

Who are you?

- Peter Bajcsy, Computer Scientist, NIST
- Ph.D. in Electrical and Computer Engineering from UIUC
- **Research Areas:**
 - Image processing, computer and machine vision, video processing,
 - Statistical modeling, pattern recognition, data mining and machine learning,
 - Novel sensor design, software engineering and scientific workflows.

What are you doing with visualization?

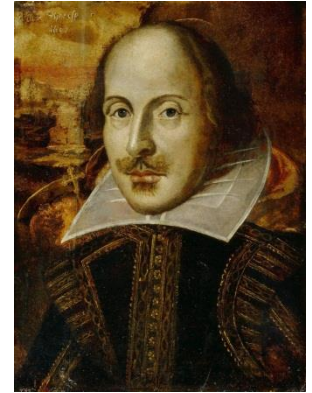
- Leading an interdisciplinary project at NIST:
 - Computational Science in Biological Metrology
- Focusing on big image applications in cell biology and material science
- Providing Web-based visualization of terabyte-sized images as one of the system components to advance measurements from microscopy images
- Enabling interactive measurements via Web-based visualization

What are you passionate about?

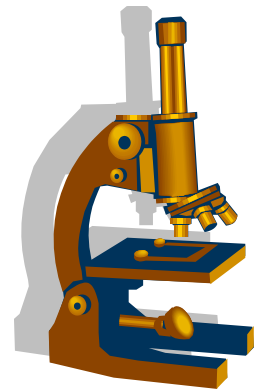
- Building bridges **from raw images to information and to knowledge** where the images come from ubiquitous multi-instrument measurement systems.
- My main research goals are
 - (1) *to automate* information processing of repetitive, laborious and tedious analysis tasks based on theoretical models,
 - (2) *to scale computations* of automated tasks using novel hardware architectures, and
 - (3) *to build decision-making systems* using web technologies.

What are you passionate about?

Assisting Scientists to Resolve the Dilemma: *To Measure or Not To Measure Terabyte-Sized Images?*



- Imaging instruments are readily available to acquire very large quantities of images
- Manual and visual inspection based analyses of megabyte-sized images do not scale to terabyte-sized images



What are your current challenges in your work?

- Lack of **reference data** for validating automated image processing methods
- Slow **network speed** between computational cloud resources and data sources
- Lack of **standards** for interoperable image processing software
- **Impedance between software and hardware**
 - Cluster computing, NVIDIA GPUs, FPGA, Raspberry Pie, HPC, ...



What is on your wish list?

- **Enable science from big image data for small teams** (e.g., PI + 2 postdocs + 3 GRA)
 - Organize a workshop on May 27 at Stanford University
 - Engage the scientific community working with big images to share software and data across applications
 - Improve reproducibility of research results
- **Make image-based decisions more quantitative**
 - Advance qualitative visual inspections by providing quantitative measurements to support decisions
 - Extend image analytics to image simulations