

Kirk R. Jensen

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EDUCATION

Ph.D., Applied Chemistry

Colorado School of Mines, Dept. of Chemistry and Geochemistry, 2014

B.S., Chemistry

University of Northern Colorado, Dept. of Chemistry, 2005

PROFESSIONAL EXPERIENCE

Osaka University, Osaka, Japan (2015 – 2018)

Research Assistant Professor:

- Successfully developed on-site helium isotope measurement method.
- Contributed to improving imaging mass spectrometry spatial resolution using conventional techniques.
- Tested a prototype detector for an outside company.
- Completed chemometric analysis of *Pseudomonas aeruginosa* clinical samples as part of an international collaborative project.
- Mentored students and taught a short courses on chemometrics and mass spectrometry.

Invited Researcher:

- Conducted research on an on-site cortisol measurement method.
- Successfully developed a novel mass calibration method for Time-of-Flight mass spectrometry.

Kelatron Corporation, Ogden, UT (2007 – 2008)

Analytical Scientist:

- Completed daily chemical analysis of production lots.
- Led a research project to adapt a conventional chemical analysis method to a different type of instrument.

Fresenius Medical Care, Ogden, UT (2006 – 2007)

Quality Systems Technician:

- Analyzed peritoneal dialysis solution production lots for standard quality.
- Determined purity of raw materials using wet chemistry techniques and ICP-AES.

ACADEMIC RESEARCH EXPERIENCE

Undergraduate Research Program, University of Northern Colorado (2005)

- Attempted to synthesize substituted fullerene compounds for stabilization of complex boron systems.

Graduate Research, Colorado School of Mines (2008-2014)

- Published papers on multivariate statistical analysis of bacterial mass spectral data for classification purposes and wrote basic data preparation software for the study in R and Python.
- Established a direct link between fuel additives and nitro compound production during diesel combustion.
- Successfully developed a fast lateral flow detection method for *Bacillus anthracis*.
- Analyzed illicit drug cutting agents in urine and tissue samples in a collaborative project with CU medical school.

TEACHING EXPERIENCE

- Short Course: Chemometrics (2018)
- Short Course: Mass Spectrometry (2017)
- Chemistry Field Session (2013 – 2014)
- Organic Qualitative Analysis (2011 – 2014)
- Chemistry I TA with lecture experience (2009)
- Chemistry Lab I & II (2008-2009, 2013-2014)

SKILLS AND TECHNIQUES

Software and Programming:

- Statistical analysis using R and R Studio.
- Basic level Python and C++.
- Document preparation using LaTeX.
- Other scientific data analysis software such as Sigma Plot, MMass, and instrument proprietary data analysis tools.
- Linux (every day usage)

Hardware and Instrumentation:

- High performance PC assembly, maintenance, and troubleshooting.
- Fixing and maintaining scientific instrumentation; specifically mass spectrometers.
- FTIR, GC-MS, ICP-AES, AA, ESI-MS, EI-MS, MALDI-MS, MULTUM-MS.

Statistical Analysis:

- Principal component analysis.
- Linear discriminate analysis.
- SIMCA.
- K-nearest neighbor.
- Cross validation.
- Clustering techniques.
- Random forest.

Microbiology:

- BSL2 Aseptic technique.
- Bacteria plating and propagation.
- Bacteriophage propagation, storage, and separation.

LANGUAGES

- English (Native).
- Japanese: Speaking (good), reading (can read with dictionary), writing (can write with dictionary).

PUBLICATIONS

- (1) Hondo, T.; **Jensen, K.R.**; Aoki, J.; Toyoda, M. A New Approach for Accurate Mass Assignment on a Multi-Turn Time-of-Flight Mass Spectrometer. *Eur J Mass Spectrom.* **2017**, 23(6): 385.
- (2) **Jensen, K.R.**; Hondo, T.; Sumino, H.; Toyoda, M. Instrumentation and Method Development for On-Site Analysis of Helium Isotopes. *Anal Chem.* **2017**, 89(14): 7535.
- (3) Martin, N.; Lombard, M.; **Jensen, K.R.**; Kelly, P.; Pratt, T.; Traviss, N. Effect of Biodiesel Fuel on "Real-World," Nonroad, Heavy Duty Diesel Engine Particulate Matter Emission, Composition, and Cytotoxicity. *Sci Tot Environ.* **2017**, 586: 409.
- (4) Ozeki, M.; Nozaki, T.; Aoki, J.; Bamba, T.; **Jensen, K.R.**; Murakami, S.; Toyoda, M. Metabolomic Analysis of Gingival Crevicular Fluid Using Gas Chromatography/ Mass Spectrometry. *Mass Spectrom.* **2016**, 5(1): A0047.
- (5) **Jensen, K. R.**; Voorhees, K. J. Analytical Applications of Electron Monochromator Mass Spectrometry. *Mass Spectrom. Rev.* **2015**, 34(1): 24.
- (6) Cox, C.R.; **Jensen, K.R.**; Saichek, N.; and Voorhees, K.J. Strain-level Bacterial Identification and Differentiation by Fatty Acid-based Metal Oxide Laser Ionization Mass Spectrometry. *Nature Sci Rep.* **2015**, 5(10470).
- (7) Cox, C.R.; **Jensen, K.R.**; Mondesire, R.; and Voorhees, K.J. Rapid Detection and Identification of *Bacillus anthracis* by γ phage Amplification and Lateral flow Immunochromatography. *J Microbiol Methods.* **2015**, 118: 51.

