Wrapup:
Research Papers and Process

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http://www.cs.ubc.ca/~tmm/courses/547-21

Today

- papers & research: pitfalls & process
  - writing infovis research papers
  - review reading, review writing, conference talks
- course endgame expectations
  - final presentations
  - final report
    - incl. course paper vs research paper differences
- [evaluations]
- open science
  - making research available, reproducible, replicable
- next steps
  - ways to continue on with visualization

Writing InfoVis Papers

Pitfalls

- writing infovis papers: pitfalls to avoid
  - Process and Pitfalls in Writing Information Visualization Research Papers.
    Tamara Munzner. In: Information Visualization: Human-Centered Issues and Perspectives.
    Andreas Kerren, John T. Stasko, Jean-Daniel Fekete, Chris North, eds.
    Springer LNCS Volume 4950, p 134-153, 2008.

Idiom pitfalls

- Unjustified Visual Encoding
  - should justify why visual encoding design choices appropriate for problem
  - prerequisite: clear statement of problem and encoding!
- Hammer In Search of Nail
  - should characterize capabilities of new technique if proposed in paper
- Color Cacophony
  - avoid blatant disregard for basic color perception issues
    - huge areas of highly saturated color
    - categorical color coding for 15+ category levels
    - red/green without luminance differences
    - encoding 3 separate attributes with RGB
- Rainbows Just Like In The Sky
  - avoid hue for ordered attribs, perceptual nonlinearity along rainbow gradient

Later pitfalls: Strategy

- What I Did Over My Summer Vacation
  - don't focus on effort rather than contribution
  - don't be too low level, it's not a manual
- Least Publishable Unit
  - avoid tiny increment beyond (your own) previous work
  - bonus points: new name for old technique
- Dense As Plutonium
  - don't cram in so much content that can't explain why/what/how
    - fails reproducibility test
- Bad Slice and Dice
  - two papers split up wrong
  - neither is standalone, yet both repeat

Later pitfalls: Tactics

- Stealth Contributions
  - don't leave them implicit, it's your job to tell reader explicitly!
  - consider carefully, often different from original project goals

Contributions in research papers

- what are your research contributions?
  - what can we do that wasn't possible before?
  - how can we do something better than before?
  - what do we know that was unknown or unclear before?
- determines everything
  - from high-level message to which details worth including
- often not obvious
  - diverged from original goals, in retrospect
- state them explicitly and clearly in the introduction
  - don't hope reviewer or reader will fill them in for you
  - don't leave unsaid should be obvious after close reading of previous work
  - goal is clarity, not overselling (limitations typically later, in discussion section)

Later pitfalls: Tactics

- Stealth Contributions
  - don't leave them implicit, it's your job to tell reader explicitly!
  - consider carefully, often different from original project goals
- I Am So Unique
  - don't ignore previous work
  - both on similar problems and with similar solutions
- Enumeration Without Justification
  - "X did Y" not enough
  - must say why previous work doesn't solve your problem
  - what limitations of their does your approach fix?
- I Am Utterly Perfect
  - no you're not; discussion of limitations makes paper stronger!

Later pitfalls: Results

- Unfettered By Time
  - choose level of detail for performance numbers
  - detailed graphs for technique papers, high-level for design & eval papers
- Straw Man Comparison
  - compare appropriately against state-of-the-art algorithms
  - head-to-head hardware is best (re-run benchmarks yourself, all on same machine)
- Tiny Toy Datasets
  - compare against state-of-the-art dataset sizes for technique (small ok for eval)
- But My Friends Liked It
  - asking labmates not convincing if target audience is domain experts
- Unjustified Tasks
  - use ecologically valid user study tasks: convincing abstraction of real-world use

Final pitfalls: Style

- Deadly Detail Dump
  - explain *how* only **after** *what* and *why;* provide high-level framing before low-level detail
- Story-Free Captions
  - optimize for flip-through-pictures skimming
- My Picture Speaks For Itself
  - explicitly walk them through images with discussion
- Grammar Is Optional
  - good low-level flow is necessary (but not sufficient), native speaker check good if ESL
- Mistakes Were Made
  - don't use passive voice, leaves ambiguity about actor
    - your research contribution or done by others?

Final pitfalls: Style 2

- Jargon Attack
  - avoid where you can, define on first use
    - all acronyms should be defined
- Nonspecific Use Of Large
  - quantify! hundreds? 10K? 100K? millions? billions?…

Final pitfalls: Submission

- Slimy Simultaneous Submission
  - often detected when same reviewer for both
  - instant dual rejection, often multi-conference blacklist
- Resubmit Unchanged
  - respond to previous reviews: often get reviewer overlap, irritated if ignored

Generality

- encoding: visualization specific
- strategy: all research
- tactics: all research
- results: visualization specific
- style: all research, except
  - Story-Free Captions, My Picture Speaks For Itself

Research Process & Pitfalls

Review reading pitfalls

- Reviewers Were Idiots
  - rare: insufficient background to judge worth
  - if reviewer didn't get your point, many readers won't
  - your job: rewrite so clearly that nobody can misunderstand
- Reviewers Were Threatened By My Brilliance
  - seldom: unduly harsh since intimately familiar with area
- I Just Know Person X Wrote This Review
  - sometimes true, sometimes false
  - don't get fixated, try not to take it personally
- It's The Writing Not The Work
  - sometimes true: bad writing can doom good work (good writing may save borderline)
  - sometimes false: weak work common! reinvent the wheel worse than previous one

