

CoMInDS Program Profile: University of Maine

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Program Snapshot: A summer workshop and academic-year follow-up program for all STEM graduate teaching assistants (GTAs)* at the University of Maine is augmented by a one-semester seminar course in the mathematics department. In mathematics, the program primarily serves masters students teaching in the calculus sequence.

How did the program originate?

The program developed in opportunistic fashion and two key contextual factors influenced its formation. First, it began just as the mathematics department undertook a shift in the structure of Calculus I. Under the new structure, the department offered 75-student lecture sessions of Calculus I accompanied by two weekly GTA-led recitation sessions. This generated an increased role for GTAs in undergraduate calculus instruction, a greater need to understand the experiences of GTAs in the classroom, and a desire to gain insight into GTA performance. The founder of the program, Natasha Speer, saw an opportunity to introduce GTAs to teaching and to support them while they taught.

Second, the university received a grant to understand and improve support for pre-service teachers in STEM fields. That project included professional development for all STEM graduate student instructors. The resulting program model included a multi-disciplinary summer orientation and monthly workshops during the academic year for all STEM GTAs. Discipline-specific support is provided through the mathematics department's semester-long course for all those teaching in that department for the first time. Though the grant has ended, these professional development opportunities still exist on the campus.

What is the scope of the program?

- The two-day pre-semester orientation for all new STEM GTAs typically serves 30-40 PhD and Masters students across STEM departments.
- The semester-long seminar typically serves 8-12 students, mostly masters students in math.
- In math, most GTAs will lead recitation sections for Calculus I. Some GTAs may serve as instructor of record for an undergraduate mathematical modeling course.

How is the program staffed and funded?

- One faculty member serves as the director and teaches the seminar course as part of the regular teaching load.

*Here the term graduate teaching assistant (GTA) includes all graduate students holding or preparing for teaching roles. Local terminology may differ.

- The mathematics department's service course coordinator offers support for all courses below Calculus II. Though not formally part of the GTA teaching development program, this person is an important source of information on what is happening in the calculus classes from both the faculty and GTA perspectives.

What are the main components of the program?

Features of the all-STEM program include:

- *Summer orientation*: This two-day meeting introduces new STEM GTAs to the practice of teaching and the culture of undergraduate teaching at the University of Maine. Key ideas introduced are: 1) teaching is a central part of the scholar's workload, 2) "teaching is something we talk about here," 3) understanding student thinking matters, and 4) active instruction is a preferred teaching method. The course serves as an introduction to the problems and issues of STEM undergraduate education and plants the seeds for a professional identity geared toward addressing those issues.
- *Monthly workshops*: During the academic year, meetings of the GTAs with the program director or other STEM education faculty cycle through important topics.

The math department's seminar course meets one hour per week and counts as one credit (where a normal graduate course is 3 credits). The seminar includes in-class and out-of-class activities and assignments, and self-assessment activities. The seminar features:

- *Sharing sessions*: Each session opens with an opportunity for GTAs to share stories about what is going on in their courses—perhaps surprising ways students think about ideas, or student behaviors that pleased or puzzled the GTA. The instructor's prompt and resulting stories seek to establish a culture of inquiry and openness about teaching. The instructor and other GTAs respond to these, and the instructor may adjust the schedule of topics based on GTA experiences.
- *In-class activities*: Class time is spent discussing text-based or video case studies, examining student thinking as evidenced by their written work, exploring core mathematical concepts and their connections to topics in undergraduate mathematics (e.g., function, variable). These model active learning approaches and are supported by out-of-class readings from mathematics education research on student thinking, observations of experienced instructors and peers, and written reflections on these assignments.
- *Guided observation and evaluation*: GTAs follow a structured protocol to observe each other teach and reflect together on that experience. This doubles as a learning tool for the GTAs who are observing and as a means for the instructor to see what is going on in GTA classrooms without being directly present. GTAs are also guided through a mid-term

evaluation process to help them solicit feedback from students and then to support them in processing that feedback and using it to inform their teaching practice for the rest of the term.

- *Video analysis of teaching*: This more direct form of monitoring is conducted by the program director and is used to help individual GTAs reflect on their practice and consider areas of improvement.

What aspects of this program make it work in the local institutional context?

- *Ongoing communication*: Though not necessarily a formal piece of the program's design, the ability of the program director to communicate with GTAs, instructors, and relevant members of university administration plays a crucial role in the execution of the program. Informal conversations with all stakeholders of the program enhance the potential for the program to meet everyone's needs
- *Vision for the purpose of professional development*: This begins with the message delivered at the summer orientation, which fosters key conversations that increases GTA awareness of the problems and issues of STEM undergraduate education. This vision embraces active instructional techniques and a concern for student thinking about mathematics. It encourages new GTAs to identify with the campus-wide STEM community and bolsters their identity as future mathematics educators.

Leaders' advice about this program model

- Be aware of the politics in your department. Learn to be the public relations liaison between the GTA development program and the faculty and administrators.
- Different stakeholders may value different things. It is useful to figure out what information various stakeholders find helpful in determining the value of the program, and use it to advantage when soliciting support.
- This model has been run by its founder so far. When it is handed off to another faculty director, it will be important to ensure that the messages remain stable regardless of who runs the program.

Where can I learn more?

Maine Physical Science Partnership (no date). Campus Initiatives – STEM TA workshops.

<https://umaine.edu/mainesps/university-initiatives/stem-ta-workshops/>

Search by contributor (Speer) to find resources from this program on the CoMInDS instructor resource site, <http://cominds.maa.org/instructional-resources> Some items include

How Do We Learn Activity. Natasha Speer. <http://cominds.maa.org/instructional-resources/browse-instructional-resources/types-understanding-activity>

Office Hours Scenarios Activity. Natasha Speer. <http://cominds.maa.org/instructional-resources/browse-instructional-resources/office-hours-scenarios-activity>

Peer and Group Observation Activity. Natasha Speer. <http://cominds.maa.org/instructional-resources/browse-instructional-resources/peer-and-group-observation-activity>

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