

InfoVis Group Research

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CPSC 344 Outro

8 Nov 2023

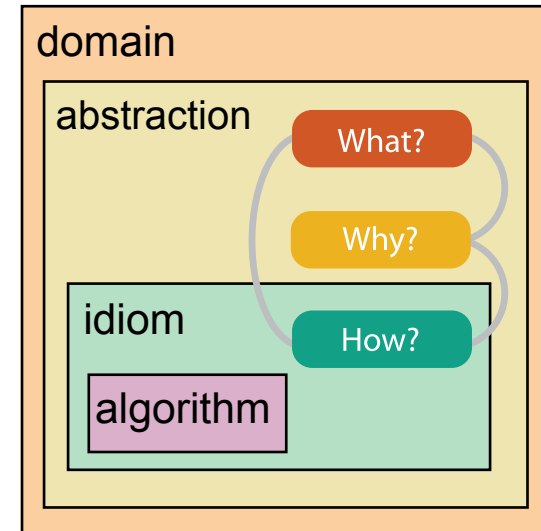
www.cs.ubc.ca/~tmm/talks.html#344-outro23nov

Visualization defined & motivated

- computer-based visualization systems
 - provide visual representations of datasets
 - designed to help people carry out tasks more effectively.
- suitable when
 - there is a need to augment human capabilities
 - rather than replace people with computational decision-making methods

Nested model: Four levels of visualization design

- *domain situation*
 - who are the target users?
- *abstraction*
 - translate from specifics of domain to vocabulary of vis
 - **what** is shown? **data** abstraction
 - **why** is the user looking at it? **task** abstraction
- *idiom*
 - **how** is it shown?
 - **visual encoding** idiom: how to draw
 - **interaction** idiom: how to manipulate
- *algorithm*
 - efficient computation





[A Nested Model of Visualization Design and Validation. Munzner. *IEEE TVCG* 15(6):921-928, 2009 (Proc. InfoVis 2009).]


[A Multi-Level Typology of Abstract Visualization Tasks. Brehmer and Munzner. *IEEE TVCG* 19(12):2376-2385, 2013 (Proc. InfoVis 2013).]

Why is validation difficult?

- different ways to get it wrong at each level

 **Domain situation**
You misunderstood their needs

 **Data/task abstraction**
You're showing them the wrong thing

 **Visual encoding/interaction idiom**
The way you show it doesn't work

 **Algorithm**
Your code is too slow

[A Nested Model of Visualization Design and Validation. Munzner. *IEEE TVCG* 15(6):921-928, 2009 (Proc. InfoVis 2009).]

Evaluation: broadly interpreted

- methods from many fields, qualitative & quantitative
 - controlled experiments in lab, field studies of deployed systems

