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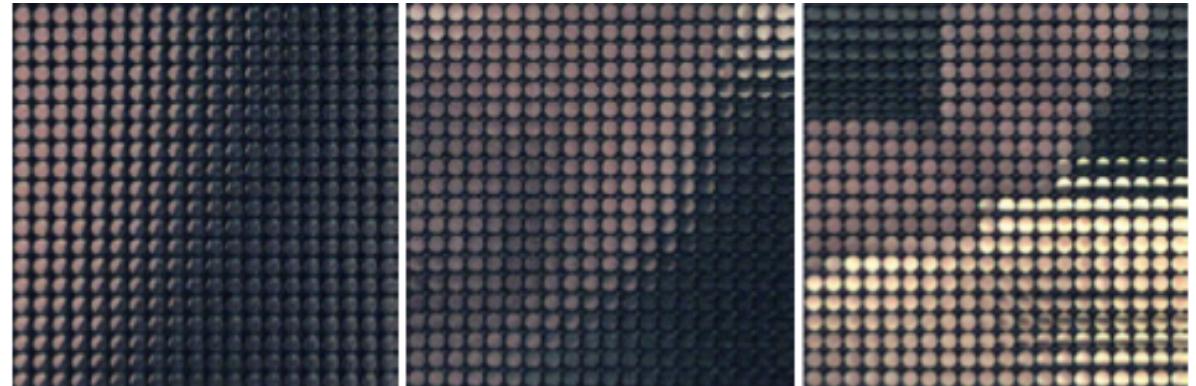
CS475 / 675, Fall 2016

Siddhartha Chaudhuri

You're at the end of CS475/675, the  
introductory graphics class

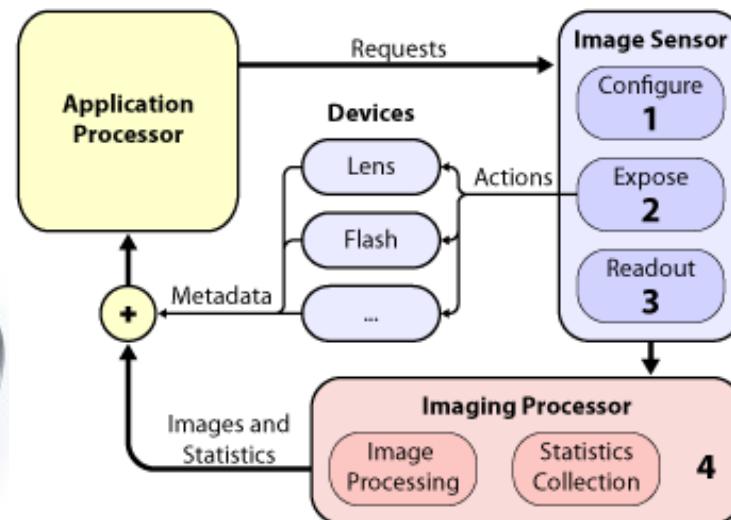
What's next?

# Computational Photography



Light Field Photography with a Hand-Held Plenoptic Camera  
(Ng, Levoy, Brédif, Duval, Horowitz, Hanrahan. 2005)

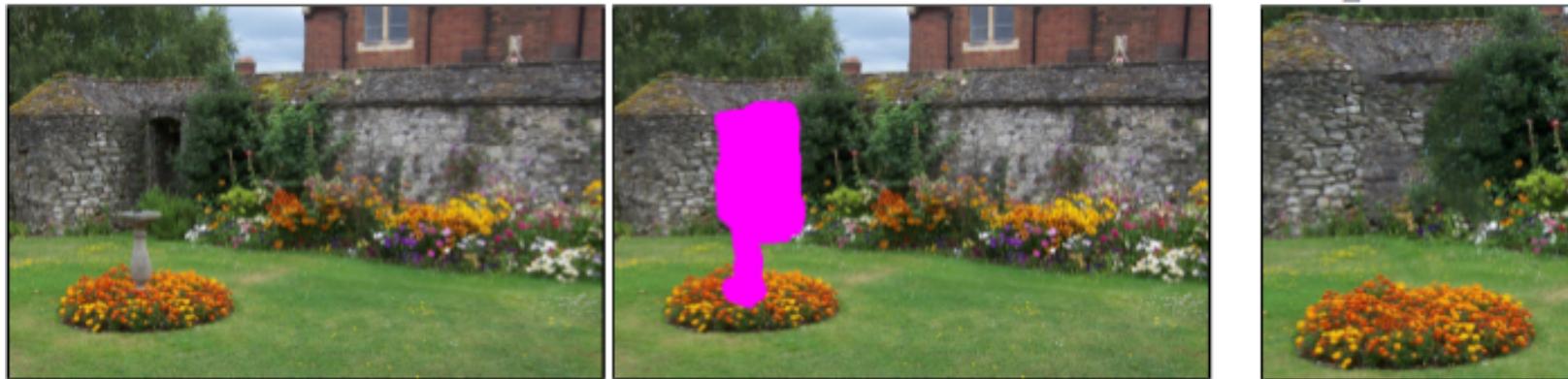
# Computational Photography



The Frankencamera:  
An Experimental Platform for Computational Photography

(Adams, Talvala, Park, Jacobs, Ajdin, Gelfand, Dolson, Vaquero,  
Bæk, Tico, Lensch, Matusik, Pulli, Horowitz, Levoy. 2010)