Review writing pitfalls

- Uncalibrated Dismay
  - remember you've only read the best of the best!
  - most new reviewers are overly harsh
- It's Been Done, Full Stop
  - you must say who did it in which paper, full citation is best
- You Didn't Cite Me
  - stop and think whether it's appropriate
  - be calm, not petulant
- You Didn't Channel Me
  - don't compare against paper you would have written
    - review the paper they submitted

Conference talk pitfalls

- Results As Dessert
  - don't save until the end as a reward for the stalwart!
  - showcase early to motivate
- A Thousand Words, No Pictures
  - aggressively replace words with illustrations
  - most slides should have a picture
- Full Coverage Or Bust
  - cannot fit all details from paper
  - communicate big picture
  - talk as advertising: convince them it's worth their time to read paper!

Paper writing process suggestions

- pre-paper talk
  - write and give talk first, as if presenting at conference
  - iterate on talk slides to get structure, ordering, arguments right
  - then create paper outline from final draft of slides
    - encourages concise explanations of critical ideas, creation of key diagrams
    - avoids wordsmithing digressions and ratholes
    - easier to cut slides than prose you agonized over
- pre-paper/practice talk feedback session: at least 2-3x talk length
  - global comments, then slide by slide detailed discussion
  - nurture culture of internal critique (build your own critique group if necessary)
- have non-authors read paper before submitting
  - internal review can catch many problems
  - ideally group feedback session as above

Course Endgame

Logistics

- Assignments: Final Presentations on Canvas
  - upload due Wed Dec 15 noon (2 hrs before session)
    - required & posted: slides (Project Final Presentation Slides, PDF)
    - optional & posted: video (Project Final Presentation Video, mp4)
- Assignments: Final Report on Canvas
  - upload due Fri Dec 17 8pm (PST)
    - required & posted: report (Project Final Report, PDF)
    - required & posted: showcase image (Project Teaser Image, png)
    - required but not posted: code incl README (Project Source Code and Other Materials, zip)
    - encouraged & posted: live demo URL (include in code README)
    - encouraged & posted: video (include in code zip *only* if different from final present video)

Final Presentations

Final presentations: Wed Dec 15 2-5pm

- length (14 projects)
  - **presentation** (live **or** prerecorded): 10 min for groups, 8 min for solo
  - **Q&A** live: 2 min per project
- session structure
  - order alphabetical by first name, as on project page
  - 2 breaks, between each set of 5-6 presentations
  - CS dept (fac / grads) & infovis group invited, friends/others very welcome!
- presentation structure
  - content: **motivation/framing**, **project**, **results**, **critique/limitation**
    - standalone: don't assume audience has read proposal or updates (or remembers your pitch)
  - slides (***& slide numbers)*** mandatory for main part
  - demo strongly encouraged, either live or prerecorded
  - format is up to you: live presentation or prerecorded video or a mix

Final presentations, cont

- slides/video upload
  - upload to Canvas Assignments: Final Slides (mandatory), Final Video (optional)
  - by noon Wed Dec 15
- code freeze after presentations!
  - no additional work on project allowed after presentation deadline
  - additional two days to get it all written down coherently for final report

Final Presentations Schedule

- 2:00-2:12 Abi Kuganesan, Ivan Song, Lufei Liu.
  Hood Hunter: A House Hunter's Guide to Narrowing Neighbourhoods.
- 2:12-2:24 Arash Kamyabi, Negar Sadrzadeh.
  Drinking Behavior Patterns in Dairy Cattle.
- 2:24-2:36 Armita Safa, Janet Li, Neera Patadia.
  Multiscale Visualization of Pathogenic Structural Variants.
- 2:36-2:48 David Chen, Hongyang Yang, Madison Lore, Niels Semb.
  A New City Map.
- 2:48-3:00 Deepansha Chhabra, Lucie Polakova, Niloofar Zarif.
  What Can We Learn from User-Movie Ratings?
- *3:00-3:10 BREAK*
- 3:10-3:22 Elizabeth Reid, Mifta Sintaha, Nichole Boufford.
  SoundMap: A Visualization Tool to Explore Multi-Attribute Sound Data.
- 3:22-3:34 Felipe Gonzalez-Pizarro, Soheil Alavi.
  MultiModalTopicExplorer: Topic modeling for exploring multi-modal data from asynchronous online conversations.
- 3:34-3:44 Hadi Sinaee.
  PartViz: Visualizing Graph Partitioners.
- 3:44-3:56 Inna Ivanova, Jonatan Engstad.
  Explorify: A Personalized Interactive Visualization Tool for Spotify Listening History.
- 3:56-4:08 Jocelyn Minns, Mary Abikoye, Minglong Li.
  Necklace Maps for COVID-19 Visualization.
- *4:08-4:18 BREAK*
- 4:18-4:28 Mara Solen.
  Visualization Literacy in the Age of Big Data: Vital Skills for Modern Media Consumption.
- 4:28-4:40 Marie Salomon, Noa Heyl, Shizuko Akamoto, ToTo Tokaeo.
  Course Friction Explorer: Visualizing and Validating Indicators of Student Struggle.
- 4:40-4:50 Michael Tegegn.
  Visualizing Android Features Through Time.
- 4:50-5:00 Zainab Saeed Wattoo.
  Visualizing the Run Time Execution of Command Patterns.

