# InfoVis Group Research

## Tamara Munzner
### Department of Computer Science
University of British Columbia
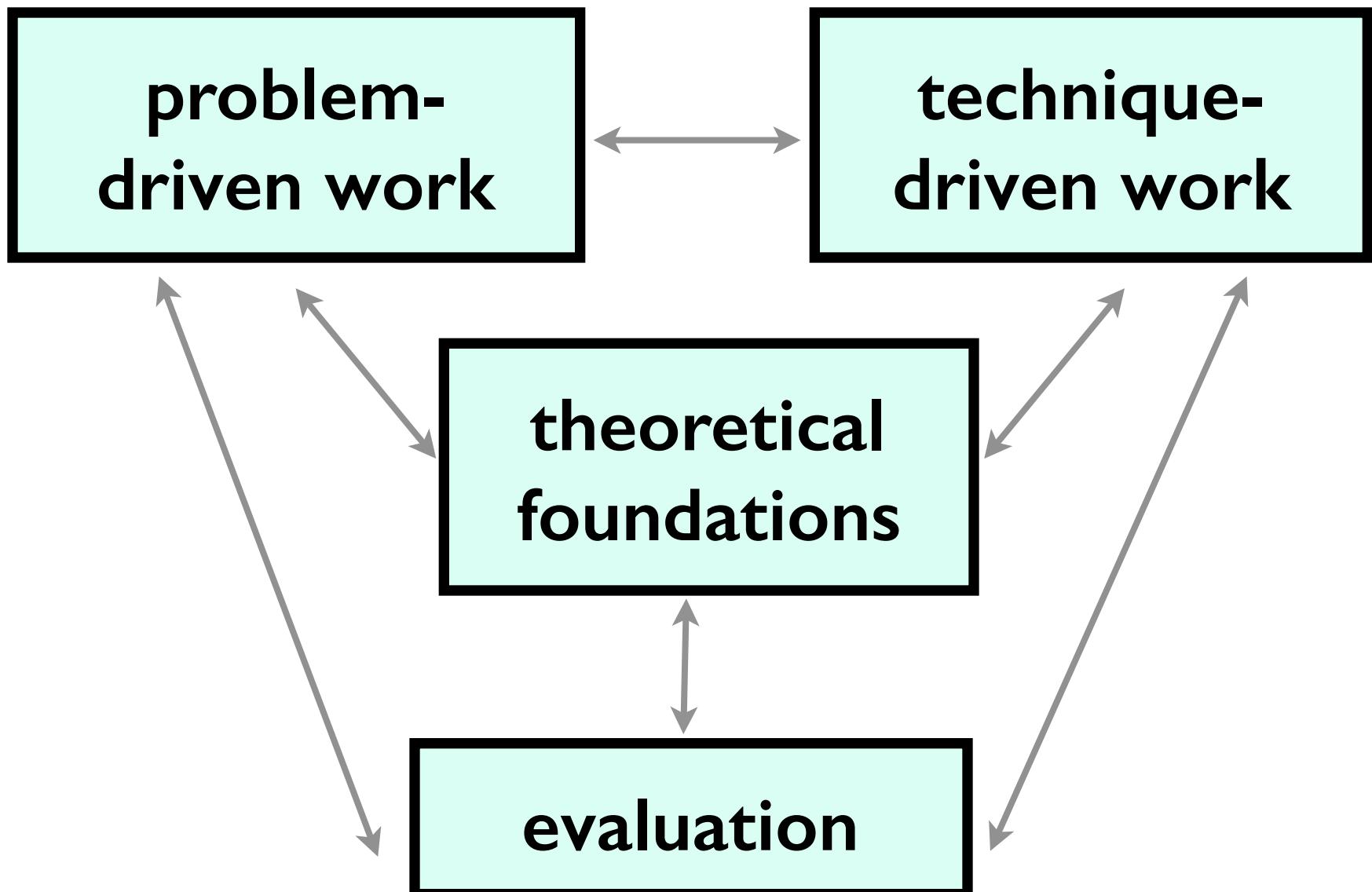
*Huawei Burnaby*
*8 Feb 2018*

