Paper writing process suggestions
- pre-paper talk
  - write and give talk first, as if presenting at conference
  - iterates on talk slides to get structure, ordering, arguments right
- then write paper outline from final draft of slides
  - encourages concise expressions of critical ideas, creation of key diagrams
  - avoids wandering digressions and rambles
  - easier to cut slides than prose you've spent hours over
- pre-paper/practice talk feedback session: at least 2.5x talk length
  - global comments, then slide by slide detailed discussion
  - wartime culture of internal critique (build your own critical group if necessary)
- have non-authors read paper before submitting
  - internal review can catch many problems
  - ideally group feedback session as above

Course requirements vs research paper standards
- research novelty not required
- mid-level discussion of implementation is required
  - part of my judgement is about how much work you did
  - high-level what tools etc did you use
  - medium-level what pre-existing features did you abstract
- design justification is required
  - (unless analysis/survey project)
- different in flavour between design study projects and technique projects
- technique explanation alone is not enough
- publication-level validation not required
  - user-studies, extensive computational benchmarks, utility to target audience

Sample outlines: Other types
• see page for implementation & analysis project types
  - implementation, analysis
  - medium-level implementation description
  - analyze your domain problem according to book framework (what/why)
  - discuss algorithm and data structures
  - analyze it according to book framework (how)
- results
  - include scenarios of use illustrated with multiple screenshots of your software
  - make sure to use real references for work that’s been published academically
  - not URL
  - model taken from many years work forward to final publication venue - use that too!
- bibliography
  - be consistent - most online sources require cleanup including IEEE/ACM DLs
  - do pay attention to my instructions for checking reference consistency
- discussion and future work
  - reflect on your approach strengths, weaknesses, limitations
  - lessons learned: what do you know now that you didn’t know when you started?
  - future work: what would you do if you had more time?

Sample outlines: Design study IV
• conclusions
  - summarize what you’ve done
  - different than abstract since reader has seen all the details
• technique explanation
  - make sure to use real references for work that’s been published academically
  - not URL
  - model taken from many years work forward to final publication venue - use that too!
- bibliography
  - be consistent - most online sources require cleanup including IEEE/ACM DLs
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Sample outlines: Design study II
• data and task abstractions
  - specify your domain problem according to book framework (what/why)
  - include both domain-language descriptions and abstract versions
  - could split into data vs task, then domain vs abstract - or vice versa!
  - typically data first then task, so that can refer to data within task abstr
  - solution
    - describe your solution idiom (visual encoding and interaction)
    - analyze it according to book framework (how)
    - justify your design choices with respect to alternatives
  - if significant algorithm work, discuss algorithm and data structures

Sample outlines: Design study III
• implementation
  - medium-level implementation description
  - specific to what you wrote in the above abstract or tools/techniques/components do
  - breadth/depth of what you did work
- results
  - include scenarios of use illustrated with multiple screenshots of your software
  - model taken from many years work forward to final publication venue - use that too!
- discussion and future work
  - reflect on your approach strengths, weaknesses, limitations
  - lessons learned: what do you know now that you didn’t know when you started?
  - future work: what would you do if you had more time?

Sample outlines: Other types
• see page for implementation & analysis project types
  - implementation, analysis
  - medium-level implementation description
  - analyze your domain problem according to book framework (what/why)
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  - analyze it according to book framework (how)
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  - include scenarios of use illustrated with multiple screenshots of your software
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Sample outlines: Technique (diffs)
• abstract
  - concise summary of your project
  - do not include citations
• introduction
  - high-level big-picture, establish scope, some background material might be appropriate
• related work
  - include both work aimed at similar problems and similar solutions
  - no requirement for research novelty but still frame how your work relates to it
  - cover both academic and relevant non-academic work
  - you might reorder to have this section later

Code / Video
• required: submit your code
  - so I can see what you did, but I will not post
  - include README file at root with brief roadmap/overview of organization
  - which parts are your code vs libraries
  - how to compile and run
  - I do not necessarily expect your code compile on my machine
• encouraged but not required
  - submit live demo URL
  - open-source your code (if so, fine to just send me that URL)
  - submit supporting video
  - web or without voiceover
  - you're nice to have: software montages demos not but forever
  - can be same or different from what you show in final presentation

Showcase image
• new this year: showcase image for projects page
  - 300x200 image
  - call it showcase.png or showcase.jpg
Reproducible and Replicable Research

**Come talk!**
- encourage meeting with me to get advice/feedback before final present
- do so you can still act on it
- do send email to schedule, can't meet with all 10 teams in last few days!

**Reproducibility: Levels to consider.**

- **data**
  - make available
  - tricky if not documented
  - tricky to regenerate/produce
- **code**
  - make available as open source
  - tricky to reproduce/produce
- **content**
  - well documented in paper itself
  - build a community

**Reproducible?**
- you can still act on it
- do send email to schedule

**View from industry**
- Increasing the Impact of Visualization Research panel, VIS 2017
  - Krist Wongsuphasawat, Data Visualization Scientist, Twitter
  - Uri Simonsohn post Menchsplaining: Three Ideas for Civil Criticism

**Terrain of blog critiques**
- meta: methods for methodological critique
  - don't label, describe
  - don't assume audience has read proposal or updates (or remembers your pitch)

**Replication crisis in psychology, medicine, etc**
- early rumblings left me with (ignorable) qualms
- papers: Is most published research false?, The Earth is spherical (p < 0.05), False-Positive Psychology

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Visualization course in Psych
• Ron Rensink course
  • Special Topics in Perception: Visual Display Design
  • http://www2.psych.ubc.ca/~rensink/courses/psyc579/