VANCOUVER ISLAND UNIVERSITY

Science and Technology Teaching and Learning Symposium

Wednesday May, 21 8:30 a.m. – 3:00 p.m.

Invited Speakers

Dave Berry: Laboratory Supervisor and Senior Lab Instructor, Department of Chemistry, University of Victoria

As a Laboratory supervisor, Dave is responsible for the overall administration of the Undergraduate Laboratory Program. His own area of speciality is for labs in the areas of inorganic chemistry. He has also been a Visiting Research Fellow at the Australian National University (1985), University of Bristol, UK (1991) and University of Canterbury, NZ (1998). Dave is the recipient of the 3M National Teaching Fellow Award (2000) awarded by the Society of Teaching and Learning in Higher Education (STLHE) and 3M Canada. He has also received the President's Distinguished Service Award (2004) and Team award for innovation (2012). He also is the recipient of the 1997 Excellence in Teaching Award sponsored by the Alumni Association, University of Victoria. Dave was the Associate Director for TA Development in the Learning and Teaching Centre (2000-2008).

Jamie Mulholland: Senior Lecturer, Department of Mathematics, Simon Fraser University

Jamie is a senior lecturer in the department of mathematics at Simon Fraser University since 2006. Jamie holds a PhD in Mathematics (UBC), MSc Mathematics (UBC) and BSc Mathematics (SFU). His background is in pure mathematics; in particular abstract algebra, algebraic topology, combinatorial group theory, and number theory. Jamie is also very interested in mathematics education and promoting mathematics to students at all age levels: elementary school through college/university. Mathematics is a very beautiful subject, and highlights some of the greatest achievements in human thought, unfortunately not everyone hangs on long enough to reach the stage where they get to encounter this beauty. In 2011, Jamie won the Excellence in Teaching Award (SFU) and the Faculty of Science Excellence in Teaching Award. During his doctoral work at UBC he was awarded a NSERC Postgraduate Scholarship and a Governor Generals Gold Medal for his academics. Boosting a community appreciation towards mathematics is something that interests Jamie a great deal.

Brett Gilley: Carl Wieman Science Education Initiative (CWSEI) Teaching and Learning Fellow, Department of Earth and Ocean Sciences, University of British Columbia

Brett Gilley has been trying to decide if he is a Geologist or an Educational Developer since 2003. He completed his Masters Degree in Earth Science at Simon Fraser University and has been running teaching workshops, designing courses and alternately inspiring and scaring students since then. He has taught at more post-secondary institutions in the Vancouver area then he cares to admit, and is currently working in the Earth and Ocean Sciences Department at UBC as part of the Carl Wieman Science Education Initiative (http://www.cwsei.ubc.ca/). Brett hopes he is unable to resolve this apparent career dichotomy any time soon.

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AGENDA

8:30– 9:00 Arrival and Breakfast - Royal Arbutus Room

9:00 – 9:05 **Welcome + Speaker Introductions**
from Science and Technology Faculty Planning Committee
Wendy Simms, Tim Stokes, Christine Tong and Greg Klimes

9:05 – 9:35 **Invited Speakers Panel** (10 mins per speaker) – Royal Arbutus Room
Science Students of Today: Are They Really Different? How to Engage?
All faculty work diligently to motivate and involve students in the academic learning environment, but there are increasing obstacles and challenges arising in post-secondary education. In this opening panel session, the three invited speakers will share their top tips and strategies for engaging the science students of today.

9:35 – 10:00 **Open Discussion with Panel**

10:00 – 10:15 *Movement to Session 1*

10:15 – 11:15 **Session 1** (Choose 1 of 3 – Send Choice to Charity.Gillett@viu.ca before May 14)

1. **Collaborative Learning** (Dave Berry, UVic) – Room 444
   In this session, we will discuss strategies for engaging students to learn - from anyone involved with the course. Examples will be drawn from the context of a lab program, but we will be walking the talk and using everyone's experiences to germinate ideas new to us individually.

2. **Flipped Learning** (Jamie Mulholland, SFU) – Royal Arbutus Room
   The flipped classroom (or inverted classroom) teaching model has received a lot of attention in recent years, primarily due to the available use of technology for recording and distributing video lectures. What exactly is the ``flipped classroom"? This is a very broad term that encompasses a lot of other teaching methods. At its very heart it describes an approach where in-class time is re-purposed for inquiry, application, and assessment. In this session, Jamie will describe one particular implementation of the flipped class used for large first year calculus courses, and we'll discuss what the implementation could look like for smaller enrolment courses.