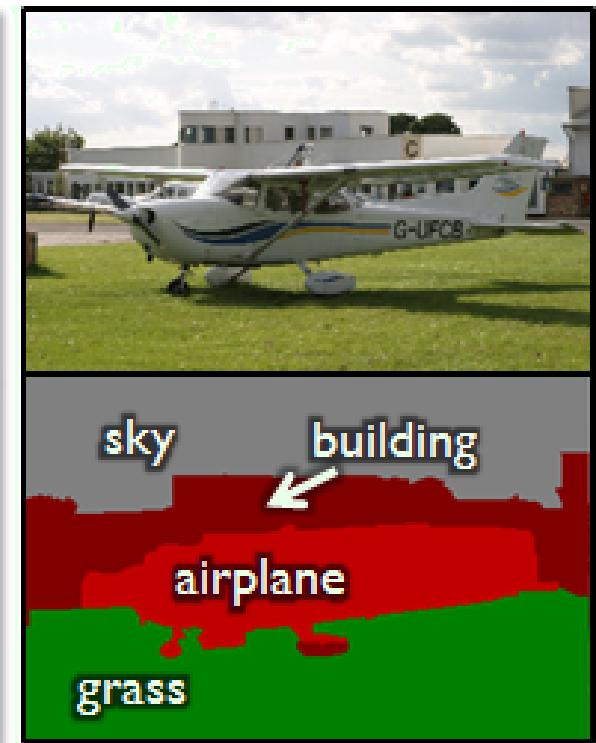
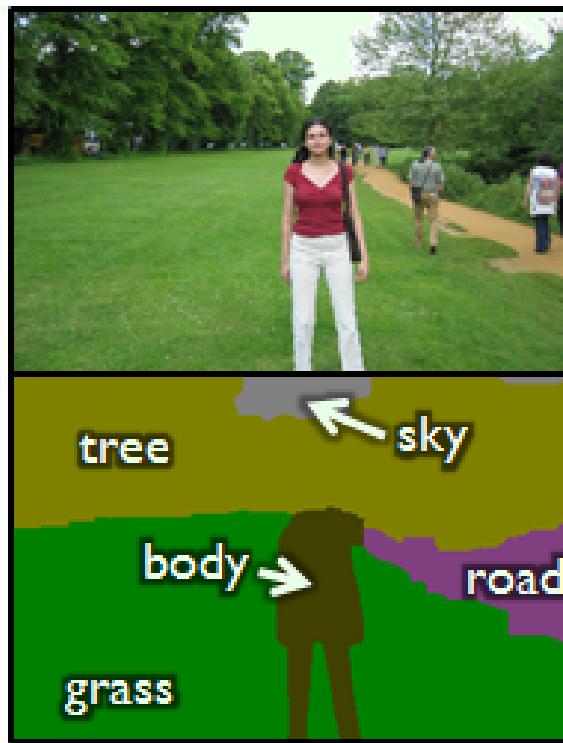
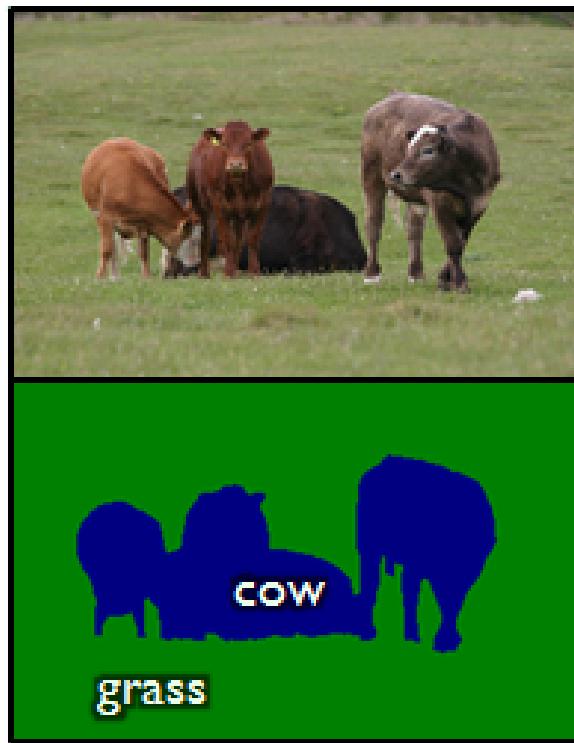
# Image Editing



PatchMatch: A Randomized Correspondence Algorithm  
for Structural Image Editing  
(aka Photoshop CS5 Content-Aware Fill)

(Barnes, Shechtman, Finkelstein, Goldman, 2009)

