Applying to Graduate School in Biostatistics

Amy Herring, Professor

The University of North Carolina at Chapel Hill

Dan Scharfstein, Professor

Johns Hopkins University

Logistics

- Questions are typed (no audio for listeners)
- We will answer questions at the end of each segment

Outline

- Biostatistics degree programs
- Application timeline
- Application components
- Funding!
- In-person campus visits

Welcome to Biostatistics!

- Biostatistics involves research in statistical methods and the application of statistical methods to studies in public health and medicine

Biostatistics degrees

- Master's: preparation for work as applied statistician/programmer in academic setting, government, or industry; typically 2 years
- PhD: preparation for research-oriented career in academics, government, or industry; typically 5+ years
- MPH/DrPH: broader public health focus and less emphasis on math theory

Apply for MS or PhD?

- If interested in applications of existing statistical methods, apply MS
- If interested in development of new statistical methods, apply PhD
  - Doctoral students often given preference for funding
  - If program thinks MS beneficial, may admit you there to start (but will know you have potential desire to continue)

Questions?

- Questions about MS vs. PhD or other degrees (DrPH, MPH, …)

Application timelines

- Deadlines vary across programs (vary from December 1 through spring; most December/January)
- Admissions decisions may be made on rolling basis (early applicants may hear sooner)

Application timelines

- Admissions decisions often made before funding decisions
- Most programs communicate decisions in February and March

Application components

- Transcripts
- GRE scores (general test) and TOEFL if not citizen of English-speaking country
- CV or resume
- Letters of recommendation
- Personal statement

Evaluation of transcript information

- Bachelor's degree required (any area of study as long as sufficient mathematics training)
- Related master's degree good but not required

Evaluation of transcript information

- Mathematics courses
  - Required: basic calculus (through multivariable calculus), linear algebra
  - Required/strongly recommended for most doctoral programs: advanced calculus (elementary real analysis)

Transcript information

- Mathematics courses
  - Good to have: additional higher-level mathematics courses (experience writing proofs)
  - Math ability VERY important
- Statistics courses
  - Good to have: coursework in probability/inference, applied statistics

Transcript information

- Computer science
  - Programming coursework / programming skills highly desirable
- Other science courses
  - Biology, population science, genetics, public health, etc. courses are good but typically not required for admission

Common transcript issues

- Had fun undergraduate with mediocre grades; followed by good work experience or master's degree in highly applied field (MPH, applied stat)
  - Can applicant handle theoretical rigor of a PhD program?
  - An "A" in a recent, hard math class (elementary real analysis, complex analysis, combinatorics, etc.) can help a lot in this case!

Common transcript issues

- Great grades in statistics but little math
  - Need to show mathematical ability; write mathematical proofs
  - Really helps to have a letter of recommendation from a math professor who can comment on your skill at writing proofs

Questions?

- Questions about transcripts?

Standardized tests

- GRE general test required
  - Study – some of the math is so basic you may have forgotten!
  - Quantitative scores high (>60%ile for many MS programs; >80%ile for many PhD programs; many top programs have perfect median math GRE!)
  - Verbal scores less emphasized but still important

Standardized tests

- TOEFL (test of English as a foreign language)
- Typically required if undergraduate degree from institution not providing sole instruction in English
- Minimum scores vary across institutions

Questions?

- Questions about standardized tests?

CV or resume

- Neat, easy-to-read format
- Relevant work experience
- Research experience and internships
- Programming skills (e.g., C++, Matlab, R, SAS, LaTeX)
- Academic honors and awards
- Community service and leadership

Questions?

- Questions about the CV?

Letters of Recommendation

- Extremely important; can make or break application
- Letters from math professors useful (lack of any may kill your application)
- Letter from someone supervising a research experience very useful

Letters of Recommendation

- What do we like to see in letters?
  - Hard working
  - Highly intelligent
  - Independent worker
  - Focused, stays on task
  - Strong mathematics background/ability
  - Collegial personality

Letters of Recommendation

- Ask at least one month in advance
- Provide your recommender with your resume, personal statement, and copy of unofficial transcript
- Follow up to be sure recommendations submitted on time
- Be sure to write a thank-you note to letter writers (also reminds them to complete the letters!)

Letters of Recommendation

- Provide full list of programs/schools all at once (not a new school every week!)
- If person asks you to write your own letter, just ask someone else
- If person shows hesitation, ask someone else (people do not like to write bad letters); may ask if they feel comfortable recommending you if unsure

Questions?