**www.cs.ubc.ca/~tmm/talks.html#huawei18**          **@tamaramunzner**

# Research agenda: interleaved angles of attack



problem-driven work ↔ technique-driven work

theoretical foundations

evaluation

# 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


- my strategy: opportunistic collaboration
  - many domains
  - both industrial and academic partners

# Problem-driven: Tech industry

**SessionViewer: web log analysis**
https://youtu.be/T4MaTZd56G4

Heidi Lam

Diane Tang
(**Google**)
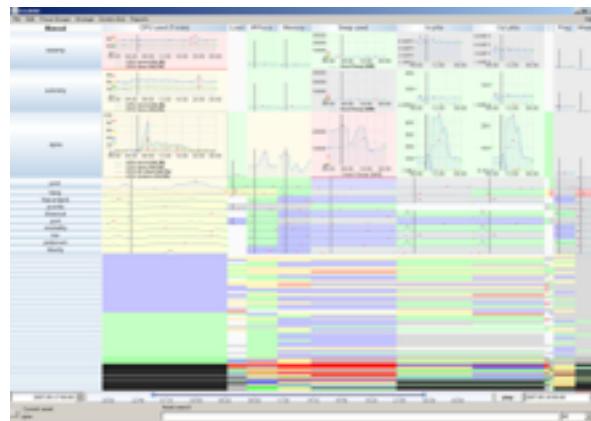




Peter McLachlan

Stephen North
(**AT&T Research**)







**LiveRAC: systems time-series logs**
https://youtu.be/Id0c3H0VSkw

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# Problem-driven: Genomics

Aaron Barsky

Jenn Gardy
(UBC Micro)
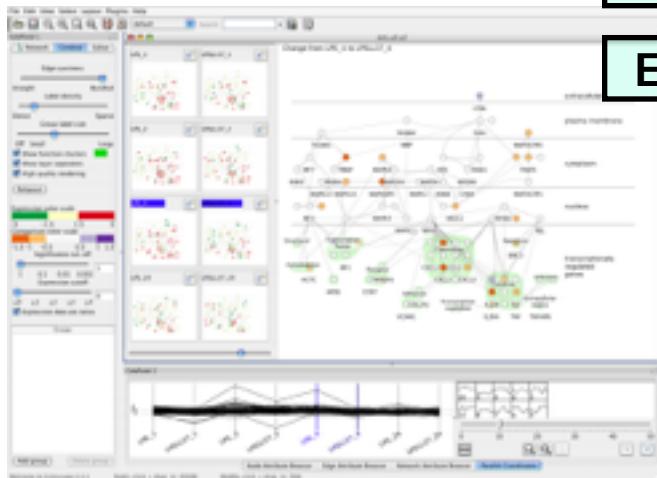
Robert Kincaid
**(Agilent)**



**Cerebral**
**https://youtu.be/76HhG1FQngI**
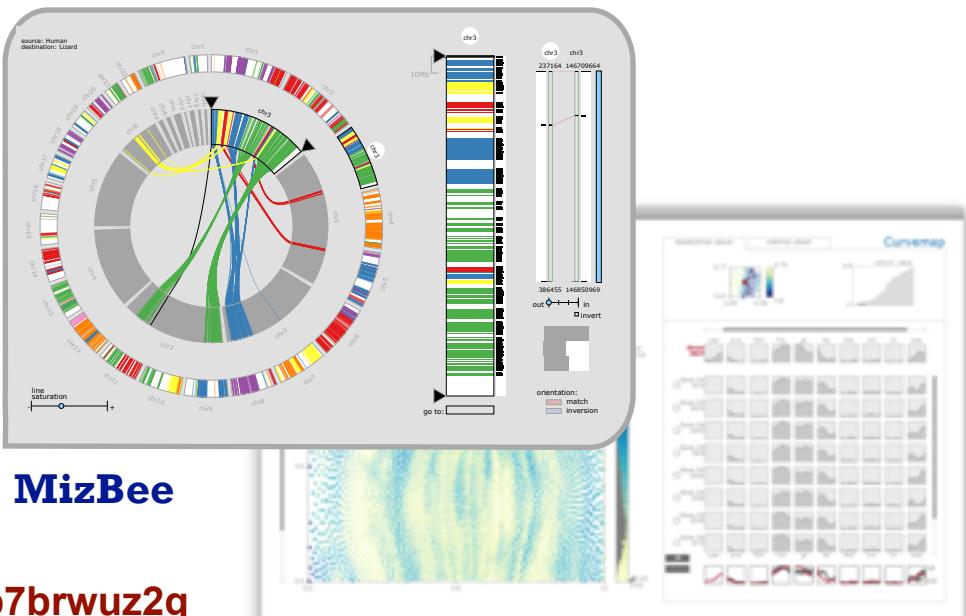
Miriah Meyer

Hanspeter Pfister
(Harvard)



