

# **SUMMER SEMINAR IN PHIL STAT (12-30-18)**

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## **OVERVIEW**

We will offer a 2-week immersive seminar on Philosophy of Statistics (PhilStat) at Virginia Tech for faculty and post-docs in philosophy who wish to acquire or strengthen their background in PhilStat as it relates to philosophical problems of evidence and inference, to today's statistical crisis of replication, and to associated evidence-policy debates. We also invite social scientists and methodology researchers interested in strengthening their philosophical scholarship in this arena. A total of 12-15 applicants will be selected. (Up to 2 advanced Ph.D. students working on a dissertation that is directly in this area, may be considered.)

All accepted participants will receive housing with kitchen facilities and a stipend of \$1,000 (in 2 installments). See STIPENDS.

Our primary goal is to strengthen Phil Stat research and teaching in Philosophy. However, we wish also to enable statistical practitioners and researchers on methods to gain a greater facility in the conceptual and critical skills included under the umbrella of Phil Stat. Today's debates are intertwined with philosophical terms that often remain vague, such as evidence, validity, inference, realism, reliability, rationality, explanation, induction, confirmation, and falsification. This hampers communication among various stakeholders, making it difficult to even see where they agree. Thus we also encourage interested social scientists and methodology researchers to apply.

**Philosophy of Statistics (Phil Stat), broadly understood**  
Phil Stat includes

(a) philosophy of statistics: the philosophical and conceptual foundations of statistical inference and the analysis of the uses of probability in collecting, modeling and learning from data;

(b) problems of general philosophy of science insofar as aspects of error-prone and uncertain reasoning are involved: problems of inductive and deductive inference, evidence, testing, falsification, science/pseudoscience, underdetermination, realism, modeling, data analysis and experiment;

(c) the philosophy and history of science, and evidence policy, insofar as these involve error-prone reasoning, whether formal or informal.

### **The focus of the Summer Seminar in Phil Stat**

Our focus will revolve around current controversies about statistical methodology. The field of philosophy of statistics has long been marked by philosophical disagreement and controversy. Although the availability of high-powered methods has led to eclecticism and pragmatism, long-standing battles still simmer below the surface in questions about scientific trustworthiness and in the evidence policy reforms put forward by journals and professional societies. Rival conceptions of the nature of statistical inference show up unannounced in today's problems of scientific integrity, irreproducibility, and questionable research practices.

For example, today's statistical crisis of replication grows out of the difficulty in obtaining statistically significant results when an independent group seeks to replicate a finding using more stringent protocols and preregistration of hypotheses and data generation. However statistical significance tests are themselves steeped in the inductive-statistical controversies played out in the philosophy and history of statistics. Key notions—P-values, Type I and II error probabilities, power, confidence levels, posterior probabilities—are often confused and are interpreted in myriad ways. A jungle of thorny debates about probabilistic ontology, the nature of scientific progress, the role of probability—not to mention matters of politics—are interwoven. These issues form an important part of what we are calling PhilStat. Questions about values in science and ethics of research are also intimately entwined. Work in AI, machine learning, and causal modeling are also components of the broad area we have in mind, although we will not have time to study those topics in our summer seminar. However, participants may have projects that relate to these.

### **Justification**

The current statistical crisis in science cries out for philosophical illumination, while offering a superb avenue for philosophers to genuinely impact scientific practice and policy. The assumptions behind today's competing evidence reforms are largely hidden to those outside the loop of Phil Stat. This is a crucial obstacle to scrutinizing the consequences to science policy, clinical trials, personalized medicine, and across a wide landscape of Big Data modeling. Our program is intended as a first step to overcoming this obstacle. Despite technical sophistication, basic concepts of statistical testing and inference are more unsettled than ever. We aim to strengthen the role of philosophy in statistical debates as well as to enhance statistical inference in philosophical debates.

Many of the key problems in today's evidence-policy disputes are conceptual. Philosophers of science should be involved. Likewise, by bringing philosophical acumen to the debates, practitioners and metascience researchers can cut through the unclarity we often see regarding

the nature and roles of probability in inference. The deepest problems underlying the replication crisis go beyond formal statistics—into measurement, experimental design, communication of uncertainty. In addition, the importance of ethics in research and in data science is becoming increasingly recognized. Without an understanding of the basic statistics, informed by philosophical assumptions about the nature and goals of using probability in learning, it's impossible to see where the formal and informal, value-laden issues intersect.

### **Participants Can Expect to:**

- (1) Gain the necessary background in statistical methodology and philosophical foundations of statistics in order to integrate PhilStat into their research, teaching and professional engagements.
- (2) Study current debates between frequentist, Bayesian, likelihood and other methods, as they interrelate to (i) philosophical problems of evidence and inference, and to (ii) today's debates over data methods and statistical policy.

They will also have a role in shaping a futuristic interdisciplinary field including cutting across philosophy, statistics, and science.

## **SELECTION CRITERIA**

A selection committee consisting of the two directors and a colleague, will read and evaluate all completed applications to select the most promising applicants and alternates.

