Framing Mathematics as a Foundation for Ethical STEM
April 2023 (virtual kickoff meeting; date TBD) and June 7–9 2023 (in-person workshop, Washington, DC)
Organizing Committee: Victor Piercey, Catherine Buell, Rochelle Tractenberg

Deadline to apply: February 10, 2023
APPLY

We seek instructors of math courses (e.g., Calculus, Differential Equations, Linear Algebra) in higher education contexts, to participate in a 3-year NSF-funded project to explore new ethical guidelines for mathematical practice and how best to integrate these into existing courses. Our funding allows support for 16 participants over the 3-year period which begins with a virtual kickoff meeting (April 2023), followed in June by an in-person workshop described below. We seek a pool of mathematics instructors that are diverse in terms of underrepresented demographic groups, institutional contexts, and career stage.

Participants will leave the June workshop with learning outcomes and supportive teaching materials tailored to their respective mathematics course contexts that feature ethical reasoning to initiate critical thinking and discussions about ethical guidelines for and around ethical mathematical practice. During the subsequent academic years (2023-5), participants will leverage their institutional supports for implementing their new materials, together with input as needed from the organizing committee and fellow participants. As members of this new community of practice, participants will create, discuss, refine, and share their experiences and materials.

Important Notes for Participation
This is a 3-year commitment with $1000 annual compensation. The compensation for the first year is to offset travel costs. Participants commit to actively engage all three years:
> **Year 1**, participants develop learning outcomes featuring ethical reasoning (ER) in their respective mathematics course contexts and draft supportive teaching materials.
> **Year 2**, participants will implement their materials in the classroom, and share their work with stakeholders, including non-instructor stakeholders through focus groups with business, industry, and government about their perceptions of building ER capabilities in users of, and contributors to, mathematics.
> **Year 3**, participants will continue to implement and revise their materials, and attend national or regional workshops where instructors of other foundational mathematics courses, and at different student levels, can adapt the tested ER instruction materials to promote implementation among a broader set of learners.

Participants will be expected to introduce materials in their courses, periodically report, and meet over the three years.

The deadline to apply is 10 Feb 2023, with the Organizing Committee making recommendations for selection of participants by 1 March 2023.

We plan a virtual meeting to kick off the work of the project and get participants engaged in (April 2023, date/time TBD), the in-person meeting will take place 7-9 June 2023 in Washington, DC; semi-annual virtual meetings will take place each academic year 2023-24, 2024-25.

Funding Details
We are able to offer 16 participants $1000 per year to cover travel and other expenses. We may have a limited amount of additional $500 stipends to defray travel expenses for the June 2023 workshop.

APPLY

Questions? Contact Victor Piercey or Catherine Buell.

NSF Grant Background
This project is jointly funded by the Improving Undergraduate STEM Education and Ethical and Responsible Research Programs.

Mathematicians, with some exceptions, have not described what it means to practice and use mathematics ethically. This has contributed to a culture permissive of data-related scandals, questionable professional practices, and decreased public trust in science. By integrating ethical reasoning (ER) into undergraduate mathematics classes, we can begin to alter the perception that, if mathematics features abstract and theoretical constructs, then the mathematics practitioner has no ethical responsibility. Considering the 'mathematics practitioner' to be both the user of, and the contributor to, mathematics, this proposal seeks to establish ER as a regular component of mathematical practice. Rather than wait until practitioners have committed to a career in research, we target instructors of, and students in, math courses (such as Calculus, Differential Equations, and Linear Algebra) that are foundational for diverse STEM fields and seek to introduce a learnable, improvable skill set (ER). This project serves the national interest in the faith and trust the public puts in the results of STEM research, including both that which is part of mathematics and that which involves the use of mathematics.
The project builds on a published, developmental model of ethical reasoning and a national survey of mathematics practitioners' perceptions of aspects of ethical practice that were derived from mathematics, statistics, and computing (the results of which we refer to as the "proto-guidelines") Using this foundation, the project seeks to foster integrity in both the use of, and contribution to, mathematics.