Cells." NASA Cell Science Conference, Houston, Texas. February 20-22, 2003.
86.  Culbertson, C. T., McClain, M. A., Jacobson, S. C., and Ramsey, J.M. "Single Cell Analysis and Multidimensional Separations on Microfluidic Devices." Truman State University, Kirksville, MO, 15 November 2002.
87.  Culbertson, C. T., McClain, M. A., Jacobson, S. C., and Ramsey, J.M. "Microfluidic Devices for Proteomics." ACS MidWest Regional Meeting, Lawrence, KS, 22-25 October 2002.
88.  Culbertson, C. T., McClain, M. A., Poulsen, C., Jacobson, S. C., and Ramsey, J.M. "Single Cell Analysis on Microfluidic Devices." FACSS 2002, Providence, RI, 13-16 October 2002.
89. Culbertson, C.T., Tolley, L. T., Ramsey, J. M., and Gonda, S. R. "Integration of Microfluidic (Lab-on-a-Chip) Devices and NASA Bioreactors for Environmental Monitoring On-Orbit." Environmental Biosentinels, Houston, TX 17-18 September 2002.
90. Culbertson, C.T. McClain, M. A., Jacobson, S.C., and Ramsey, J.M. "Microfluidic Devices for single Cell Assays." HPCE2002, Stockholm, Sweden, 11-15 April 2002.
91. Culbertson, C. T., Jacobson, S. C., and Ramsey, J. M. "Rapid Cellular Assays on Microfabricated Fluidic Devices." 5th International Conference on Miniaturized Chemical and Biochemical Analysis Systems, Monterey, CA, 21-25 October 2001.
92. Culbertson, C. T., Jacobson, S. C., and Ramsey, J. M. "Microfabricated Fluidic Devices for Biochemical Assays." smallTalk2001, San Diego, CA, 28-31 August 2001.
93. Culbertson, C. T., Jacobson, S. C., and Ramsey, J. M. "Flow Cytometry on Microfluidic Systems." The Gordon Research conference on the Physics and Chemistry of Microfluidics, Oxford, United Kingdom, 29 July-3 August 2001.
94. Culbertson, C. T., Jacobson, S. C., and Ramsey, J. M. "High Efficiency Separations on Microchip Devices." 14th International Symposium on Microscale Separations and Analysis (HPCE 2001), Boston, MA, 13-18 January 2001.
95. Culbertson, C. T., Jacobson, S. C., and Ramsey, J. M. "High Efficiency Separations on Microchips." 11th Annual Frederick Conference on Capillary Electrophoresis, Frederick, MD, 16-18 October 2000.



