



**A STORMWATER TOWN/GOWN SUCCESS STORY:
G201, SERVICE LEARNING IN CHEMISTRY AND
WATER-QUALITY MONITORING**

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City of Bloomington and Indiana University –
Bloomington Cooperation Program

Who are we?



- **Kriste Lindberg** = *Education Specialist, City of Bloomington Utilities Department. Kriste has an MEd in Instruction Design specializing in natural resources and has been working in the stormwater field since 1992. stormwater@bloomington.in.gov*



- **Cate Reck** = *Director of Undergraduate Studies in Chemistry at IUB; teaches chemistry to the masses; offers service classes to undergraduates on water quality; provides service trips abroad to Dominican Republic to install water filters in homes. creck@indiana.edu*

Town/Gown Motivations

- **Vision Statement** = addressing challenges, emerging issues and opportunities between and amongst institutions of higher education and the communities in which they reside.
- **Mission Statement** = strengthen town/gown partnerships by providing a network of professionals and resources, identifying and sharing leading practices, innovative solutions and professional development opportunities for municipal and university communities.
- **Service learning** in the school systems is a good way to find a captive audience for these programs.

MS4 Learning Goals

- Under the MS4 program, permittees are required to incorporate the following six elements (known as Minimum Control Measures, or MCMs) into their stormwater management programs:
 - **Public education and outreach**
 - **Public participation and involvement**
 - **Illicit discharge detection and elimination**
 - Construction site stormwater runoff control
 - Post-construction stormwater control
 - **Municipal Operations Pollution Prevention and Good Housekeeping**

Motivations for Service Learning at IUB?

- Students stating in evaluations they were learning “nothing” relevant in their coursework
- Provides an opportunity to use skills and knowledge in real-life situations
- Extends learning beyond the classroom
- Promotes learning through active participation
- Addresses the need for further transferable skills before employment
- Fosters a sense of caring for others/community

National studies suggest that students in effective service-learning programs:

- Improve academic grades (highest impact on minorities)
- Increase attendance in school
- Develop and/or enhance personal and social responsibility

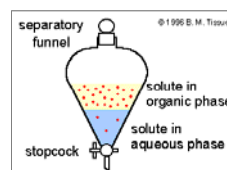
Timeline

- Fall 2005 Chemistry first offered a course in service learning G201 (1 cr.) – Relationship to community as after school activities
- Summer 2007 Chemistry Chair approved hiring of an outreach coordinator
- Summer 2009 Service learning conference (met Kriste)
- Fall 2009 Developed plans for project and sought approval (city and IU)
- Spring 2011 Received Bravo Award from City of Bloomington Parks and Recreation Department
- Spring/Fall 2010 – 2015 Taught each Spring and Fall semester
- Spring 2013 Received Indiana Department of Environmental Management Award
- Spring 2016 Collaboration with IU – Media course to cover marketing
- Summer 2016 StormCon 2016 presentation
- Fall 2016 Starting up, again!



Example syllabus for one semester

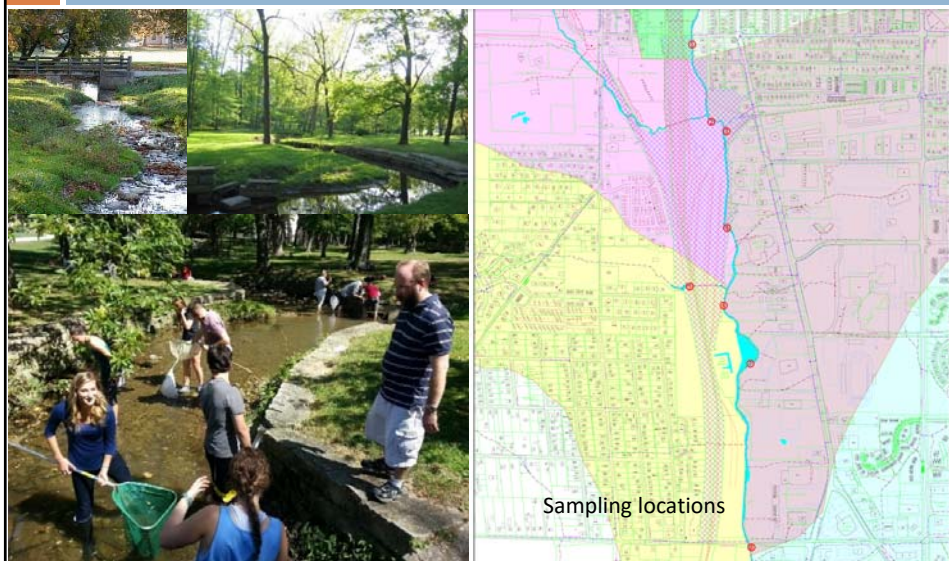
- Intro, set up groups, scheduling, course overview, hand out materials
- Three days of **Hoosier Riverwatch** (Indiana Department of Environmental Management) training
- Atomic Absorption Lecture
- Atomic Absorption tour and demo
- In-class experiment with separation/extractions
- Lab work doing hands on separation/extractions
- GCMS talk, tour, and demo by department MS facility directory
- Discussion of National Water Issue (e.g., Chesapeake Bay, Pb^{2+} in Flint)
- E. coli and **storm drain marking training** by Kriste
- Group presentations (2-3 weeks)
- Reflection papers



Hoosier Riverwatch Training & Kit Composition



Jordan River (IUB) flows to Clear Creek (city)



Largest Obstacles and their Solutions

Obstacles

- Finding enough time out of class to finish goals
- 6-h training scheduled
- Getting students to really test enough sites (4/sem)
- Getting students to put data in database
- Getting students to re-enroll to become peer leaders in future semester
- Getting students to continue to show up to class and prepare for planned discussions

Solutions

- Students had to coordinate their complicated schedules
- Had to negotiate with HRW to get abbreviated training since students already have some chemistry background
- GRADE: need to motivate to complete course requirements
- Lots of email reminders
- Offer new discussion material / themes each semester to make repeating the course more appealing
- GRADES; bring in interesting outside speakers (hard to screen speakers in advance); keep classes interactive so that they feel they contribute and are needed in class

Student Feedback

- “(This class) provides a **bigger picture of the environment** and what one could do about it.”
- “I learned what **actual data taking would be like** as a potential career.”
- “Volunteering **gave me life skills** to be successful.”
- “I would recommend this class due to the **breadth of knowledge** that is helpful in later chem courses and I **like the small class feel.**”
- “Volunteering is essential in a society because it **fosters a sense of community** and brings people of different backgrounds together to help one another.”
- “I think it’s even more **important for scientists to participate in community service** because of their extensive knowledge and specified skill set that not have.”



Acknowledgements (People, \$\$, and Resources)



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- **Indiana University**, Steven Tait, Department of Chemistry
- **Indiana University**, Ben Burlingham, Department of Chemistry
- **American Chemical Society** – Analytical Division
- **American Chemical Society** – Innovate Projects Grant

Questions?

