Breakout Questions

- What is the part of being a professor which seems most exciting?

- What is the part of being a professor which seems most daunting?

Teaching-Focused Careers

Jo Hardin & Beth Chance

Preparing to Teach - JSM - August 6, 2022

Life at (my) small college - Jo

- low acceptance rate
- large endowment

- autonomy over classes (topics, books, etc.)
- student mentors & graders
- smart & motivated students
- very high student contact hours

- vast majority of mental energy & time go toward pedagogy

Life at (my) state university - Beth

- state university but many majors very competitive
- mercy of state budget

- autonomy over pedagogy, Learn by Doing philosophy
- undergraduate student graders
- 4 unit courses (4 hours per week plus office hours), max class size 35

- vast majority of mental energy & time go toward course preparation, meeting student needs
- expectation of "active scholarship", later service

Liberal Arts Colleges

- Often a department of Mathematics & Statistics (etc.)
- undergraduate only (usually)
- teaching highly valued
- curriculum development, pedagogical research
- small class sizes
- close student-faculty interaction
- undergraduate research opportunities
- increasing emphasis on statistics & data science

Teaching Universities

- committed to quality undergraduate teaching
- similar student-faculty interaction to liberal arts colleges
- larger classes
- heavier teaching loads

Research Universities

- Traditionally have not valued teaching
- Often focused on graduate students
- Strong TA support
- Strong grant development support, expectation
- 1-2 classes per semester

Research Universities - Professor of the Practice

- Professor of the Practice or Professor of Teaching
- long-term / permanent / tenure-track positions with primary responsibility in education
- emphasis on excellence in teaching and other instruction-related activities
- expected to engage in professional activity and service related to the pedagogical mission of the university
- 4 - 8 classes per year

It's rewarding!

- Interactions with students
- Strong impact on students
  - future statisticians, data scientists
  - future leaders, scientists
- Creativity
  - courses, curriculum
- Educational research
- Statistical consulting, collaboration

Things to consider

- teaching load
  - number of preparations?
  - class size?
- teaching support
  - graders
  - technology
- colleagues, collegiality
- what is expected, what is valued?
- requirements for scholarship, including what “counts”

Two things I was nervous about:

Research:

- would I ever think of an interesting question?
- would I ever be able to publish in “good enough” journals?
- will they "count" scholarship of teaching?

Grant writing:

- did I need to write grants?
- what if I couldn’t get grants?

Research with undergraduates

- your own research agenda
- consulting
- computational
- pedagogical

Research Circle: Long-term Averages of the Stochastic Logistic Map

- group of 6 students
- students received 2 credits
- met weekly two hours together + two hours students only

https://arxiv.org/abs/2206.03849

Maricela Cruz ---- Madison Hobbs

Consulting project with a molecular biology colleague

- data viz skills
- communication skills
- real / applied problems

Research with undergraduates

- your own research agenda
- consulting
- computational
- pedagogical

Ciaran Evans - PTT Fellow!

Selecting between-sample RNA-Seq normalization methods from the perspective of their assumptions

Ciaran Evans ✉, Johanna Hardin, Daniel M Stoebel

Briefings in Bioinformatics, Volume 19, Issue 5, September 2018, Pages 776–792,
https://doi.org/10.1093/bib/bbx008

Research with undergraduates

- your own research agenda
- consulting
- computational
- pedagogical

Will Gray

Marie Tano

OpenIntro:

- learnr tutorials
- randomization v. mathematical method comparison table / cheat sheet
- integrate the R homework assignments
- student perspective on materials
- develop visuals

Stat Ed Research

1. Tools for Teaching, Assessing Statistical Inference Project
   - 5-year collaboration with Joan Garfield and Bob delMas (University of Minnesota)
     - Diverse background/perspective
     - Diverse institutions
   - Developed new instructional technology
   - Developed new assessment tools (visual), student interviews
2. Simulation-Based Inference Project
   - 10-year+ collaboration with Tintle, Cobb, Rossman, Roy, Swanson, VanderStoep
   - Developed new instructional materials
   - Developed new instructional technology (applets)
   - Cross-institutional assessment (pre/post)
     - Multilevel models
   - Workshops for teachers

