Field Trip! Computational Biology on the Road

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ABSTRACT

A few weeks ago I took my students to the Association for Computing Machinery Conference on Bioinformatics, Computational Biology, and Health Informatics (ACM-BCB) in Seattle, WA. It was a fantastic experience for everyone involved, and the organizers did an excellent job running the conference. I asked my students to reflect on the conference, and I figured I should do the same.

This report also highlights some features of the ACM LaTeX template. The original `bio331-sample.tex` file is available on Moodle.

Keywords

ACM; conferences; undergraduate research

1. MOTIVATION

When I learned that ACM-BCB 2016 was going to be held in Seattle, I jumped at the chance to take Reed students. ACM-BCB is a computer science conference focused on applications to computational biology and health informatics, and I have published there in the past [1]. My upper-level class, *Computational Systems Biology*, included a great mix of biology and math/CS majors. Thirteen Reed students attended ACM-BCB (Table 1).

1.1 Broader Impacts of Conference Travel

The timing and location of the conference coincided perfectly with my *Computational Systems Biology* class, and I received funding from the NSF for student travel. The grant, titled **A Course-Based Undergraduate Conference Experience in Computational Biology**, offers the following broader impacts (phrasing borrowed from the proposal abstract). First, it will promote interdisciplinary research by educating students about computer science applications within biology. Second, it will empower students with a unique opportunity that few undergraduates obtain, leading to an anticipated increased confidence in engaging in science and scientific research. Third, it will provide an opportunity for Principal Investigators (PIs) from other institutions to interact with strong interdisciplinary undergraduates.

Figure 1: The group before boarding Seattle's Great Wheel at Pier57. From left to right: Elaine, Eli, Erik, Nick, Mina, Amy Rose, Yurel, Rose, and Karl. Not shown: Emily, Vikram, Danny, and Barney.

1.2 Recruiting and Retaining STEM Students

As a computer scientist, I am interested in recruiting students to computational fields *and* supporting them if they decide to continue this line of study. My classes are interdisciplinary in nature, offering a unique opportunity to engage students in computational biology material. As I wrote in the NSF proposal, conference travel is available to **any** student to takes my upper-level class, encouraging students from both computational and non-computational backgrounds to attend:

The proposed travel is also a potential mechanism for recruiting underrepresented groups in STEM. The introductory computational biology courses in 2015-2016 included students from all years (freshmen through seniors) majoring in eight different areas (including four outside the Division of Math & Natural Sciences). Further, 60% of the students who completed the course were women, a group traditionally underrepresented in computer science. Thus, the pool of students eligible for the upper-level course (and the proposed conference travel) include a group that is diverse in terms of gender, class year, and declared major.

– NSF Proposal Abstract

Bio331 Fall 2016, Reed College, Portland, OR

ACM ISBN X-XXXXX-XX-X/XX/XX.

DOI: XX.XXX/XXX_X

Name	Year	Major	Bio331?
Amy Rose Lazarte	Sophomore	Alt-Bio	✓
Yurel Watson	Sophomore	Math-CS	
Elaine Kushkowski	Junior	ES-Bio	
Eli Spiliotopoulos	Junior	Biology	✓
Danny Heinz	Senior	Bio-Psych	
Erik Lopez	Senior	Math-CS	✓
Karl Menzel	Senior	Biology	✓
Mina Marden	Senior	Math-Stats	✓
Nick Franzese	Senior	Math-Bio	✓
Rose Driscoll	Senior	Alt-Bio	
Vikram Chan-Herur	Senior	Biology	✓
Barney Potter	'16 Graduate	Math-Bio	
Emily Merfeld	'16 Graduate	Bio-Psych	

Table 1: Reed students who attended ACM-BCB.

2. REFLECTION

With such a large cohort of undergraduates at a scientific conference, my role shifted to encompass one of an educator as well as a researcher. I honed in on the accessibility of the material in talks, feeling a bit of pride when the speakers showed an image or mentioned a topic I have taught in class. I also had some moments of "wow, should have taught them that" when a speaker presented a fundamental concept we have not yet covered. Many of my students came out of sessions excited about what they had just learned. They talked with the speakers, asked for their papers, and are now delving into this new material. Graduate student attendees became mentors, fielding questions about why they went to graduate school and how they picked their research topic.

ACM-BCB was an ideal size – the conference had compelling talks and tutorials while being small enough to chat with the keynote speakers and conference organizers. I caught up with existing colleagues and met some potential collaborators in the Pacific Northwest. I also found myself in discussions with graduate students about my position in a liberal arts environment. Reed had a research presence, since three Reed students submitted posters to the poster session. My students had garnered enough research experience – either through their thesis, summer research, or independent projects in class – to have engaging conversations with other attendees.

2.1 Lessons Learned

The trip to ACM-BCB as a class taught everyone (including me) the importance of logistics. Some gems:

1. Make sure the taxi to the train station can fit the entire group.

2. Remember who you gave the posters to in your mad dash to find parking before your train departs (see #1).

3. Make sure your PCard credit limit is set so it's not declined at the hotel.

4. Tell your students the correct time of the first keynote.

And the question of the day: is a (very detailed) receipt for a can of soda written on a napkin by a bartender reimbursable (Figure 2)?

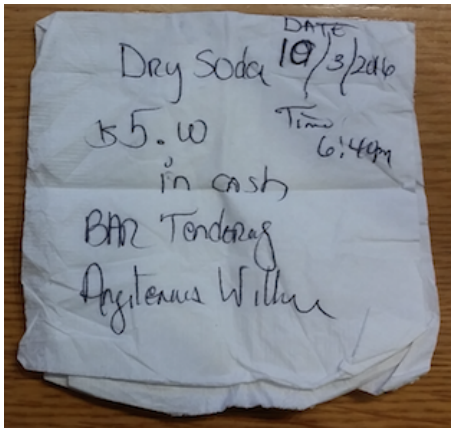

Figure 2: The napkin receipt.

3. REFERENCES

[1] Anna Ritz and TM Murali. Pathway analysis with signaling hypergraphs. In *Proceedings of the 5th ACM Conference on Bioinformatics, Computational Biology, and Health Informatics*, pages 249–258. ACM, 2014.