Final presentations marking

- template (may change)
  - Intro/Framing: 20%
  - Main: 30%
  - Limitations/Critique/Lessons: 10%
  - Slides: 10%
  - Presentation/Video Style: 10%
  - Demo: 10% (or N/A)
  - Question Handling: 10%
- marking by buckets
  - great 100%
  - good 89%
  - ok 78%
  - poor 67%
  - zero 0%

Marking: Course overall

- 50% Project,
  summative assessment at end
  - 15% Final Presentation
  - 25% Final Report
  - 60% Content
  - *(Milestones pass/fail,*
    penalty up to 25% if missed)
    - *pitch 5%, proposal 10%, update 10%*

- 36% Async Discussion
  - 9 weeks, 4% per week
    - 75% own comments, 25% responses
    - *(almost all got full credit)*

- 14% Sync: In-Class Participation
  - 12 sessions, 1% per session
  - 2% final presentations
  - *(almost all got full credit)*

Final Reports

Final reports

- PDF, use InfoVis templates http://junctionpublishing.org/vgtc/Tasks/camera_tvcg.html
  - your choice to use Latex/Word/whatever
- no length cap: illustrate freely with screenshots!
  - design study / technique: aim for at least 6-8 pages
  - analysis / survey: aim for at least 15-20 pages
- strongly encouraged to re-use text from proposal & update writeups
- encourage looking at my writing correctness and style guidelines
  - http://www.cs.ubc.ca/~tmm/writing.html
- strongly encourage looking at previous examples
  - www.cs.ubc.ca/~tmm/courses/547-21/projectdesc.html#examp
  - Example Past Projects (curated list)
  - direct links to all project pages to browse 2020-2003

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 toolkits etc did you use
  - medium level: what pre-existing features did you use/adapt
  - low level **not** required: manual of how to use, data structure details
- 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

Report structure: General

- low level: necessary but not sufficient
  - correct grammar/spelling
  - sentence flow
- medium level: order of explanations
  - build up ideas
- high through low level: why/what before how
  - paper level
    - motivation: why should I care
    - overview: what did you do
    - details: how did you do it
  - section level
    - overview then details
  - sometimes subsection or paragraph level

Sample outlines: Design study

- www.cs.ubc.ca/~tmm/courses/547-21/projectdesc.html#examp
- Abstract
  - concise summary of your project
  - do not include citations
- Introduction
  - give big picture, establish scope, some background material might be appropriate
- Related work
  - include both work aimed at similar problems & similar solutions
  - no requirement for research novelty, but still frame how your work relates to it
  - cover both academic & relevant non-academic work
  - you might reorder to have this section later

Sample outlines: Design study II

- Data and Task Abstractions
  - analyze 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 abstr within task abstr
- Solution
  - describe your solution idiom (visual encoding and interaction)
  - analyze it according to book framework (how)
    - only for custom encodings, no need to repeat book material for standard chart types
  - 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
    - specifics of what you wrote vs what existing libraries/toolkits/components do
- Milestones
  - breakdown of who did what work
  - **remember to update milestones:** add actual hours/date to estimated hours/date
- Results
  - include scenarios of use illustrated with multiple screenshots of your software
    - walk reader through how your interface succeeds (or falls short) of solving intended problem
    - report on evaluation you did (eg deployment to target users, computational benchmarks)
    - screenshots should be png (lossless compression) not jpg (lossy compression)!
- Discussion / Future Work
  - reflect on your approach: strengths, weaknesses, limitations
  - lessons learned: what do you know now that you didn't 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
- Bibliography
  - note format is numerical & alphabetical
    - use citation manager / bibtex!
  - make sure to use real references for work that's been published academically
    - not just URL
    - **check arxiv papers**, some have link to final publication venue, also search on titles!
  - **check carefully to ensure consistency & nothing mangled or missing**
  - most online sources require cleanup
    - see guidance at http://www.cs.ubc.ca/~tmm/writing.html#refs

Marking

- **design study** & technique & explainer
  - 12.5% each for
    - intro
    - related work
    - abstractions
    - solution
    - implementation/milestones
    - results
    - discussion
  - 10% style, 2.5% bibliography

Sample outlines: Survey (diffs)

- *Abstract (same as above)*
- Introduction
  - discuss the scope of what you're covering, why it's interesting/reasonable partition compared to visualization as a whole
- Related Work
  - **only** previous surveys
    - focus on how your work is similar to or different from them, especially wrt coverage
- Main
  - break up into sections based on your own synthesis of themes of work covered
  - you might want a Background section at the start if domain-focused survey
    - where there's important vocabulary/ideas to establish before diving into main discussion
  - analyze visualizations proposed in these papers in terms of what/why/how framework (if applicable)
    - include images from papers
- *Milestones, Discussion / Future Work, Conclusions, Bibliography (same as above)*
- *marking: intro (10%), relwork (10%), main (60%), milestones/discussion (10%), style (10%)*

Sample outlines: Implementation (diffs)

- *Abstract, Introduction (same as above)*
- Related Work
  - paper you're reimplementing, maybe other closely related work for framing context
  - much shorter than other project types
- Scope
  - big picture of what you did, esp. only a subset of original paper or covering multiple papers
  - nice to have somewhat comprehensible & standalone document but no need to explain in full
    - ok to discuss similarities and differences assuming familiarity with goals of original work
- Implementation
  - detailed implementation discussion: much more than other project types
  - as above, include specifics of what you build on vs what you coded yourself
  - issues that arose: choices unclear in original, subtleties and nuances you discovered along the way, challenges in adapting toolkit capabilities