# Computer Vision



Real-Time Object Segmentation with Semantic Textron Forests

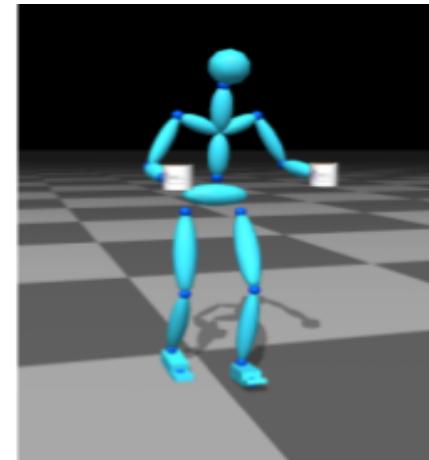
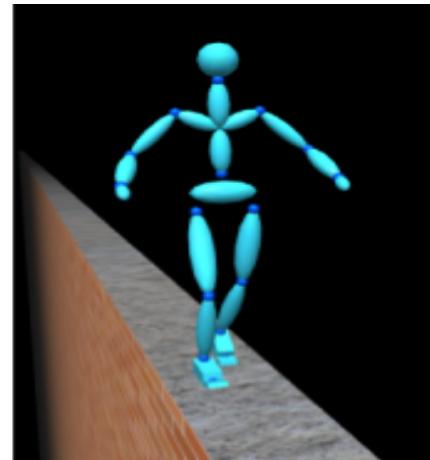
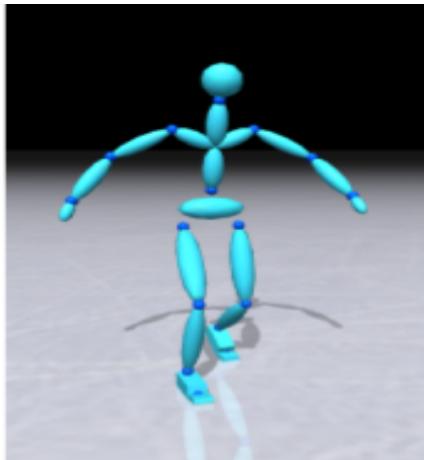
(Shotton, Johnson, Cipolla. 2008)

# More Information

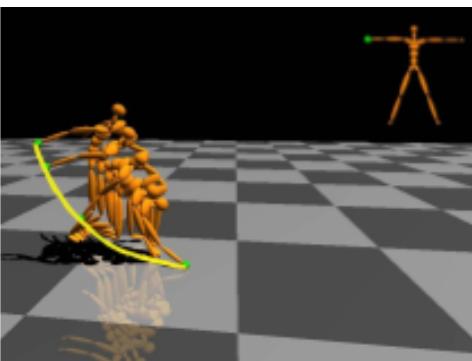
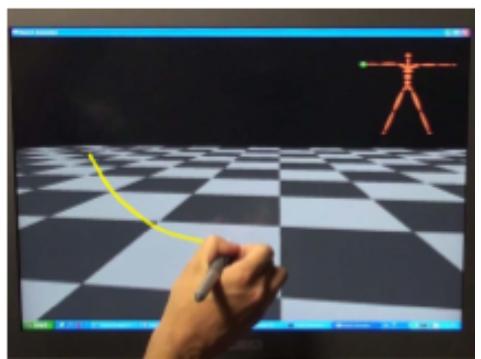
**CS663:** Digital Image Processing

**CS763:** Computer Vision

# Character Animation



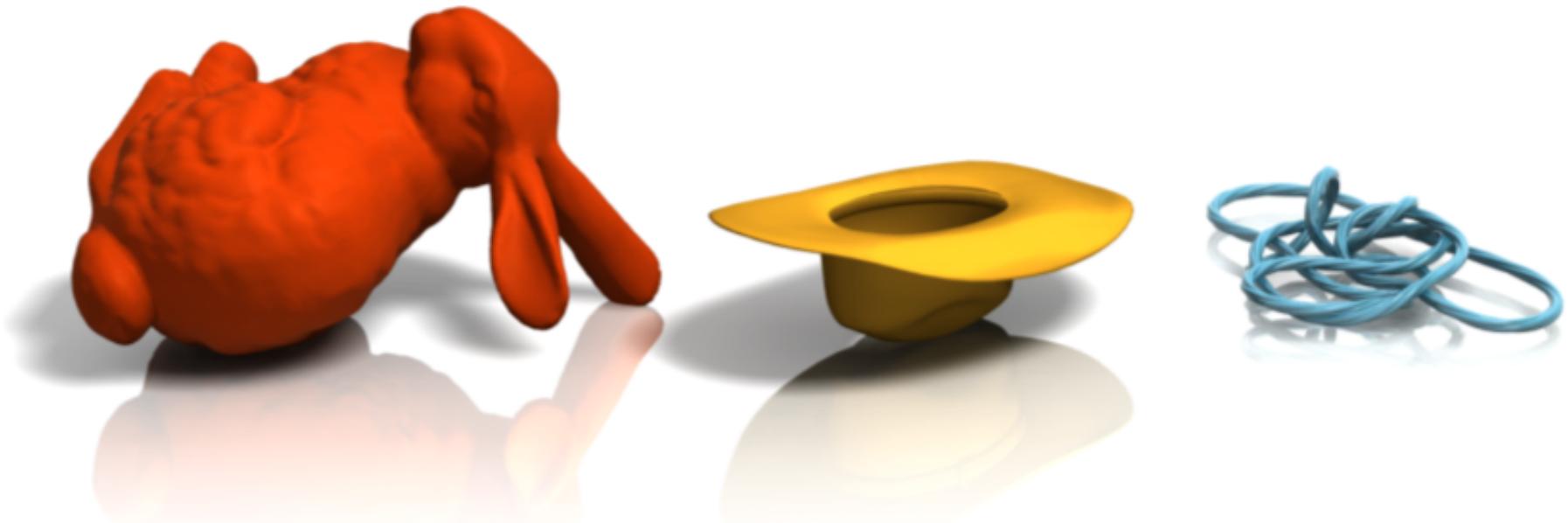
Optimizing Walking Controllers for Uncertain Inputs and Environments  
(Wang, Fleet, Hertzmann)



