

<p>Lecture 16: Research Process and Paper Writing Information Visualization CPS3 533C, Fall 2009</p> <p>Tamara Munzner UBC Computer Science Wed, 2 December 2009</p>	<p>Overview</p> <ul style="list-style-type: none"> Course-Specific Issues Writing InfoVis Papers: Pitfalls to Avoid Non-Paper Research Process and Pitfalls Custom Course Evaluations 	<p>Course-Specific Issues</p>	<p>Individual Meetings</p> <ul style="list-style-type: none"> you're encouraged to meet with me before presentation <ul style="list-style-type: none"> chance to get feedback when you can still act on it schedule ahead by email (best), or use office hours
<p>Final Presentations</p> <ul style="list-style-type: none"> context <ul style="list-style-type: none"> department will be invited refinements will be saved order: alphabetical by first name 12 min: 10 minutes talk, 2 minutes questions <ul style="list-style-type: none"> some context setting, but focus on results ok to assume audience already saw update demos encouraged <ul style="list-style-type: none"> do include screenshots in slides as backup practice timing in advance since hard to do quickly if you're using my laptop, must checkout in advance 	<p>Final Project Writeups</p> <ul style="list-style-type: none"> no length restrictions <ul style="list-style-type: none"> use images liberally conference paper format <ul style="list-style-type: none"> use templates provided (LaTeX, Word) submit PDFs due two days after presentations (Wed 12/16 2pm) standalone document <ul style="list-style-type: none"> ok to reuse some text from proposal (only if appropriate) please do read Project Description page closely! 	<p>Final Project Writeup Structure</p> <ul style="list-style-type: none"> Introduction - description of problem: task, data Related work Description of solution: infovis techniques, visual encoding Medium-level implementation <ul style="list-style-type: none"> must include specifics of what other components or libraries you built upon, vs. what you did yourself Results Screenshots of your software in action Scenarios of use Discussion and Future Work <ul style="list-style-type: none"> strengths and weaknesses lessons learned what would you do if you had more time? Bibliography 	<p>Course Requirements vs. Standard: 1</p> <ul style="list-style-type: none"> research novelty not required <ul style="list-style-type: none"> some past projects implement published technique some past projects explicitly not aiming for academic publishability many past projects propose solution using existing techniques (design study) some past projects extend/refine algorithms (technique) some past projects have become posters at InfoVis some past projects could have been submitted as papers with further work
<p>Course Requirements vs. Standard: 2</p> <ul style="list-style-type: none"> explicit explanation of what was coded is required for programming projects <ul style="list-style-type: none"> submission of code itself not required (but you're encouraged to make it available open-sourced) part of my judgement is about how much work you did <ul style="list-style-type: none"> high level: what toolkits etc did you use medium level: what pre-existing features did you use medium level: how did you adapt/extend existing features to solve your specific problems design justification is required (unless analysis/survey project) <ul style="list-style-type: none"> technique explanation alone is not enough 	<p>Course Requirements vs. Standard: 3</p> <ul style="list-style-type: none"> user studies not required - time frame too short confirm that your color choices appropriate <ul style="list-style-type: none"> vischeck.com for colorblind legibility, color guidelines 	<p>Writing InfoVis Papers: Pitfalls to Avoid</p> <ul style="list-style-type: none"> you should avoid them too! 	<p>Early Stage: Paper Types</p> <ul style="list-style-type: none"> less useful for your final papers most projects are design studies or algorithm/technique surveys, analysis not covered in this reading