Sample outlines: Implementation (diffs)

- Results
  - as above, should include screenshots of your software that illustrate scenarios of how to use it
    - but less emphasis particular target users in scenarios
  - definitely include computational benchmarks to evaluate your work

- *Milestones, Discussion / Future Work, Conclusions, Bibliography (same as above)*

- *marking: intro (10%), relwork (10%), main (60%), milestones/discussion (10%), style (10%)*

Report marking

- required: at least material I've listed
  - you may include more material
  - you may choose alternate orderings

- reminder: project content is 60% of entire project mark
  - report is 25%, presentation is 15%

- you'll get detailed written feedback
  - combined: final presentation, final report, project content
  - in some cases, next steps

Code / Video

- required: submit your code
  - so I can see what you've done, but I will not post
  - include README.txt 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 compiles on my machine
- encouraged but not required
  - submit live demo URL (provide in README.txt file)
  - open-source your code (if so, fine to just send me that URL)
  - submit supporting video (if different from final presentation)
    - with or without voiceover
    - very nice to have later, software bitrot makes demos not last forever!

Showcase image

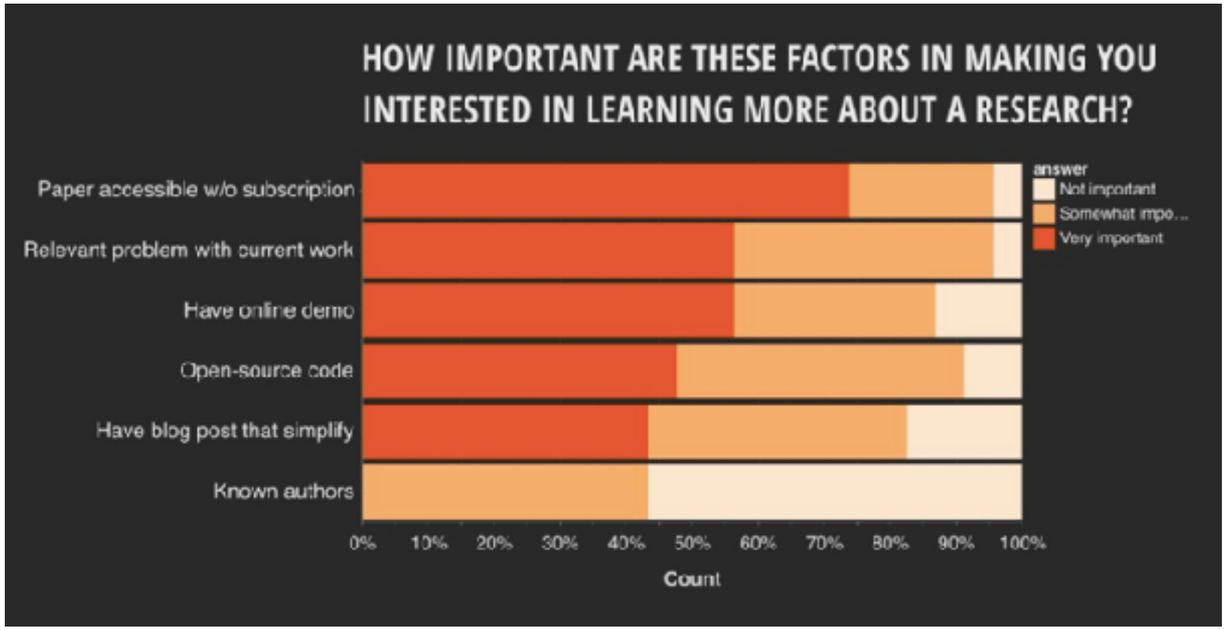
- showcase image for projects page
  - 300x300 image
  - call it showcase.png