96. Culbertson, C. T., Jacobson, S. C., and Ramsey, J. M. "High Efficiency Separations on Microchips." 4th International Symposium on Micro Total Analysis Systems, Twente, The Netherlands 14-18 May 2000.
97. Culbertson, C. T., Whitten, W. B., Jacobson, S. C., and Ramsey, J. M. "Miniaturized Chemical Measurement Instrumentation for Liquids and Gases." Nanospace 2000, Houston, TX, 23-28 January 2000.
98. Culbertson, C. T., Schrum, D. P., Jacobson, S. C., and Ramsey, J. M. "Microfluidic Devices for Rapid Chemical Measurements." Southeastern Regional Meeting of the American Chemical Society (SERMACS), Knoxville, TN, 17-18 October 1999.
99. Culbertson, C. T., Schrum, D. P., Jacobson, S. C., and Ramsey, J. M. "Microchip Flow Cytometry Using Electrokinetic Focusing." Gordon Research Conference on Analytical Chemistry, New England College, Henniker, NH, 1-6 August 1999.
100. Culbertson, C. T., Jacobson, S. C. and Ramsey, J. M. "Electroosmotically Generated Field-Free Pumping on Microchips." 12th International Symposium on High Performance Capillary Electrophoresis and Related Microscale Techniques (HPCE'99), Palm Springs, CA, 23-29 January 1999.
101. Culbertson, C. T., Jacobson, S. C. and Ramsey, J. M. "Minimizing Dispersion Introduced by Turns on Microchips." Micro Total Analysis Systems '98, Banff, Canada, 13-16 October 1998.
102. Culbertson, C. T., Jacobson, S. C. and Ramsey, J. M. "Excess Analyte Dispersion Generated by Turns on Microchips." Solid State Sensor and Actuator Workshop, Hilton Head Is., SC, 8-11 June 1998.
103. Culbertson, C. T., Jacobson, S. C. and Ramsey, J. M. "Dispersion Sources for Compact Geometries on Microchips." 11th International Symposium on High Performance Capillary Electrophoresis and Related Microscale Techniques (HPCE'98), Orlando, FL, 31 January - 5 February 1998.
104. Culbertson, C. T., Jacobson, S. C. and Ramsey, J. M. "Band Broadening Sources on Microchips." 19th International Symposium on Capillary Chromatography and Electrophoresis, Wintergreen, VA, 18-22 May 1997.
105. Hooker, T. J., Culbertson, C. T., and Jorgenson, J. W. "Enhanced UV Detection of Peptides and Proteins using CZE and 2D  $\mu$ LC-CZE with a Linear Photodiode Array." High Performance Capillary Electrophoresis'97 (HPCE'97), Anaheim, CA., 26-30 January 1997.
106. Culbertson, C. T., Hooker, T. J., Burton, K. M., and Jorgenson, J. W. "Use of a Linear Photodiode Array Detector to Lower the UV Absorbance Detection Limit in Capillary Zone Electrophoresis." High Performance Capillary Electrophoresis'97 (HPCE'97), Anaheim, CA., 26-30 January 1997.
107. Culbertson, C. T. and Jorgenson, J. W. "Flow Counterbalanced Capillary Electrophoresis Using an Array Detector." High Performance Capillary Electrophoresis '96 (HPCE'96), Orlando, FL, 25 January 1996.
108. Culbertson, C. T. and Jorgenson, J. W. "Separation of Amino Acids and Bioactive Peptides Using Flow Counterbalanced Capillary Electrophoresis." Gordon Research Conference on Analytical Chemistry, New Hampton, NH, 5 August 1995.
109. Culbertson, C. T. and Jorgenson, J. W. "Resolution Enhancement in Capillary Electrophoresis using Flow Counterbalanced Migration." 17th International Symposium on Capillary Chromatography and Electrophoresis, Wintergreen, WV, 7-11 May 1995.

110. Culbertson, C. T. and Jorgenson, J. W. "Resolution Enhancement in Capillary Electrophoresis using Flow Counterbalanced Migration." 209th ACS National meeting, Anaheim, CA, 2 April 1995.
111. Culbertson, C. T. and Jorgenson, J. W. "Flow Counterbalanced Capillary Electrophoresis." High Performance Capillary Electrophoresis '95, Wurzburg, Germany, 1 February 1995.
112. Culbertson, C. T. and Jorgenson, J. W. "Resolution Enhancement in Capillary Electrophoresis using Flow Counterbalanced Migration." 11th Annual Triangle Symposium, Research Triangle Park, NC, 19 May 1994.
113. Culbertson, C. T. and Jorgenson, J. W. "Resolution Enhancement in Capillary Electrophoresis using Counterbalanced Migration." Kenan Analytical Award Symposium, Union Carbide, South Charleston WV, 13 April 1994.
114. Culbertson, C. T. and Jorgenson, J. W. "Flow Counterbalanced Capillary Electrophoresis." High Performance Capillary Electrophoresis '94, San Diego, CA, 3 February 1994.
115. Culbertson, C. T. and Jorgenson, J. W. "Flow Counterbalanced Capillary Electrophoresis." High Performance Capillary Electrophoresis '93, Orlando, FL, 27 January 1993.