NSF Grants

- CCLI #0633349: *Concepts of Statistical Inference: A Randomization-Based Curriculum,*
- *NSF TUES* Type I Project, Award #1140629: *Developing an Innovative Randomization-based Introductory Statistics Curriculum*
- NSF/TUES/DUE- Phase II, Award #1323210: *Broadening the impact and evaluating the effectiveness of randomization-based curricula for introductory statistics*
- NSF/IUSE/HER #1612201: *Developing and Assessing a Conceptual Approach to an Algebra-based Second Course in Statistics*
- RCN-UBE #1730668: *Statistical Thinking in Undergraduate Biology (STUB) Network: A network for coordinating the teaching and assessment of statistical thinking in introductory biology*

Grant writing (?)

- Funding for you
- Funding for students
- Fantastic way to synthesize your research program
- Deadlines for staying on task

Grant writing (?)

- Funding for you
- Funding for students
- Fantastic way to synthesize your research program
- Deadlines for staying on task

- Research focused grants
- Teaching focused grants
- Student focused grants
- Discipline focused grants
- No grants

Grants in statistics education - Where to Begin

Resources

- *Using statistics effectively in mathematics education research* (Scheaffer et al., 2007)
- *SERJ* special issue: Qualitative approaches in statistics education research (Nov. 2010)
- *Handbook of Research Design in Mathematics and Science Education*, Kelly and Lesh, Eds. (2000)
- *International Handbook of Research in Statistics Education*, Ben-Zvi, Makar, and Garfield, Eds. (2018)
- *Classroom Research: Implementing the Scholarship of Teaching*. Cross, K. P., and Steadman, M. H (1986)

Grants in statistics education - Where to Begin

- Garfield (1995), Garfield & Ben-Zvi (2007)
  - Students learn by constructing knowledge
  - Students learn by active involvement in learning activities
    - *Active learning increases student performance in science, engineering, and mathematics*, Freeman et al (*PNAS*, 2014)
  - Students learn to do well only what they practice doing
  - Do not underestimate student difficulty
  - Students need to become aware of and confront their errors in reasoning
  - Use technology to visualize and explore
  - Consistent and helpful feedback on their performance
  - Students learn to value what they know will be assessed

Grants in statistics education - Where to Begin

- Familiarize yourself with the research, assessment tools
  - NSF Award Search
- Connect with others (e.g., causeweb.org)
  - Within and Across institutions
  - Across disciplines
  - New and “Old” folks
- Talk with program officer
  - NSF's IUSE program (formerly TUES) supports curricular innovation, experimentation, and implementation

Track	Level
Engaged student learning	Level 1/Level 2/Level 3
Institutional and community transformation	Capacity building/Level 1/Level 2

- Be open to alternative research methodologies
  - Synergy with your “real” research
- Talk with your institution's IRB officer

Preparing for teaching-focused career

- Lots of teaching experience
- Teaching awards
- Develop an independent research program
- Love of teaching?
- Preparing to Teach
- Work at your teaching and learning center
- Experiences with diverse groups (diversity statement)
- ASA Section on SDSE (mentors), Causeweb.org

Succeeding in teaching-focused career

- Time to develop courses
  - Don't over-develop
- Talk with students, other instructors
  - Class visits
  - Reflection
- Institution's teaching and learning center
  - Class visits

- Value your time
- Develop an independent research program - long-term sustainability
- Textbooks?
- Align expectations

Pie Charts

- what aspects of your identity impact how you teach?

- what aspects of your identity impact how you are perceived as a teacher?

Your Future...

- in what ways does reflecting on your identity impact what type of teacher you will be?
- in what ways do you think a teaching career is the right path for you?

Chimamanda Adichie: Danger of a Single Story
https://www.ted.com/talks/chimamanda_ngozi_adichie_the_danger_of_a_single_story

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Thank You!