- (8) Cody, R.B.; McAlpin, C.R.; Cox, C.R.; **Jensen, K.R.**; Voorhees, K.J. Identification of Bacteria by Fatty Acid Profiling with Direct Analysis in Real Time Mass Spectrometry. *Rapid Commun Mass Sp.* **2015**, 29: 2007.
- (9) **Jensen, K.R.**; Voorhees, K.J.; Dempsey, E.A.; Burton, J.; Ratcliff, M.A.; and McCormick, R.L. Production of 2,6-Di-*Tert*-Butyl-4-nitrophenol from Combustion of Diesel Fuel Antioxidant Precursors. *Energy & Fuels.* **2014**, 28(11): 7038.
- (10) Voorhees, K.J.; Saichek, N.R.; **Jensen, K.R.**; Harrington, P.B.; Cox, C.R. Comparison of Metal Oxide Catalysts for Pyrolytic MOLI-MS Bacterial Identification. *J. Anal. Appl. Pyrol.* **2014**, 113: 78.
- (11) Voorhees, K.J.; **Jensen, K.R.**; McAlpin, C.R.; Cox, C.R.; Rees, J.C.; Cody, R.; Ubukata, M. Modified MALDI MS Lipid Profiling for Identification of Bacteria. *J. Mass Spectrometry.* **2013**, 48: 850.

CONFERENCES

- (1) **Jensen, K.R.**; Hondo, T.; Kawai, Y.; Sumino, H.; Toyoda, M. High-Resolution Helium and Argon Isotope Analysis by Ion Counting in a Small, Multi-Turn Time-of-Flight Mass Spectrometer. *Proceedings of the 65th ASMS Conference on Mass Spectrometry and Allied Topics.* Indianapolis, Indiana. June 4 – 8, **2017**. American Society of Mass Spectrometry. Oral presentation.
- (2) **Jensen, K.R.**; Sumino, H.; Hondo T.; Toyoda, M. Method Development and Evaluation of the infiTOF Time-of-Flight Mass Spectrometer for On-Site Helium Isotope Analysis. *Proceedings of the 1st JpGU-AGU Joint Meeting.* Chiba, Japan, May 20 – 24, **2017**. Japan Geoscience Union. Oral presentation.
- (3) **Jensen, K.R.**; Sumino, H.; Hondo T.; Toyoda, M. Instrumentation and Method Development of On-Site Analysis Using a Multi-Turn Time-of-Flight Mass Spectrometer. *Proceedings of the 65th Annual Conference on Mass Spectrometry, Japan.* Tsukuba, Japan, May 17 – 19, **2017**. Mass Spectrometry Society of Japan. Oral presentation.
- (4) Cox, C.R.; **Jensen, K.R.**; Saichek, N.R.; and Voorhees, K.J. Strain-level Bacterial ID by CeO₂-catalyzed MALDI-TOF MS Lipid Profiling and Comparison to Protein-based Methods. 54th Interscience Conference on Antimicrobial Agents and Chemotherapy. Washington, D.C., Sept. 5-9, **2014**. American Society for Microbiology. Poster.
- (5) **Jensen, K.R.**; McAlpin, C.R.; Cox, C.R.; Cody, R.B.; Rees, J.C.; and Voorhees, K.J. Modified MALDI MS Fatty Acid Profiling for Bacterial Identification. 61st Conference of Mass Spectrometry and Allied Topics. Minneapolis, MN, June 9-13, **2013**. American Society for Mass Spectrometry. Poster.

(6)**Jensen, K.R.**; McCormick, R.L.; Traviss, N.; Ratcliff, M.A.; Voorhees, K.J.
23rd Rocky Mountain Regional Meeting of the American Chemical
Society, Westminster, CO, United States, October 17-20; American
Chemical Society, 2012; p. RMRM-172. Oral presentation.

MEMBERSHIPS

- American Chemical Society
- American Society of Mass Spectrometry
- National Society of Collegiate Scholars
- Japan Geoscience Union
- Mass Spectrometry Society of Japan
- Shorinji Kempo

REFERENCES

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