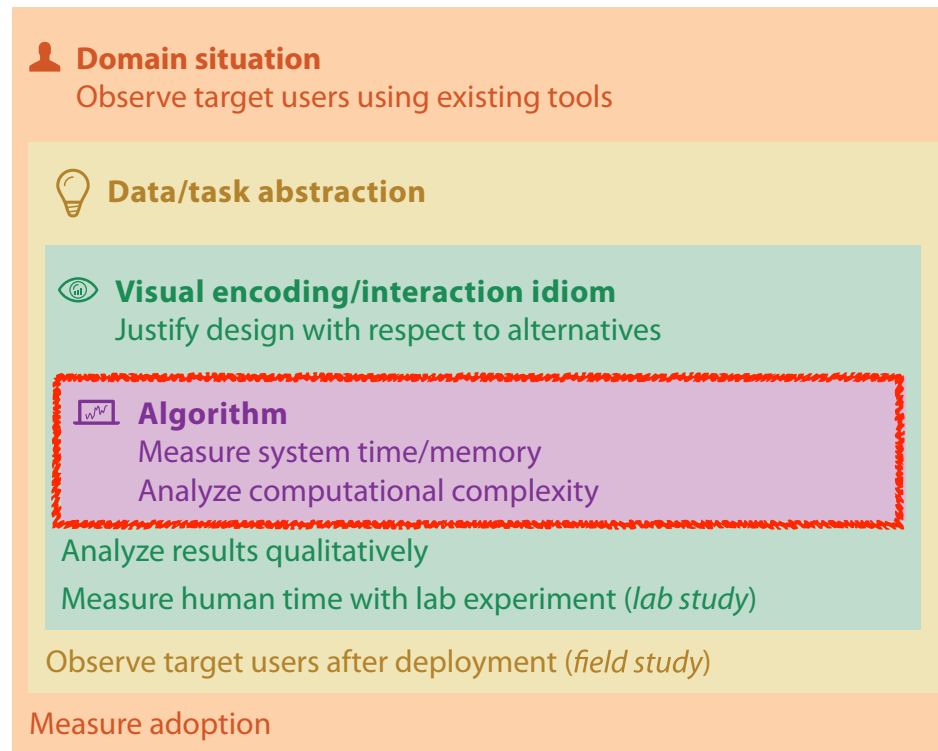
anthropology/
ethnography

design

computer
science

HCI/
psychology

anthropology/
ethnography

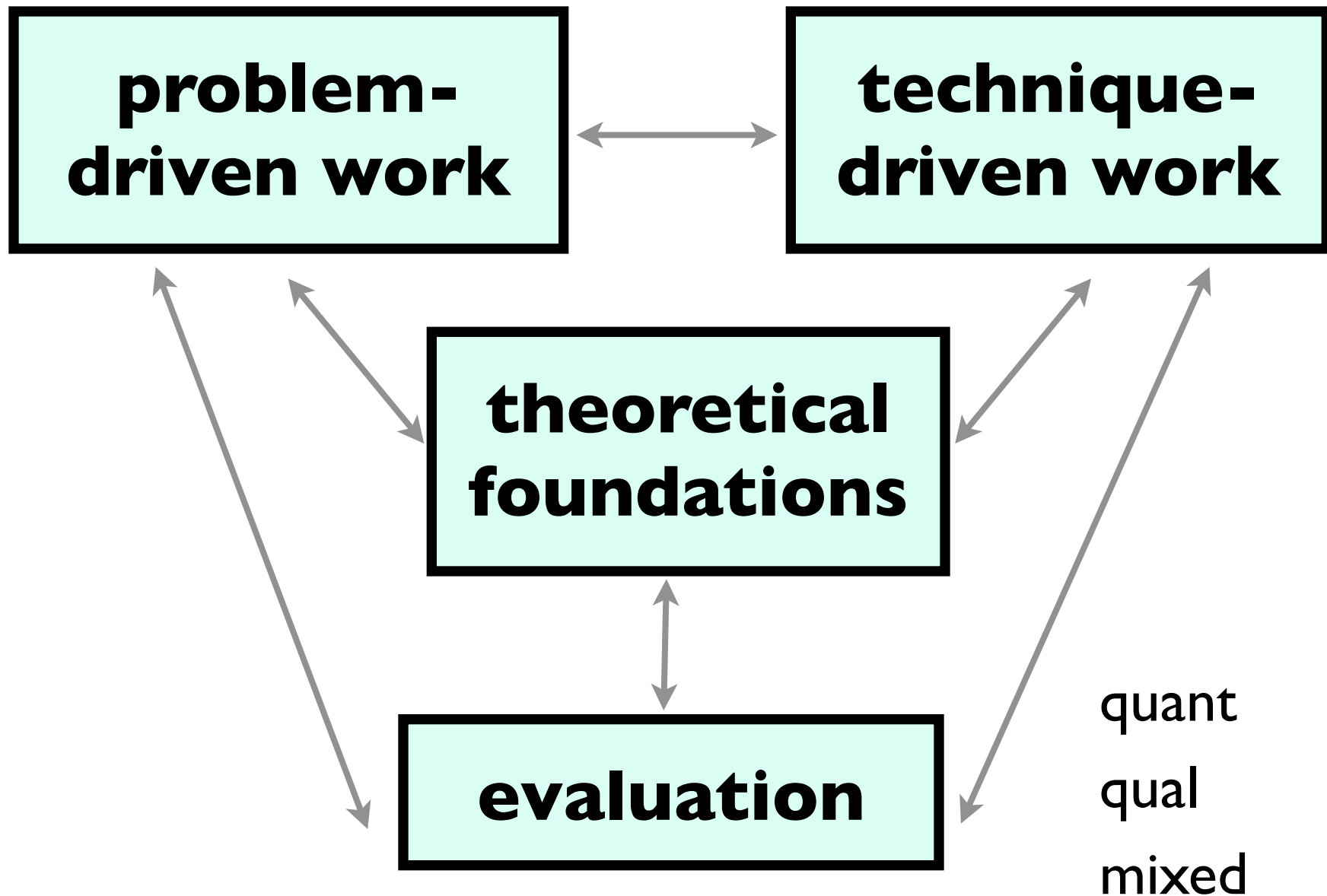


problem-
driven work

↓

technique-
driven work

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Problem-driven work

- design studies
 - in collaboration with target users
 - real data, real tasks
 - intensive requirements analysis
 - iterative refinement
 - deploy tools/systems
 - typical evaluation: field studies
 - pre-design & post-deployment, often qualitative
 - opportunistic collaboration
 - many domains, industry & academia

Design studies: domains

- many domains
 - fisheries, in-car networks, journalism, ...
- genomics
 - Harvard Med School, BC Cancer, UBC Biodiversity, Agilent, ...
- log analysis
 - Google web search, AT&T web hosting, Mobify e-commerce
 - building & energy usage

Ocupado design study

Ocupado: Visualizing Location-Based Counts Over Time Across Buildings

Michael Oppermann

Tamara Munzner



THE UNIVERSITY
OF BRITISH COLUMBIA



Project partner:



<https://youtu.be/KcwjVK8eUdw>

Technique-driven work

- **scalable algorithms & systems**
 - typical evaluation: computational benchmarks
- **new visual encoding & interaction techniques**