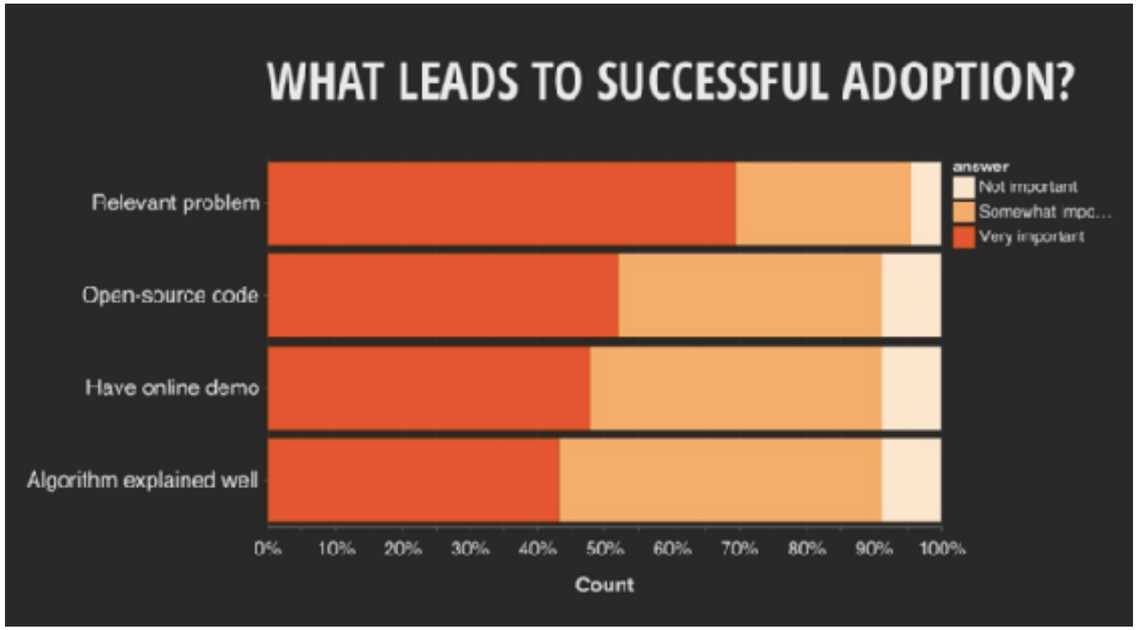
Evaluations

Open Science: Available, Reproducible, & Replicable Research

Making the world care about your research!

- Increasing the Impact of Visualization Research panel, VIS 2017
  - Krist Wongsuphasawat, Data Visualization Scientist, Twitter





https://www.slideshare.net/kristw/increasing-the-impact-of-visualization-research

Disseminating research

- paper page for each paper
  - everything! PDF, supplemental materials, videos, software/demos, talk slides, figures, ...
  - examples:
    - Table Scraps, http://www.cs.ubc.ca/group/infovis/pubs/2020/table-scraps/
    - TimeLineCurator, http://www.cs.ubc.ca/labs/imager/tr/2015/TimeLineCurator/
- write blog post to accompany each paper
  - very high-impact bang for the time buck
    - Multiple Views: Visualization Research Explained umbrella blog
      https://medium.com/multiple-views-visualization-research-explained
    - UW IDL individual lab blog
      - Surprise Maps: Showing the Unexpected
        https://medium.com/@uwdata/surprise-maps-showing-the-unexpected-e92b67398865
      - Bayesian Surprise Maps
        http://idl.cs.washington.edu/papers/surprise-maps/

Making your research reproducible

- why bother with reproducibility?
  - moral high ground
    - for Science!
  - enlightened self-interest
    - make your own life easier
    - you'll be cited more often by academics
    - your work more likely to be used by industry

- reproducibility levels
  - 5: 15 minutes with free tools
  - 4: 15 minutes with proprietary tools
  - 3: considerable effort
  - 2: extreme effort
  - 1: cannot seem to be reproduced
  - 0: cannot be reproduced

[Vandewalle, Kovacevic and Vetterli.
Reproducible Research in Signal Processing - What, why, and how.
IEEE Signal Processing Magazine, 26(3):37-47, May 2009.]

Reproducibility: Levels to consider

- paper
  - post it online
  - make sure it stays accessible when you move on to new place
  - external archives are better yet (arxiv.org)
- algorithm
  - well documented in paper itself
  - document further with supplemental materials
- code
  - make available as open source
  - pick right spot on continuum of effort involved, from minimal to massive
    - just put it up warts and all, minimal documentation
    - well documented and tested
    - (build a whole community - not the common case)

Reproducibility: Levels to consider, cont.

- data
  - make available
    - technique/algorithm: data used by system
      - tricky issue in visualization: data might not be yours to release!
    - evaluation: user study results
      - ethics approval possible if PII (personally identifiable information) sanitized, needs advance planning
- parameters
  - how exactly to regenerate/produce figures, tables
  - example: http://www.cs.utah.edu/~gk/papers/vis03/

Replication: crisis in psychology, medicine, etc

- early rumblings left me with (ignorable) qualms
  - papers: Is most published research false?, Storks Deliver Babies (p= 0.008), The Earth is spherical (p < 0.05), False-Positive Psychology
- groundswell of change for what methods are considered legitimate
  - out: QRPs (questionable research practices)
    - p-hacking / p-value fishing / data dredging
    - Hypothesizing After Results are Known (HARKing)
  - in
    - replication
    - pre-registration
  - brouhaha with bimodal responses
    - some people doubling down and defending previous work
    - many willing to repudiate (their own) earlier styles of working

Remarkable introspection on methods

- thoughtful willingness to change standards of field
  - Andrew Gelman's commentary on the Susan Fiske article
    - http://andrewgelman.com/2016/09/21/what-has-happened-down-here-is-the-winds-have-changed/
  - Simine Vazire's entire Sometimes I'm Wrong blog
    - http://sometimesimwrong.typepad.com/
    - especially posts on topic Scientific Integrity
  - Joe Simmons Data Colada blog post What I Want Our Field to Prioritize
    - http://datacolada.org/53/
  - Dana Carvey's brave statement on her previous power pose work
    - http://faculty.haas.berkeley.edu/dana_carney/pdf_My%20position%20on%20power%20poses.pdf

