Kenneth Brezinski

Environmental Researcher

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Work and Research Experience

Treatment Designer, Water & Wastewater *WSP Canada*, Winnipeg, Canada

05/23 - present

- Work with the Water & Wastewater Group on developing water and wastewater solutions for the prairie region of Canada
- Carrying out water treatment plant assessments, investigations, and process design & system optimization

Investigate ion-exchange as an effective treatment for Trihalomethane and DOC reduction using high performance size exclusion chromatography

University of Manitoba

- Investigated the correlation between trihalomethane formation potential and multi-wavelength absorbance spectra using high-performance size exclusion chromatography
- Collected samples and measured various water quality parameters from 7 Manitoba surface waters of varying levels of TOC, Alkalinity and SUVA; conducted ion-exchange jar tests to compare removal based on resin type and dosage
- Applied numerical methods and statistical analysis using MatLab in order to predict and model the correlation between 3D spectra and trihalomethane formation, TOC and SUVA
- Disseminated the research findings through 2 publications published in peer-reviewed periodicals and 1 master thesis

Evaluation of a pilot scale Nanofiltration and Ion-Exchange contactor for the Waterhen, Manitoba water treatment plant

University of Manitoba in tandem with KGS Group

- Optimized hydraulic and operational parameters for a custom built nanofiltration and ion-exchange unit for seasonal operations. Included weeklong trips to target site for extended pilot testing lasting several days
- Reduced DOC levels (<0.04mg/L), trihalomethanes (<0.014mg/L) and haloacetic acids (<0.04mg/L) following ion-exchange treatment tested with four resins with several flowthrough rates and regeneration cycles
- Consulted with operators, engineers, and municipal officials to coordinate the needs for all parties towards the implementation of a potential new upgrade
- Submitted a technical report to KGS. Group and to Manitoba Aboriginal and Northern Affairs

Design of an Ion-Exchange contactor for Trihalomethane reduction for the Rainy River, Ontario water treatment plant

University of Manitoba in tandem with KGS Group (Project Link)

- Tested and evaluated equivalent exchange, contact time, regeneration cycles, and breakthrough profiles for the sorption of dissolved organic carbon on a series of ion-exchange resins for the removal of trihalomethanes and haloacetic acids
- Reduced trihalomethanes to <0.06 mg/L and haloacetic acids <0.05mg/L as per Ontario regulations with additional 95% DOC removal
- Project deliverables led to a full-scale implementation of an ion-exchange contactor constructed in August 2016; as well as 1 publication in a peer-reviewed periodical
- Project was awarded the Excellence in Municipal and Water Technology given by the Association of Consulting Engineering Companies of Manitoba, on April 18th

Technical Skills

Computer Skills	Python, Matlab, LaTeX, M365 suite. Deep expertise in high dimensionality modeling and machine learning techniques to classify and predict future outcomes.
Laboratory and Instrumental	Advanced knowledge and experience in analytical laboratory practices, including compliance standards and quality control. Demonstrated experience with conducting jar tests, handling and analyzing samples, conducting tests (including but not limited to titrations, filtration, pH measurements, and the use of reagents and standards). Operational and method development knowledge of various instruments including HPLC, GC-MS, FAAS/FAES, GFAAS, FIA, TOC/TN/TC Analyzer using Oxidation/Combustion methods. Operational knowledge with UV-VIS, Fluorometry, FTIR, HACH test kits

Education

since 08/18 **Doctor of Philosophy,** *University of Manitoba*, Winnipeg, MB.
Electrical and Computer Engineering

01/16-09/18 **Master of Science,** *University of Manitoba*, Winnipeg, MB.
Civil Engineering

08/10-08/15 **Bachelor of Science,** *University of Winnipeg*, Winnipeg, MB.
Chemistry

Committees and Positions

05/17 – present Reviewer for the Journal of Desalination and Water Treatment

11/17 – present Reviewer for the Journal of Journal of Water Science and Technology

Selected Publications

Mehrnaz Sadrnourmohamadi**, Ken Brezinski**, Beata Gorczyca, "Ozonation of natural organic matter and aquatic humic substances: the effects of ozone on the structural characteristics and subsequent trihalomethane formation potential**",** *Water Quality Research Journal of Canada, 2020*

Ken Brezinski, Beata Gorczyca, "Multi-spectral characterization of natural organic matter (NOM) from Manitoba surface waters using high performance size exclusion chromatography (HPSEC)", *Chemosphere, 2019*

Ken Brezinski, Beata Gorczyca, "An overview of the uses of high-performance size exclusion chromatography (HPSEC) in the characterization of natural organic matter (NOM) in potable water, and ion-exchange applications", *Chemosphere, 2018*

Ken Brezinski, Mehrnaz Sadrnourmohamadi, Beata Gorczyca, "Ion-Exchange for Trihalomethane control in potable water treatment – A municipal water treatment case study in Rainy River, Ontario, Canada", *Water Quality Research Journal of Canada, 2018*

Lisa D. Winning, Beata Gorczyca, **Ken Brezinski**, "Effect of Total Organic Carbon and Aquatic Humic Substances on the Occurrence of Lead at the Tap", *Water Quality Research Journal of Canada, 2017*

For a full list of my refereed works, please visit by personal ResearchGate or my personal website.