

Derek D. Bussan

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EDUCATION

MBA, Eastern Kentucky University, 2022

Ph.D., Analytical Chemistry, University of Mississippi, 2015

M.S., Inorganic Chemistry, Oklahoma State University, 2011

B.A., General Chemistry, Minor in Mathematics, University of Iowa, 2004

WORK AND PROFESSIONAL EXPERIENCE

United States Department of Agriculture – 2/23-present Research Chemistry Manager

As an expert resource overseeing the operations of the Nutritional Analytic Laboratory (NAL) and managing a laboratory budget, my role encompasses various responsibilities involving budget preparation, equipment procurement, personnel management, and research oversight.

Effectively negotiated an instrument agreement, achieving a cost reduction from 600k to 255k, thereby enhancing our laboratory infrastructure.

One of my key responsibilities is to prepare and present the lab's annual budget for each fiscal year, following Generally Accepted Accounting Principles (GAAP). This involves conducting market research and negotiating prices for both service contracts and instrumentation, particularly for large ticket items exceeding 10k. Collaborating with the center director, center scientists, lab technicians, and administrative and accounting officers from our center and regional office, I ensure that the budget aligns with the lab's operational needs and strategic objectives.

Additionally, I am actively involved in overseeing sample preparation for laboratory technicians. This includes tasks such as organic extraction, solid phase extraction, or acid digestion for analysis across a complex array of biological matrices, including food samples. By ensuring proper sample preparation techniques, I contribute to the accuracy and reliability of the laboratory's analytical results.

The laboratory is equipped with a diverse range of instruments and equipment, including:

- Three LC-MS systems (SCIEX-5500, SCIEX-6500, and a Shimadzu 8050).
- A brand new ICP-MS – Perkin Elmer Nexion 5000.
- Three Thermo Trace 1310 gas chromatography systems.
- A CEM Sprint protein analyzer, as well as the CEM percent fat and moisture analyzer, and a CEM Blade microwave for mineral digestion.

- A UV-visible spectrometer.
- Multiple -80°C freezers.
- Numerous Peak gas generators, reducing the need for purchasing gas tanks.
- Plus, many more ancillary instruments and equipment to support a wide array of laboratory activities.

In my role as a manager, I also plan and direct research studies. Serving as an investigator, I utilize both sophisticated and standard methods, applying a high degree of originality to advance scientific understanding in the field. I am responsible for developing papers and abstracts based on the data generated from methods development, providing input for manuscripts, and reviewing papers and abstracts from the analyses of studies. This involvement in the scientific community helps disseminate knowledge and contributes to the advancement of nutritional analysis methodologies.

To stay abreast of the latest analytical methodologies, I actively participate in scientific meetings and workshops. These events provide opportunities to exchange ideas with other scientists, learn about emerging techniques, and remain at the forefront of advancements in the field. This knowledge sharing enables me to implement state-of-the-art methodologies and technologies within the laboratory.

In my day-to-day operations, I utilize a range of tools and software applications. These include word processing, spreadsheets, relational databases, email, statistical software packages, and specialized instrumentation and analytical software programs such as R. Proficiency in these tools allows me to efficiently manage data, perform statistical analyses, and generate comprehensive reports.

As a manager, I outline work assignments and provide guidance on procedures and methods to be employed. I review work in progress to ensure quality and adherence to established protocols. Additionally, I identify and implement training courses that enhance the skills of lab personnel and introduce novel methods and equipment to improve the utilization of human, technical, and fiscal resources.

Another aspect of my role involves hiring and evaluating lab personnel. I conduct performance reviews, providing constructive feedback and identifying areas for improvement. By building a capable and motivated team, I foster a productive work environment that supports the lab's objectives and promotes professional growth among the staff.

In summary, as the manager overseeing the operations of the Nutritional Analytic Laboratory, my role extends beyond managing the budget and laboratory equipment. I actively contribute to research, scientific collaboration, and personnel development, ensuring the lab operates efficiently and maintains high standards of scientific excellence.

I was the corresponding author on a review paper with Rob Thomas (World Expert in ICP-OES/MS) regarding the fundamentals of ICP, accepted to Science of the Total Environment impact factor: 9.8.

Douvrin, Chris, Vaughan Trey, **Derek Bussan**, Georgios Bartzas, and Robert Thomas. "How ICP-OES changed the face of trace element analysis: Review of the global application landscape." *Science of The Total Environment* (2023): 167242.

USDA scientists routinely turn to me for guidance in developing analytical methods across a wide spectrum of sample matrices, encompassing soil, food, plasma, bone, and water. These methods are crafted to analyze a diverse array of substances, including, but not limited to, minerals, carotenoids, vitamin D, cortisol, lipids, fatty acid methyl esters, and various other analytes.

Eastern Kentucky University - Assistant Professor, Chemistry, 08/19-02/23.