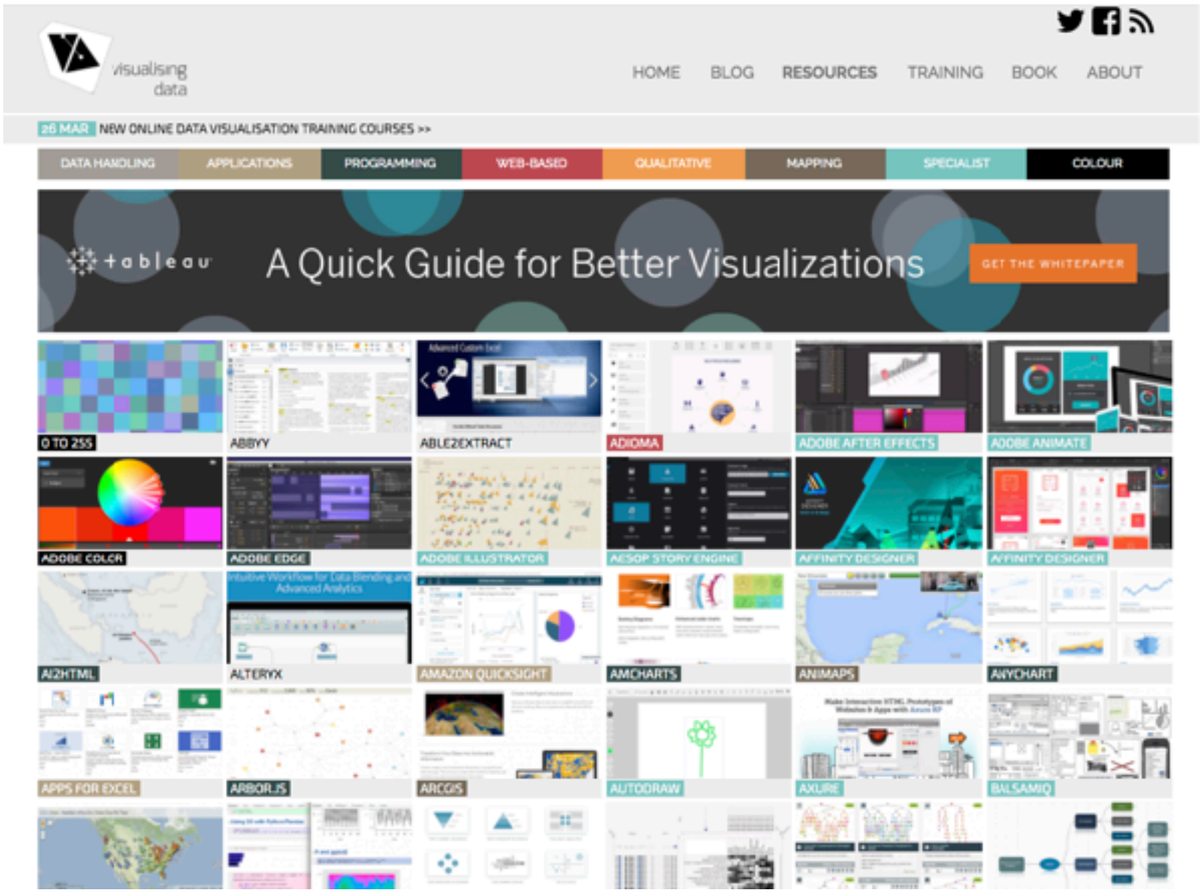
When and how will this storm hit visualization?

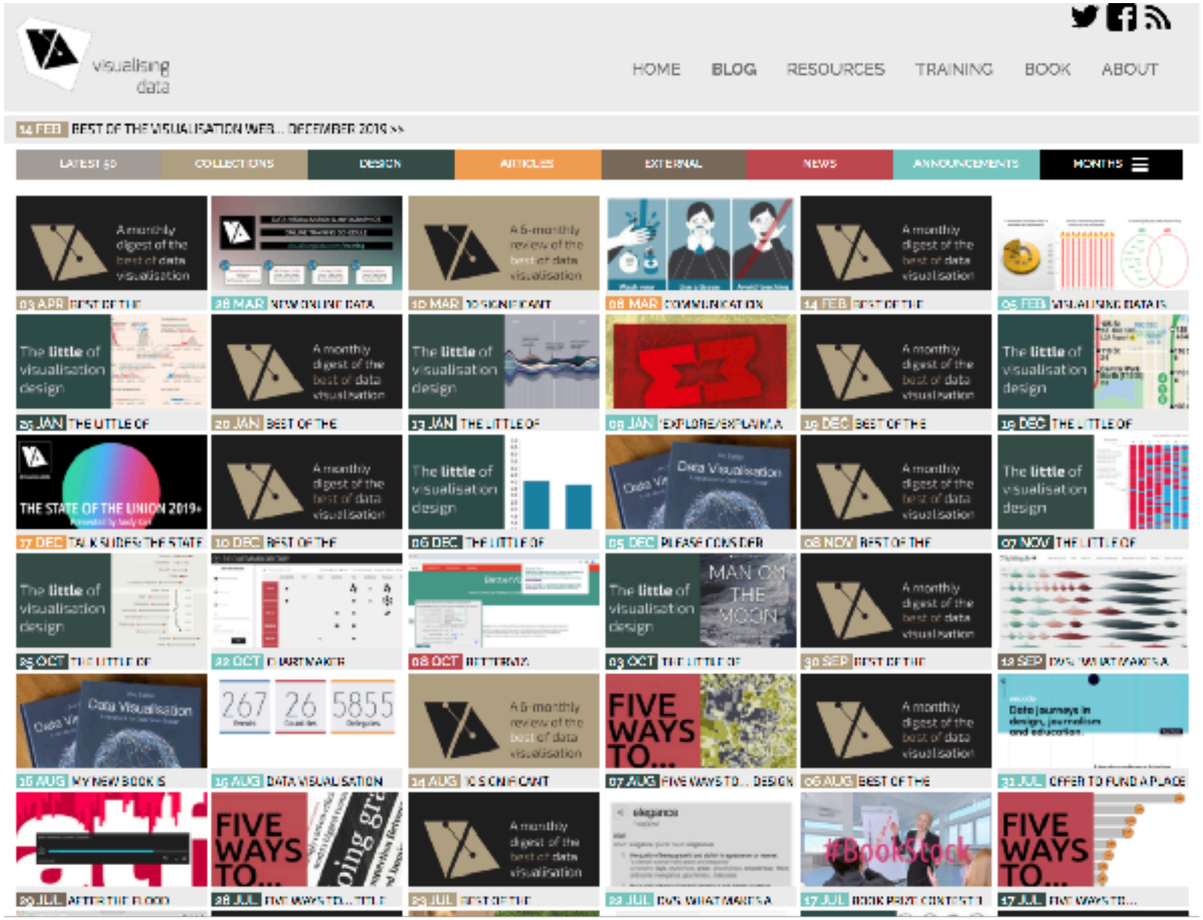
- they're ahead of us
  - they have some paper retractions
    - we don't (yet) have any retractions for methodological considerations
  - they agonize about difficulty of getting failure-to-replicate papers accepted
    - we hardly ever even try to do such work
  - they are a much older field
    - we're younger: might our power hierarchies thus be less entrenched??…
  - they are higher profile
    - we don't have vis research results appear regularly in major newspapers/magazines
  - they have rich fabric of blogs as major drivers of discussion
    - crosscutting traditional power hierarchies
    - we have far fewer active bloggers
- replication crisis was focus of BELIV 2018 workshop at IEEE VIS
  - evaluation and BEyond - methodoLogIcal approaches for Visualization
  - http://beliv.cs.univie.ac.at/