 - typical evaluation: controlled experiments with people (quant)
 - typical evaluation: qualitative assessment
- **areas**
 - graph drawing, dimensionality reduction
 - human-in-the-loop curation/assessment of ML results

TimelineCurator

The screenshot displays the TimelineCurator interface for the topic "Iceland & Denmark". The main timeline shows events from 1929 to 2000, with markers for specific years and arrows for duration-based events. The interface is divided into three main sections: a list of events, a central timeline, and a detailed text description.

Date	Title
1929	Formation Lunn
1956	The first Danish popmusic dates
1956	Jan & Kield
1960 - 1970	At the end of the
1960 - 1970	More progressive rock was made
1960 - 1970	Popular rock and beatmusic in
1966	In 1966 they made a
1968	In 1968 the theater-rockcompany Rode
1969	After two albums disbanded in
1970	It only came to one
1970 - 1980	In the seventies the biggest
1970 - 1980	In the seventies the borthers
1975	Charlotte Rordam Larsen
1975	In 1974 Hijomar came back
1978	Punk hit Denmark in 1978
1979	Bubbi Morthens recorded his first
1979	It was not until 1979
1980 - 1990	The same move is done
1980 - 1990	The definite breakthrough of Anne
1986	Sugarcubes
1990 - 2000	Brandt was briefly in it

