

Email: [YaldahAzimi@cunet.carleton.ca](mailto:YaldahAzimi@cunet.carleton.ca)**EDUCATION**

<b>Ph.D., Department of Chemical Engineering and Applied Chemistry, University of Toronto</b> Thesis Title: The Effect of Physicochemical Properties of Secondary Treated Wastewater on UV Disinfection	<b>2013</b>
<b>M.A.Sc., Department of Chemical Engineering and Applied Chemistry, University of Toronto</b> Thesis Title: Investigation of Coat Weight Distribution & its Influence on Roughness Changes During Printing of Paper	<b>2008</b>
<b>B.A.Sc., Department of Chemical Engineering, Sharif University of Technology</b> Thesis Title: Methods of Sweetening Sour Gas (Removal of H <sub>2</sub> S) and Designing a Bioreactor for Removing H <sub>2</sub> S from Natural Gas	<b>2006</b>

**RESEARCH EXPERIENCE**

<b>Postdoctoral Research Fellow, University of Toronto</b> <b>Supervisors – Dr. D. Grant Allen &amp; Dr. J. Stewart Aitchison</b> <i>Department of Chemical Engineering &amp; Department of Electrical and Computer Engineering</i> <ul style="list-style-type: none"> <li>• Developed probability distribution models to demonstrate the behavior of suspended biomass vs. biofilms of various shapes and densities when interacting with light.</li> <li>• Applied optics/photonics principles through ray-tracing simulation and modelling to obtain light distribution profiles for various algae biofilm photobioreactor/waveguide designs.</li> <li>• Collaborated on designing a photobioreactor for resource recovery from wastewater, incorporating membranes for CO<sub>2</sub> delivery to microalgae biofilm based on modelling results.</li> <li>• Investigated the effects of select fruit waste enzymes in enhancing wastewater sludge dewatering and hydrolysis for enhancing biogas production in anaerobic digestion of municipal and industrial sludge.</li> </ul>	<b>2016 - 17</b>
<b>Postdoctoral Research Fellow, University of Oxford</b> <b>Supervisor – Dr. Ian Thompson</b> <i>Department of Engineering Science</i> <ul style="list-style-type: none"> <li>• Invented a novel physicochemical filtration process to inhibit biodegradation of metal working lubricants, through capturing phosphorus and inducing nutrient (C:N:P) imbalance. Identified physical and biological process combinations for treating wastewaters produced from spent metal working lubricants.</li> <li>• Applied whole-cell biosensors to determine the environmental toxicity of nanoparticles targeted as replacement for biocides in metalworking fluids wastewater.</li> <li>• Developed a metalworking fluid formulation with high resistance to microbial degradation in collaboration with BP Castrol.</li> <li>• Established a novel non-destructive physical method using UV treatment to distinguish biosorption from metabolic removal of select contaminants by biofilms.</li> <li>• Collaborated with Thames Water (UK) on the application of hydroponic plant bed systems in removing <i>Microcystis</i> from drinking water reservoirs and controlling algal blooms.</li> </ul>	<b>2014 - 15</b>

<p><b>Intern Research Engineer, National Water Research Institute (NWRI), Environment Canada</b>  <b>Supervisor – Dr. Peter Seto</b>  <i>Wastewater Technology Centre (WTC)</i></p> <ul style="list-style-type: none"> <li>• Designed, assembled and operated pilot-scale biological wastewater treatment systems, using real wastewater under 10 different process conditions and evaluated sludge particle properties under each condition.</li> <li>• Assessed the impact of process conditions on wastewater sludge flocs' chemical composition, structural stability, size, shape and ultraviolet (UV) disinfection kinetics.</li> <li>• Identified key process parameters that influence final effluent quality and UV disinfection energy demands in municipal wastewater treatment for reuse applications.</li> <li>• Studied the impacts of sludge retention time, temperature, and influent phosphorous levels on sludge settling properties, effluent quality, and UV disinfection efficiency.</li> <li>• Compared a biological nutrient removal system with a conventional wastewater treatment system in terms of effluent quality, UV disinfection and sludge properties.</li> <li>• Initiated and managed collaborative research with other research staff, leading to joint publications.</li> </ul>	<b>2010 - 13</b>
<p><b>Doctoral Candidate, University of Toronto</b>  <b>Supervisors – Dr. Ramin Farnood, Dr. D. Grant Allen</b>  <b>Examiner – Dr. Wayne Parker (University of Waterloo)</b>  <i>Department of Chemical Engineering &amp; Applied Chemistry</i></p> <ul style="list-style-type: none"> <li>• Discovered a novel naturally-occurring photoactive agent for advanced oxidation and disinfection embedded in phosphorus accumulating organisms in wastewater treatment.</li> <li>• Developed combined UV/advanced oxidation mathematical models for predicting the UV disinfection kinetics of microbial aggregates in the presence of an embedded photoactive chemical</li> <li>• Theorized conceptual and mathematical models for the UV disinfection of wastewater flocs and identified the sources of UV resistance.</li> <li>• Identified key process parameters that influence final effluent quality and UV disinfection energy demands in municipal wastewater treatment for reuse applications.</li> <li>• Assessed the effects of wastewater biological treatment process conditions on microbial floc chemical composition, structural stability, size, shape and UV disinfection kinetics.</li> </ul>	<b>2009 - 13</b>
<p><b>M.A.Sc Candidate, University of Toronto</b>  <b>Supervisors – Dr. Ramin Farnood, Dr. Mark Kortschot</b>  <i>Department of Chemical Engineering &amp; Applied Chemistry</i></p> <ul style="list-style-type: none"> <li>• Developed a non-destructive method using X-ray tomography for determining coating coverage and weight distribution on paper substrates.</li> <li>• Developed and applied a variety of image analysis techniques using Matlab for correlating topographic distortions during printing to the local coating material distribution (pixel-by-pixel comparison).</li> </ul>	<b>2006 - 08</b>