Next Steps

Tools & ideas: Andy Kirk's Visualizing Data

http://www.visualisingdata.com/resources/ https://www.visualisingdata.com/blog/



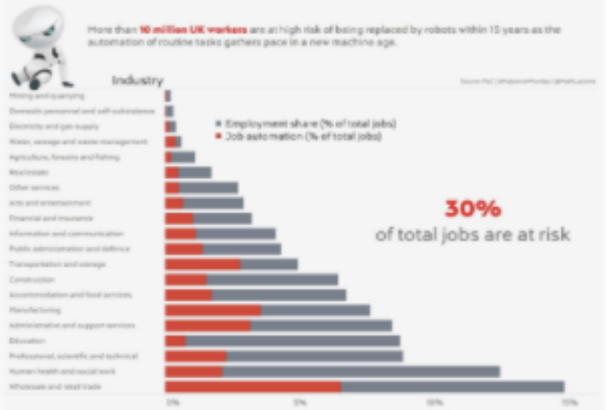


Videos

- many great conferences with free videos online
  - broadly accessible: OpenVisConf, Eyeo, InformationPlus
  - cutting-edge technical research: IEEE VIS

Redesign En Masse: **Makeover Mondays**

- easy entry point (Tableau focus)



Week 14 – Millions of UK workers at risk of being replaced by robots

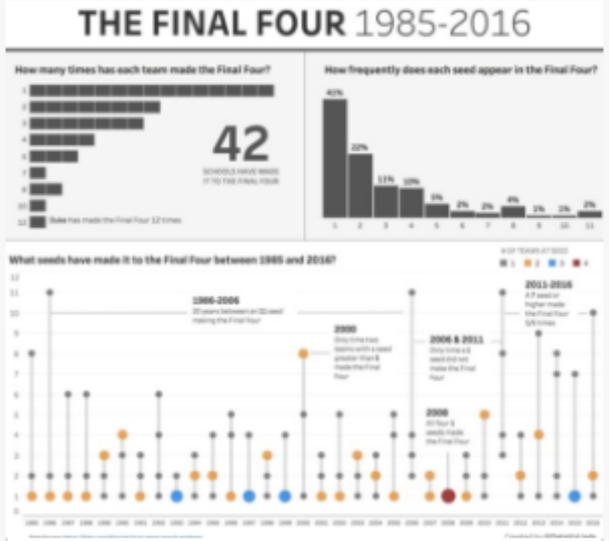
Apr 7, 2017

During week 14 we looked at job automation and the potential impact of robots and AI on the UK employment market.

Week 13 – The Secret of Success

Mar 31, 2017

Week 13 took a look at a Russian survey about the secret of success. Dot plot, bump charts, bar charts, radar charts. This week had it all! Plus seven lessons to take on board.



Week 12 – March Madness

Mar 24, 2017

We looked at March Madness data for week 12, highlighting the phenomenon that is US college basketball. Quite a few vizzes showed the passion that

