Embedding Ethics In Mathematics
(Org: **Diana Skrzydlo** (University of Waterloo))

MARITZA BRANKER, Niagara University
Viewing our students as ambassadors of our discipline: a new approach to the mathematics senior seminar.

The capstone course is traditionally an opportunity for students to delve deeper into the mathematical discipline. This talk outlines the rationale and details of designing a senior seminar course on the theme of the relevance of mathematics to society. Viewing students as ambassadors of the discipline provides the flexibility to accommodate math majors, preservice teachers with a math concentration and actuarial science majors within a single section of the course. More importantly it provides a venue for students to articulate their personal philosophy on the significance of mathematics and grapple with ethical ramifications of the discipline on our society. By the end they are cognizant of the need to consider not only if they are capable of crafting an effective solution to any given problem but also the implicit duty to avoid causing harm with their mathematical knowledge.

DAN BROWN AND MAURA GROSSMAN, University of Waterloo
Teaching computer ethics by focusing on discrimination and surveillance: takeaways from an online teaching experiment

We discuss our experiences teaching a computer ethics course focused on discrimination and surveillance. Our course's content includes algorithmic bias; how gender, racial, and sexual minorities are disproportionately impacted by technology; surveillance and privacy concerns; and methods technologists can use for ameliorating these concerns in the workplace and in society. We also discuss the results of an experiment in different formats of teaching this material: online versus in-person. Our analysis concentrated on the extent and contents of self-disclosure by both students and instructors. Using both quantitative and qualitative methods, we observed a higher prevalence of self-disclosure by both students and instructors in the online section. Notably, an analysis of demographic data revealed that minority group members were particularly active in self-disclosure in both formats. Overall, our findings suggest that an online setting may be more effective for delivering computer ethics courses where a primary goal is increasing open discussion and self-disclosure among participants.

CARMEN BRUNI, University of Waterloo
On the Ethics of Social Computing for Computer Science Majors

In the rapidly evolving field of computer science, the intersection of technology, society, and human behaviour presents both immense opportunities and complex ethical challenges. As computer science majors, students must not only learning how to build systems but also how their actions effect the environments in which millions of people interact with. This talk will explore a course taught at the University of Waterloo concerning the ethical implications of designing and developing technologies that impact societies.

SAMANTHA-JO CAETANO, University of Toronto
Teaching Ethics in the Era of Data

In this talk, I will discuss the integration of ethics into statistical education through the Embedded Ethics program developed by the Department of Statistical Sciences in collaboration with the Department of Philosophy. Recognizing that ethics permeates all aspects of statistics, we have introduced ethics modules in four undergraduate statistics courses. I will specifically focus on the implementation of these modules and the associated ethics assessments in a large third-year statistics course taught in Fall 2023. The presentation will highlight the benefits of this program while also addressing the challenges we encountered. Additionally, I will outline plans for future adaptations and the expansion of the program to include more courses.

MATT HAYAT, Georgia State University
Integrating Ethics into Mathematics and Statistics Education

Data examples in mathematics and statistics education often includes data collected on human subjects. Thus, educators have a responsibility to educate their students about the ethical aspects related to the collection of those data. With technological advancement and the increase in availability of real-world datasets, it is necessary that instructors educate about integrating the ethical aspects around data sources, such as privacy, how the data were obtained and whether participants consent to the use of their data. In this talk, we propose incorporating ethics into established curricula and integrating ethics into undergraduate-level introductory mathematics and statistics courses based on recommendations in the American Statistical Association's evidence-based Guidelines for Assessment and Instruction in Statistics Education (GAISE) Report. We provide a few examples of how to prompt students to constructively think about their ethical responsibilities when working with data.

JUDITH KOELLER, University of Waterloo
Experiences teaching About Ethics in Math via Peace Studies

Collaborations between University of Waterloo's Peace and Conflict Studies department and Faculty of Mathematics exposed the need for a course in Ethics in Math. Along with Peace Scholar Lowell Ewert, Judith Koeller co-developed and co-taught the course "Math for Good and Evil" starting in 2019; registrants included students from math/CS, peace studies and many other programs. Koeller also teaches "Math and Peace for Teachers" in the Masters for Math Teachers program, and will launch the Math Faculty elective "Social Implications of Math" in Winter 2025.

NATHALIE MOON, University of Toronto
Embracing Uncertainty: Weaving Ethics into Statistics Education

The foundational role of uncertainty in statistics provides a unique opportunity to meaningfully integrate ethics into the curriculum. While many students, particularly those with strong mathematical backgrounds, seek definitive answers, statistical practice inherently involves judgment under uncertainty. This talk explores how the ubiquitous "it depends" of statistical decision-making naturally aligns with ethical reasoning. Rather than treating ethics as an isolated topic confined to a dedicated week, we demonstrate how uncertainty serves as a bridge between technical content and ethical considerations. Through examining both clear-cut ethical rules and context-dependent dilemmas, students learn that navigating uncertainty is both a statistical and ethical skill. This integrated approach not only produces more ethically-minded practitioners but also develops students' comfort with ambiguity – a crucial skill for modern statistical practice. I will present practical examples of how I have integrated ethical discussions into core statistical curricula, transforming students' discomfort with uncertainty into a valuable professional asset.

LINDSAY POIRIER, Smith College
Data Ethnography: Cultivating Reflexive Sensibilities through the Cultural Analysis

Canonical ideologies tend to position data as neutral, when they may be more aptly characterized as power-laden systems for signification. While critical for interpreting the cultural meaning of data, the skills needed to historicize, situate, and deconstruct data are often underrepresented in STEM education. In this talk, I outline a series of pedagogical approaches to teaching cultural analysis of datasets, data infrastructures, and data work. I show how, by cultivating competency in hermeneutics, ethnography, and critical theory, students can learn to attend to the cultural provenance of data across a number of registers – from interrogating the belief systems of data designers, to examining the cultural logics of data infrastructures, to analyzing the interests of data-producing institutions, to unpacking the discourses that shape public understandings of data. Further, by pluralizing the epistemic lenses through which data are analyzed, students have an opportunity to nourish reflexive sensibilities – discerning their own cultural positioning as they question why culture tends to be deleted from data science work.

TALKBACK/ROUNDTABLE SESSION, Various
Talkback/roundtable discussion

We'll have an opportunity for audience members and speakers from the session to discuss ideas that were presented and share new ones.

VICKI ZHANG, University of Toronto

Taking Stock: Eight Years of Embedded Ethics at UofT's Actuarial Science Program

For over eight years, we have conducted various embedded ethics pedagogical experiments in University of Toronto's actuarial science program. We incorporate ethical discussions organically into technical teaching, and to use examples and case studies with an ethical dimension to discuss technical content.

For our introductory courses, we have incorporated narrative-based pedagogy for life contingencies, creative artmaking in financial math, exploring financial puzzles from pop culture, and team-based projects to explore insurance ethics.

For higher-year courses, we coached students to write modified op-ed to deep dive in different perspectives, taught students to code in industry software AXIS while exploring insurance regulations. We have also approached insurance decision-making (i.e. whether to insure or deny access to insurance protection) as a distributive justice and fairness question. We explored with our students alternative fairness frameworks including Luck-Egalitarianism and Democratic Equality, and how insurability decisions would be made differently - from the industry-standard "actuarial fairness" perspective - under those alternative frameworks.

In this talk, I will present the key examples of embedding ethics education in actuarial math education, and discuss the importance of marrying active learning activities with embedded ethics to maximize the impact. I will also share students' feedback and lessons learned.