Interactive Generation of Human Animation  
with Deformable Motion Models (Min, Chen)

Gesture Controllers  
(Levine, Krähenbühl, Thrun, Koltun)

# Fluids and Solids



Unified Simulation of Elastic Rods, Shells, and Solids

(Martin, Kaufmann, Botsch, Grinspun, Gross, 2010)

# Photorealistic GPU Rendering

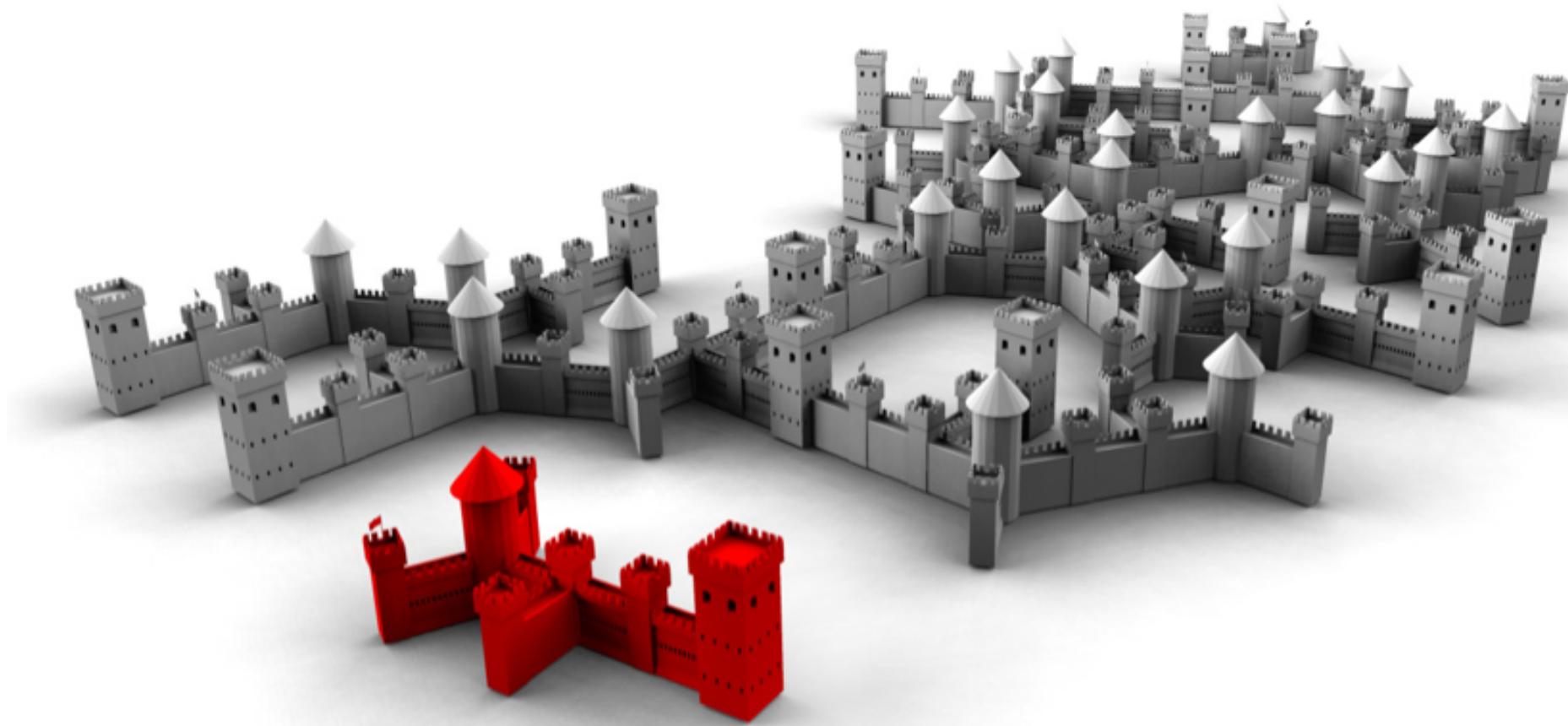


Nvidia OptiX GPU Raytracer

# More Information

**CS775:** Advanced Computer Graphics

# Understanding Shapes



A Connection between Partial Symmetry  
and Inverse Procedural Modeling

(Bokeloh, Wand, Seidel, 2010)

# Generating Shapes



Metropolis Procedural Modeling

(Talton, Lou, Lesser, Duke, Měch, Koltun, 2010)

# Data-Driven Modeling



A Probabilistic Model for Component-Based Synthesis

(Kalogerakis, Chaudhuri, Koller, Koltun, 2010)