**MizBee**

**https://youtu.be/86p7brwuz2g**

**MulteeSum, Pathline**

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# Problem-driven: Genomics

Joel Ferstay

Cydney Nielsen
(BC Cancer)

**Variant View**

**https://youtu.be/AHDnv_qMXxQ**
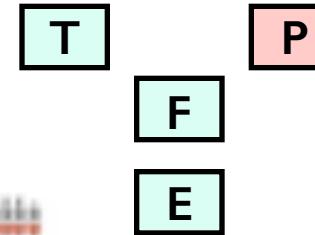
Ana Crisan

Jenn Gardy
(UBC Public Health & BC CDC)

**current work:
genomic epidemiology**
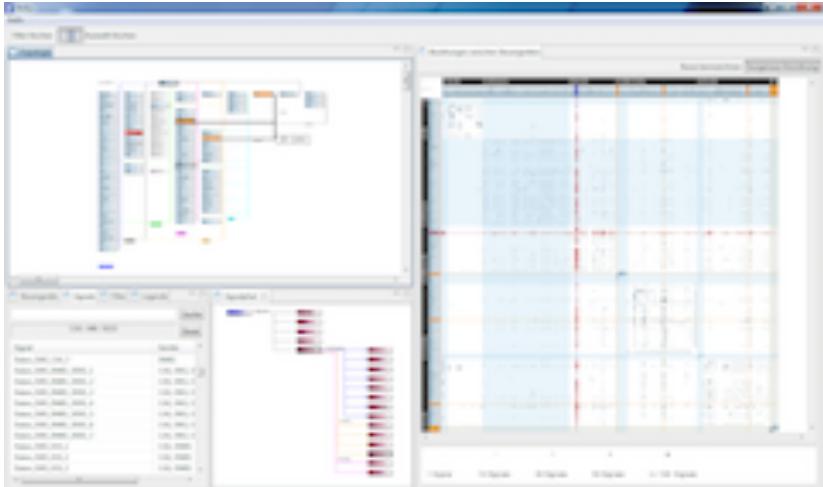
Zipeng Liu

**current work:
gene trees
(UBC Zoology)**

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# Problem-driven: Automotive, journalism

**Michael Sedlmair**



**RelEx** **(BMW)**

https://youtu.be/89IsQXc6Ao4

**Jonathan Stray**
**(Assoc Press)**





**Overview**

https://vimeo.com/71483614

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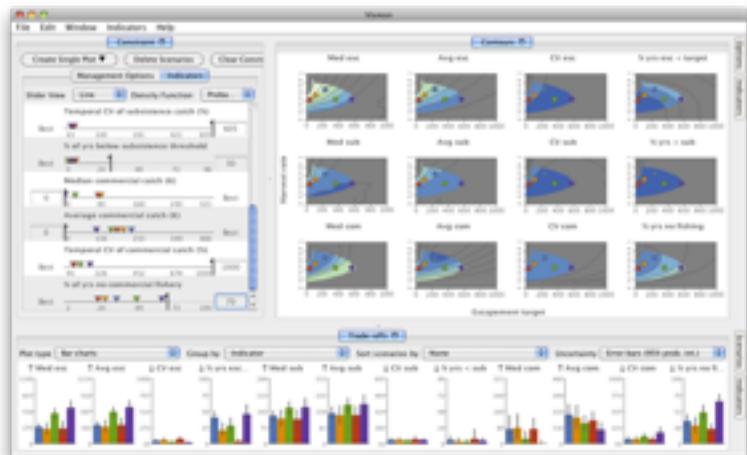
# Problem-driven: Sustainable buildings, fisheries

