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Data @ Carolina Workshop 2015

Thoughts on Big Data

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Big Picture Research Proposal Idea

Well Understood Concept:

Great science now done by <u>teams</u>

with complementary skill sets

- Biology
- Chemistry
- Engineering
- Quantitative Work

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Common Current Idea:
1 Team member

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Big Picture Research Proposal Idea

Next Generation of this Concept:

Great *Quantitative Work* needs <u>teams</u>

with complementary skill sets

- Statistics
- Imaging
- Optimization
- Data Base

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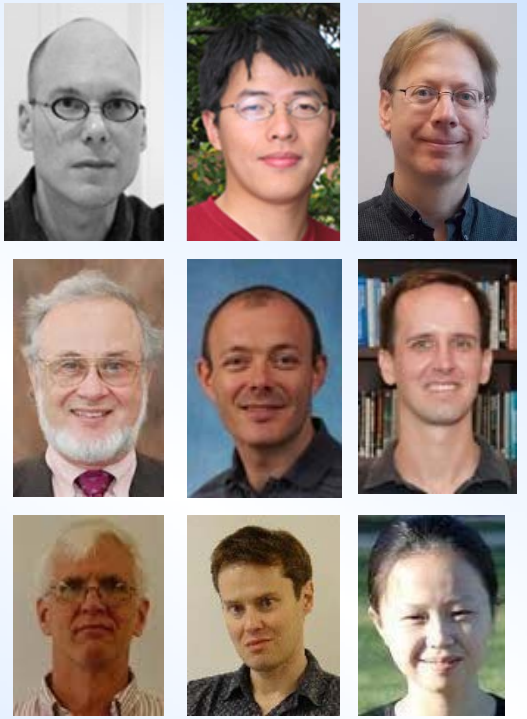
→ Big Data



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BIG DATA is a Challenge

Perhaps Bigger Challenge: *Complex Data*

Useful approach:

Object Oriented Data Analysis

Focal Point of Interdisciplinary Discussions:

"What should be the data objects?"

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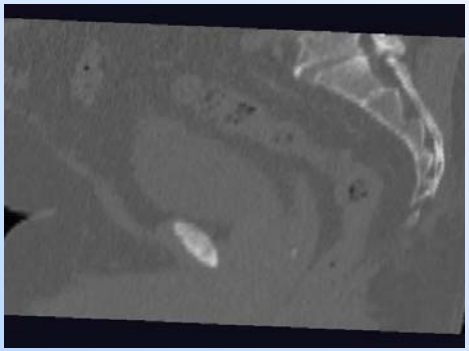
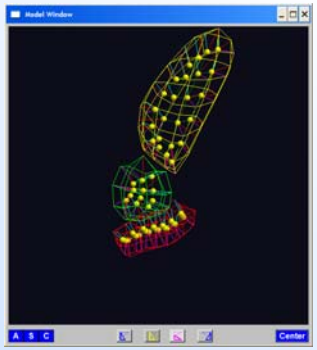
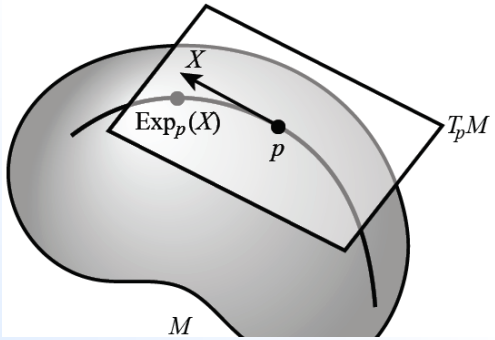
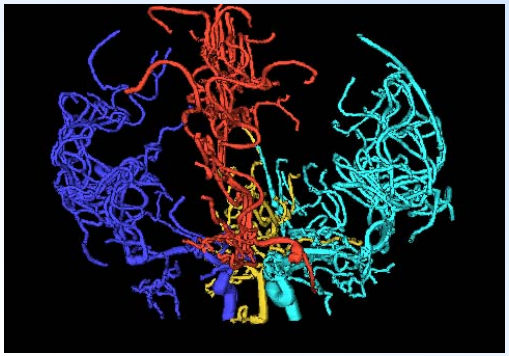
Object Oriented Data Analysis

- Data Visualization
- Complex Data Spaces









- Recent Breakthrough:

  Backwards PCA

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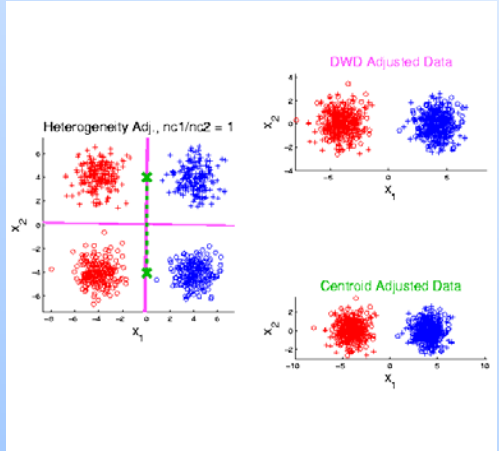
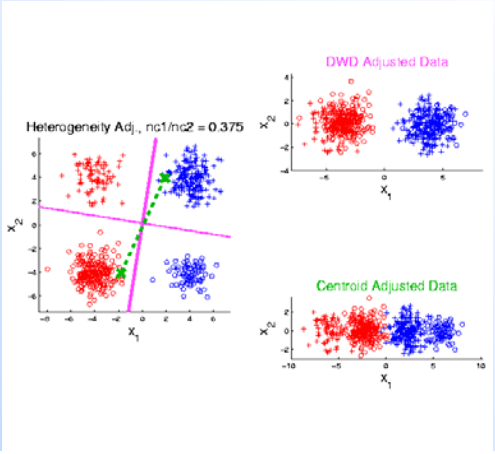
New Trend in Big Data:

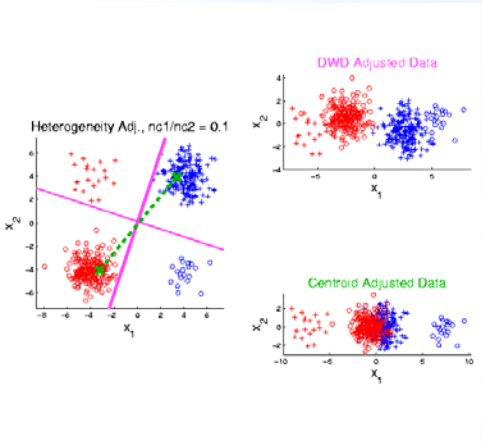
Heterogeneity & *Robustness* Against It

New Conceptual Model:

(Unknown Gaussian Mixtures)







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What Can UNC Do About Big Data?

- ✓ Nurture Research & Collaboration
- ✓ Get *Serious* About Faculty Retention
- ✓ Treasure Innovation & Creativity