- Questions about recommendation letters?

Personal statement

- Your forum for direct communication with the admissions committee
- Make your application shine!
- Show how you are unique; why should the program admit you? What do you have to offer?
- Statements tailored to the school of interest are almost always stronger (why THIS program?)

How your personal statement is used

- Getting to know you personally; something to remember, e.g. “bluegrass mandolin guy”
- Determination of your interest level in biostatistics (vs. any statistics graduate program)
- Assessment of English writing skills
- Matching you to appropriate funding sources

Personal statement: what you might write about

- Why you are pursuing graduate study in biostatistics; career goals and how the program will help you achieve them
- Areas you may be particularly interested in studying (e.g., passionate about longitudinal data analysis or applications to genomics)
- Projects you have completed
- Relevant jobs and your responsibilities

Personal statement: what you might write about

- Major scholastic accomplishments (but not a rehash of your resume)
- Challenges you have overcome
- People who greatly influenced you or motivated you
- Traits, work habits, and attitudes that will ensure your success in the program

Personal statement: what you might write about

- Address problem areas in your application but don't dwell on them (C in calculus; retaking GRE because had flu on test date)
- Get input on your statement from colleagues and classmates!

Personal statement

- Things to avoid:
  - English/grammatical errors (proofread, proofread, proofread)
  - Excessive talking about your “gifts” or weaknesses – don’t brag or knock yourself down
  - “I am convinced Boston University is the program for me” in your application to Michigan!

Personal statement

- Things to avoid:
  - Concentrating on your math/stat theory skills and forgetting to motivate why you're applying to biostat rather than math/stat

Questions?

- Questions about the personal statement?

Funding!

- Most doctoral students in biostatistics can receive essentially full financial support for a typical term of study
- Support may be in the form of scholarships, National Institutes of Health (NIH) or National Science Foundation (NSF) traineeships or research assistantships
- Typically cover tuition + ~20,000/year (adjusted for area cost of living)

Scholarships

- Some from individual universities (ask if separate application needed)
- Some from external sources (e.g., American Statistical Association Gertrude Cox Scholarship, undergraduate honor society-sponsored graduate school scholarships, fraternity/sorority-sponsored grad school scholarships)

NIH Traineeships

- Many departments have one or more NIH training grants
- These function much like scholarships except that a research internship is included
- Often need to specialize in a certain area
- Restricted to U.S. citizens or permanent residents

Graduate research assistantships

- Typically require weekly work (20 hours) on research projects
- Often can lead to authorship on publications
- Ask Admissions Director whether the university assigns these, or whether you should contact individual faculty members

Questions?

- Questions about funding?

How do you decide?

- Very interested universities will typically provide some amount of travel support for a visit (at least for doctoral applicants)
- During visits, ask professors which other programs they feel are strong and how they feel their program compares

During an interview

- Do your research! Look up web pages of all faculty members you'll meet (ask for schedule in advance)
- Ask faculty members about their own research programs and research involving current graduate students

Common questions faculty members ask

- How did you come to be interested in biostatistics?
- What kind of job do you expect after graduation?
- What specific textbooks did you use in your math courses (e.g., advanced calculus, statistics)?
- Where else are you applying?

Be sure to ask

- What are the top programs and how their program compares
- Ask students why they chose the program
- Ask students whether they are satisfied with their training
  - Include students at different training stages, e.g. coursework versus dissertation writing

Be sure to ask

- What percentage of students are fully funded for graduate study?
  - How many students lose funding during their time in the program?
- What is the typical time to graduation?
- Where are your recent graduates employed?

Decision timeframe

- Institutions are required to keep offers of admission open until April 15
- After April 15, institutions are no longer bound by their offers
- If you decide before April 15, please let other institutions know quickly so that they can extend offers to other applicants (don’t feel badly about saying “no”)

Post graduation – salaries!

- Job market excellent!
- American Statistical Association makes salary survey results available annually at http://www.amstat.org/careers/salaryinformation.cfm
- Example salaries:
  - 50th %ile assistant professors: 94K
  - 50th %ile full professors: 194K
  - 50th %ile pharmaceutical with MS: 148K
  - 50th %ile pharmaceutical with PhD: 190K

Questions?

- Any final questions?