T   F   E   P



**Energy Manager**

**Matt Brehmer**
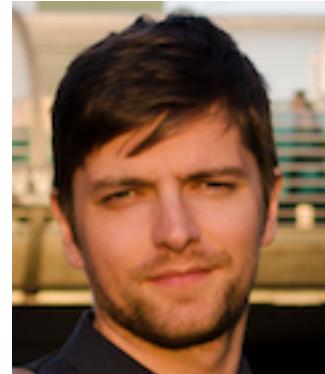
**Kevin Tate (Pulse/EnerNOC)**

**Maryam Booshehrian**

**Torsten Moeller (SFU)**

**Vismon**   **https://youtu.be/h0kHoS4VYmk**

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# Problem-driven: Current data science

## Kimberly Dextras-Romagnino



**current work:
Segmentifier
(Mobify)**

**e-commerce
clickstreams**

**build tools for
human-in-the-loop
visual data analysis**

## Michael Oppermann



**current work:
Ocupado
(Sensible Building
Science)**

**wifi proxy for real-time
building occupancy**

**integrate visual analytics
and predictive ML for
facilities management**

# Technique-driven work

- scalable algorithms & systems
  - typical evaluation: computational benchmarks
- new layout & interaction techniques
  - typical evaluation: controlled experiments on human subjects
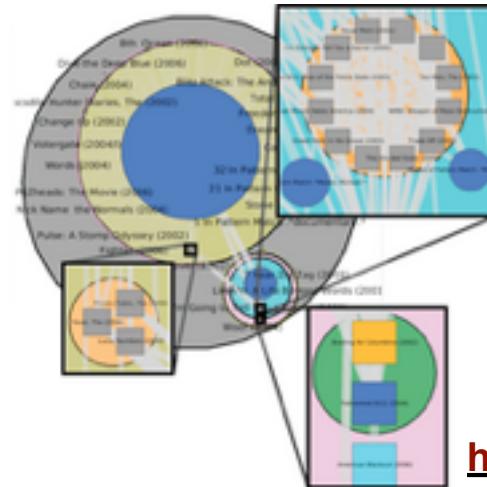
# Technique-driven: Graph drawing

Daniel Archambault

David Auber
(Bordeaux)

**TopoLayout
SPF
Grouse
GrouseFlocks
TugGraph**

**https://youtu.be/AWXAe8zvkt8**

Benjamin Renoust

**Detangler**    **https://youtu.be/QOtnHSsUV6k**
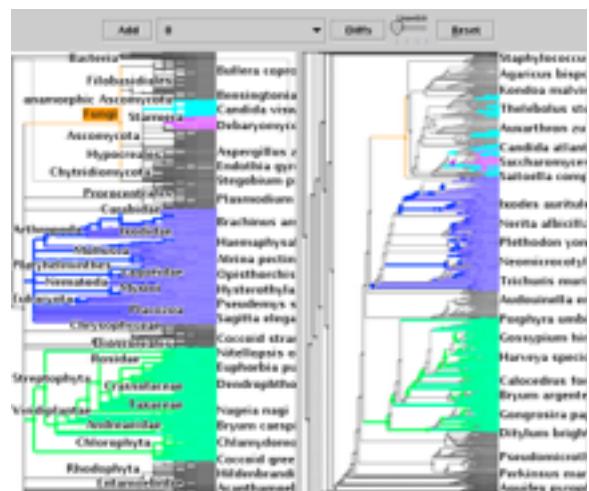
Guy Melançon
(Bordeaux)

**TreeJuxtaposer**

**https://youtu.be/GdaPj8a9QEo**

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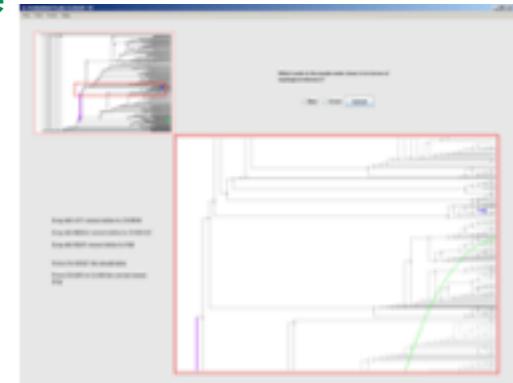
# Evaluation experiments: Graph drawing

