# Philip D. Bulsink B.Sc., M.Sc.


CONTACT INFORMATION

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SUMMARY

Analytical Chemist with a passion for problem-solving and a proven ability to leverage computational tools (R, VBA, Python) to develop novel solutions. Thrives in fast-paced environments, excelling at independent learning and driving innovative research efforts.


EDUCATION

**University of Ottawa**
*Master's Degree* **2015**

- Thesis: "*Rhenium (I) Terdentate Compounds: Theoretical and Experimental Investigations*"
- Seminar: "*Recent Advances in $NO_x$ Abatement from Diesel Engine Emissions*"
- Tasks: Synthesis & characterization of ligands and catalysts with novel photochemical properties. In-depth mechanism studies with various computational packages. Developed software in Python to simplify & accelerate research.
- Supervisors: Dr. Tom Woo and Dr. Darrin Richeson

**University of Waterloo**
*Bachelor of Science, Honour's Chemistry, Co-op, Music Minor* **2012**

- Honour's Thesis: "*Solid Sample Analysis by Microplasma Optical Emission Spectroscopy*"

PROFESSIONAL EXPERIENCE

**Characterization Laboratory, CanmetENERGY, Natural Resources Canada** Ottawa
*Fuels Chemist* **2014 – Present**

- Pioneered advanced analytical methods using FTIR, HPLC, GC-MS, and GCxGC to unlock new insights from solid, liquid, and gaseous samples.
- Cultivated strong client relationships by providing expert analysis recommendations and cost-effective experimental design.
- Championed data quality by overseeing all liquid and gaseous sample analysis, personally verifying all reported data, and certifying as ISO 17025 internal auditor through CALA.
- Represented the laboratory, department, and Canadian scientific interests at internal and external client meetings, as well as national and international committees.
- Spearheaded international round-robin studies of Bio-Liquefaction oils, fostering collaboration and advancing scientific understanding of analytical methods.
- Contributed to research funding proposals, strengthening experimental design and improving project outcomes.
- Led analytical components (including method development) of projects related to carbonyl quantification, aqueous phase reforming, bioslurries, bio-char surface characterization, GCxGC for functional group typing, and FTIR chemometrics.
- Actively participating in Emergency Response and Building Emergency and Evacuation teams.

**University of Ottawa, University of Waterloo** Ontario
*Laboratory Teaching Assistant* **September 2011 – May 2014**

- Supervised undergraduate labs in General, Organic, Inorganic, Analytical, and Physical Chemistry, demonstrating techniques, explaining theoretical concepts, and ensuring safe and accurate experiment execution.

**CanmetENERGY, Natural Resources Canada** Ottawa
*Research Assistant - $DeNO_x$ Group* **May 2010 – August 2011 (12 months total)**

- Investigated homogeneous catalysts for the reduction of $NO_x$ in lean-burn diesel engine exhaust.
- Scaled catalyst synthesis processes by 3 orders of magnitude.
- Custom-built instrumentation and software to support studies.

## Honours and Distinctions

Excellence in Science - Departmental Achievement Award, Natural Resources Canada **2023**

Positive Workplace Impact - Energy Efficiency & Technology Sector Award, Natural Resources Canada **2022**

Innovation & Creativity - CanmetENERGY-Ottawa Award, Natural Resources Canada **2021**

Dean's Scholarship, University of Ottawa **2015**

Dean's Honour Roll, University of Waterloo, University of Ottawa **2011 – 2014**

Graduate Student Poster Award, CSC Inorganic Division Poster Symposium, Quebec City **2013**

Recognition of Collaboration - Departmental Achievement Award, Natural Resources Canada **2012**

Aileen Proudfoot Award, CanmetENERGY, Natural Resources Canada **2011**

Outstanding Co-op ranking, University of Waterloo **2009 – 2012**

## Selected Publications, Works & Presentations

Bulsink, P., and Makanda, U., "PlotFTIR: Production of FTIR spectra plots in R", *Pending S&T Pubs Process*

