

Penn Center for Learning Analytics Research Apprenticeship Course Contents 2019-2025

Topics

- Systematic Reviews
- State of the lab stats - what approaches are we using to do what across projects?
- Causal Inference in Educational Data Mining
- Collaborative research techniques - group writing, code review, communication, etc
- How to network - conferences, building a research community, how to get cited, etc.
- How to develop good ideas worth pursuing that are also relevant to the field, and impactful?
- Fine-Tuning and RLHF
- From detectors to intervention
- Applying for fellowships and grant proposals
- Feature Engineering (and how to avoid overfitting)
- Conferences and journals in the field and what kind of paper submissions go where
- Lab processes and practices
- Career trajectories post-phd: industry, industry research, soft money, faculty, postdoc, government, foundation
- Strategies for writing a painless dissertation
- Practical skills: making high-quality presentations, videos, and other visuals
- Research ethics at a variety of points in the research process
- Strategies for improving reading efficiency - reading for specific information v/s learning and exploring new ideas
- Common statistics used in the field, and how to avoid violation and inaccurate use. Identifying common miscalculations and misinterpretations of stats tests.
- Strategies for productive conference attendance and Networking tips
- Mottos and slogans
- Creating a PCLA task board ("I need X help on Y task")
- "Not eating the ice cream" -- having the best job in the world and not spending any time on the fun parts of it
- Discussions of faculty attending classes
- Short papers: when are they worth it?
- Tools for video and image editing
- Who should be a co-author and processes for avoiding ruffled feathers; credit and attribution

- Creating a narrative for faculty position applications, small/secondary task tracking
- How to write conference paper and tailor it to specific venues
- How to measure impact, how to achieve actual impact & finding collaborative partner for impact
- Finding, sourcing, and managing articles
- A post-mortem on an error in a submitted paper
- CVs and resumes
- Design based research: working with stakeholders, getting a better idea of DBR
- Keeping up with current work
- Grant writing (seeking collaborative partners, coordinating grants)
- Project management and the Czar system
- RYAnalytics and productivity
- Supporting equity in education and in the field
- Code review and QA processes
- Learning unfamiliar research methods
- Establishing an online presence
- Translating academic work into practice
- Quality Control in Quantitative Research
- Monte Carlo analysis
- Knowledge Communication, Knowledge Construction, or Procedural Skill Development: What's the Point?
- Debugging, error checking open discussion
- Research community citizenship: data sharing, code sharing, tool development

Activities

- Each PhD student or postdoc presents for 5 minutes on a current area of their research (ideally: one that involves fewer other PCLA members)
- Annual “state of the lab” addresses
- “Ask me anything” sessions with top scholars
- Lab summits with other top research groups
- Presenting work to broader audience & Elevator Pitches
- Conference presentation practice + strategies
- Conference paper review
- Review of interesting research group worldwide
- Technical workshop: Data sources + problems in data + code review/QA
- CV review

Readings

- Data Science at the Singularity by David Donoho
- “Networking on the Network” -- Phil Agre

- <https://arxiv.org/abs/2108.07258>
- You and your research -- Hamming
- General system theory, von Bertalanffy
- Cybernetics: Or Control and Communication in the Animal and the Machine, Norbert Wiener
- <https://journals.sagepub.com/doi/pdf/10.1177/2053951715622512>
- <https://arxiv.org/pdf/1811.10154>
- https://drive.google.com/file/d/11W6_bg7Yq-WAlj7J2us-0jwRszHsEFX/view
- <https://users.cla.umn.edu/~nwaller/prelim/boxscienceandstatistics.pdf>