Announcing: A USCOTS Pre-Conference Workshop

June 23 - 25, 2009

Teaching Statistical Modeling

If we statistician/teachers can follow [this] example of teaching modeling in a first stat course, in such an accessible, thoughtful, statistically sophisticated way, the consequences for the future of our profession could be profound. — George Cobb

Statistical modeling is a process of asking questions of data based on your knowledge of the system represented by the data. Teaching statistics through modeling provides students with the concepts and techniques they need to understand contemporary research and statistical discourse: not just t-tests and p-values but the description of partial and total relationships, adjustment for covariates, the interpretation of statistical significance in context, the limits and possibilities of drawing causal inferences from observational or imperfect experimental data.

Modern approaches make statistical modeling accessible, informative, and exciting to the general student.

This hands-on workshop will show you how to teach statistical modeling at an introductory level, either as a first university-level course or a post-AP course. At Macalester College, where the approach was developed, fully one-quarter of all students take the course: biology students, economics and business students, social and natural scientists, humanities students, ... Students like the course because it provides them a formal way to shape the kinds of sophisticated questions their intuition leads them to. Faculty like the course because it prepares their students to understand the research presented in their classes.

The workshop provides a complete exposure to all aspects of this statistical modeling course. It's spread over three days to allow participants to master the several components that come together in the course: modeling, computation, and a theoretical exposition based in easily accessible geometry rather than algebra. The workshop reviews exercises and in-class activities and provides a complete package for teaching your own course in statistical modeling.

Outline of the Workshop

Tuesday June 23: 10am - 5pm

- Statistical modeling and the ASA GAISE recommendations.
- Starting R. What students need to know.
- The organization of data.
- The language of modeling.
- Model formulas and coefficients.
- Correlation in a modeling framework.
- Total and partial relationships.

Wednesday June 24: 9am - 5pm

- R for instructors. What you need to know to teach effectively with R.
- The geometry of statistics.
- Describing randomness.
- Resampling, bootstrapping, and simulation.
- Confidence from models.
- Hypothesis testing on whole models.

Thursday June 25: 9am - 3pm
(ending in time for the opening of USCOTS)

- Data collection and modeling projects.
- Hypothesis testing on parts of models.
- Modeling Yes/No variables.
- Causation and experimentation.
- Experimental design and simulation.

Computation (using the free package R) will feature prominently in hands-on activities; participants should bring laptop computers if possible. Participants do NOT need to have previous experience with R or with statistical modeling. Our students can learn it and so can you!

Location and Logistics

Teaching Statistical Modeling will be held at the same location as USCOTS. See `http://www.causeweb.org/uscots` for information on transportation and lodging.

- Registration: `http://www.causeweb.org/workshop/uscots09_modeling/register.php`
- Finances: The workshop is free and the registration fee for USCOTS will be waived for those attending the workshop. Lunches during the three workshop days will be provided. Limited support to help cover additional housing costs may be available: contact Danny Kaplan (`kaplan@macalester.edu`) for more information.
- Materials provided: A free copy of the *Introduction to Statistical Modeling* book, exercises, and course-specific software making use of the free R package.
- Bring a laptop. Instructions for installing the free software and files via the Internet will be sent out before the workshop.

Workshop Leaders

Danny Kaplan is DeWitt Wallace Professor at Macalester College where he teaches applied statistics, mathematics, and computer science. He is the author of several textbooks, including the upcoming *Introduction to Statistical Modeling*. (See `www.macalester.edu/~kaplan/ISM`.) He won Macalester's annual Excellence in Teaching award in 2006.

Victor Addona is assistant professor in the Department of Mathematics and Computer Science at Macalester College. He completed his PhD in statistics in 2005 at McGill University in Montreal, Canada. Vittorio's research interests are in survival analysis, other medical applications of statistics, and sports statistics. He has also recently become interested in statistically based post-election audit models. Vittorio teaches courses across the statistics curriculum, including the Introduction to Statistical Modeling course presented in this workshop. He helped establish a new major in Applied Mathematics and Statistics at Macalester College.

For More Information: `www.macalester.edu/~kaplan/USCOTS2009` or email `kaplan@macalester.edu`.

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