VIRGINIA TECH

Experts convene to explore new philosophy of statistics field

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From universities around the world, participants in a summer session gathered to discuss the merits of the philosophy of statistics. Co-director Deborah Mayo, left, hosted an evening for them at her home.

In the heat of a Blacksburg summer evening, the talk on Deborah Mayo's back deck was of philosophy and statistics. Fifteen innovators in the Virginia Tech Summer Seminar in Philosophy of Statistics were contemplating the beginnings of a new field – Phil Stat.

"The overarching goal is that Phil Stat, short for the philosophy of statistics, will become a field in philosophy," said Mayo, one of the seminar's co-directors and a professor emerita in the Virginia Tech Department of Philosophy. "Today the problems about data are everywhere, as are problems about ethics and values. The justification for this new field is if you don't understand the underpinnings of statistics, you cannot understand the consequences of certain reforms that are being proposed or adopted."

Mayo defines Phil Stat as the philosophical and conceptual foundations of statistical inference. The idea involves the formation of judgments about the measures that define a population and the reliability of statistical relationships, usually based on a random sampling of data. With this, Phil Stat analyzes the uses of probability in collecting, modeling, and learning from the data.

Aris Spanos, Mayo's co-director of the seminar, said that during the past decade, many published, observation-based or experience-based research results in several disciplines within the medical and social sciences have been found not to be replicable. This has led some researchers to regard the results as untrustworthy, and several leading statisticians have been calling for reforms. Spanos said the need is

pressing for a better understanding of the main sources of untrustworthy evidence and a balanced appraisal of the proposed reforms.

“We designed the seminar on the philosophy of statistics in response to these discussions to inform the participants about these debates,” said Spanos, the Wilson E. Schmidt Professor of Economics in the College of Science. “We wanted to provide them with a sufficient background in the philosophy of science and statistics to enable them to participate in these debates.”

Mayo and Spanos decided the seminar, held on Virginia Tech’s Blacksburg campus, would help advance scholarship in this new transdisciplinary area and seminar participants could integrate into their research and teaching. In response to their call for applicants, a selection committee invited 15 of the 55 faculty, postdoctoral fellows, and senior graduate students who applied to participate.

The participants were a diverse group. They came from Auburn University, Duke University, Lehman College at City University of New York, the Ohio State University, Princeton University, Radboud University, Rutgers University, St. John’s College at the University of Oxford, Université de Montréal, the University of Amsterdam, the University of Colorado at Boulder, the University of Illinois at Urbana-Champaign, and the University of Utah. An attorney from the New Jersey Office of the Public Defender also joined their ranks.

Participants from the Virginia Tech Summer Seminar in Philosophy of Statistics included Dean Sally C. Morton (third from the right in the first row). Deborah Mayo and Aris Spanos appear to the left behind her.

Sally C. Morton, dean of the College of Science and interim director of the Fralin Life Sciences Institute at Virginia Tech, attended one of the seminar sessions.

“The proper use of evidence in decision-making is essential to tackling the complex problems in society today,” said Morton. “The summer seminar that brought together the fields of statistics and philosophy demonstrated the power of using a transdisciplinary approach to give the attendees an expansive view of the challenges we face. I was delighted to see the deliberate inclusion of students and early-career researchers in the seminar.”

For two weeks, the group gathered with special guest speakers, both in person and through an online meeting platform. Presenting at the seminar were Andrew Gelman, a professor of statistics from Columbia University; Richard Morey, a reader for the School of Psychology at Cardiff

University; Nathan Schachtman, a lawyer who specializes in scientific and medico-legal issues; and Stephen Senn, a consultant statistician from Edinburgh, Scotland.

The seminar, largely funded by Mayo and her husband, George Chatfield, through their Fund for Experimental Reasoning, Reliability, Objectivity, and Rationality of Science, also benefited from a number of sponsors. These included the College of Liberal Arts and Human Sciences, the College of Science, the Data and Decisions Destination Area, the Department of Philosophy, and the Department of Economics.

The summer seminar is not the first collaboration between Mayo and Spanos. In 2010, they coedited the book "Error and Inference: Recent Exchanges on Experimental Reasoning, Reliability, and the Objectivity and Rationality of Science." Together they have also published six papers and book chapters in such publications as the British Journal for the Philosophy of Science, Synthese, and the Philosophy of Science. The contributions stemmed from a Virginia Tech conference, ERROR06, which included the statistician Sir David Cox and the philosophers Alan Chalmers, Clark Glymour, and Alan Musgrave.

More recently, Mayo authored the book "Statistical Inference as Severe Testing: How to Get Beyond the Statistics Wars," published by Cambridge University Press.

The directors and participants will continue to propel Phil Stat beyond the summer experience through conferences, online publications, and an upcoming book, "Probability

Theory and Statistical Inference: Modeling with Observational Data," slated for publication by Cambridge University Press. As a group, they occasionally meet online and maintain a blog together. And they plan to present sessions at conferences.

"What we initiated here at Virginia Tech," Mayo said, "will have a big impact not just on the way we think about the philosophy of science, but on how both it and the philosophy of knowledge are taught and integrated."

– *Written by Leslie King*

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