- Increased enrollment beginning in 2019 from 199 students in the forensics program (FEPAC accredited) to currently 250 students, this represented in increase in revenue of \$2.0 million USD to \$2.3 million USD, during the same time period I have helped increase summer organic chemistry revenue from \$17K to currently \$136K.
- Managed and oversaw nine undergraduate research projects.
- Chaired two hiring committees and served on three other committees.
- Voted faculty senator by my fellow peers in my department.
- Over 20 external collaborators including the FDA, Valvoline and Brewing and Distilling analytical services.
- Published seven peer-reviewed articles.
- Invited to contribute to a Springer book titled "The Handbook of Environmental Chemistry, with the topic "Metal(loid)s in the Environment".
- Brought in over 20 seminar speakers including academic, industry and government speakers.
- Served as an academic advisor to over 100 chemistry and forensics students.
- Served as the Data subcommittee Chair for the Kentucky Telehealth Program.

McNeese State University - Assistant Professor, Chemistry, 08/17-08/19

- \$718,000.00 USD Equipment Enhancement Grant to update existing chemistry instrumentation. This money was used to purchase a GC-MS, ICP-MS, Tabletop NMR, LC-MS and Microlab units.
- Spearheaded the Forensic Chemistry Unit, overseeing the most popular concentration for our chemistry students, which constituted more than 50% of our chemistry program enrollment, comprising 40 students on average at the time.
- Acquired quotes and purchased instruments from various instrument manufacturers for the aforementioned instruments.
- \$5,000.00 USD Endowed Professorship award funded in 2018 and 2019.
- Served as Assistant Department Head and Instrument Manager of the Department.
- Lead one masters student thesis project.
- Involved with local industries including Phillips 66, Sasol and the Calcasieu Parishes forensics crime lab in placing students in internships and potential employment opportunities.

- Helped manage six employees as assistant department head, these duties included but not limited to creating and managing schedules, evaluating performance, providing feedback for performance and resolving employee issues and disputes.

Lancaster Eurofins/Altria (40hrs/week) 12 Month Contract

**Richmond, VA
2016 –2017**

Senior Scientist/Post Doc

- In charge of the trace metals lab at Altria (fortune 200 company).
- Managed a worldwide interlaboratory metals proficiency study in 2017 for assessing laboratory capabilities for analyzing specific trace elements in tobacco and tobacco products. Proficiency testing is an important component of a quality system and is a requirement of ISO 17025 accreditation.
- Helped create standard operating procedures for trace elements in smokeless tobacco products.
- Was able to get a 400K instrument up and running after 8 years of nonuse.
- Presented an oral poster presentation at the 71st Tobacco Science Research Conference in 2017.
- Developed and coordinated biologic, hydrologic, and environmental science projects to meet research and regulatory objectives for the Center of Tobacco Products under the FDA.
- Played a pivotal role in developing and influencing the scientific, administrative, and technical policies, standards, procedures, and instructions required for the effective direction and operation of the trace metals lab.
- Acted as the principal contact with Federal agencies, state and local government organizations, and other stakeholders, ensuring alignment and cooperation for the success of trace metals analysis in tobacco and tobacco products.

**Oak Ridge National Laboratory (40hrs/week)
Post-Doctoral Research Associate**

**Oak Ridge, TN
2015 -2016**

- Developed an analytical method that can separate transition and rare earth elements utilizing HPLC-ICP-MS.
- Presented our research findings to representatives from the Defense Threat Reduction Agency.
- Underwent radioactive worker training for radioactive waste.
- Worked with faculty members from the University of Tennessee on research projects.

PROFESSIONAL MEMBERSHIPS

- Biological Trace Element Research- 2023 – present; Member of the Editorial Board.
- American Chemical Society, 2012-present
- Journal of Distilling Science – 2021 -present; Member of the Editorial Board.
- Multidisciplinary Digital Publishing Institute – 2021-present reviewer
- American Society of Nutrition, 2023- present

AWARDS AND PUBLICATIONS

Teaching: Pinnacle Award, 2018- McNeese State University

Publications: 15 peer reviewed publications

Authors highlighted in bold are self and/or undergraduate/graduate researchers.

