

Engaging Students through Statistical Research

An eCOTS 2020 panel discussion
Wednesday, May 20 (12:15pm EST)

Panelists: **John Gabrosek** (Grand Valley State University)
Lynne Seymour (University of Georgia)
Vittorio Addona (Macalester College)



Department of Statistics
Franklin College of Arts and Sciences
UNIVERSITY OF GEORGIA



MACALESTER

MATHEMATICS, STATISTICS, AND COMPUTER SCIENCE

Panelists' undergraduate research experience

John Gabrosek (Grand Valley State U.) was Editor of *The Journal of Statistics Education* (2010-12). He works with undergrads on research via a project-based statistical consulting course.

Lynne Seymour (U. of Georgia) does research on climatological and environmental problems. She has directed undergraduate research in the *Statistics Capstone* course for several years.

Vittorio Addona (Macalester College) has several peer-reviewed publications with undergraduate co-authors. He has also been co-chair of [USPROC](#) and [eUSR](#) since 2016.

Discussion Topic # 1

- If faculty want to engage in research with undergraduates, how do they get started?
- And, how can faculty generate topic ideas for research projects?

Hello GVSU faculty/staff member.

This email is coming from John Gabrosek from the Department of Statistics. If you have research/data analysis that has languished due to time conflicts or the need for assistance from a statistician, we can help. You can request assistance from the students in **STA 419 (Statistics Project)** during the winter 2020 semester to help move that research project along.

While I will supervise the work being done by the students and provide necessary technical guidance, the primary consultation is between you and the students. By the end of the semester, the student consultants provide you with a written summary of their involvement in the study. This is an extremely valuable learning experience for our students as they get to engage in the same activities as a professional statistician. Usually students work in groups of two.

To request the services offered by STA 419, please click on this link [***](#) and complete the Research Project Form. I will be in contact with you within a couple weeks to acknowledge receipt of the form. Feel free to contact me with any questions at gabrosej@gvsu.edu.

Cheers, John

- Seek data analysis projects
- Leverage past relationships
- Reach out to non-profits

Getting started and generating topics

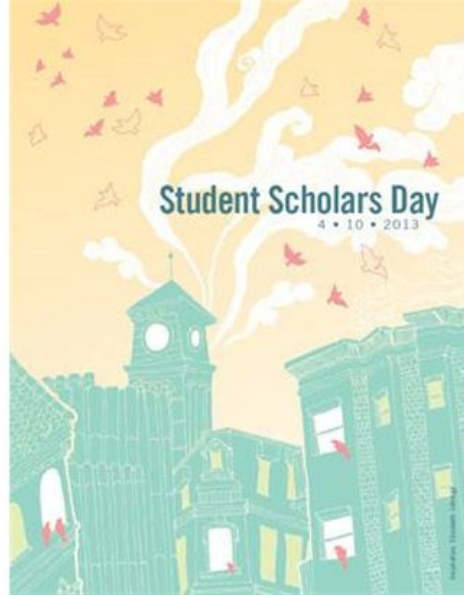
- Look into *internal* student funding options.
- Consider: *research-based courses, Honors projects, consulting (on- and off-campus)*.
- Generating topics should be part of students' tasks (with guidance); provides great “teaching moments”:
 - *Well-posed, answerable, research questions,*
 - *Previous literature, data availability,*
 - Emphasize the *creativity* involved in research.

Discussion Topic # 2

- Are undergraduates ready to complete meaningful research projects?
- How do we prepare undergraduates to conduct impactful research?

Are undergraduates ready for research?

- “Ready” means different things to different people, and for students at different levels. We may rethink the meaning of “research” in an undergrad context.
- Alternatives to traditional peer-reviewed papers:
 - Local & e-conferences ([eUSR](#)), campus poster sessions,
 - conference proceedings, paper competitions ([USPROC](#)),
 - apps, publicly available results (blogs, GitHub, etc.)
- We help them *become* ready (organization, reproducibility, data sanctity, product accountability, ...).



- Impacts of Ethical Education on Hospital Employees
- Comprehensive Measures of Mobility in Urban Research
- Dogbreeding at Paws With A Cause
- Statistical Analysis of Phone Records for Law Enforcement

Discussion Topic # 3

- What are the benefits & joys, and the barriers & struggles of engaging undergraduates in research?

Benefits & Joys / Barriers & Struggles

- Students help to solve problems that *matter* in some sense - researchers; UGA offices; local businesses, government, non-profits
- Students experience the power of data analysis first-hand - watch them mature from students to practitioners
- Thinking critically about data & results; moving away from “ $p < 0.05$ ” and “fail to reject” language
- Students have trouble staying focused on the question, and with keeping the client informed
- Students are sometimes unmotivated, or want an easy way out
- Clients sometimes can't get promised data, or (more rarely) “ghost” us

Benefits & Joys / Barriers & Struggles

- **Funding** students has been a challenge: I've had to re-tackle the issue annually, often with piecemeal solution.
- The work is extremely **fulfilling**: I feel like I'm inspiring the next generation of statisticians, & the visibility of statistics on our campus has grown tremendously.
- **Lib. arts students** well positioned for research success: closeness with mentors, writing & communication skills, breadth of knowledge in domain areas.

Discussion Topic # 4

- How can faculty teach the principles of good communication as part of the essential toolbox of research skills?

UGA's Writing Intensive Program

- Courses are specially-designated as writing-intensive (e.g. STAT 5010W)
- Funding for dedicated TAs, and special training for them to coach writing
- We expand that to include communication writ large
 - Presentations
 - Posters
 - Written report for the client
- Exercises!! Many, early & often
 - Start light-hearted; e.g., VERY brief public speaking
 - Combine speaking and writing (write an excuse - tell the class about it)
 - Peer review
 - Explain it to Grandma
 - Tweets

Course Description: Students will learn a systematic approach to statistical consulting, how to communicate with nonmathematical audiences, and develop the ability to apply appropriate statistical techniques to research questions. Actual experience with current university and industry research projects and SAS/SPSS is given.

- Attend consulting sessions
- Watch mock consulting session videos
- Write up data analysis papers
- Get peer / instructor feedback on writing
- Role playing

Audience Participation



Use the Chat feature to provide thoughts on the next discussion topic. We'll give you 30-45 seconds to start to collect your thoughts before we proceed.

Discussion Topic # 5

- How can we engage diverse populations in undergraduate research?
- What are some obstacles?
- What are some success stories?

Engaging Diverse Populations

At UGA, the year-long Statistics Capstone Course is required of all our majors and is taken in their Senior year

- It is only as diverse as our major - increasing as the popularity of statistics increases
- But, UGA itself has some diversity issues
- Point of Pride: Latest cohort of ~45 students included diversity over not only races and ethnicities, but also age and gender identity
- Bonus: Sometimes, clients will bring data and questions that include diversity issues

Additional Discussion Topics

6. How can faculty engage in undergraduate research while maintaining productivity in their own research?
7. How can faculty integrate ethical practice into projects?
8. How can faculty get compensated for their work, and get their institution to value undergraduate research?

- **Thank you!**
- **We'd be delighted to take questions!**