## Proposals, Grants and Contracts 2002-2019

### Pending

1. **NIH 1 R01 EB025245-01A1** 7/1/19-6/30/24  
NIH-NCI \$1,915,035  
Title: Development of a Point-of-Care Microfluidic Device for the Early Detection of Pancreatic Cancer  
Role: PI
2. **NSF-1917390**  
NSF  
Title: EFRI CEE Preliminary Proposal: Opening the Gates of Apoptosis in Cancer  
Role: co-PI (Motamedi – UTMB PI)

### Current and Past to 2002

1. **NSF-CHE-1852182** 5/01/19-4/30/22  
NSF \$344,225  
Title: REU Site: Research Experiences for Undergraduates in Chemistry at Kansas State University  
Role: PI
2. **NSF-CBET-1842670** 8/02/18-8/01/20  
NSF \$300,000  
Title: EAGER: Design and Validation of a Point-of-Care Device To Detect Biomarkers of Pain  
Role: Co-PI (Bossmann PI)
3. **NSF-CBET-1804416** 5/01/18-4/30/21  
NSF \$325,000  
Title: A point-of-care device for diagnosis and management of pulmonary diseases  
Role: Co-PI (Bossmann PI)
4. **NSF-CHE1460898** 05/01/15-04/30/18  
NSF \$345,000  
Title: REU Site: Research Experience for Undergraduates in chemistry at KSU  
Role: PI
5. **Cancer Center – Summer Graduate Student Support** 6/1/17-8/15/17  
Johnson Cancer Center \$5400  
Title: Summer Graduate Student Support for Kathleen Sellens  
Role: PI
6. **NSF-CHE1310460** 08/01/14-07/31/17  
NSF \$180,000 (KSU)  
Title: Microanalytical Methods for Investigation of the Inflammatory Response  
Role: Co-PI (PI: Susan M. Lunte KU)

7. **NIH R01 1R01AI095842-01** 5/1/11-4/30/16  
 NIH \$1,503,216  
 Title: The function of SRPN2 in mosquito immunity and physiology  
 Role: Named Collaborating Scientist (PI: Kristin Michel KSU Biology)
8. **NSF-CBET1656968** 10/01/16-9/30/18  
 NSF-CBET \$185,541  
 Title: Integrating Optical Fiber Bridges in Microfluidic Devices for Ultrasensitive Analyses of Biomarkers in Single Cells  
 Role: Co-PI (PI: Stefan Bossmann)
9. Cancer Center – Innovative Research Award 4/1/2016-open  
 \$22,245  
 Title: Development of a Prototype Paper Microfluidic Device for Monitoring Critical Biomarkers of Breast Cancer  
 Role: PI
10. Cancer Center – Summer Graduate Student Support 6/1/16-8/15/16  
 \$4800  
 Title: Summer Graduate Student Support for Shu Jia  
 Role: PI
11. Cancer Center – Special Gift from Eric Stonestreet 9/1/16-open  
 \$50,000  
 Title: Towards Clinical Detection of Biomarkers for Breast Cancer and Other Solid Tumors  
 Role: PI
12. **NSF-DUE0934905** 7/1/09-6/30/15  
 NSF \$849,765  
 Title: K-State Robert Noyce Scholarship Program  
 Role: PI
13. DCE – Online Course Proposal 05/31/14-04/30/15  
 Division of Continuing Education \$10,100  
 Role: PI
14. Terry C. Johnson Cancer Research Center 05/31/15-08/31/15  
 Graduate student summer award \$4500  
 Role: PI
15. **NSF-CHE1004991:** 6/1/10-5/31/14  
 NSF \$261,702  
 Title: **NSF-REU Site:** Research Experiences for Undergraduates in Chemistry at Kansas State University  
 Role: PI