## INDUSTRY EXPERIENCE

<p><b>Process Optimization and Technical Services Program Manager (Wastewater)</b>  <b>Ontario Clean Water Agency (OCWA)</b></p> <ul style="list-style-type: none"> <li>• Lead the planning and delivery of OCWA wastewater treatment process optimization and upgrades projects (over 40 projects to date- a Select list of projects provided at end of CV).</li> <li>• Provide engineering, process and operational guidance to troubleshoot process and compliance issues at wastewater treatment facilities across Ontario.</li> <li>• Lead comprehensive performance evaluations and operational analysis regarding the design of wastewater treatment plants to support environmental compliance and process optimization.</li> <li>• Conduct comprehensive performance evaluations and operations analysis on the design of wastewater treatment plants to optimize process, support capital projects and improve environmental compliance.</li> <li>• Compiling and writing cases on disconnects between engineering and operations leading to poor design and process challenges. This material will be published as a book.</li> </ul>	<p><b>2021 - Present</b></p>
<p><b>Water and Wastewater Process Engineer</b>  <b>CH2M-Jacobs, Toronto, Canada</b></p> <ul style="list-style-type: none"> <li>• Engineered and designed wastewater treatment plant upgrades and expansions for process intensification, improving resource recovery, replacing old infrastructure or accommodating new growth to meet new or existing regulatory discharge requirements (List of projects provided at end of CV).</li> <li>• Lead and managed multidisciplinary design for solids and liquids treatment retrofits and facility expansion or implementation of new processes at wastewater treatment facilities.</li> <li>• Conducted full process analysis and life cycle assessment for plant expansion/retrofit scenarios and developed biological models for wastewater and solids treatment alternatives.</li> <li>• Evaluated the application of smart city technologies and artificial intelligence in water and wastewater conveyance and treatment in Canadian cities.</li> <li>• Provided technical advice and participated in proposal writing.</li> </ul>	<p><b>2017 - 20</b></p>
<p><b>Process Engineer Intern</b>  <b>Pars Oil and Gas Company (POGC)</b>  <i>Furfural Extraction Unit</i></p> <ul style="list-style-type: none"> <li>• Verified heat transfer and fluid dynamics calculations on Furfural refining unit.</li> <li>• Developed Process Flow Diagrams (PFDs) for Furfural Refining unit</li> </ul>	<p><b>Jun-Sep 2005</b></p>

## INVENTION DISCLOSURE

“Novel Photocatalyst for Disinfection / Advanced Oxidation”, **Azimi. Y.**, Farnood. R., Allen. D. G., Document # 10002579, Confidential Intellectual Property Center at the University of Toronto.

## LIST OF PUBLICATIONS ([Google Scholar Profile](#))

### Published Journal Articles

- 15- Castro-Castellon. A., Hughs. J., Read. D, **Azimi. Y.**, Chipps. M., Hankins. N. **2021**. The Role of Rhizofiltration and Allelopathy on the Removal of Cyanobacteria in a Continuous Flow System. *Environmental Science and Pollution Research*, 28, pp. 27731-27741. [DOI:10.1007/s11356-021-12343-9](https://doi.org/10.1007/s11356-021-12343-9).
- 14- Arabi. S., Pellegrin. M., ..., **Azimi. Y.**, Dow. A., Tootchi. L., Kinser. K., Kaushik. V., Saldanha. V. **2020**. Membrane Processes. *Water Environment Research*, 92 (10), pp. 1447-1498. [DOI:1002/WER.1385](https://doi.org/10.1002/WER.1385).
- 13- Salmean. C., Bonilla. S., **Azimi. Y.**, Aitchison. J. S., Allen. D. G, **2019**. Design and Testing of an Externally-coupled Planar Waveguide Photobioreactor. *Algal Research*, 44, Dec 2019. [DOI:10.1016/j.algal.2019.101684](https://doi.org/10.1016/j.algal.2019.101684).
- 12- Zhuang. L.-L., **Azimi. Y.**, Wu. Y.-H., Hu. H. -Y., **2018**. Effects of Nitrogen and Phosphorus Concentrations on the Growth of Microalgae Scenedesmus. LX1 in Suspended-Solid Phase Photobioreactors (ssPBR). *Biomass and Bioenergy*, 109, pp.47-53. [DOI:10.1016/j.biombioe.2017.12.017](https://doi.org/10.1016/j.biombioe.2017.12.017).
- 11- **Azimi. Y.**, Liu. Y., Tan. T. C., Allen. D. G., Farnood. R., **2017**. The Tail of Two Models: Impact of Circularity and Density Distribution on UV Disinfection of Wastewater Floccs. *Water Research*, 126, pp. 70-78. [DOI: 10.1016/j.watres.2017.09.011](https://doi.org/10.1016/j.watres.2017.09.011).
- 10- **Azimi. Y.**, Thompson. I. P., **2017**. Phosphorus Depletion as a Green Alternative to Biocides for Controlling Biodegradation of Metal Working Fluids. *Environmental Science and Technology*, 51(10), pp. 5695-5702. [DOI: 10.1021/acs.est.7b00317](https://doi.org/10.1021/acs.est.7b00317).
- 9- Tan. T. C., **Azimi. Y.**, Farnood. R., **2017**. Propensity of Tailing in UV Disinfection for Suspended Growth and Trickling Filter Wastewater Treatment Processes. *Water Science and Technology*, 76 (3), pp. 623-632. [DOI: 10.2166/wst.2017.242](https://doi.org/10.2166/wst.2017.242).
- 8- Zhuang. L.-L. **Azimi. Y.**, Wang. W.-L., Wu. Y.-H., Dao. G. -H, Hu. H.-Y., **2016**. Enhanced Attached Growth of Microalgae *Scenedesmus*. LX1 through Ambient Bacterial Pre-coating of Cotton Fiber Carriers. *Bioresource Technology*, 218, pp. 643-649. [DOI: 10.1016/j.biortech.2016.07.013](https://doi.org/10.1016/j.biortech.2016.07.013).
- 7- Adapa. L. M., **Azimi. Y.**, Singh. S., Porcelli. D., Thompson. I., **2016**. Comparative Study of Chemical and Physical Methods for Distinguishing between Passive and Metabolically Active Mechanisms of Water Contaminant Removal by Biofilms. *Water Research*, 101, pp. 574-581. [DOI: 10.1016/j.watres.2016.06.015](https://doi.org/10.1016/j.watres.2016.06.015).
- 6- **Azimi. Y.**, Allen. D. G., Seto. P., Farnood. R., **2014**. Effect of Activated Sludge Retention Time, Operating Temperature, and Influent Phosphorus Deficiency on Floc Physicochemical Characteristics and UV Disinfection. *Industrial & Engineering Chemistry Research*, 53 (31), pp. 12485-12493. [DOI: 10.1021/ie5012068](https://doi.org/10.1021/ie5012068).
- 5- **Azimi. Y.**, Allen. D. G., Farnood. R., **2014**. Enhancing Disinfection by Advanced Oxidation under UV Irradiation in Polyphosphate-containing Wastewater Floccs. *Water Research*, 54(2), pp. 179-187. [DOI: 10.1016/j.watres.2014.01.011](https://doi.org/10.1016/j.watres.2014.01.011).
- 4- **Azimi. Y.**, Pileggi. V, Chen. X., Allen. D. G., Farnood. R., Droppo. I., Seto. P., **2013**. UV Disinfection of Wastewater Floccs: The Effect of Secondary Treatment Conditions. *Water Science and Technology*, 64 (12), pp. 2719-2723. [DOI: 10.2166/wst.2013.148](https://doi.org/10.2166/wst.2013.148).
- 3- **Azimi. Y.**, Allen. D. G., Farnood. R., **2012**. Kinetics of UV Inactivation of Wastewater Bioflocs. *Water Research*, 46(12), pp. 3827-3836. [DOI: 10.1016/j.watres.2012.04.019](https://doi.org/10.1016/j.watres.2012.04.019).
- 2- **Azimi. Y.**, Kortschot. M., Farnood. R., **2011**. Surface Roughening by Wetting of Coated Papers at Meso- and Micro-scale. *Appita Journal*, 64 (5), pp. 428-435. [ISSN: 10386807](https://doi.org/10.1038/6807).