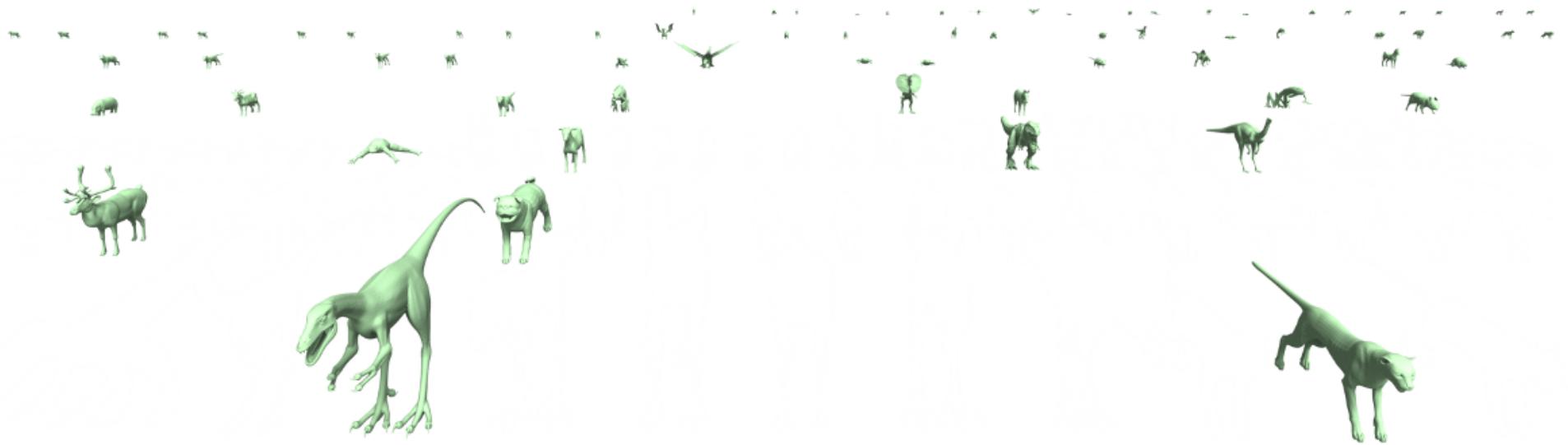
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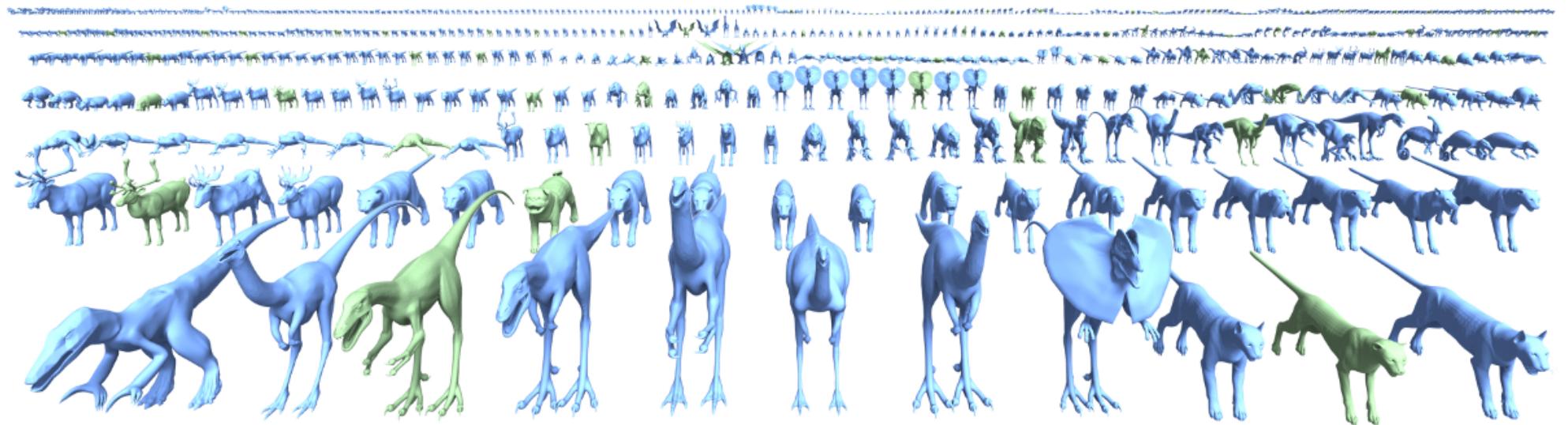
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# Data-Driven Modeling



A Probabilistic Model for Component-Based Synthesis

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# Model Acquisition and Reconstruction