The most important consideration in selecting participants is to further the goals of the seminar while benefiting the applicant professionally. Relevant factors should be addressed in the application essay.

These factors include:

- (1) intellectual interests and commitment, both in general and as they relate to the work of the seminar or
- (2) special perspectives, skills, or experiences that would positively contribute to the seminar
- (3) commitment to participate fully in the work of the seminar;
- (4) evidence that the participation in this seminar will promote the participant's understanding of PhilStat, and the goals of integrating PhilStat into the participant's research and/or teaching.
- (5) the participant's conception of how they will utilize the scholarship from this seminar in their research and/or teaching.
- (6) evidence that the participant will significantly contribute to the success, collegiality and diversity of the seminar.

### **Projects**

All participants should identify a project they propose to develop, based on their work in the

Summer Seminar in Phil Stat. It might involve including Phil Stat in courses in logic, critical thinking, philosophy of science, statistical research methods, and so on. It might be an extension of their existing work in philosophy of science, epistemology, foundations of probability, formal epistemology, research ethics, data science, metascience, improving science policy, etc. These are just sketchy examples, there are many other possibilities.

## **APPLICATION INSTRUCTIONS**

Please read the detailed information about the topic, expectations and goals prior to applying.

### **Application Essay**

The application essay should be no more than four or five double spaced pages. This essay should include a statement of what the applicant intends to accomplish by participating, and how it will relate to the applicant's work and professional responsibilities. It should address the participant's reasons for applying, their qualifications for doing the work of the seminar, their interest in promoting the goals of the seminar, and their ability to contribute to the seminar's learning community.

### **Reference Letters**

The reference letters should be written by persons familiar with the applicant's professional accomplishments or promise, teaching and/or research interests, and ability to contribute to and benefit from participation in the seminar. Referees should be provided with the description of the seminar and the applicant's essay. Applicants who are current graduate students should secure a letter from an advisor. Letters should be sent by the referee writer.

## **STIPEND, EXPECTATIONS, AND CONDITIONS OF AWARD**

Individuals selected to participate will receive housing and a stipend of \$1,000 (in two payments) to cover travel, food and other expenses. Housing expenses (\$1500) for studio apartments (or 1 bedroom flats) will be paid directly to the residence beginning check-in on Saturday, July 27. This will enable participants to enjoy private hotel quarters (with indoor pool, fitness facilities), while living in close proximity to each other<sup>[1]</sup>. There will be a Seminar dinner the night of July 27.

Seminar participants are required to attend all meetings and to engage fully as professionals in the work of the project. During the project's tenure, they may not undertake teaching assignments or other professional activities unrelated to their participation in the project. Participants who, for any reason, do not complete the full tenure of the project must refund a pro-rata portion of any stipend received and/or will not receive the second installment of the stipend. On completion of a seminar, participants will receive a certificate indicating their participation (on August 11, 2019).

There *may* be a limited number of small travel grants (of \$250.) for participants who must travel considerable distances. We will notify applicants of these in February 2019.

Applicants will receive a copy of *Statistical Inference as Severe Testing: How to Get Beyond the Statistics Wars* by Deborah Mayo (2018, CUP) upon acceptance into the seminar. In order for the seminar to be fully interactive, participants should have read at least half of this book prior to the seminar, given our limited time. (Specific notes will be posted on this blog to facilitate the reading.) Participants will have access to all of the main papers associated with the work, should they wish to access them. There will be guest lectures to be announced in February.

Prior to completing an application please study the GOALS and EXPECTATIONS sections above, and consider what we hope to achieve with this seminar and what is expected in terms of residence and attendance, and general participation in the work of the project.

Compliance with Virginia Tech's stipulations for international visitors is required. The latest guidelines for international participants will be available some time in late January.

Whenever this document is updated, a new date will appear at the top.[\[2\]](#)

## **CHECKLIST OF APPLICATION MATERIALS**

A complete application consists of two physical copies, and one electronic copy, of the following collated items:

\_\_\_\_\_ the completed application cover sheet (see cover sheet page),

\_\_\_\_\_ a detailed résumé, curriculum vitae, or brief biography (no more than 4 pages), and

\_\_\_\_\_ an application essay as outlined above.

\_\_\_\_\_ One or two letters of recommendation as described above.

Completed applications should be submitted to:

Deborah Mayo  
235 Major Williams Hall  
Blacksburg, VA 24061 (2 copies)

and

electronically to

Jean Miller: [jemille6@vt.edu](mailto:jemille6@vt.edu) with the subject: APPLICATIONPhilStat

Electronic copies must be sent by March 20, 2019; physical copies need to be postmarked by March 20, 2019.

Successful applicants will be notified of their selection by April 10, 2019, and they will have until April 14 to accept or decline the offer.

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[1] 2-3 participants may be housed in E.R.R.O.R.'s private conference lodge, if they elect to do so.

[2] These stipulations follow many of the requirements of the National Endowment for the Humanities summer seminars , although we are not in any way affiliated with the NEH. We will abide by all of Virginia Tech's non-discrimination rules.

**PDF of Application Instructions can be found [here](#).**