- 1- **Azimi. Y.**, Kortschot. M., Farnood. R., **2009**. A Non-destructive Method for Obtaining a Local Coat Weight Map using X-ray Imaging. *Journal of Pulp and Paper Science*, 35 (1), pp. 11-16. [ISSN: 08266220](#).

#### Other Publications

- 1- **Azimi. Y.**, Chopra. S., Zhang. J., Stewart. S., Pereira. J. **2022** "Practical Approach to Innovative Process Technology Implementation at Small and Medium Sized WWTPs", *Influents Magazine*

#### Articles Submitted / In Preparation

- 3- **Azimi. Y.**, Aitchison. J. S., Allen. D. G. "The Effects of Light Leakage and Uniformity on the Productivity of Algal Biofilms in Waveguide Photobioreactors"
- 2- **Azimi. Y.**, "Wastewater Floc Breakage in Open Channels and Weirs During Tertiary Treatment"
- 1- Armioon. S., **Azimi. Y.**, Kroukamp. O., Wolfaardt. G., Farnood. R., "UV Disinfection Mechanism of Anaerobic Fecal Coliform in Wastewater Flocs, and the Effect of Iron"

#### Peer Reviewed Conference Papers

- 9- Azimi. Y., Stewart. S., Chopra. S. **2023**. "Typical Design-Operation Disconnects Leading to Ammonia Non-Compliance Issues at Sewage Treatment Facilities". Annual Water Environment Association of Ontario (WEAO) conference proceedings, April 16-18, Toronto, Canada.
- 8- **Azimi. Y.**, Agarwal. A., Aitchison. J. S., Allen. D. G., **2017**. The Impact of Waveguide Structural Properties on Enhancing Algal Biofilm Growth. 10<sup>th</sup> International Water Association Conference on Biofilm Reactors Proceedings, May 9-12, Dublin, Ireland.
- 7- **Azimi. Y.**, Amin. P., Allen. D. G., Seto. P., Farnood. R., **2013**. The Effect of Secondary Treatment Operating Temperature and Sludge Retention Time on UV Disinfectability of Final Effluents and Sludge Filterability. 86<sup>th</sup> Annual Water Environment Federation Technical Exhibition and Conference (WEFTEC) Proceedings, October 5-9, Chicago, USA.
- 6- **Azimi. Y.**, Pileggi. V., Chen. X., Allen. D. G., Farnood. R., Droppo. I., Seto. P., **2012**. The Effect of Secondary Biological Treatment Process Conditions on UV Disinfection of Wastewater. International Water Association (IWA) World Water Congress & Exhibition Proceedings, September 16-21, Busan, South Korea.
- 5- **Azimi. Y.**, Pileggi. V., Chen. X., Allen. D. G., Farnood. R., Droppo. I., Seto. P., **2012**. Secondary Biological Treatment and UV Disinfection of Wastewater. 41<sup>st</sup> Annual Water Environment Association of Ontario (WEAO) conference proceedings, April 22-24, Ottawa, Canada.
- 4- **Azimi. Y.**, Pileggi. V., Chen. X., Allen. D. G., Farnood. R., Seto. P., **2011**. Tailing Phenomenon and the Effect of Secondary Treatment Process Conditions on UV Disinfection. 84<sup>th</sup> Annual Water Environment Federation Technical Exhibition and Conference (WEFTEC) Proceedings, October 16-19, Los Angeles, USA.
- 3- **Azimi. Y.**, Allen. D.G., Cairns. B., Farnood. R., **2011**. Tailing in Ultraviolet Disinfection of Wastewater. Water Environment Federation (WEF) Disinfection Proceedings, April 10-12, Cincinnati, USA.
- 2- **Azimi. Y.**, Kortschot. M., Farnood. R., **2009**. Characterizing Coating Structure Non-uniformity Using X-ray Imaging. 7<sup>th</sup> International Paper and Coating Chemistry Symposium Proceedings, June 10-12, McMaster University, Hamilton, Canada.
- 1- **Azimi. Y.**, Kortschot. M., Farnood. R., **2008**. Using X-ray Imaging for Characterizing Coating Structure Non-uniformity. 94<sup>th</sup> Pulp and Paper Technical Association of Canada (PAPTAC) Annual Meeting Proceedings, February 5-7, Montreal, Canada.