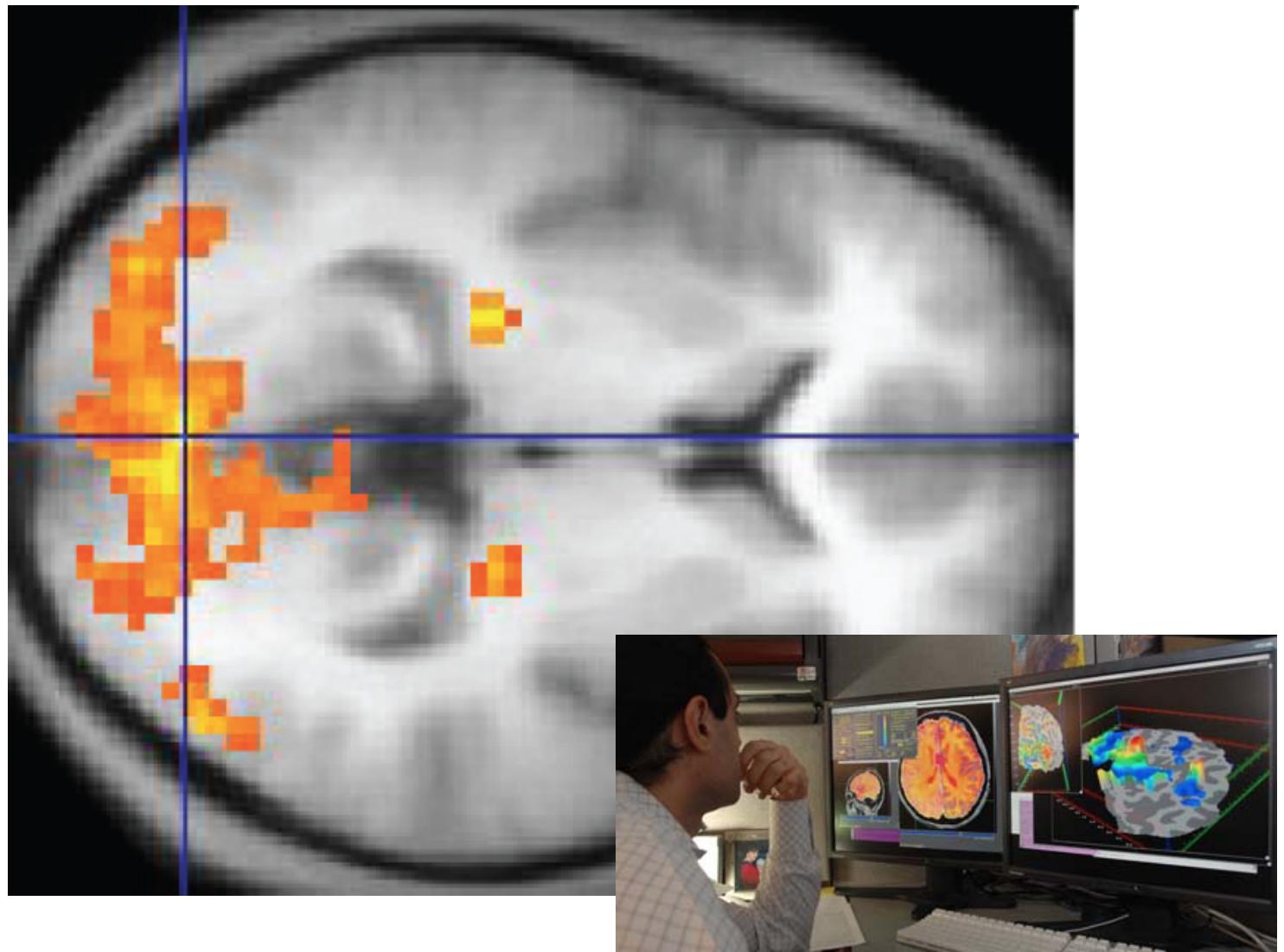
Non-local Scan Consolidation for 3D Urban Scenes

(Zheng, Sharf, Wan, Li, Mitra, Chen, Cohen-Or, 2010)

# More Information

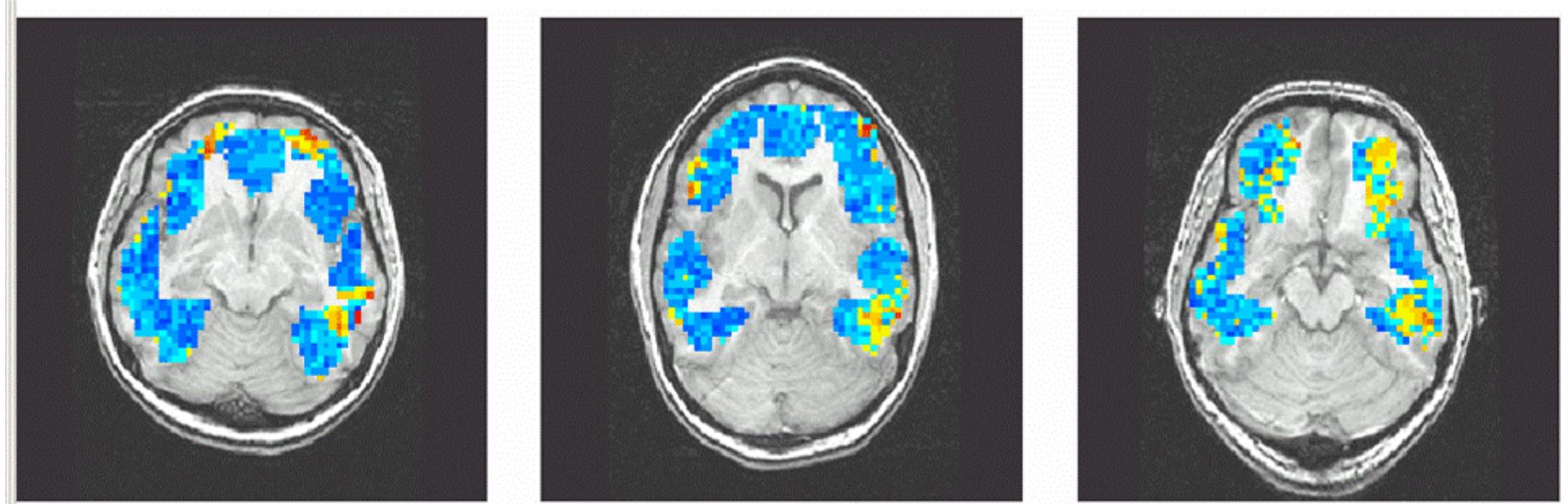
**CS749:** Digital Geometry Processing

# Mapping the brain



Functional Magnetic Resonance Imaging (fMRI)