3. **Classroom Assessment Techniques: What are Students Learning?** (Brett Gilley, UBC) – Room 514
   Figuring out exactly what your students are thinking is one of the more difficult parts of teaching. Before learning can occur student misconceptions must be addressed and initial knowledge must be gauged. After learning instructors need to figure out how students are thinking and whether they truly understand the material. Classroom Assessment Techniques (CATs) are relatively simple assessments that are easy to deploy in real time in any or all of your class meetings in a given semester. In this session we will discuss ideas behind these assessments, specific examples of CATs you can try, and how they might be beneficially used in your classes.

11:15 – 11:30 *Movement to Session 2*

11:30 – 12:30 **Session 2** (Choose 1 of 3 – Send Choice to Charity.Gillett@viu.ca before May 14)

1. **Designing a Lab Course** (Dave Berry, UVic) – Room 444
   Is the lab portion of the course another turnstile in the path to the final exam or does it have an independent function? We will explore some of the criteria for consideration when constructing a lab course and how we might engage the learner better.

2. **Visualizations for Learning** (Jamie Mulholland, SFU) – Royal Arbutus Room
   Bringing concepts to life through use of interactive visualizations can be a very powerful learning tool for students. Searching online for just the right visualization often leads to an instructor settling for one that does almost what they wanted. In this session we'll discuss two mathematical software packages used for creating/modifying visualizations that can be delivered to students in a web browser (which will even work on the iPad). The software we'll discuss is GeoGebra (graphing utility, with a lot "under the hood"), and Sage (a computer algebra system comparable to Maple). Both are open source and completely free.

3. **How People Learn: Using Research Based Instructional Strategies in Your Classes** (Brett Gilley, UBC) – Room 514
   In recent years work in cognitive science, brain research, classroom studies, and expertise development have combined to give us a coherent picture of how people learn. Using these ideas, and those from related fields, as a framework, we can improve the learning in our classes. The addition of research based instructional strategies (RBIS), those that have been shown to be effective in the literature or other independent studies, can improve student performance, retention, motivation, and help our students succeed.

12:30 – 1:30 **LUNCH** - Royal Arbutus Room

1:30 – 2:45 **Round Table Conversations -** Royal Arbutus Room

There are 6 Table Topics below.

Each round table conversation is schedule for approximately 25 minutes per table X 3 rotations. There is no sign up required. After lunch when indicated, choose a table and discuss topic with others at table. Invited speakers join tables too. When time is up and signaled for rotation, either stay at same table for more discussion or move to another table to discuss another topic.

Table 1: The First Year Experience

- How can we help our VIU students with the transition from high school to university?
- How can I get more students to pass my first year course?
- How/ Where can students obtain a quick reference guide to help them and to ensure a successful 1st year?

Table 2: Cross-Discipline Communication Strategies

- What are other departments in Science and Technology doing?
- Is there any way we can make our science curriculum more cohesive?

Table 3: Running Successful Labs/Seminars

- How can I get my students to link lab exercises with the concepts I am teaching in lecture?
- Will students get more out of a lab if they have to design the experiment themselves?
- Will providing online review material help my students retain what they learn in lab?

Table 4: Bringing Technology into the Field

- Is technology something I can bring into my lab or use in my research projects?
- Are there any educational apps that I can use in my program to help students learn?
- What technologies are being used in our S+T faculty already and how are they going?

Table 5: Time Management in the Classroom

- How do I get through the material in content heavy courses?
- Should I lecture extensively about a portion of the material or briefly introduce all of the concepts in lecture? How much is too much or not enough?
- How much material can I expect students to cover on their own? What amount is reasonable?
- How can I be sure the material students are covering on their own is being retained? Weekly quizzes, or answer posted questions weekly into VIULearn (Desire2Learn) drop boxes?

Table 6: Learning through Community Involvement

- How can we connect student learning with course/ program objectives in the community?
- Models of success, what has been done to date and what do they look like
- Future opportunities for S&T with cross-discipline projects

2:45 – 3:00 **Wrap Up** (prize draws, feedback)