## CONFERENCE PRESENTATIONS

### (Speaker's name is underlined)

- 20- Azimi. Y., Stewart. S., Chopra. S. **2023**. "Typical Design-Operation Disconnects Leading to Ammonia Non-Compliance Issues at Sewage Treatment Facilities". Annual Water Environment Association of Ontario (WEAO) conference proceedings, April 16-18, Toronto, Canada.
- 21- Azimi. Y., Agarwal. A., Bonila. S., Aitchison. J. S., Allen. D. G., **2017**. Photobioreactors Integrating Light-Leaking Waveguides: The Role of Waveguide Geometry and Surface Texture on Light Distribution and Algal Biofilm Growth. 7<sup>th</sup> International Conference on Algal Biomass, Biofuels and Bioproducts, June 18-21, Miami, Florida, USA. [Poster]
- 19- Allen. D. G., Azimi. Y., Bonilla S. and Meyer, T., **2017** "Innovative approaches to addressing biomass dewatering challenges in biological wastewater treatment", 52<sup>nd</sup> Central Canadian Water Symposium, February 23, Toronto, Canada.
- 18- Azimi. Y., Agarwal. A., Aitchison. J. S., Allen. D. G., **2017**. The Impact of Waveguide Structural Properties on Enhancing Algal Biofilm Growth. 10<sup>th</sup> International Conference on Biofilm Reactors, 9-12 May, Dublin, Ireland.
- 17- Azimi. Y., Genin. S. N., Aitchison. J. S., Allen. D. G., **2016**. Growing Algal Biofilms on Light-emitting Waveguides. 10<sup>th</sup> Annual Algae Biomass Summit, October 23-26, Phoenix, Arizona, USA. [Poster]
- 16- Azimi. Y., Genin. S. N., Aitchison. J. S., Allen. D. G., **2016**. Using Light-leaking Waveguides for Growing Algae as a Biofilm. 66<sup>th</sup> Canadian Chemical Engineering Conference, October 16-19, Quebec City, Canada.
- 15- Azimi. Y., Genin. S. N., Aitchison. J. S., Allen. D. G., **2016**. Growing Algal Biofilms on Light-Emitting Waveguides for Producing Value-added Products. 18<sup>th</sup> Annual Canadian Society of Chemical Engineering (CSCHE) Ontario-Quebec Biotechnology Meeting, May 26-27, University of Waterloo, Ontario, Canada.
- 14- Feng. C., Azimi. Y., Farnood. R., **2014**. Surface Modified Cellulosic Membrane and its Application in Membrane Bioreactor (MBR) System. 2<sup>nd</sup> FIBRE conference, May 12-15, Vancouver, Canada. [Poster]
- 13- Azimi. Y., Amin. P., Allen. D. G., Seto. P., Farnood. R., **2013**. The Effect of Secondary Treatment Operating Temperature and Sludge Retention Time on UV Disinfectability of Final Effluents and Sludge Filterability. 86<sup>th</sup> Annual Water Environment Federation Technical Exhibition and Conference (WEFTEC), October 5-9, Chicago, USA.
- 12- Azimi. Y., Pileggi. V., Chen. X., Allen. D. G., Farnood. R., Droppo. I., Seto. P., **2012**. The Effect of Secondary Biological Treatment Process Conditions on UV Disinfection of Wastewater. International Water Association (IWA)World Water Congress & Exhibition, September 16-21, Busan, South Korea.
- 11- Azimi. Y., Pileggi. V., Chen. X., Allen. D. G., Farnood. R., Droppo. I., Seto. P., **2012**. Secondary Biological Treatment and UV Disinfection of Wastewater. 41<sup>st</sup> annual WEAO conference, April 22-24, Ottawa, Canada.
- 10- Azimi. Y., Allen. D. G., Farnood. R., **2012**. The Effect of Floc Properties on UV Disinfection of Wastewater Effluents. 47<sup>th</sup> Central Canadian Symposium on Water Quality Research, February 21-22, Canada Centre for Inland Waters, Burlington, Canada.
- 9- Azimi. Y., Pileggi. V., Chen. X., Allen. D. G., Farnood. R., Seto. P., **2011**. Tailing Phenomenon and the Effect of Secondary Treatment Process Conditions on UV Disinfection. 84<sup>th</sup> Annual Water Environment Federation Technical Exhibition and Conference (WEFTEC), October 16-19, Los Angeles, USA.
- 8- Azimi. Y., Allen. G., Cairns. W., Droppo. I., Seto. P., Farnood. R., **2011**. Tailing in Ultraviolet Disinfection of Wastewater and the Effect of Sludge Retention Time and Process Type. 61<sup>st</sup> Canadian Chemical Engineering Conference, October 23-26, London, Canada.

- 7- **Azimi, Y.**, Allen. G., Cairns. B., Droppo. I., Seto. P., Farnood. R., **2011**. Cause of Tailing in UV Disinfection and the Effect of Sludge Retention Time and Process Type. 64<sup>th</sup> Canadian Water Resources Association (CWRA) National Conference, "Our Water-Our Life- The Most Valuable Resource", June 27-30, St. John's, Canada.
- 6- **Azimi, Y.**, Cairns. B., Allen. G., Farnood. R., **2011**. UV Disinfection of Wastewater Effluents: How to Control the Tailing Level, and Improve the Efficiency. 46<sup>th</sup> Central Canadian Symposium on Water Quality Research, February 23-24, Burlington, Canada.
- 5- **Azimi, Y.**, Cairns. B., Allen. G., Farnood. R., **2011**. The Effect of Activated Sludge Process Conditions on Ultraviolet Disinfection of Secondary Effluents. 13<sup>th</sup> Annual Canadian Society of Chemical Engineering (CSChE) Ontario-Quebec Biotechnology Meeting, May 12-13, 2011, Kingston, Canada. [Poster]
- 4- **Azimi, Y.**, Allen. D.G., Cairns. B., Farnood. R. R., **2011**. Tailing in Ultraviolet Disinfection of Wastewater. Water Environment Federation (WEF) Disinfection, April 10-12, Cincinnati, USA.
- 3- **Azimi, Y.**, Cairns. B., Allen. G., Farnood. R., **2011**. The Effect of Wastewater Floc Structure on Disinfectability with UV Light. Current Research in Science & Technology (CREST), March 11-12, Hamilton, Canada.
- 2- **Azimi, Y.**, Kortschot. M., Farnood. R., **2009**. A Non-destructive Method to Obtain Local Coat Weight Map Using X-ray Imaging. 7<sup>th</sup> International Paper and Coating Chemistry Symposium, June 10-12, Hamilton, Canada.
- 1- **Azimi, Y.**, Kortschot. M., Farnood. R., **2008**. Characterizing Coating Structure Non-uniformity Using X-ray Imaging. 94<sup>th</sup> Pulp and Paper Technical Association of Canada (PAPTAC) Annual meeting, February 5-7, Montreal, Canada.

