

Karl Oetjen

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Education:

PhD. in Hydrologic Science and Engineering at Colorado School of Mines, 2018 (Anticipated)

- Organic chemistry and mass spectrometry focus

M.S. in Environmental Engineering and Science at Syracuse University, L.C. Smith College of Engineering,
May 2014

B.S. in Geology / B.S. in Environmental Science at Plattsburgh State University, May 2012, Cum Laude

Skills:

- Analytical chemistry (LC-QToF-MS, GC-MS/MS, LC-MS/MS, GC-MS, LC-MS, IC, ICP, etc.)
- Surface/Groundwater analysis (modeling, slug test, tracer studies, stream gauging etc.)
- Molecular biology techniques (PCR, DNA and RNA extraction/quantification, SAGE microarrays etc.)
- GC/LC and MS maintenance (AB Sciex, Thermo Fisher Scientific, Perkin Elmer, Agilent)
- Surface/Groundwater analysis (tracer studies, stream gauging etc.) and GIS/Remote sensing
- Data analysis using R and MATLAB

Environmental Experience:

Graduate Research Fellow, Colorado School of Mines, Golden CO, August 2015- current

- Implemented non-target/suspect/target analysis on complex aqueous samples using LC-QToF-MS and GC-MS/MS
- Quantified traditional and emerging contaminants including pesticides and pharmaceuticals using LC-MS/MS and GC-MS/MS
- Analyzed water, soil, and other matrices for biological and chemical transformation products
- Screened HRMS data for isotope patterns, homologous series, etc. using R
- Managed four undergraduate researchers

Graduate Research Fellow, Syracuse University, Syracuse NY, September 2012 – July 2015

- Analyzed groundwater samples for trace organics using GC/HPLC-MS
- Performed Semi-VOC and VOC extractions
- Responsible for method development, sampling plans and, QAQC
- Managed five undergraduate researchers

Project Monitor/Air Sample and Soil Technician, Atlantic Testing Laboratories, Highland, NY

May 2012- January 2013

- Guaranteed projects were finished on time and honored contractual agreements
- Hazardous materials management/Air Sampling
- Kept detailed legal documents and log books

Water Quality Field Technician/Lab Assistant, The Research Foundation of SUNY, Plattsburgh, NY

June 2011- May 2012

- Collected water samples/Performed stream gauging
- Measured trace ion/organic compound levels
- Composed rating curves and hydrographs/Ran statistical analyses

Geochronological Lab Assistant, The Research Foundation of SUNY, Plattsburgh, NY, June 2011-May 2012

- Performed Apatite separation/fission track dating
- Prepared professional mineral thin sections
- Maintained lab equipment (Thin section saws, Gemini separator, Frantz Magnetic separator, Crushers/Pulverizers)

Field Assistant, University of California Long Beach Research Project, Altona, NY August – October 2011

- Monitored distributed temperature sensing equipment

Teaching Experience:

Teaching Assistant, Colorado School of Mines, Golden CO, August 2015-December 2015

- Instructed mechanical engineering laboratory
- Demonstrated the key fundamentals of fluids and structure mechanics
- Accountable for maintaining laboratory equipment

Teaching Assistant, Syracuse University, Syracuse NY, August 2013 – May 2014

- Instructed environmental engineering recitation
- Assisted students with understanding important environmental concepts
- Responsible for the grading of exams and assignments

Publications:

Oetjen, K., Chan K., Gulmark, K., Christensen, J., Blotevogel, J., Borch, T., Spear, J., Cath, T., and Higgins, C.P.

“Temporal Characterization and Statistical Analysis of Flowback and Produced Waters and Their Potential for Reuse” *Science of the Total Environment* - 2017 (accepted)

Oetjen, K., Giddings, C.G., McLaughlin, M., Nell, M., Blotevogel, J., Helbling, D.E., Mueller, D. and Higgins, C.P.,

“Emerging analytical methods for the characterization and quantification of organic contaminants in flowback and produced water.” *Trends in Environmental Analytical Chemistry*, 15, (2017): 12-23.

Barzen-Hanson, K.A., Roberts, S.C., Choyke, S.J., **Oetjen, K.**, McAlees, A., Riddell, N., McCrindle, R., Ferguson, P.L., Higgins, C.P. and Field, J.A., 2017. "Discovery of 40 classes of per- and polyfluoroalkyl substances in historical aqueous film-forming foams (AFFFs) and AFFF-impacted groundwater." *Environmental Science & Technology* (2017).

Oetjen, K., and Thomas, L. "Volatile and semi-volatile organic compound patterns in flowback waters from fracturing sites within the Marcellus Shale." *Environmental Earth Sciences* 75.12 (2016): 1-10.

Oetjen K., "Evaluation of Volatile and Semi-Volatile Organic Compounds Potentially Associated with the Gas Shale Fracturing Process in the Fayetteville and Marcellus Shale" (2014). *Theses - ALL*. Paper 57.