<p>Middle Stage: Visual Encoding</p> <ul style="list-style-type: none"> Unjustified Visual Encoding <ul style="list-style-type: none"> should justify why visual encoding design choices appropriate for problem require clear statement of problem and encoding, of course Hammer In Search Of Nail <ul style="list-style-type: none"> characterize capabilities of new technique before submitting paper even if start from technique-driven place 2D Good, 3D Better <ul style="list-style-type: none"> must justify when benefits 3D outweigh cost of occlusion abstract visual encoding allows choice over mapping variables to spatial position 	<p>Middle Stage: Visual Encoding 2</p> <ul style="list-style-type: none"> Color Cacophony <ul style="list-style-type: none"> blatant disregard for basic color perception facts huge areas of highly saturated color color coding intended for regions too small for distinguishability nominal color coding for too many (15+) categories red/green with no luminance difference encode 3 separate variables with RGB Rainbows Just Like In The Sky <ul style="list-style-type: none"> unjustified use of continuous rainbow colormap hue does not have implicit perceptual ordering standard rainbow colormap is perceptually nonlinear for many nameable regions, quantize into segmented colormap 	<p>Later Pitfalls: Strategy</p> <ul style="list-style-type: none"> What I Did Over My Summer Vacation <ul style="list-style-type: none"> focus on effort not contribution too low-level Least Publishable Unit <ul style="list-style-type: none"> tiny increment beyond (your) previous work bonus points: new name for old technique Dense As Plutonium <ul style="list-style-type: none"> so much content that no room to explain why/what/how fails reproducibility test Bad Slice and Dice <ul style="list-style-type: none"> two papers split up wrong neither is standalone, yet both repeat 	<p>Later Pitfalls: Tactics</p> <ul style="list-style-type: none"> Stealth Contributions <ul style="list-style-type: none"> it's your job to tell reader explicitly consider carefully, often different from original goals

<h3>Paper Writing: Contributions</h3> <ul style="list-style-type: none"> what are your research contributions? <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> from high-level message to which details often not obvious <ul style="list-style-type: none"> diverged from original goals, in retrospect state them explicitly and clearly in introduction <ul style="list-style-type: none"> don't hope that reviewer or reader will fill in for you don't leave unsaid what should be obvious after close reading of previous work <ul style="list-style-type: none"> give very important - but many readers skip goal is clarity, not overselling <ul style="list-style-type: none"> do include limitations: often later, in discussion subsection 	<h3>Later Pitfalls: Tactics</h3> <ul style="list-style-type: none"> Stealth Contributions <ul style="list-style-type: none"> it's your job to tell reader explicitly consider carefully, often different from original goals I Am So Unique <ul style="list-style-type: none"> don't ignore previous work both on similar problems and with similar solutions Enumeration Without Justification <ul style="list-style-type: none"> "X did Y" not enough must say why previous work doesn't solve your problem! what limitations of theirs does your approach fix? Sweeping Assertions <ul style="list-style-type: none"> cite source or delete assertion or flag as contrib check what "everybody knows" I Am Utterly Perfect <ul style="list-style-type: none"> discussion of limitations makes paper stronger 	<h3>Later Pitfalls: Results</h3> <ul style="list-style-type: none"> Unfettered By Time <ul style="list-style-type: none"> choose level of detail for performance numbers detailed graphs for technique, high-level for design/eval Fear and Loathing of Complexity <ul style="list-style-type: none"> present the complexity analysis for technique papers full proof not required Straw Man Comparison <ul style="list-style-type: none"> compare against state-of-the-art algorithms head-to-head hardware best Tiny Toy Datasets <ul style="list-style-type: none"> compare against state-of-the-art dataset sizes for technique small datasets may be acceptable for user studies 	<h3>Later Pitfalls: Results 2</h3> <ul style="list-style-type: none"> But My Friends Liked It <ul style="list-style-type: none"> asking labmates not convincing when targets different Unjustified Tasks <ul style="list-style-type: none"> user study tasks should be ecologically valid convincing abstraction of real-world tasks of target users
