# ALEXANDER REY

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## Profile

- PhD candidate in coastal engineering and registered Engineer-In-Training
- Developed a web accessible, real-time forecast of nearshore conditions during Hurricane Dorian
- Excited to continue learning within a team finding creative solutions to complex problems
- Bilingual (intermediate French), with experience in numerical modelling (Delft3D/FM, XBeach), field observations, coding (MATLAB, Python), AutoCAD, ArcGIS, and HEC-RAS

## Education

**Doctor of Philosophy, Civil Engineering** ▪ September 2016 – May 2020 (anticipated)
Queen's University ▪ Kingston, Ontario

- Currently completing thesis, which is focused on the behavior of shallow water, including retention times in wastewater stabilization ponds and climate enhanced hurricane driven flooding in estuaries
- Implemented an online updating forecast for wave, current, and water levels in North Carolina, USA
- Senior Campus Tour Guide and co-coordinator of the Civil Engineering Speakers Forum
- Completed the US Army Corps of Engineers coastal training course
- Supervised by Dr. Ryan Mulligan, Dr. Ana Maria da Silva, and Dr. Yves Filion

**Bachelor of Science, Civil Engineering** ▪ September 2012 – May 2016
Queen's University ▪ Kingston, Ontario

- Completed a capstone project on port design and coastal modeling with Baird and Associates
- Director of Human Resources for the Student Engineering Society
- Member of the Queen's Mostly Autonomous Sailboat Team

## Employment Experience

**Teaching Assistant** ▪ September 2016 – December 2019
Queen's University ▪ Kingston, Ontario

- CIVL 200: Professional Skills II
- CIVL 460: Civil Engineering Design and Practice (Capstone)
- CIVL 455: River Engineering
- CIVL 473: Water Resources Systems

**Engineer-In-Training** ▪ May 2016 – August 2016
Baird and Associates ▪ Ottawa, Ontario

- Imported and analyzed field data to evaluate model performance
- Created a database of National Data Buoy Center information to streamline model calibration
- Visualized modeled and measured results to in an interactive format to evaluate accuracy
- Wrote automating scripts to significantly reduce time required for data import

## Awards and Recognition

- Robert J. Mitchel Prize (2018)
- Aquahacking Startup Competition Finalist (2018)
- Dean's Teaching Assistant Award (2018)
- S.D. Lash Scholarship (2016)
- NSERC Undergraduate Student Research Award (2015)

## Volunteer Work

**Grant Review Team** ▪ September 2018 – Ongoing
Ontario Trillium Foundation ▪ Kingston, Ontario

- Grant evaluator on the provincially appointed committee responsible for selecting Ontario Trillium Foundation grants, which provide critical funding to non-profit organizations to build up communities

**Research Advisory Committee** ▪ May 2018 – Ongoing
Beaty Water Research Centre, Queen's University ▪ Kingston, Ontario

- Representative to the advisory board of an interdisciplinary water research center responsible for identifying grant and research funding streams and research facility decisions.

**Municipal Appeals Committee** ▪ November 2017 – December 2019
City of Kingston ▪ Kingston, Ontario

- Adjudicated appeals in arising under the property standards and licensing bylaws

## Selected Publications

**Rey, A.,** Mulligan, R. "Influence of Hurricane Tack and Wind Field Variability on Real-time Forecast Simulations of Coastal Conditions." *Manuscript in preparation for submission to Geophysical Research Letters.*

**Rey, A.,** Mulligan, R., Corbett, R. "Impact of Wind Field and Precipitation on Back-Barrier Estuary Hurricane Storm Surges." *Manuscript in preparation for submission to Journal of Geophysical Research: Oceans.*

**Rey, A.,** Mulligan, R., Boegman, L., Filion, Y., da Silva, A. M., Champagne, P. "Three-dimensional Hydrodynamic Behavior of an Operational Wastewater Stabilization Pond." *Manuscript in preparation for submission to Advances in Water Resources.*

**Rey, A.,** Mulligan, R., Corbett, R., Wadman, HM. (2019). "Numerical Modelling of Storm-Driven Sediment Transport in Currituck Sound, NC." *International Conference on Coastal Sediments 2019. St. Petersburg, Florida, United States.*

Mulligan, R. P., Mallinson, D. J., Clunies, G. J., **Rey, A**., Culver, S. J., Zaremba, N., Leorri, E. and Mitra, S. (2019) "Estuarine responses to long-term changes in inlets, morphology and sea-level rise." *Journal of Geophysical Research: Oceans. John Wiley & Sons, Ltd, p. 2018JC014732. doi: 10.1029/2018JC014732.*

Fruetel, C., Mumford, K. G., Ferreira da Silva, A. M., **Rey, A**., Bascom, K. S. (2019) "A laboratory method for the visualization and quantification of hyporheic flow paths and velocities." *Canadian Journal of Civil Engineering. NRC Research Press, 46(5), pp. 448–457. doi: 10.1139/cjce-2018-0131.*

**Rey, A.,** Mulligan, R., Boegman, L., Filion, Y., da Silva, A. M., Champagne, P. (2018). "Impact of Control Structures on Hydraulic Retention Time in Wastewater Stabilization Ponds." *1st International WDSA / CCWI 2018 Joint Conference, Kingston, Ontario, Canada, Y. Filion and M. Hulley, eds.*

## Selected Presentations

**Rey, A**., Mulligan, R. (2020). "Real-time high-resolution forecasting of the coastal ocean during a hurricane." *Ocean Sciences Meeting 2020 – San Diego, California, United States.*

**Rey, A**., Mulligan, R. (2018). "Three-Dimensional Modelling of an Operational Wastewater Stabilization Pond." *Young Coastal Scientists and Engineers Conference – Americas, Mérida, Yucatán, México.*

**Rey, A**., Sauder, M., Mulligan, R., Boegman, L., Filion, Y., da Silva, A. M., and Champagne, P. (2017). "Modeling and validation of stratification and hydrodynamics in a wastewater stabilization pond using Delft3D." *S2Small2017 Conference on Small Water & Wastewater Systems and Resources Oriented Sanitation – Nantes, France.*