Oetjen K., Kranitz R, Zimmermann T, Fuller R, Franzi D. “Spatial and Temporal Variability of Anion Concentrations and Suspended Solids in the Little Chazy River, Northeastern New York.” *GSA Today Northeastern Section*. Paper No: 48-7. (2012)

Presentations:

- WE²ST Research Symposium – Golden, CO April, 2017 (Poster)
 - “Temporal Characterization of Produced Waters throughout the Flowback Process”
- Annual Meeting of Analytical Forum Water Contaminants- Freising, Germany April, 2017 (Oral)
 - “Application of Non-Target Analysis on Oil and Gas Waters Using LC-HRMS”
- 254th American Chemical Society National Meeting & Exposition – San Francisco April, 2017 (Oral)
 - “Nontarget Analysis of Hydraulic Fracturing Flowback Waters Throughout the Fracturing Process Using LC-QToF-MS”
- Geological Society of America Annual Meeting – Denver, CO September, 2016 (Poster)
 - “Organic Compound Characterization of Hydraulic Fracturing Flowback Waters Throughout the Fracturing Process”
- 2016 Shale Network Workshop – State College, PA May, 2016 (Oral)
 - “Synthetic Organic Compound Characterization of Hydraulic Fracturing Flowback Waters by LC-QToF-MS”
- WE²ST Research Symposium – Golden, CO April, 2016 (Poster)
 - “Synthetic Organic Compound Characterization of Hydraulic Fracturing Flowback Waters by LC-QToF-MS”
- SETAC Hydraulic Fracturing Workshop – Denton, TX March, 2016 (Poster)
 - “Synthetic Organic Compound Characterization of Hydraulic Fracturing Flowback Waters by LC-QToF-MS”

- 2015 NSF Hydraulic Fracture Workshop – Little Rock, AR April, 2015 (Poster)
 - *“Volatile and Semi-Volatile Organic Compound Trends in Flowback Waters from the Marcellus Shale*
- Gas and Fuels Research Initiative Shale Gas Monetization – Houston, TX March, 2014 (Poster)
 - *“Evaluation of Volatile and Semi-Volatile Organic Compounds Associated with the Gas Shale Fracturing Process in the Fayetteville and Marcellus Shale”*
- Syracuse Center of Excellence Annual Research Competition – Syracuse, NY October, 2013 (Poster)
 - *“Evaluation of Hydrocarbons in Groundwater Wells Near Gas Shale Fracturing Sites in North-Central, Arkansas”*
- North-Central Geological Society of America Conference – Hartford, CT March, 2012 (Poster)
 - *“Spatial and Temporal Variability of Anion Concentrations and Suspended Solids in the Little Chazy River, Northeastern New York”*

Committees:

ASTM committee D19.09 on Water – Hydraulic Fracturing Fluids

- The goal of the committee is to develop standards used for assessing water quality of flowback water for the re-use and reinjection of hydraulic fracturing fluids

Awards:

- American Chemical Society Certificate of Merit (2017)
- 1st Place ConocoPhillips WE²ST Research Symposium Competition (2017)
- ConocoPhillips WE²ST Fellowship (2015)
- Water Initiative Fellowship (2014)
- NSF Travel Grant (2014)
- 3rd Place Syracuse Center of Excellence Annual Research Competition Masters level (2013)
- Outstanding Graduating Student in Geology (2012)
- Cum Laude (2012)

Professional Outreach (Most Recent):

- Deer Creek Middle School (2017) – Girls in STEM after school club
- Wheat Ridge High School Capstone Project (2017) – Served as a judge for the senior capstone project
- Shelton 6th grade Geology Laboratory (2017) – Science mentor
- Wheat Ridge High School Capstone Project (2016) – Served as a judge for the senior capstone project
- Mentored Middle School Student (2016)– Assisted in designing a science fair project for the state science fair (He won the science fair state championship in CO and came in 2nd in the Broadcom MASTERS competition)
- Shelton 6th grade Geology Field Trip (2016) – Took students on a geology tour of Golden, CO
- Shelton 6th grade Geology Laboratory (2016) – Familiarized students with geologic concepts
- Shelton Elementary Math and Science Night (2015) – Presented “fun” chemistry to elementary students
- Science and Technology Entry High school Outreach Program (2014) – Introduced high school students to STEM
- Donofrio’s Scholars Program (2013-14) – Mentored undergraduate students in the laboratory

Computer Skills - ArcGIS 10.1, Chromeleon, ChromStation, SigmaPlot 12.5, SPSS, MATLAB, TotalChrom, MODFLOW, AQUIFLOW, HEC-RAS, R, MATLAB, SWIMM, Analyst, Multiquant, Masterview, Peakview, MassHunter

Certifications- Asbestos Project Monitor, Air Sampling Technician, Portable Nuclear Gauge, HAZMAT, OSHA 10

Memberships- ASTM Inter., Geological Society of America, Shale Network, Environmental Systems Research Institute, SETAC, ACS