## INVITED PRESENTATIONS/GUEST LECTURER

- 1- "**Considerations Before Moving into Process Intensification**", Ontario Water Consortium, Process Intensification Workshop, December 4<sup>th</sup>, 2023, Waterloo, ON.
- 2- "**Wastewater Treatment Process Optimization and Troubleshooting**", Carlton University, Department of Civil and Environmental engineering, November 7<sup>th</sup>, 2023, Ottawa, ON.
- 3- "**Municipal Project Lifecycle**", University of Northern British Columbia (UNBC), Engineering Department, March 22<sup>nd</sup>, 2022, Prince George, BC.

## TEACHING & MENTORING EXPERIENCE

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**Guest Lecture**, Department of Civil and Environmental Engineering, Carleton University

- Wastewater troubleshooting and optimization, disconnects between engineering and operations, and opportunities in the net zero space **2023**

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**Guest Lecture**, University of Northern British Columbia

- Municipal project life cycle and common challenges to implementing innovative technologies in the wastewater field. **2022**

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**Co-instructor for Separation Processes (CHE311)**, Department of Chemical Engineering & Applied Chemistry, University of Toronto **2017**

- Prepared lectures for a core third-year chemical engineering (approx. 140 students) course on solvent extraction, leaching, and membrane processes.
  - Delivered lectures using various media during in-class contact hours (board, PowerPoint, projector slides, videos, hands-on demonstrations).
  - Assisted students with conceptual understanding of separation processes and problem-solving techniques (in classroom and during office hours).
  - Designed midterm and final exams to assess students on their learning.
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- Coordinated tutorial content and exams with teaching assistants.
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**Teaching Assistant**, Department of Chemical Engineering & Applied Chemistry, University of Toronto

Applied Mathematics – Graduate Course (CHE1107; 50 students)	<b>2016</b>
Physical Chemistry (CHE112; 65 students/year)	<b>2009 - 12</b>
Reaction Kinetics (CHE332; 50 students/year)	<b>2007 - 08</b>
Applied Differential Equations (CHE222; 50 students/year)	<b>2007 - 08</b>
Organic Chemistry and Biochemistry Laboratory (CHE391; 20 students/year)	<b>2009 - 12</b>

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**Mentor of PhD, masters, undergraduate thesis students, summer students, and international students (total of 18)**, University of Toronto and Oxford University

- Defined and planned projects with set objectives and timelines.
  - Taught research background and methodologies.
  - Met with students on a regular basis to discuss findings and determine future work.
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## HONOURS AND AWARDS

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Jacobs Innovation Research Grant (\$50,000)	<b>2018</b>
American Chemistry Society (ACS) Postdoc to Faculty Scholarship (\$3,000)	<b>2017</b>
Water Environment Association of Ontario (WEAO) Student Scholarship (\$2,000)	<b>2012</b>
University of Toronto Doctoral Completion Award (\$10,000)	<b>2012</b>
Teaching Excellence Award nomination to the Faculty of Applied Science and Engineering by Department of Chemical Engineering & Applied Chemistry (non-monetary)	<b>2012</b>
University of Toronto School of Graduate Studies Conference Grant (\$2,000)	<b>2012</b>
W.H. Rapson Memorial Award (\$2,000)	<b>2011</b>
Bill Stolte Silver Student Award, Canadian Water Resources Association (\$1,000)	<b>2011</b>
University of Toronto Open Fellowship (\$22,000 / year)	<b>2006-13</b>
Graduating Class Academic Award (Ranked 3 <sup>rd</sup> ), Department of Chemical and Petroleum Engineering, Sharif University of Technology (non-monetary)	<b>2006</b>

## ADMINISTRATIVE EXPERIENCE

**Workshop Organizer**, Careers Network, CH2M-Jacobs

- Initiated and established a series of workshops with the help of a theatre actor with the goal of enhancing communication and team-work skills and addressing issues with diversity and inclusion. **2017 -2019**
  - Sought funding from various sources within the company and budgeted resources for the workshop series.
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**Chair**, Water Environment Association of Ontario (WEAO) student chapter, University of Toronto

- Organized educational and social events and invited speakers from the water industry.
  - Sought funding from various industrial and academic sources, and composed the annual report on the student chapter's activities. **2011 - 12**
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- Supported other members of the group in completing their tasks.