T P
F
E

Dmitry Nekrasovski  Adam Bodnar  Joanna McGrenere
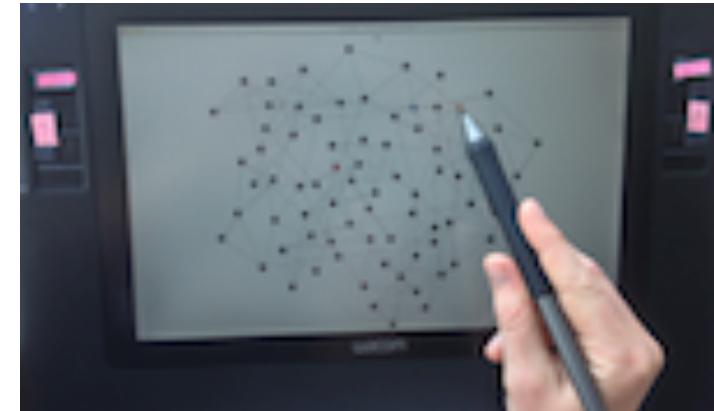
**Stretch and squish navigation**

Jessica Dawson  Joanna McGrenere
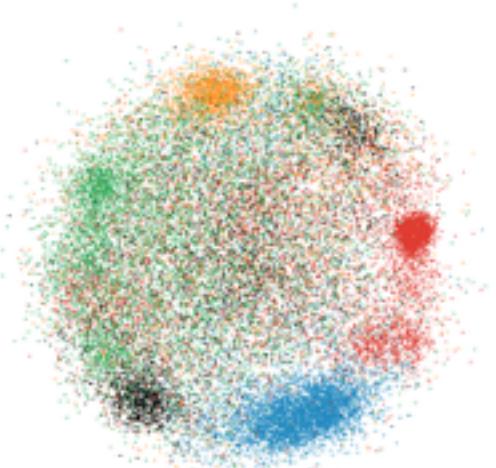
**Search set model of path tracing**

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# Technique: Dimensionality reduction
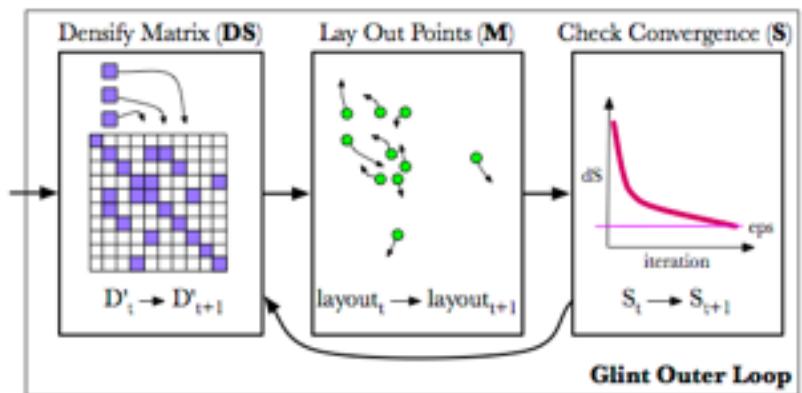
Stephen Ingram
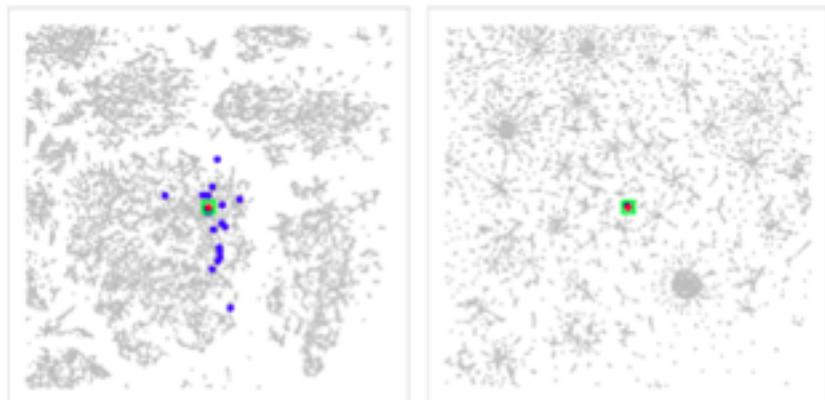