1. Douvris, Chris, Edward Bentil, Isaac Ayensu, Clement Osei Akoto, Isaac Kingsley Amponsah, Joseph Adu, and **Derek Bussan**. "Trace Metals in Cannabis Seized by Law Enforcement in Ghana and Multivariate Analysis to Distinguish among Different Cannabis Farms." *Toxics* 10, no. 10 (2022): 567.
2. **Burns, Rachel L., Raegan Alexander, Liliya Snaychuk**, John C. Edwards, Neil Fitzgerald, Pei Gao, Donghui Quan, Chris Douvris, Trey Vaughan, and **Derek D. Bussan**. "A fast, straightforward and inexpensive method for the authentication of Baijiu spirit samples by fluorescence spectroscopy." *Beverages* 7, no. 3 (2021): 65.
3. Douvris, Chris, Vaughan Trey, **Derek Bussan**, Georgios Bartzas, and Robert Thomas. "How ICP-OES changed the face of trace element analysis: Review of the global application landscape." *Science of The Total Environment* (2023): 167242.
4. **Bussan, Derek D., Liliya Snaychuk**, Georgios Bartzas, and Chris Douvris. "Quantification of trace elements in surgical and KN95 face masks widely used during the SARS-COVID-19 pandemic." *Science of The Total Environment* 814 (2022): 151924.
5. **Bussan, Derek D.**, Chris Douvris, and James V. Cizdziel. "Mercury methylation potentials in sediments of an ancient cypress wetland using species-specific isotope dilution GC-ICP-MS." *Molecules* 27, no. 15 (2022): 4911.
6. **Snaychuk, Liliya**, Trey Vaughan, **Zachary Ullery**, Chris Douvris, and **Derek D. Bussan**. "Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES) Analysis of Trace Metals in Cigarette Litter collected at McNeese State University in Lake Charles, LA, United States." *Methods & Objects of Chemical Analysis/Metody & Objekty Himičeskogo Analiza* 17, no. 1 (2022).
7. Douvris, Chris, Christos Lampropoulos, David Matatov, Donald J. Wink, Aleksey E. Kuznetsov, and **Derek Bussan**. "Synthesis and structural characterization of the first stable cycloheptatrienyl metal complexes bearing a CF₃ moiety. DFT investigations of structures, energetics, NBO charges, and frontier MOs of W-CF₃ and Mo-CF₃ with η^7 -C₇H₇ and η^5 -C₅H₅." *Polyhedron* 221 (2022): 115875.
8. Douvris, Chris, David Matatov, **Derek Bussan**, Christos Lampropoulos, and Donald J. Wink. "Synthesis, Characterization, and X-ray Crystallography, of the First Cyclohexadienyl Trifluoromethyl Metal Complex (η^5 -C₆H₇) Fe (CO) 2CF₃." *Molecules* 27, no. 21 (2022): 7595.
9. **Bussan, Derek, Austin Harris**, and Chris Douvris. "Monitoring of selected trace elements in sediments of heavily industrialized areas in Calcasieu Parish, Louisiana, United States by inductively coupled plasma-optical emission spectroscopy (ICP-OES)." *Microchemical Journal* 144 (2019): 51-55.

10. Materer, Nicholas F., Allen Ablett, Evgueni B. Kadossov, **Derek Bussan**, Meagan Bobo, Grit Kupgan, and Dylan Dyer. "Experimental and Computation Studies of the Reaction of Hydrogen Peroxide and Methyl Hydroperoxide on Molybdenum Hydrogen Bronze Surfaces." *Topics in Catalysis* 61 (2018): 1183-1192.
11. **Bussan, Derek D.**, Clifford A. Ochs, Colin R. Jackson, Tarun Anumol, Shane A. Snyder, and James V. Cizdziel. "Concentrations of select dissolved trace elements and anthropogenic organic compounds in the Mississippi River and major tributaries during the summer of 2012 and 2013." *Environmental monitoring and assessment* 189 (2017): 1-18.
12. **Bussan, Derek D., Ryan F. Sessums**, and James V. Cizdziel. "Activated carbon and biochar reduce mercury methylation potentials in aquatic sediments." *Bulletin of environmental contamination and toxicology* 96 (2016): 536-539.
13. Plukienė, R., A. Plukis, A. Puzas, R. Gvozdaitė, V. Barkauskas, G. Duškesas, J. V. Cizdziel, **D. Bussan**, and V. Remeikis. "Actinides input to the dose in the irradiated graphite of RBMK-1500 reactor." *Nuclear Engineering and Design* 300 (2016): 530-535.
14. **Bussan, Derek D., Ryan F. Sessums**, and James V. Cizdziel. "Direct mercury analysis in environmental solids by ICP-MS with on-line sample ashing and mercury pre-concentration using a direct mercury analyzer." *Journal of Analytical Atomic Spectrometry* 30, no. 7 (2015): 1668-1672.
15. Reidy, Lorlyn, Rachel Williams, **Derek Bussan**, Steve Brewer, and James V. Cizdziel. "Elemental fingerprinting of gypsum drywall using sector field ICP-MS and multivariate statistics." *International Journal of Environmental Analytical Chemistry* 94, no. 13 (2014): 1273-1287.

MY TIME

Spending time with my daughter and wife.

Officiating High School and College Baseball/Softball Games.

Increasing my external network via internal and external collaborations.

Reading inspiration books such as *Winning* by Jack Welch and *Water Dog* by Richard Wolters.

Visiting my family back home in Iowa.

REFERENCES:

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