TLAC Conference Grant Program
Winter 2016

Brandon M. Canfield, PhD
Tenure-earning Assistant Professor
Chemistry Department
bcanfiel@nmu.edu, 227-1069

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251st American Chemical Society National Meeting
March 13-17, 2016
San Diego, California

B Canfield "Rolling the dice on chromatography role-playing board games" *Oral*, Division of Analytical Chemistry: Approaches to Engaging Students in Analytical Chemistry Courses, American Chemical Society, 251st National Meeting, San Diego, CA (2016)

Background

Teaching is a great passion of mine, and my mission as an educator is to engage my students in such a way as to impart knowledge and equip them with the tools necessary for successful independent inquiry. Throughout my career, I have taken regular steps to assess and improve my effectiveness as an educator by attending faculty development workshops, such as those organized by the Center for Teaching and Learning, or equivalent offices at previous institutions, as both participant and presenter. As can be inferred from the various titles of my presentations (*On teaching 'scientific thinking': a collaborative approach to student-centered active learning and technology-enhanced course design*; *Multimedia projects: Reversing roles and developing 21st century skills*; *Intelligent Redesign: A Collaborative Approach to 'Scientific Thinking'*), educational technologies and active learning environments are both major factors in shaping my pedagogy. At past institutions I often taught general science courses to non-science majors, which provided an ideal learning environment for me in which various general pedagogical strategies could be applied and evaluated. Now, at Northern, I find myself largely teaching advanced chemistry to chemistry majors, and the need is great to develop more specific and effective strategies for engaging these students at this level.

Active learning in the forms of independent inquiry, problem solving, and peer-teaching/collaboration inherently presents itself in the laboratory course components of the natural sciences. However, there is often a jarring dichotomy between the learning that takes place in the laboratory and that which takes place in the classroom. To whatever extent possible, I would like to encourage and extend the active environment of the former into the latter. While I still feel that traditional lecturing remains an effective means of instruction, I try to also balance that form of information delivery with opportunities for engaging students in discussion and activities designed to encourage students to form and reflect on their own conceptual comprehension. Over the past three years in my 400-level chemistry courses at NMU, I have been working to apply these general pedagogical approaches to very specific course content, such as chromatographic *rate theory*, by developing and refining unique boardgame-style simulations. Rather than passively hearing or reading the details of this theory, the students actively discover the principles while playing the game. I am quite pleased with and proud of these activities, and intend to submit them to the Journal of Chemical Education, the leading pedagogical publication in my field. Before doing so, I am interested in presenting these ideas to an audience of educational peers for feedback.

Funding Requested

I am requesting support to attend and present my work at the 251st National Meeting of the American Chemical Society. Although the major focus of these conferences is on scientific research, they also include significant attention to the scholarship of teaching. My abstract, *Rolling the dice on chromatography role-playing board*

games, was accepted for oral presentation in a session hosted by the Division of Analytical Chemistry. Other topics to be presented in this session, titled Approaches to Engaging Students in Analytical Chemistry Courses, include flipped classrooms, student-driven methods development, and skill-oriented labs. I am excited because my talk is relatively unique among the group, however it is clear that the others will inform the further refinement of the work I will be presenting.

While I definitely intend to take advantage of the interesting scientific research that will be presented at this conference, there are several other sessions that are directly relevant to my teaching interests, and potentially relevant to a larger cohort of NMU faculty not limited to those in the Chemistry Department. For example, the Division of Chemical Education is hosting a session, titled Cottrell Scholars Collaborative: Innovating the Integration of Research & Teaching, which includes topics such as teacher-scholars, course-based undergraduate research experiences (CUREs), and using integrated activity portfolios to promote positive institutional transformation.

After attending this conference, I expect to be better prepared to submit my work to the Journal of Chemical Education, where it might eventually be adopted in analytical chemistry classrooms around the country, bringing positive attention to the teaching strategies I have developed and to Northern Michigan University. I also expect that my own students will benefit directly from my attendance; ideas which may be new to me, but which have been vetted by others' experiences, will be brought back for trial, modification, and implementation in my courses. Although the specific boardgame activities I will be presenting at the conference may not have any direct application to courses outside the Chemistry Department, I will also be in a stronger position to present the underlying mechanics and outcomes as they simply relate to teaching, and I would be interested in working with CTL or TLAC to organize a presentation or workshop on the topic. It also seems that the Division of Chemical Education session mentioned above may tie in directly to the Fall 2015 CTL-sponsored Undergraduate Research Learning Circle, which sought to explore various strategies for incorporating/recognizing research as official components of our academic programs. Most Learning Circle participants seemed interested in continuing this discussion as our institution enters another major transitional period, and perhaps I could lead or assist in a follow-up session based on the information gathered at this conference.

Finally, in reviewing the past recipients of this award, I notice that the natural sciences are only represented once in its history. The primary emphasis for all faculty at NMU is teaching, therefore an ongoing conversation about what constitutes excellence in that area is a necessary one. After attending this conference, I hope to introduce another informed voice, representing the experiences and perspectives from the natural science classrooms and laboratories, to this conversation.

Anticipated Expenses

Conference registration, ACS member rate:	$415.00
Round-trip airfare, Marquette to San Diego:	458.20
4-night lodging at reduced conference rate:	956.00
Ground transportation:	60.00
Meals (5 days):	160.00
total:	$2049.20

Total anticipated costs exceed the maximum grant award amount of $1500. The balance of costs will be covered by my remaining Professional Development funds.