**Glimmer**



**DimStiller**



**Glint**



**QSNE**

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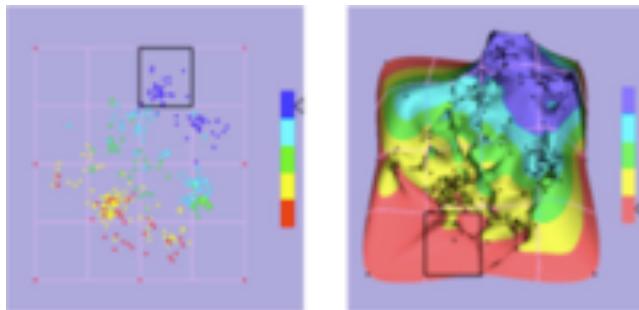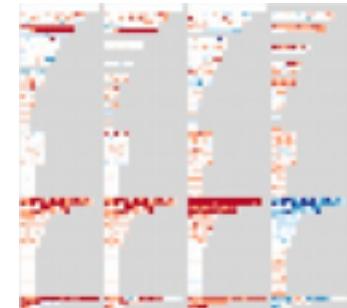
# Evaluation experiments: Dim. reduction

Melanie Tory



**Points vs landscapes for dimensionally reduced data**
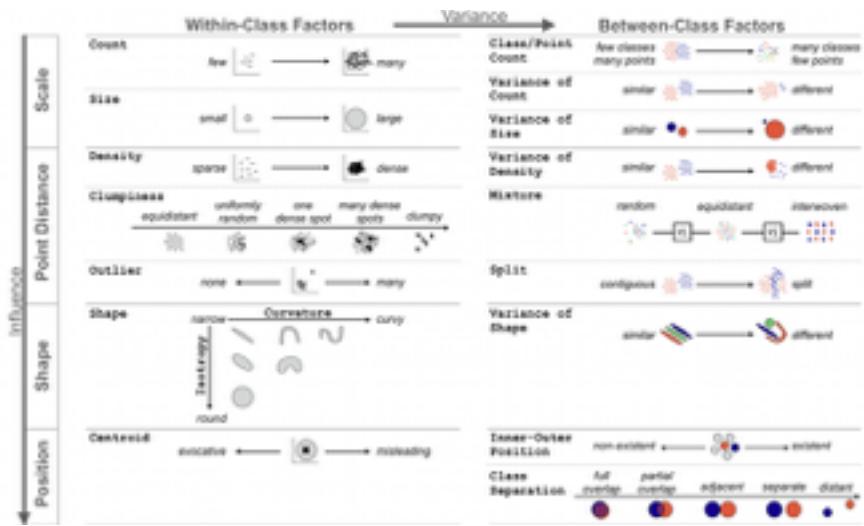


**Guidance on DR & scatterplot choices**

Michael Sedlmair    Melanie Tory



**Taxonomy of cluster separation factors**

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# Evaluation in the field: Dim. reduction

**DR in the Wild**

Matt Brehmer    Michael Sedlmair    Melanie Tory    Stephen Ingram

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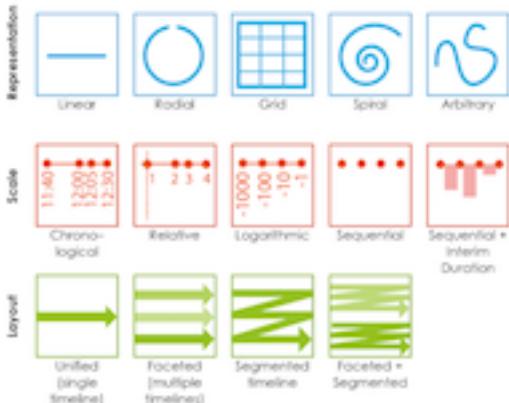
# Curation & Presentation: Timelines