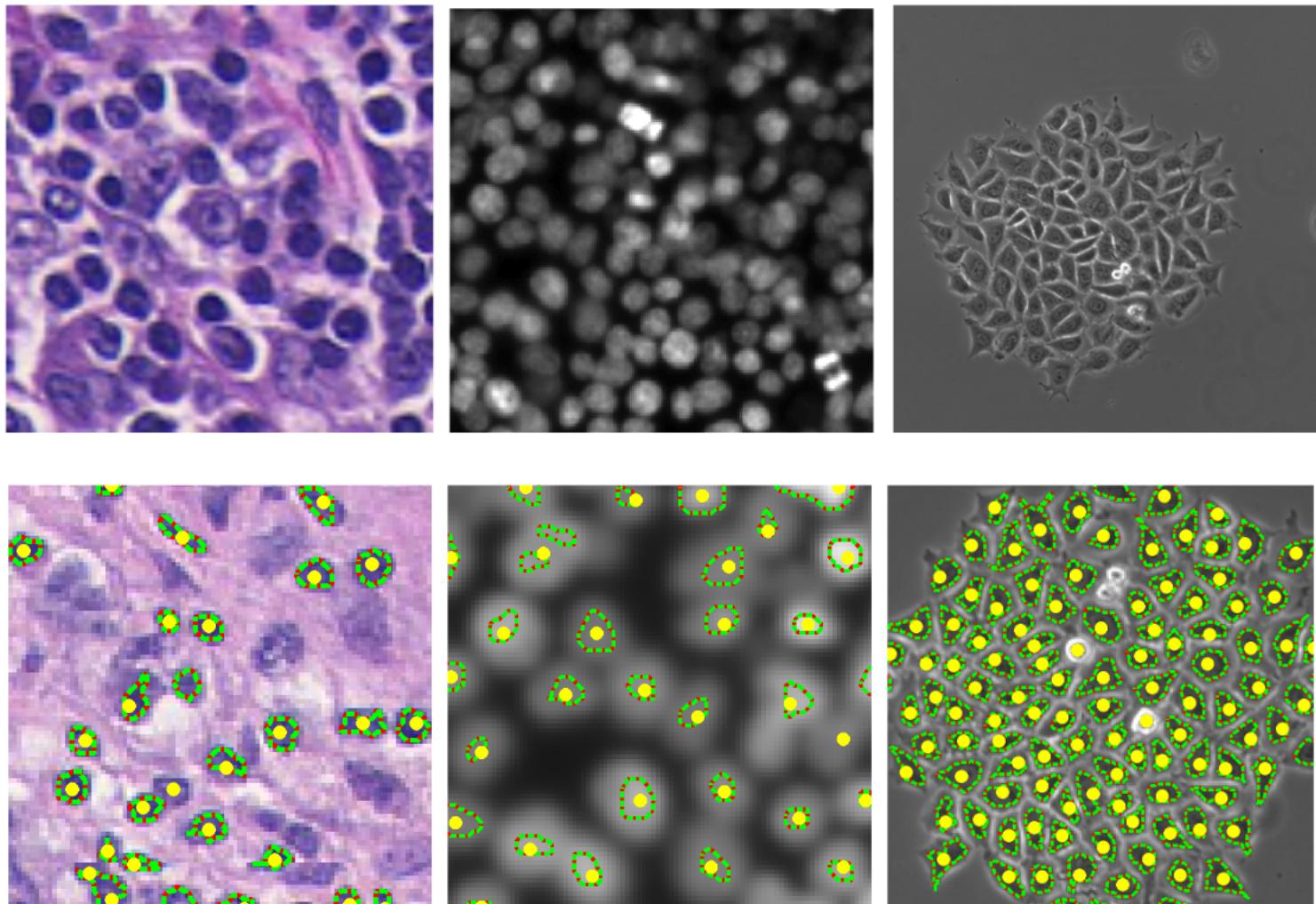
# Mapping the brain



Brain locations most useful for predicting word semantic categories in 3 different subjects

(Mitchell et al.)

