

# URBAN UPDATE

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## Urban Projects

Joined Komal Habib, Goretty Dias and Steve Young in EV3 to Play "In the Loop" boardgame which is being introduced as a teaching tool on circular economy.

Joined Mansour Esnaashary Esfahani's PhD committee for his research on "Methodology for improving the success probability of adaptive reuse projects through improved pre-project planning."

## Engineering Education

Attended UW's 2019 11th Annual Teaching and Learning conference. #uwtl19

## Teaching

CIVE230 started, and I'm enjoying the interaction with the 2nd year civil engineering students. CIVE400 started as well and it's fascinating to see the teams forming and brainstorming project ideas. 28 groups between Cory Zurell and I, and the diversity of ideas is what makes this course ever so exciting every day.



## City Circle Launched

City Circle is a lunch hour discussion that is held weekly for students on Fridays 12:30-1:20PM in E2-3356, and is facilitated to learn about our urban world, one city at a time. The discussions introduce thought-provoking topics from global cities, and present urban infrastructure challenges and opportunities for discussion. The seating format is a circle to encourage participation and peer-to-peer learning, which is inspired by the "talking circle" or "circle talks" as a traditional way for indigenous culture to solve problems. City Circle follows a foundational approach to First Nations pedagogy because it provides a model for an educational activity that encourages dialogue and co-creation of learning content. We looked at Cape Town, Barcelona, Quito, and Tokyo.



Event Highlights



**Smart Cities and IoT Conference.**

Attended the session on smart cities, digital transformations and smart governance, April 30-May 1.

**Mobility 2030 Hackathon.** Run by KPMG Toronto to develop practical answers to 'future mobility' questions. PhD student Hamed Shahrokhi Shahraki (Supervisor Chris Bachmann) attended and represented UW on May 9.

**Great Lakes Economic Forum.**

Convened in Cleveland, OH, May 6-8, Dan Hoornweg presented our megaregions work at the Great Lakes Economic Forum.

**CIVxTalks** Together with Daniel Lacroix presented our research to CEGES on May 15.

**Keep an eye out next month for...**

Here are events to look forward to in June 2019:

- Design Charrette of Civil District, Kitchener at KWAG, June 7
- CEEA in Ottawa, June 9-12
- OSPE's Panel talk, June 18



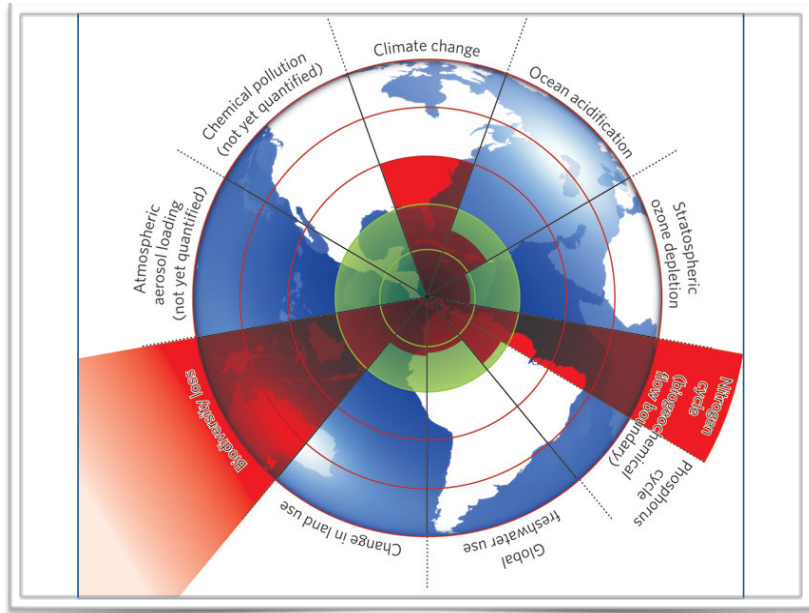
**COUNCIL OF THE GREAT LAKES**  
FOLLOWING THE ECONOMIC FORUM



**WARRIOR HOME**  
OBSERVING THE RACE-TO-ZERO COMPETITION

engineer of  
**2050**

**ENGINEER OF 2050**  
FINALIZING ANNUAL REPORT TO CEEA 2019



**Sustainability of the Megaregions**

Rockstrom et al's concept of planetary boundaries estimates a safe operating space for humanity with respect to the functioning of the Earth System. The problem, however, is that cities, including across the Great Lakes Region (GLR), lack the expertise and tools to assess their performance across a range of bio-physical and socio-economic indicators (e.g. climate change, biodiversity loss, freshwater use, mobility and connectivity, economic development, etc.). Our work on megaregions with the Council of the Great Lakes Regions looks at the GLR in the context of other global megaregions.

Rockström, J., et al., (2009). Planetary boundaries:exploring the safe operating space for humanity. *Ecology and Society* 14 (2): 32. [online] URL: <http://www.ecologyandsociety.org/vol14/iss2/art32/>

**Every design has a great story to tell.**



## Faculty Contribution



**Wayne Parker** shares a summary of his research on an urban project. Management of wastewater is a core function of municipalities in urban environments and involves major capital infrastructure and significant operating costs. The Region of Waterloo is in the midst of a long term upgrade of the major wastewater treatment plants (WWTPS) in the Region with the goals of improving water quality and increasing efficiency. Once complete, the Region will have invested \$800 million dollars in the upgrades which represents the second largest infrastructure investment by the Region after the light rail transit project. Once installed, new infrastructure typically requires optimization of operations to maximize effectiveness and efficiency. These optimization exercises has provided an opportunity for collaborative studies between the Region and Wayne Parker in the Department of Civil and Environmental Engineering.

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The projects completed to date have supported optimization of the sludge processing systems at three WWTPs (Waterloo, Kitchener and Galt).

- At the Waterloo WWTP, scale development on sludge dewatering equipment has become an operational challenge requiring equipment to be taken offline for frequent acid washing. A pilot study of a commercial physical treatment technology revealed a modification in sludge chemistry that yielded reduced scale formation. On the basis of the study results, the Region has installed physical treatment units on all dewatering lines at the plant.
- At the Galt WWTP, cogeneration equipment is being installed for enhanced biogas utilization, however, high levels of hydrogen sulfide (H<sub>2</sub>S) in the biogas was going to require installation of additional equipment for gas cleaning. A study that compared operations between the Galt and Kitchener WWTPs suggested that changing the coagulant employed for phosphorous control at the Galt WWTP would yield a secondary benefit of controlling H<sub>2</sub>S in the biogas. The change in coagulants was implemented and biogas quality was observed to improve substantially resulting in a significant cost savings associated with the implementation of cogeneration.
- The addition of polymer to enhance sludge dewatering is a substantial cost for all of the studied WWTPs. Historical data revealed significant differences in polymer use between the WWTPs in the Region and hence a study was conducted to better understand the underlying reasons for these differences. It was found that increased polymer use at Galt could be attributed to unique wastewater chemistry at this plant. A novel lab scale dewatering test was implemented and found to be valuable for diagnosing conditions that impact on dewatering efficiency. Through the study, the Region was able to reduce polymer dosing at WWTPs thereby saving significant operating costs.

The studies have proved to be mutually beneficial to the collaborators and have provided students an opportunity to gain experience in solving real world problems. The results of the studies have been presented at major technical conferences and journal papers are currently under review.