**TimeLineCurator**

**https://vimeo.com/123246662**



**Timelines Revisited**

**timelinesrevisited.github.io/**

**Johanna Fulda
(Sud. Zeitung)**



**Matt Brehmer**



**Bongshin Lee
(Microsoft)**



**Benjamin Bach
(Microsoft)**



**Nathalie Henry-Riche
(Microsoft)**
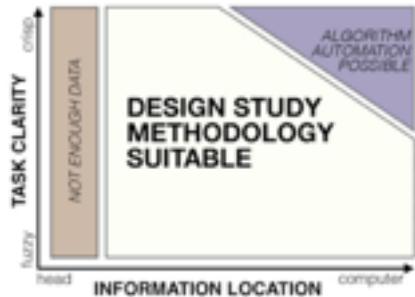


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# Theoretical foundations

T     P

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E
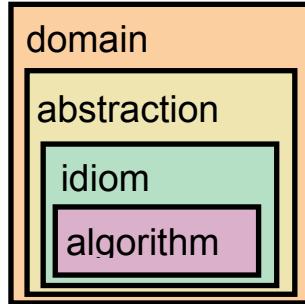
**Papers Process & Pitfalls**
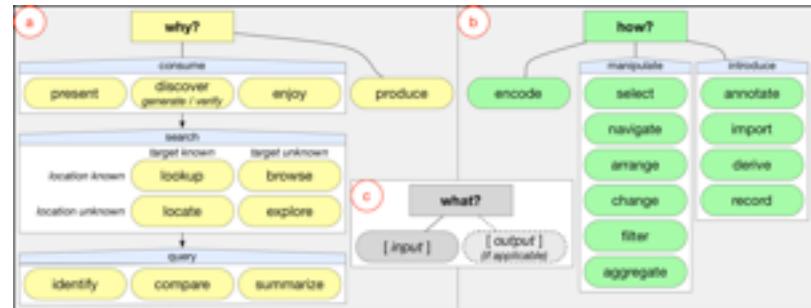
**Design Study Methodology**

domain

abstraction

idiom

algorithm

**Nested Model**

**Abstract Tasks**

Michael Sedlmair    Miriah Meyer
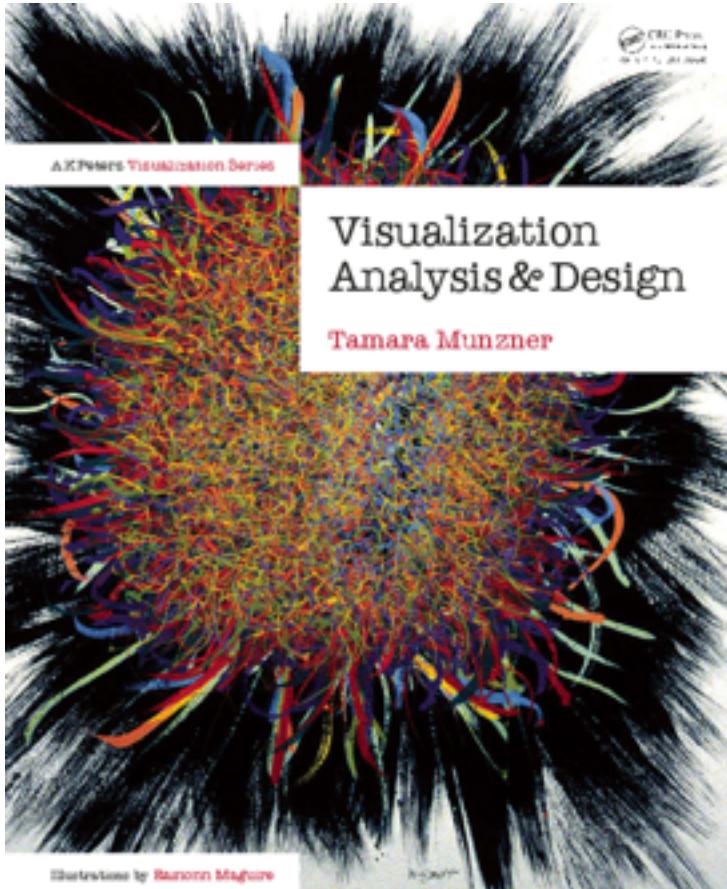
Matt Brehmer

# Theoretical foundations

**Visualization Analysis & Design**

# More information

- papers, videos, open source software, talks, courses

  http://www.cs.ubc.ca/group/infovis
  http://www.cs.ubc.ca/~tmm