Iceland & Denmark

In this timeline we compare the history of pop music in Iceland and in Denmark

■ Iceland ■ 2

The first Danish popmusic dates from 1956 and sees influences from Elvis, local folkmusic and skiffle. The banjo playing teenduo Jan & Kjeld even make it into the US charts with Tiger Rag, Banjo Boy'. Their success leads to the start of the ban Lollipopps. In the sixties the local scene gets influenced by the British beat invasion. Groups like The Beefeaters, Sir Henry & his Butlers with Tommy Seebach on vocals (with the hit Camp') and Peter Belli & the Defenders all follow in their footsteps. At the end of the sixties popmusic becomes more experimental with spacey guitars and jazz influences. The first band that creates this music in the Danish language is Steppenulvenne (translated: Steppenwolf) with Eik Skaloel on vocals. It stayed with just one album due that Skaloel disappears during a hippie-trail in Afghanistan. Bandmember Stig Moller continues a solo career with Dylanesque music. In 1968 the theater-rockcompany Rode Mor (with the brothers Lars and Troels Trier) becomes popular with political tainted folkmusic. In the seventies the borthers would also work solo. The band Savage Rose with singer Annisette and Thomas Koppel are perhaps the best known bluesband that come from this period. In the 1970s, following trends found in North America and the United Kingdom, Danish popular music styles began to diverge and audiences fragment.

Essential for Danish pop is the harbour place of Aarhus where a lot of popgroups originate. In the Seventies many rock musicians in Denmark began to compose music and texts that reflected more

This timeline was created with TimelineCurator

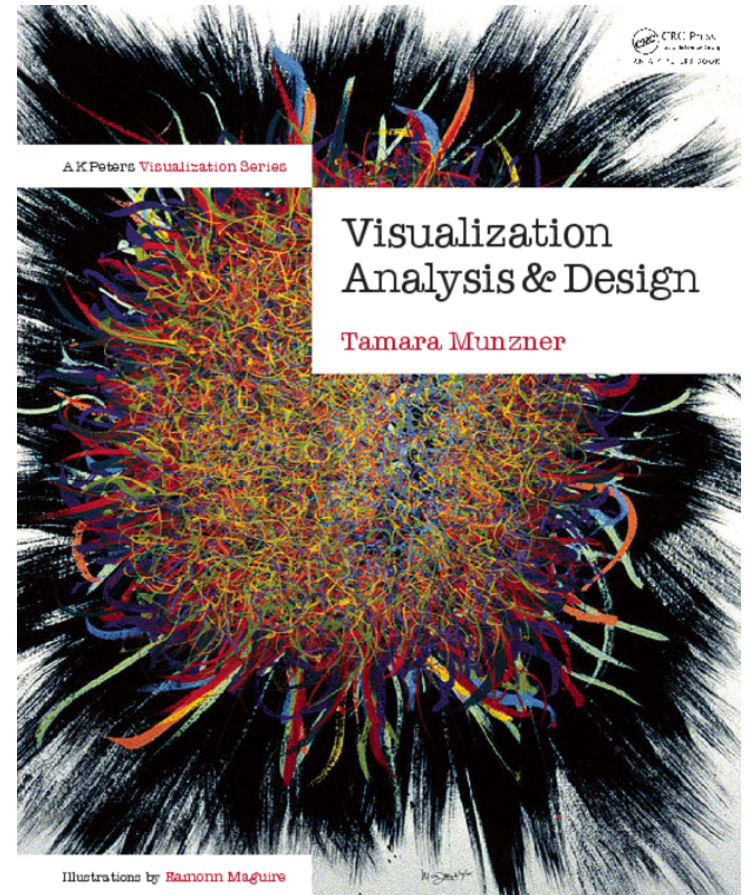
<https://youtu.be/Lff398EEswM>

Courses

- grad course CPSC 547: next offering Sep 2025
- new-ish ugrad course: CPSC 447
 - (first three years was CPSC 436V)
 - current offering
<https://www.students.cs.ubc.ca/~cs-447/23Jan/>
 - current offering now (Sep 2023), then Jan 2025
 - 4th year majors course
 - theory: visualization foundations
 - tooling: D3.js
 - prereq: CPSC 310 (for JavaScript)
 - HCI not required, but very helpful

More info

- book (free through UBC library)
<http://www.cs.ubc.ca/~tmm/vadbook>
- papers, videos, software, talks, courses
<http://www.cs.ubc.ca/group/infovis>
<http://www.cs.ubc.ca/~tmm>



Visualization Analysis & Design