<b>Scientific Committee Member</b> , International Water Association Young Water Professionals Conference (Germany)	<b>2014</b>
<b>Conference Co-chair</b> , the Canadian Association of Water Quality (CAWQ) conference, National Water Research Institute (Canada).	<b>2012</b>
<b>Conference Session Chair</b> , the Canadian Association of Water Quality (CAWQ) Conference, Wastewater Treatment Session.	<b>2012 &amp; 2016</b>
<b>Reviewer</b> , Environmental Science and Technology, Journal of Applied Microbiology, Water Science and Technology, Environmental Reviews, International Water Association (IWA) World Water Congress, Environmental Engineering Science, Environmental Reviews	<b>2012 - Present</b>
<b>Pulp and Paper Centre Technical Tour Co-organizer</b> ; University of Toronto	<b>2007</b>
<b>Social Chair</b> , Technical Association of the Pulp and Paper Industry (TAPPI), University of Toronto student chapter	<b>2007-08</b>
<b>Member of Judging Panel</b> , Undergraduate Engineering Research Day (UnERD), University of Toronto	<b>2007, 2015 &amp; 2016</b>

## OTHER RELEVANT TRAINING

- Stand Up Comedy Training, offered by Second City (2020), 8-week course
- Advanced BioWin (Wastewater Process Simulation), offered by Envirosim (2017), 2-day course
- Introduction to BioWin (Wastewater Process Simulation), offered by Envirosim (2017), 2-day course
- Postdoc to Faculty (P2F), American Chemistry Society (ACS) (2017), 2-day workshop
- Elite Entrepreneurship Training for Scientists and Engineers, Techno-Impact Centre, University of Toronto (2016), 1-week workshop
- Connaught Summer Institute on Synthetic Biology, University of Toronto Impact Centre (2016), 1-week workshop
- Essentials of Project Management, Oxford University Learning Institute (2014), 1-day workshop
- Supervising Doctor of Philosophy Students and Time Management, Oxford University Learning Institute (2015), 1-day workshop
- Identifying, Assisting & Referring a Student in Distress, University of Toronto Health & Wellness Centre (2016), 3-hour workshop
- Course Design, Oxford University Learning Institute (2015), 1-day workshop
- Equality and Diversity in the Workplace, Oxford University (2014), 3-hour course
- Principles & Practices of Biosafety, University of Toronto (2009), 2-day course
- Radiation Safety, University of Toronto (2009), 3-hour course
- Papriprint, Printing for Paper Makers, Paprican, Pointe-Claire (2006), 3-day course

## PROFESSIONAL MEMBERSHIPS

- International Water Association (IWA)
- Water Environment Federation (WEF)
- Canadian Association Water Quality Association (CAWQ)
- Water Environment Association of Ontario
- International Ultraviolet Association (IUA)
- Canadian Society for Chemical Engineering (CSChE)
- American Chemistry Society (ACS)
- Algae Biomass Organization (ABO)

## LIST OF REPRESENTATIVE INDUSTRIAL PROJECTS

<p><b>Lake Simcoe Phosphorus Reduction Project, Technical Process Lead &amp; Engagement Manager</b> Conduct a full feasibility analysis for reviewing options to remove up to 5 tonnes/year of phosphorus from Lake Simcoe. Tasks include background data review, developing design basis and technical options, evaluating options based on technical, environmental, social, cost and site selection criteria and provide recommendations on design, operability and construction. Further, to develop paths of cost recovery from phosphorus capture and reuse in the region.</p>	2024 - Ongoing
<p><b>Mississippi Mills WWTP, ON, Technical Process Lead &amp; Project Manager</b> Review process and operational practices at the facility to determine the causes of increased alum and polymer usage for phosphorus removal and sludge thickening and dewatering. Includes a full assessment of all treatment processes at the plant, interviewing operations, reviewing all design documents and developing process and operational recommendations for reducing chemical usage.</p>	2024
<p><b>Kirkland Lake WWTP, ON, Technical Process Lead &amp; Project Manager</b> Conducted a full process capacity and operations analysis to determine the impacts of receiving planing mill (lumber producing) condensate material. Included a full review of the condensate material chemical composition to determine toxicity levels and evaluating potential impacts to the activated sludge process, chemical consumption and effluent quality. Developed recommendations for reducing the potential impacts of receiving condensate material on the treatment process.</p>	2024
<p><b>Petawawa WWTP, ON, Technical Process Lead</b> Conducting a full process and operations assessment to evaluate the impacts of codigestion implementation on the existing processes at the facility, and recommend capital upgrades and operational adjustments as necessary. Codigestion is being implemented as part of the net zero program.</p>	2024
<p><b>Halton Region Nitrous Oxide Monitoring Project, Operational Optimization (Sub to GHD)</b> Provide technical process and operational optimization expertise in developing and implementing strategies to monitor and reduce N2O emissions in the Halton Region Wastewater Treatment Plants.</p>	2024
<p><b>Lake Huron WTP, ON, Technical Process Lead</b> Reviewed the causes of chemical dosing deficiencies for coagulation at the water treatment plant by jet mixing. Included a full review of designers calculations and design basis, specifications, and calculations. After determining the causes of chemical dosing deficiencies and the resulting compliance issues, recommendations were developed to be discussed with the designer to resolve the process and operational issues.</p>	2023
<p><b>Carleton Place WPCP, ON, Technical Process Lead &amp; Project Manager</b> Launched a Facility Optimization Program (FOP) including review of all plant background data, engineering document, O&amp;M, non-compliance, etc. Conducted a full process assessment to determine unit process capabilities and shortcomings in process control and operation. Provided recommendations for capital upgrades, process adjustments and sampling and operational practices. Provided technical input on the Class EA and review of MBR detailed design (conducted by Stantec).</p>	2021-2023
<p><b>Halton Renewable Energy Project, ON, Technical Process Reviewer (Joined with GHD &amp; JLR)</b> The project includes establishing baselines for the two wastewater facilities (Mid-Halton and Skyway WWTPs) and then assess each emissions/energy reduction opportunity with life cycle aspects including emission reduction, cost savings and operational resiliency. My role was/is to provide technical review to GHD and Halton Region on wastewater treatment plant process upgrades to improve energy efficiency and optimize GHG emissions reductions. Included reviewing various renewable energy process integration scenarios into the overall scheme of plant process and providing technical opinion on design and operational aspects.</p>	2023 - Ongoing
<p><b>Sanofi WWTP, ON, Technical Process Lead</b> Conducted a review of design and engineering of the new Sanofi wastewater treatment plant. Provided input to the respective OCWA operations team to develop operational requirements (costing and labour assumptions) and special circumstance operating clauses in the Operations Contract. Provided input on items that should be considered by the design and contractors to eliminate solids processing issues after commissioning. Further conducted calculations to estimate the total annual chemical consumption by the facility. Processes include: drum screen, dissolved air floatation (DAF), membrane systems, reverse osmosis (RO), aeration tanks, aeration system, UV disinfection, sludge thickening and odour control. Respective chemical systems include sulfuric acid, sodium hydroxide, alum, sodium hypochlorite, citric acid, hydrogen peroxide, polymer and defoaming chemicals.</p>	2023
<p><b>Angus WWPCP, ON, Technical Process Lead &amp; Project Manager</b> Launched a Facility Optimization Program (FOP) including review of all plant background data, engineering document, O&amp;M, non-compliance, etc. Conducted a full process assessment to determine unit process capabilities and shortcomings in process control and operation. Provided recommendations for capital upgrades, process adjustments and sampling and operational practices. Further, conducted detailed calculations on the aeration system (consisting of 8 blowers and their respective piping) to determine causes of aeration deficiencies to the sludge storage tanks.</p>	2023
<p><b>Espanola WPCP, ON, Technical Process Lead &amp; Project Manager</b> Provided process design, capacity and operational review to determine the causes of TAN non-compliance and sludge dewatering (Geotube) operational issues at the facility.</p>	2023