- |  |                               |
|--|-------------------------------|
| 16. Alternative Textbook Proposal<br>KSU Student Government Association<br>Role: PI  | 05/31/13-04/30/14<br>\$5,000  |
| 17. DCE – Online Course Proposal<br>Division of Continuing Education<br>Role: PI   | 05/31/13-04/30/14<br>\$10,100 |
| 18. Terry C. Johnson Cancer Research Center<br>Graduate student summer award<br>Role: PI   | 05/31/14-08/31/14<br>\$4500   |
| 19. <b>NSF-CHE0548046</b><br>NSF<br>CAREER: Development of a Sensitive, 'Universal' Surface Plasmon Resonance<br>Detector for Protein Separations on Microfluidic Devices<br>Role: PI  | 2/1/06-1/31/12<br>\$530,000   |
| 20. Department of Homeland Security<br>DHS<br>Center of Excellence for Emerging and Zoonotic Animal Diseases<br>Role: Investigator with Higgins and Li   | 7/1/10-6/30/12<br>\$30,000    |
| 21. Terry C. Johnson Cancer Research Center<br>Undergraduate Research Award for Samantha Talley<br>Role: PI  | 11/9/12-5/15/13<br>\$2,000    |
| 22. <b>NIH R21 NS061202-01</b><br>NIH<br>Microanalytical Methods for the Detection of Reactive Nitrogen Species<br>Role: Consultant (PI: Susan Lunte at KU)  | 6/1/09-5/31/11<br>\$275,000   |
| 23. Annual Wheat Quality Proposal Call<br>Kansas Wheat Commission<br>Development and Use of 'Lab on a Chip' Technology to provide Varietal<br>Identification of Wheat for Quality Prediction in less than 90 Seconds<br>Role: PI | 7/1/09 – 6/30/11<br>\$29,040  |
| 24. Terry C. Johnson Cancer Research Center<br>Undergraduate Research Award for Karsten Evans<br>Role: PI  | 11/9/09-5/15/11<br>\$2,000    |
| 25. K-INBRE Award 2010 Summer Scholars Program<br>Undergraduate scholar award for Karsten Evans  | 5/1/10-4/30/11<br>\$4,700     |
| 26. Arthropod Genomics<br>Center – KSU Center of Excellence<br>The Aphid Salivary Secretome: A Genomics-Based Approach   | 2/1/07-1/31/09<br>\$58,000    |

Role: PI

27. Terry C. Johnson Cancer Research Center  
Undergraduate Research Award  
Role: PI 11/9/09-5/15/10  
\$2,000
28. Division of Continuing Education  
KSU-DCE  
Development of a distance education course covering forensic analytical  
chemistry  
Role: PI 6/1/09-8/31/09  
\$4500
29. Annual Wheat Quality Proposal Call (renewal)  
Kansas Wheat Commission  
Development and Use of 'Lab on a Chip' Technology to provide Varietal  
Identification of Wheat for Quality Prediction in less than 90 Seconds  
Role: PI 7/1/06 – 6/30/07  
\$105,924
30. ACS-PRF Supplement for Underrepresented Minority Research  
ACS-PRF 5/01/05 - 8/31/05  
\$4,900
31. ACS-PRF Summer Research Fellowship  
ACS-PRF 5/01/05 – 8/31/05  
\$8,000
32. KANSAS EPSCOR  
NSF  
Novel Materials for the Fabrication and Coating of Microfluidic Devices  
Role: PI 4/1/05 – 5/30/06  
\$49,273
33. Annual Wheat Quality Proposal Call  
Kansas Wheat Commission  
Development and Use of 'Lab on a Chip' Technology to provide Varietal  
Identification of Wheat for Quality Prediction in less than 90 Seconds  
Role: PI 7/1/05 – 6/30/06  
\$49,844
34. 41858-G 10 ACS PRF G "starter grant"  
ACS-PRF  
Fabrication of Novel Sol-Gel Modified Poly(dimethylsiloxane) Microfluidic  
Devices with High Electroosmotic Mobilities and Hydrophilic Channel Wall  
Characteristics  
Role: PI 9/1/04-8/31/06  
\$35,000
35. **NIH 1R01 GM 067905-01A1**  
**NIH**  
High Throughput Measurement of Cellular Signaling  
Role: Co-PI (Ramsey PI UNC-CH) 9/01/04-8/31/08  
\$437,231 (sub only)
36. **NIH-Approved Bioengineering Research** (Culbertson co-PI) 12/03/03 – 11/30/05

	<b>NIH</b>	\$100,000
	Nanoarrays for Real-time Probing within Living Cells	
	Role: Co-PI (T.E. McKnight at ORNL is PI.)	
37.	NASA 09930-245-01 (Culbertson PI)	10/01/02-9/30/06
	USRA-NASA	\$168,000
	Biosentinels; Biology-based Microfluidic Reporter Technology for Monitoring Environmental Stressors	
	Role: PI	
38.	NASA 4000020329	12/19/02-2/28/06
	NASA	\$200,000
	Development of a Microfluidics package for a KC-135 Flight at NASA	
	Role: sub-contractor PI	