# Cell Detection



(a) Histopathology

(b) Fluorescence HEK

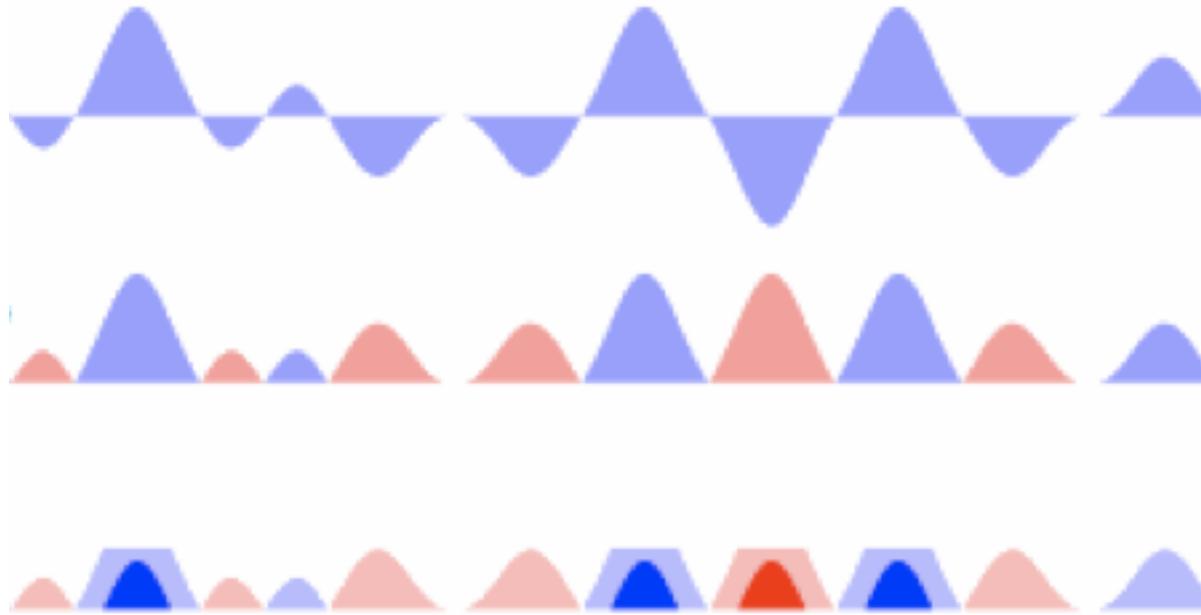
(c) Phase-contrast HeLa

Arteta, Lempitsky, Noble and Zisserman

# More Information

**CS736: Algorithms for Medical Image  
Processing**

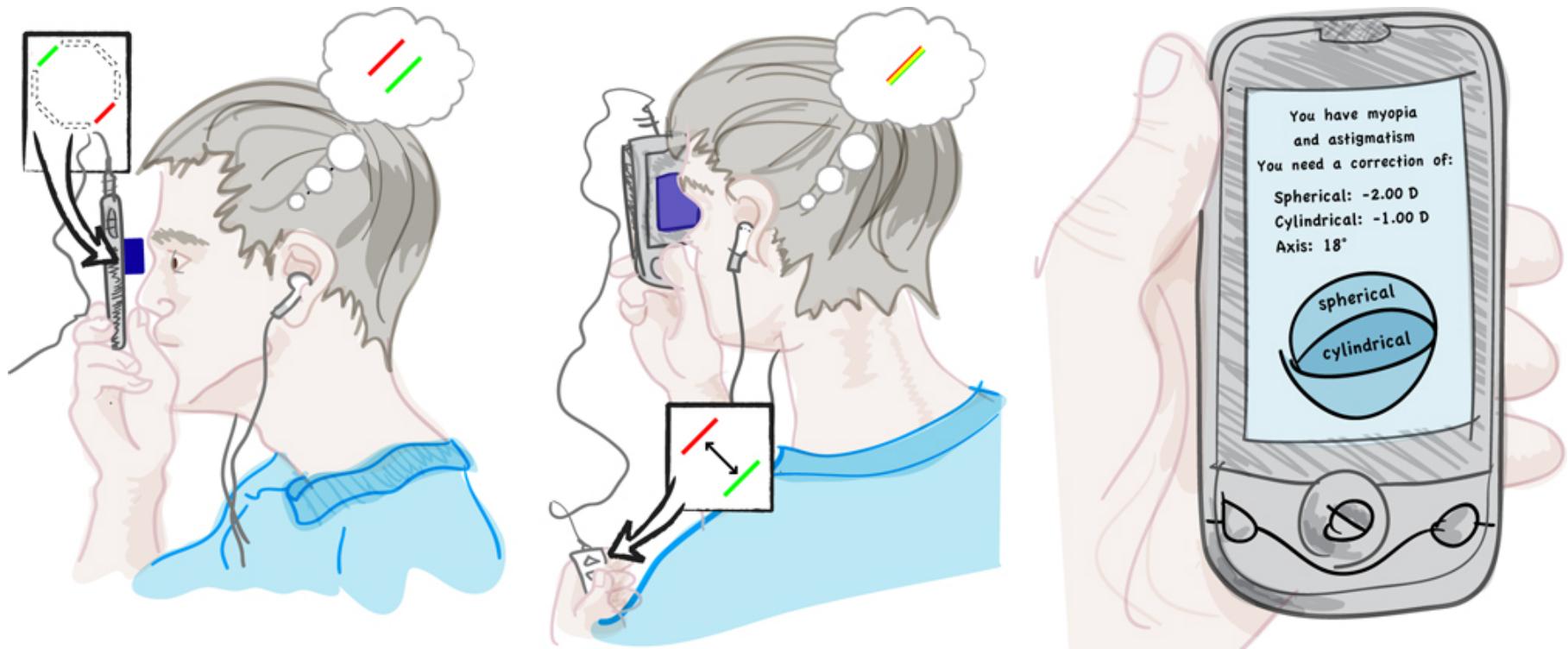
# Visualization



CS???: *Data Visualization*

(we need this course)

And now for something completely different...



## NETRA: Interactive Display for Estimating Refractive Errors and Focal Range

(Pamplona, Mohan, Oliveira, Raskar, 2010)