http://www.makeovermonday.co.uk/blog/

Visual Design Process In Depth: **Dear Data**

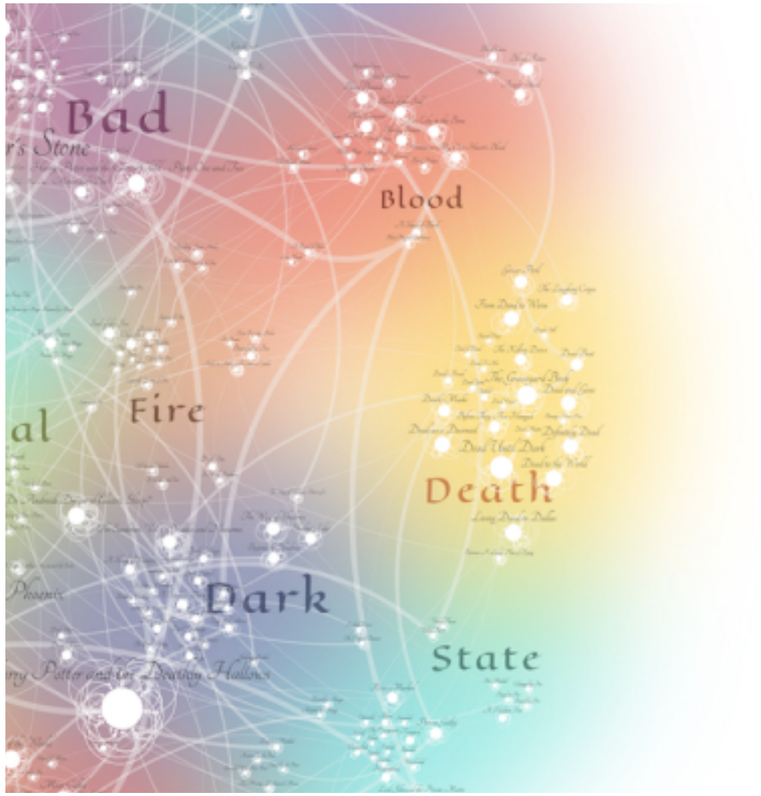
- inspiring celebration of data humanism

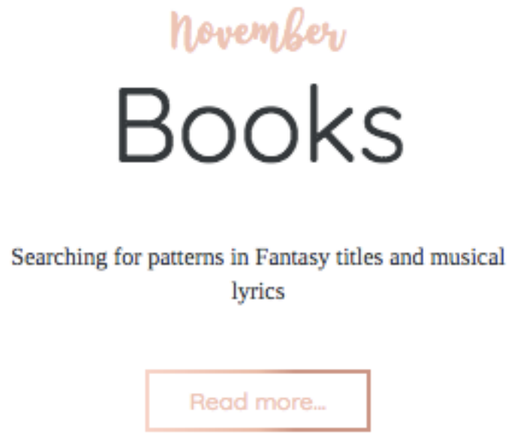
http://www.dear-data.com/by-week/

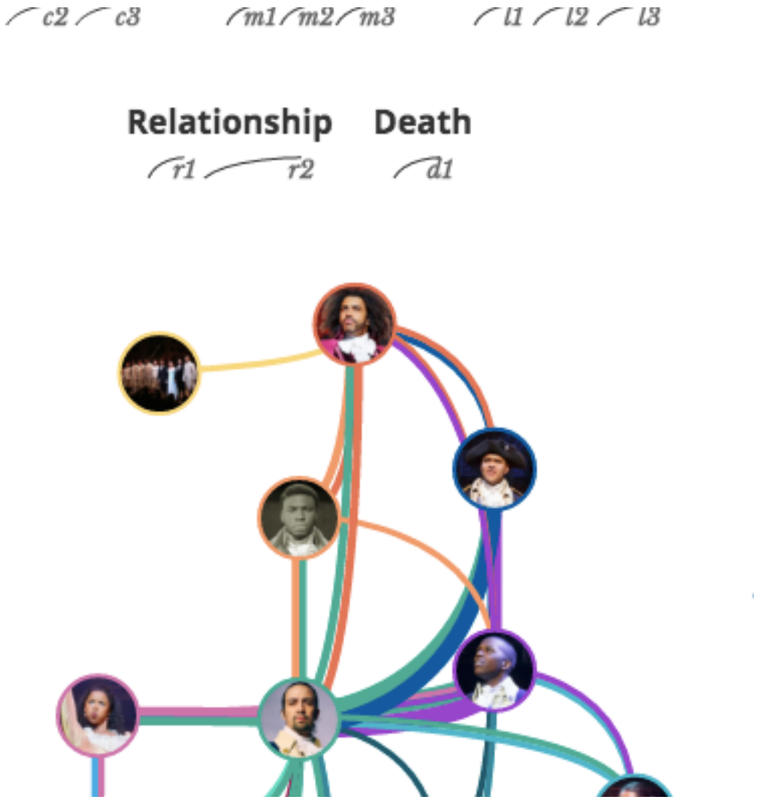
Giorgia Lupi and Stefanie Posavec

Visual Design Process In Depth: **Data Sketches**

- detailed process notes, from sketching through coding







http://www.datasketch.es/

Shirley Wu and Nadieh Brehmer

Pathways for more participation

- join Viz@UBC
  - https://dfp.ubc.ca/initiatives/viz-ubc
  - get on visatubc-announce email list (send mail to vizatubc-info@cs.ubc.ca)
  - talk series
- join Vancouver Visualization meetup
  - https://www.meetup.com/Vancouver-Data-Visualization/
  - 4K members
- join Data Visualization Society
  - https://www.datavisualizationsociety.com/
  - less than three years old, 18K+ members around the world
  - resources, jobs board, super-active Slack incl local groups, challenges, ...
  - articles on highly active blog/journal: Nightingale

Next Week

Come talk!

- encourage meeting with me to get advice/feedback before final present
  - chance to get feedback while you can still act on it
  - optional, not mandatory
  - wise to schedule in advance by email
    - can't meet with all 14 teams in last few days or in Tue office hours!