<p><b>Snow Valley WWTP, ON, Technical process Lead &amp; Project Manager</b>  Conducted a full assessment of the Fluidyne SBR system (process design and operational) to determine causes of nitrate-nitrogen non-compliance at the facility. The system includes a surge anoxic tank, an anaerobic fill tank and an aerated SBR. Process, sampling and operational strategies were recommended to resolve ongoing denitrification issues at the facility.</p>	2023
<p><b>Harmony WWTF, ON, Technical Process Lead &amp; Project Manager</b>  Evaluate the wastewater process train suitability for complete biological nitrogen removal. Recommended modifications to the existing process configuration to improve nitrate and nitrite removal efficiency. Provide technical review of the proposed design by consultant on improving nitrate removal.</p>	2021
<p><b>Belleville WPCP, ON, Technical Process Lead &amp; Project Manager</b>  Conduct a comprehensive review of plant and operating data, engineering documents to determine the causes of poor sludge settling and foaming events at the facility. Work with the operations team on completing process adjustments including methods used for biomass control and dealing with flow and contaminant load fluctuations from industrial discharges.</p>	2022-2023
<p><b>Deloro Mine Site, ON, Technical Process Lead &amp; Project Manager</b>  Review arsenic and cobalt levels in ground water at various locations. Assess the arsenic treatment process performance and develop optimization strategies and capital upgrades recommendations for enhanced removal of arsenic and cobalt.</p>	2022-2023
<p><b>Port Dover WPCP, ON, Technical Process Lead &amp; Project Manager</b>  Launched a Facility Optimization Program (FOP) including review of all plant background data, engineering document, O&amp;M, non-compliance, etc. Conducted a full process assessment to determine unit process capabilities and shortcomings in process control and operation. Provided recommendations for capital upgrades, process adjustments and sampling and operational practices. Reviewed future plant design by consultant (RVA) to assess suitability and shortcomings of the suggested upgrades.</p>	2022-2023
<p><b>Cobden WTF, ON, Technical Process Lead &amp; Project Manager</b>  Conducted a full process and operations review and launched a sampling program to determine the causes of elevated THMs and HAAs in the water distribution system &amp; occasional coloured water issues. Recommended operational changes on monitoring organics, conducting jar testing, coagulant addition and chlorination. Provided a list of required capital projects and presented to Council.</p>	2022-2023
<p><b>Aylmer STP, ON, Technical Process Lead &amp; Project Manager</b>  Based on a full process and operational review of the facility provided recommendations for resolving seasonal odour issues and effluent TP non-compliance. Further, developed a 40-year roadmap with 3 phased-approach to process upgrade and expansion of the facility, and presented to Council. Leading technical review for selecting design consulting firm &amp; providing technical review of the design provided by the selected consulting firm (WT Infrastructure).</p>	2022-2023
<p><b>Canadian Nuclear Laboratories STP, Technical Process Lead &amp; Project Manager</b>  Based on a full review of process data and operational practices, provided recommendations to reduce acute lethality events and more consistently achieve full nitrification. Further, provided guidance to operations on maintaining a healthy biomass and weathering fluctuations in influent quantity/quality.</p>	2022-2023
<p><b>Lindsay WWTP, ON, Technical Process Lead</b>  Conducted detailed assessment of aeration requirements and the history of aeration maintenance and operational practices to determine the causes of poor effluent quality at the plant. Developed a trouble-shooting sampling and diagnosis plan and worked with operations to achieve TAN and TSS compliance. Provided technical review of consultants (CIMA) design for the new aeration system.</p>	2022-2023
<p><b>Carkson WPCP, ON, Technical Process Lead</b>  Provided technical review on the aeration system and controls of the older aeration tanks at the facility to suggest suitable upgrades. Developed a testing program to determine problematic areas with the current diffusers. Determined the causes of operational issues on digester biogas distribution between the cogeneration facility and the boilers, and suggested SCADA override corrective actions.</p>	2022-2023
<p><b>GE Booth WPCP, ON, Technical Process Lead</b>  Provided technical review of the fluidized bed incineration process to determine the causes of variations in fluidizing air blower performance between the different process trains. Provided technical support with process troubleshooting and developing operational strategies for handling solids when the fluidized bed incinerators were not operating at full capacity.</p>	2021-2023
<p><b>Port Elgin WPCP, ON, Technical Process Lead and Project Manager</b>  Developed design basis for the aeration process expansion, based on population projections and historical data analysis. Further, developed life-cycle cost on 5 aeration upgrade options for the client.</p>	2024
<p><b>Renfrew WPCP, ON, Technical Process Lead &amp; Project Manager</b>  Developed design basis for aeration process expansion and provided recommendations on blower design and selection.</p>	2022
<p><b>Wasaga Beach WPCP, ON, Technical Process Lead &amp; Project Manager</b>  Developed calculations for operations to rebuild nitrifying biomass (import from another facility) to regain ammonia treatment capacity in the wintertime after a process upset event. Evaluated the biological process operating parameters to diagnose process issues leading to high TSS in effluent. Provided technical support to preliminary and tertiary treatment</p>	2022