Bulsink, P., Sant-Anna, S., Giddings, T., "Quantification of components without direct calibration by GC-MS/PolyArc®-FID" *American Chemical Society Conference*, **2023**

Bulsink, P., "Results of the IEA Bioenergy Round Robin on the Analysis of Heteroatoms in Biomass Liquefaction Oils" *CanmetENERGY-Ottawa Science Seminar*, **2020**

Bulsink, P., de Miguel Mercader, F,. Sandström, L., Van De Beld, B., Preto, F., Zacher, A., Oasmaa, A., Dahmen, N., Funke, A., Bronson, B. "Results of the International Energy Agency Bioenergy Round Robin on the Analysis of Heteroatoms in Biomass Liquefaction Oils", *Energy & Fuels*, 34, 9, pp. 11123–11133, **2020**. 10.1021/acs.energyfuels.0c02090

Bulsink, P., Al-Ghamdi, A., Joshi, P., Korobkov, I., Woo, T., Richeson, D. "Capturing Re(I) in a neutral N,N,N pincer scaffold and resulting enhanced absorption of visible light", *Dalton Trans.*, 45, pp. 8885–8896, **2016**. 10.1039/C6DT00661B

Bulsink, P. "Transforming the Chemistry of Rhenium (I): Physical and Theoretical Investigations", *University of Ottawa Thesis*, **2015**. 10.20381/ruor-2762

Stanciulescu, M., Bulsink, P., Caravaggio, G., Nossova, L., Burich, R. "$NH_3$-TPD-MS study of Ce effect on the surface of Mn- or Fe-exchanged zeolites for selective catalytic reduction of NOx by ammonia", *App. Surface Sci.*, 300, pp. 201–207, **2014**. 10.1016/j.apsusc.2014.01.175

Richeson, D., Woo, T., Bulsink, P., Joshi, P., Jurca, T., Korobkov, I. "Expanding the coordination geometry and enhancing the photophysical features of Re (I) with redox non-innocent pincer ligands", *American Chemical Society Conference*, **2014**.

Bulsink, P., Korobkov, I., Woo, T., Richeson, D. "Transforming the chemistry of $Re^{I}$ to access the elusive pincer geometry", *CSC Inorganic Division Poster Symposium*, **2013**.

Stanciulescu, M., Caravaggio, G., Dobri, A., Moir, J,. Burich, R., Charland, J.-P., Bulsink, P. "Low-temperature selective catalytic reduction of $NO_x$ with $NH_3$ over Mn-containing catalysts", *App. Catal. B: Env.*, 123–124, pp. 229–240, **2012**. 10.1016/j.apcatb.2012.04.012

Caravaggio, G., Stanciulescu, M., Burich, R., Scheier, B., Bulsink, P. "Novel Catalysts for $NO_x$ Reduction with Reductants Produced In-Situ", *DEER Conference*, **2010**.

## Activities

**f1dataR Package**
*Author & Maintainer* **2022 – Present**

- Developed and maintain an R package that simplifies accessing Formula 1 data, leveraging a Python library
- Responded to user and custodian feedback by addressing CRAN (Comprehensive R Archive Network) demands and handling issues raised on GitHub.

**BulsinkBot**
*Designer & Programmer* **2018 – Present**

- Developed and deployed predictive models for NHL hockey game, season, and playoff outcomes, achieving top-5 ranking in accuracy against professional and amateur models (2019-present).
- Leveraged data analysis to generate daily NHL predictions shared via social media platforms (Twitter, Mastodon, and BlueSky).
- Provided expert NHL predictions for dailyfaceoff.com for two seasons (2021–2022 and 2022–2023).

**Emergency Response Team - CanmetENERGY, Natural Resources Canada**
*Team Member & Incident Commander* **2015 – Present**

- Comprehensively trained in emergency medical and chemical response procedures, including first aid, burn response, trauma/wound care, and HAZMAT operations.
- Acted as backup dispatch, incident commander, and maintained annual SCBA recertification.

## Affiliations

American Chemical Society (ACS), member 2019 – Present

ASTM International, individual member 2024 – Present