<h3>Final Pitfalls: Style</h3> <ul style="list-style-type: none"> Deadly Detail Dump <ul style="list-style-type: none"> how allowed only after what and why Story-Free Captions <ul style="list-style-type: none"> optimize for flip-through-pictures skimming My Picture Speaks For Itself <ul style="list-style-type: none"> explicitly walk them through images with discussion Grammar Is Optional <ul style="list-style-type: none"> low-level flow is necessary (albeit not sufficient) have native speaker check if you're ESL Mistakes Were Made <ul style="list-style-type: none"> don't use passive voice ambiguity about actor: your research contrib, or done by others? 	<h3>Final Pitfalls: Style 2</h3> <ul style="list-style-type: none"> Jargon Attack <ul style="list-style-type: none"> avoid where you can, define before using Non-specific Use Of Large <ul style="list-style-type: none"> hundreds, 10K, 100K, millions, billions? 	<h3>Final Pitfalls: Submission</h3> <ul style="list-style-type: none"> Slimy Simultaneous Submission <ul style="list-style-type: none"> often detected when same reviewer for both instant dual rejection, multi-conference blacklist Resubmit Unchanged <ul style="list-style-type: none"> often will get same reviewer, who will be irritated 	<h3>Generality</h3> <ul style="list-style-type: none"> type: infovis encoding: color is general vis, others more infovis strategy: all research tactics: all research results: general vis style: all research, except <ul style="list-style-type: none"> Story-Free Captions: general vis and graphics My Picture Speaks For Itself: more infovis
<h3>Research Process and Pitfalls</h3> <ul style="list-style-type: none"> Review Reading Review Writing Conference Talks 	<h3>Review Reading Pitfalls</h3> <ul style="list-style-type: none"> Reviewers Were Idiots <ul style="list-style-type: none"> rare: insufficient background to judge worth if reviewer didn't get point, many readers won't rewrite so clearly that nobody can misunderstand Reviewers Were Threatened By My Brilliance <ul style="list-style-type: none"> seldom: unduly harsh since intimately familiar area I Just Know Person X Wrote This Review <ul style="list-style-type: none"> sometimes true, sometimes false don't get fixated, try not to take it personally It's The Writing Not The Work <ul style="list-style-type: none"> sometimes true: bad writing can doom good work converse: good writing may save borderline work sometimes false: weak work all too common <ul style="list-style-type: none"> many people reinvent wheels some people make worse wheels than previous ones 	<h3>Review Writing Pitfalls</h3> <ul style="list-style-type: none"> Uncalibrated Dismay <ul style="list-style-type: none"> remember you've mostly read the best of the best! most new reviewers are overly harsh It's Been Done, Full Stop <ul style="list-style-type: none"> you must say who did it in which paper providing full citation is best You Didn't Cite Me <ul style="list-style-type: none"> stop and think whether it's appropriate be calm, not petulant You Didn't Channel Me <ul style="list-style-type: none"> don't compare against the paper you would have written review the paper they submitted 	<h3>Conference Talk Pitfalls</h3> <ul style="list-style-type: none"> Results As Dessert <ul style="list-style-type: none"> don't save till end as reward for the stalwart showcase early to motivate A Thousand Words, No Pictures <ul style="list-style-type: none"> aggressively replace words with illustrations most slides should have a picture Full Coverage Or Bust <ul style="list-style-type: none"> cannot fit all details from paper talk as advertising, communicate big picture
<h3>Process Suggestions</h3> <ul style="list-style-type: none"> write and give talk first then create paper outline from talk <ul style="list-style-type: none"> encourages concise explanations of critical ideas avoids wordsmithing ratholes and digressions practice talk feedback session: at least 3x talk length <ul style="list-style-type: none"> global comments, then slide by slide detailed discussion nurture culture of internal critique have nonauthors read paper before submitting <ul style="list-style-type: none"> internal review can catch many problems ideally group feedback session as above 	<h3>Paper Structure: General</h3> <ul style="list-style-type: none"> low level: necessary but not sufficient <ul style="list-style-type: none"> correct grammar/spelling sentence flow medium level: order of explanations <ul style="list-style-type: none"> build up ideas high through low level: why/what before how <ul style="list-style-type: none"> paper level <ul style="list-style-type: none"> motivation: why should I care overview: what did you do details: how did you do it (algorithms) section level sometimes even subsection or paragraph 	<h3>Custom Evaluations</h3>	