Teaching the math – practice from the classroom
Enseigner les maths – des exercices tirés de la classe
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TREFOR BAZETT AND ASMITA SODHI, University of Victoria
Reflections on teaching limits and the Intermediate Value Theorem in a Two-Cohort Model in Calculus

In 2016, our department split the typical Calculus 1 course offering into two separate courses: one for students who have had some previous experience with calculus (such as a high school class), and one for students who have not. The hope was that students would feel more comfortable in a class with peers of the same experience level, and with an instructor tailoring the course to that level of experience. Both of these courses have the same learning objectives, and are viewed equivalently when it comes to pre-requisites. This brings up some interesting pedagogical considerations, as we need to guide two groups of students from very different starting points to the same end point, in equal amounts of time. The two of us are typically the coordinators for these calculus courses in the fall term. We'll share some context of our respective course demographics, and demonstrate how we design lessons on limits and the Intermediate Value Theorem for each cohort.

SA'DIYYA HENDRICKSON, University of Toronto
Twinning Is Winning! A Building-Block Approach to Teaching Taylor Polynomials

Taylor polynomials are powerful mathematical tools, but for students encountering them for the first time, their construction can feel mysterious. Where did that formula come from? Why does it work?

During this presentation, I'll share how I introduce Taylor polynomials to first-year engineering calculus students through a lively mathematical journey that begins with a practical motivation: the value of simpler functions for modelling and making sense of real-world phenomena. From there, we explore why polynomials make such appealing candidates for constructing a function's "twin" that can be used to approximate it when an estimate is sufficient. Drawing on familiar mathematical building blocks, students investigate the anatomy of polynomials and uncover some surprising connections hiding in plain sight. Rather than presenting the Taylor polynomial formula at the outset, we work toward its construction as a purposeful outcome of logical thinking and mathematical exploration.

I'll take you behind the scenes of this instructional approach, sharing how playful storytelling and exploration can lead students toward the rigorous mathematical reasoning behind the construction of Taylor polynomials, while reflecting on the strategic pedagogical choices and trade-offs involved in making room for this kind of lesson within a packed curriculum and limited lecture time.

CINEA JENKINS, University of Colorado Boulder
Student Driven Research Projects in the Calculus Sequence

In this talk, I will discuss creating student driven research projects in Calculus classes. As an undergraduate student, I struggled with projects in math classes because it felt like high- stakes busy work; my grade relied solely on the final product of a project that didn't interest me. When tasked with creating research projects for my own Calculus 2 and Calculus 3 students for a Research Symposium, I prioritized creating research projects around students' interests and that rewarded students' effort on the project. Students picked the topic as long as it related to Calculus 2 or 3 and decided on actionable goals for the project. These actionable goals were the basis of the grade for their final product. The grade for the whole project was spread out over a series of check-in meetings, the final product, and a post- reflection. During these check-in meetings, students could re-evaluate and update these actionable goals. In this way, students were directly involved in not only designing a project that genuinely interested them, but in how that project would be graded. I will share the execution of these research projects, the student reception, and perceived successes and shortcomings.

ALLYSA LUMLEY, York University
Once Upon a Sequence: Using Narrative and Pop Culture to Face the "Final Boss" of Taylor Series

Infinite series are notoriously tough to teach because students usually see sequences, power series, and Taylor series as a disjointed checklist rather than one big story. In this talk, I want to break down the choices I made to change that by turning the whole unit into a cohesive narrative. To meet students where they are emotionally, I deliberately brought in pop culture references they actually get, and I leaned into a classic student fear: trigonometric functions. By treating trig as the "villain" of our story arc, we built up a fun sense of dramatic tension that naturally made students want to figure out polynomial approximations. I'll share why I chose this narrative style over traditional setups, how it helped flip student anxiety into genuine excitement, and the real highs and lows of trying it out in my classroom.

ARTHUR QIU, University of Toronto
Manipulatives for Multivariable Calculus: Unorthodox Lessons for Active Learning, Collaboration, and Visualization

In this talk, I will describe several hands-on lessons embedded into a 500-student, proof-based multivariable calculus course. Designed to promote active learning, collaboration, and visualization, these lessons explore course concepts through structured group activities centred around three types of physical manipulatives:

- a 3D printed model of a function's graph used for lessons on critical points, Lagrange multipliers, and Darboux sums;

- a wooden wedge used for a lesson on integration in Cartesian coordinates; and

- a foam bead used for a lesson on integration in cylindrical and spherical coordinates.

I will discuss the qualitative benefits and challenges of these lessons, and how they were implemented at scale, including brainstorming and fabricating manipulatives, designing and executing lessons, and making revisions based on classroom observations and participant feedback. Sample models will be available for attendees to play around with!

This is joint work with Yuzhe Liu, Sydney Pinkalla, and Asif Zaman.

VANESSA RADZIMSKI, University of the Fraser Valley
Making the Math Matter: Centring Children's Mathematical Thinking in a Course for Future Elementary Teachers

The Mathematical Knowledge for Teaching of future elementary teachers, particularly in North America, has been a major concern for researchers for over 30 years (Ball, 1990). Research has brought to light mathematical misconceptions held by elementary teachers (Lo & Luo, 2012), high levels of anxiety around the teaching of mathematics (Olson & Stoehr, 2019), and how these issues affect children's learning (Hadley & Dorward, 2011). Although many teacher education programs require students to take a specified mathematics content course for future elementary school teachers, these challenges persist, with researchers observing elementary teachers avoiding challenging mathematics in their classrooms (Pahmi et al, 2025). In my work teaching such a course, I have questioned what I can do to increase students' buy-in, engagement, and their investment in developing their Mathematical Knowledge for Teaching long term.

In this talk, I will share my experience centring children's mathematical thinking into a mathematics content course intended for future elementary teachers and why I believe this framework supports students' investment in developing their Mathematical Knowledge for Teaching. I will utilize concrete excerpts from teaching multiplication and division of fractions to contextualize how I integrate this framework within the course. Additionally, I will describe my current efforts to develop extended curriculum materials for those who may be interested in adopting the framework for their own practice.

MARIA SISKAKI, University of California, Los Angeles
How to Solve an ODE by Week Three of College (and why this is important)

Calculus (sometimes followed by a formal ODE course) is the typical path for the mathematical training of life science students. However, this path is increasingly scrutinized as a way to meet their mathematical needs. Modern life science now sits at the interface of biology, mathematics, and computation, and modeling and dynamical systems have become essential. So, is

calculus still the best foundation? In this talk, I will describe a course sequence for first-year students that takes a modeling-first approach to dynamical systems, offering an alternative to the traditional calculus sequence. Along the way, I will ask what solving an ODE means for a life scientist and show how students can be working with ODE models by week three of their first math course, opening the door to the mathematics they need as future life scientists.