process design.	
<b>MiniLakes STP, ON, Technical Process Lead</b> Based on a review of process and plant historical data, provided operational recommendations to help with resolving denitrification issues (high effluent nitrates) as well as high TSS and TP. Recommended capital upgrades and providing technical input to the future design by consultant (Associated).	2021
<b>Elmvale STP, ON, Technical Process Lead &amp; Project Manager</b> Reviewed historical plant data and compared tertiary treatment upgrade scenarios based on vendor, expansion requirements, construction sequencing and overall cost. Provided technical input on the UV disinfection design.	2021
<b>Kings Bay RBC &amp; Hilton Beach RBC, ON, Technical Process Lead &amp; Project Manager</b> Identified the causes for ongoing challenges with meeting BOD and TSS objectives at the RBC facility through investigating process design and existing conditions. Developed strategies for operation at low influent BOD load, optimized operation of alum dosing and adjusting RAS rates for improving clarifier operation.	2021 - 2023
<b>Victoria Harbour STP, ON, Technical Process Lead &amp; Project Manager</b> Providing technical review on various stages of design for plant expansion (design by WSP). These included: design basis, predesign report, drawings & specs and other technical documents provided at 30, 60, 90 and 100% design.	2022-2023
<b>Dorchester STP, ON, Technical Process Lead &amp; Project Manager</b> Provided technical input for adjusting biomass to resolve issues with effluent TSS, bulking and foaming in the SBRs. Recommended the conversion of one SBR to an aerobic digester to resolve issues with solids handling at the facility.	2021
<b>Haileybury STP, ON, Technical Process Lead &amp; Project Manager</b> Conducted engineering analysis to determine causes of the combined aeration – hydraulics issues at the facility with the RAS airlift and aerobic digesters. Recommended air header modifications.	2022
<b>Bayshore STP, Lagoon City STP, Cardiff STP, Manitowaning STP, Boblo Island, Mt. Carmel STP, Manitowaning STP, McGregor STP Temagami STP, Waterford STP, Monteith STP, (All in Ontario), Technical Lead &amp; Project Manager</b> Provided engineering review and technical support to operations on resolving compliance issues related to hydraulics, loss of nitrification, algae growth, pH, elevated TP and TSS. Recommendations included chemical optimization and jar testing, implementing seasonal flow control strategies, modifying aeration practices, more vigorous sampling and monitoring programs, capital upgrades, etc.	2021-2022
<b>Highland Creek WWTP Fluidized Bed Incinerators (FBIs), Process Engineer</b> Took several roles under the FBI project including assistant project manager on the FBI pre-purchase contact, assistant design manager and lead process mechanical designer. Tasks included design of several incineration process components including and sizing equipment, developing P&IDs and process drawings, hydraulics calculations, and developing engineering specifications. Further, provided engineering and technical review of process calculations and shop drawings provided by FBI vendor (SUEZ). Developed multi-criteria analysis for determining preferred emission scrubbing alternative technologies for new fluidized bed incinerators (based on US EPA MACT). Reviewed on-site construction activities and impacts on existing processes and developed mitigation strategies for coordination with other consultants on site. Co-ordinated the multidisciplinary design for the FBI components to produce a coherent design.	2018-2020
<b>GE Booth WWTP, Plant 2 Aeration Upgrades, Process Engineer</b> Led the multidisciplinary enhanced conceptual design of aeration upgrades for Plant 2 (Blower Building 1) at GE Booth WWTP. Tasks included developing process requirements and blower options considering other ongoing upgrades at the plant (Plant 1) and coordinating upgrades by electrical, structural, I&C and building mechanical disciplines and reviewing construction scenarios to develop a coherent and feasible design and construction plan.	2020
<b>Mid-Halton WWTP, Facility Roadmap, Process Engineer</b> Led the facility expansion planning of Mid-Halton WWTP over a 25-year period. Tasks included detailed review of operational data, developing influent flow and loading projections, process modelling to develop whole-plant mass and energy balances for existing and future growth scenarios to determine future treatment process requirements, unit process capacity assessment and identifying expansion triggers, review and evaluation of upgrade technology alternatives for each treatment unit process and development of whole-plant upgrade scenarios, developing capital and life cycle cost estimates and comparison matrices for various liquids and solids treatment expansion alternatives, developing implementation schedule for construction scenarios, writing technical reports, and presenting to client.	2017-2020
<b>Duffin Creek WPCP, Facility Roadmap, Process Engineer</b> Led the capacity assessment of all unit processes at the plant and determine future treatment requirements and growth triggers. Tasks included detailed review of plant operational data, future growth scenario development, process modelling to determine future process requirements, conducting unit process capacity assessment, and identifying expansion triggers.	2019-2020
<b>Riverhead WWTP, Plant Expansion Conceptual Design, Process Engineer</b> Provided support to the conceptual design for the secondary treatment upgrade and plant expansion at the Riverhead Wastewater Treatment Plant. Tasks included desktop review of operational data, review and evaluation of alternative secondary treatment technologies, process modelling (Pro2D) to determine upgrade requirements, mass balance and energy balance analysis, site layout, cost-benefit analysis for energy recovery options and preparing technical reports.	2017-2018

<p><b>Highland Creek WWTP, Facility Roadmap, Process Engineer</b>  Lead the assessment of potential heat recovery technologies for process and non-process uses at HCTP. Evaluated the existing and future heat uses at the plant and developed heat recovery scenarios that could partially or fully support future needs. Developed technology alternatives for each heat recovery scenario and compared based on capital and life cycle cost estimates and comparison matrices. Developed recommendation for most viable future heat recovery option at the plant.</p>	2019-2020
<p>Other projects: Duffin Creek WPCP incinerator mercury scrubbing (GAC) trouble shooting, City of Hamilton Sewer By-law review, Woodward Avenue WWTP tertiary system trouble shooting, Duffin Creek elevated effluent E.Coli trouble shooting.</p>	2017-2020