

Wednesday, May 12, 2021

# HGS Environmental & Engineering Virtual Meeting

Virtual Meeting via Zoom

7:00–9:00 p.m.

HGS Members \$10 Non-Members \$25 Students \$5

<https://www.hgs.org/civicrm/event/info?id=2252>

Registered Attendees: A confirmation email will be sent upon registration with meeting links.

Event contact: Matthew Cowan – [mrccowan1@hal-pc.org](mailto:mrccowan1@hal-pc.org)

**\*\*Non-Members can submit an application and pay their dues before registering to get the member price. Please call the HGS office at 713-463-9476 to be registered only AFTER your application and dues are submitted.\*\***

*Meagan Hale  
Rice University*

## Urbanization's Environmental Impact on Water Quality

As human population grows, an increasing amount of land is being used for urban infrastructure. However, the environmental impacts of this urbanization are not completely understood. One aspect of urbanization's environmental impact is water quality. For instance, the concrete used in water transport and drainage systems can leach Ca ions into urban rivers and increase water pH. These changes are of concern because pH range is a major factor in determining the toxicity and bioavailability of chemical compounds. Additionally, many aquatic microorganisms can only thrive within certain ranges of pH and Ca concentrations.

To investigate how the concrete used in urban infrastructure impacts water quality, I studied two major rivers in Houston, TX – White Oak Bayou, which is lined with concrete, and Buffalo Bayou, which has a natural river bottom. These two rivers were

compared with the non-urban Trinity River, since river chemistry may be affected by the presence of concrete anywhere within the river's watershed. I collected water samples from Buffalo and White Oak Bayous and analyzed their major anions and cations using ion chromatography (IC) and inductively-coupled plasma mass spectrometry (ICP-MS) methods, respectively. In addition, I analyzed roughly 50 years' worth of public water quality data for each Bayou and the Trinity River. The data suggest that the concrete-lined White Oak Bayou has a higher Ca concentration and pH value than Buffalo Bayou. Both urban bayous have higher average pH values than the Trinity River. The results of this research expand our knowledge of the environmental impacts of water transport and drainage systems. ■

### Biographical Sketch



**MEAGAN HALE** is a (very) soon-to-be graduate of Rice University's Earth, Environmental, and Planetary Sciences department. She is primarily interested in pollution/urbanization and environmental chemistry, and she completed a senior honors thesis on the topic she is speaking about today. After graduating with her BS, Meagan plans to work for a few

years in industry to get a more well-rounded understanding of environmental issues. She hopes to eventually attend graduate school and earn a PhD to further her research career. In addition, she is an avid artist, and would love to someday publish a graphic novel to educate kids about science.

