Current Directions in Mathematics and Statistics Scholarship

John Kolassa

November 28, 2021
Interdisciplinary, from NSF DMS:

1. NSF-Simons Collaboration on a National Institute for Theory and Mathematics in Biology

"[P]rimarily focus on advances in theory and mathematics that are motivated by and applicable to the analysis of complex biological systems."

"Harnessing the Data Revolution: Transdisciplinary Research in Principles of Data Science Phase II (TRIPODS)"

"Algorithms for Threat Detection"

"Internet Measurement Research: Methodologies, Tools, and Infrastructure (IMR)"
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2. NSF-Simons Collaboration on Complex Biological systems (suggested for MPS)
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   “[A]ims to bring together the electrical engineering, mathematics, statistics, and theoretical computer science communities to develop the theoretical foundations of data science through integrated research and training activities. ”
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5. “Algorithms for Threat Detection”
Joint between NSF and Small Business Administration,

My list:

1. Example projects suggesting mathematical and statistical collaborations:
   - Current topics include some apparently of interest to the NSF:
     - Entrepreneurial (Kummer Institute?):
     - Some projects joint with NSF:
       1. "SBIR Phase I: Leveraging Building Information Modeling (BIM) for More Accurate Indoor Positioning"
       2. "SBIR Phase II: Rapid and Accurate Multi-Variable Optimization Software for Arrays of Heat Sinks"
   - Others with mathematical content not necessarily of interest to the NSF, with various mathematical sub-projects:
     - Advanced Analytics
     - Biotechnologies
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Specific to Statistics I

1 From JSM 2021

Caveats:
1 Many prominent topics are not the most trending.
   Ex., see invited sessions for journal best papers.
2 I am skipping entirely clinical topics.

Methodological Topics:
1 High-dimensional data
   Post-selection inference.
2 Infectious disease monitoring.
   Related: Statistics on Networks.
3 Causal inference.
   Real-world data.
4 Data Privacy.
5 Nonignorable Missing Data
6 Replicability
Specific to Statistics II

1. Wing Wong, “Understanding Human Trait Variation from the Gene Regulatory Systems Perspective”
2. Microbiome data
3. Climate statistics.
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   5. and others.
Leadership Considerations in a University
Stakeholders of the University

1. State government and general public want
   - Economic development
   - Finding jobs for new graduates
   - Finding qualified graduates for jobs
   - Extension services
2. Granting agencies want
   - Impactful research
3. Students want
   - High quality education
   - Edifying experiences
   - Fun
4. Families want
   - Jobs
5. Donors want all of these.
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Leadership Considerations in a University: 8 / 17
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My Experience with Academic leadership
Directed graduate program

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Directed graduate program

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2. Chaired PhD admissions committee
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   2. Coordinated RA lines with my colleagues
   3. Worked with colleagues to assemble financial support from miscellaneous sources.
Various roles supervising:

1. teaching assistants

2. my own supported PhD students

3. part-time lecturers

4. administrative staff who supported the program.
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4. administrative staff who supported the program.
Other university leadership roles

1. Secretary to the faculty of the School of Arts and Sciences

Service on various graduate school policy-making boards

Service on the School of Arts and Sciences core curriculum.
Other university leadership roles

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3. Service on the School of Arts and Sciences core curriculum committee.
Leadership outside the university

1. Service on various journal editorial boards
Leadership outside the university

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2. Service on conference organizing committees
Leadership outside the university

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3. Service on the ASA SPAIG committee
What I’ve learned:

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4. In the short run, departmental leadership doesn’t have a lot of control

   over the talents at its direction, or over the incentives under its control.

   Opportunities available to a department are constrained by the enthusiasm and talents of those involved.
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Directions for MST
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5. The administrative burden on faculty is heavy.
   1. Average burden per student goes down as program size increases.
   2. I don’t recommend trying to push the marginal burden to zero, but average burden still falls.
This particular small size is remarkable.

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Optimal size? Leadership Considerations in a University: Directions for MST
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