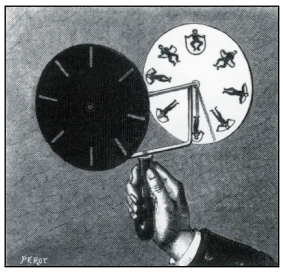
MAT 594CP Experimental Projects in Optical-Computational Processes

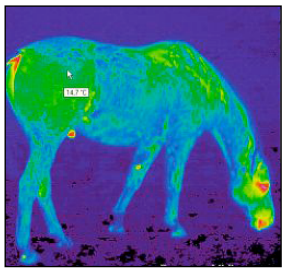
Instructor: George Legrady
TA: Pablo Colapinto

E-studio, rm 2220 Department of Art
Tues-Thurs: 10am-12pm

http://www.mat.ucsb.edu/~g.legrady/academic/courses/08s594/08s594.html

What is the course about?

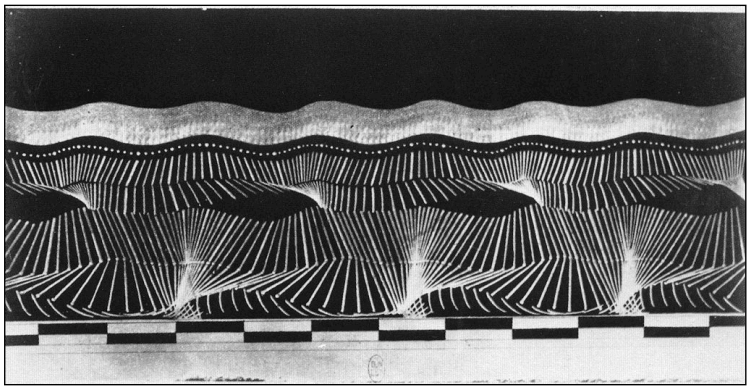




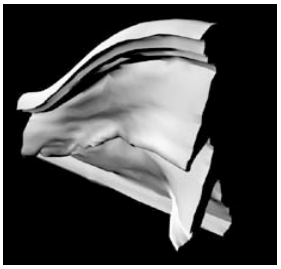
1. Historical and contemporary still and time-based images & developments
2. To explore image-making created with machines: optics, cameras, etc.
3. The intersection of cameras and computers
4. Artistic possibilities out of scientific, industrial imaging tools, processes, software

Historical Processes to Re-Explore

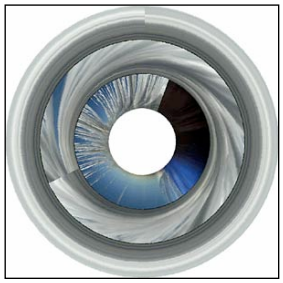
- **Anamorphic reflections**
- **Multiple-exposure studies**

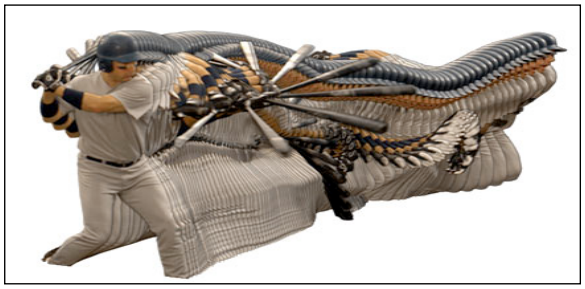


Still and Time-Based Images



- **The photograph is the result of light optics, mechanics, and imprinting of the image (chemical, electronic, etc.)**
- **The cinematic (kinetic) image is a sequence of still images**





Camera & Computers

- **Motion tracking:** Locating moving objects through image frame substraction

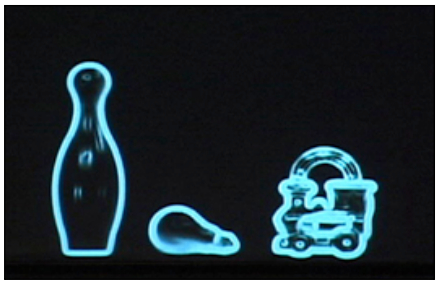
  (current image minus previous image)

- **Compiling live visual data with computer generated data:**

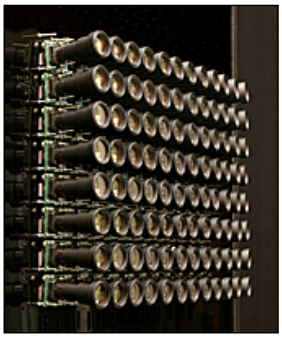
Camera & Computers

- **Multi-Image computation**

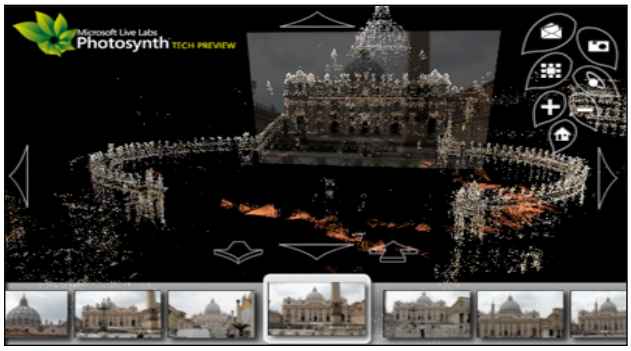
- **Machine Vision:** Image recognition and processing



Other Data driven photography



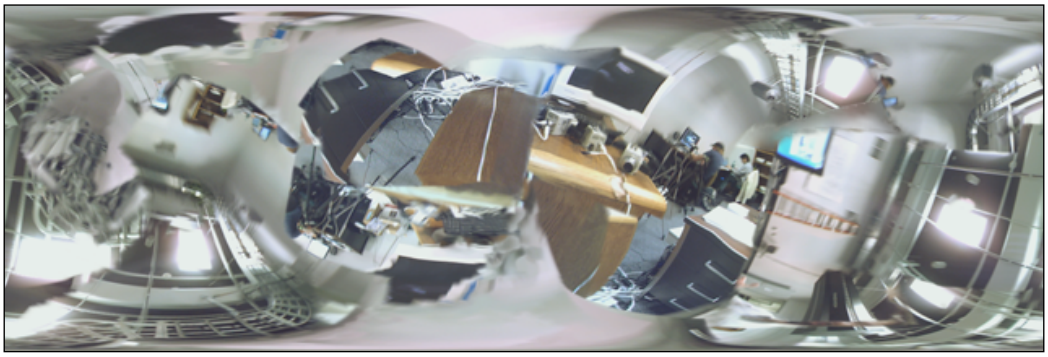
- **Light field photography:** Multi-Image computation allows for digital refocusing
- **Photosynth**: Large collection of photos are analyzed algorithmically for similarities and reconstructed in 3D



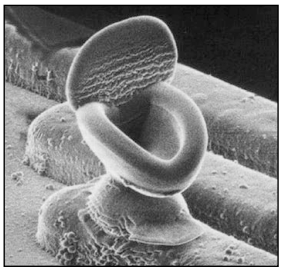
MAT 594 Projects in Optical-Computational Processes

Panoramic Dynamic Stitching

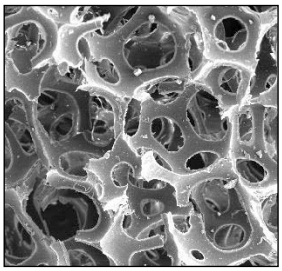
- Diverdi Envisor augmented reality panoramic video stitching



Scientific Imaging Perspectives



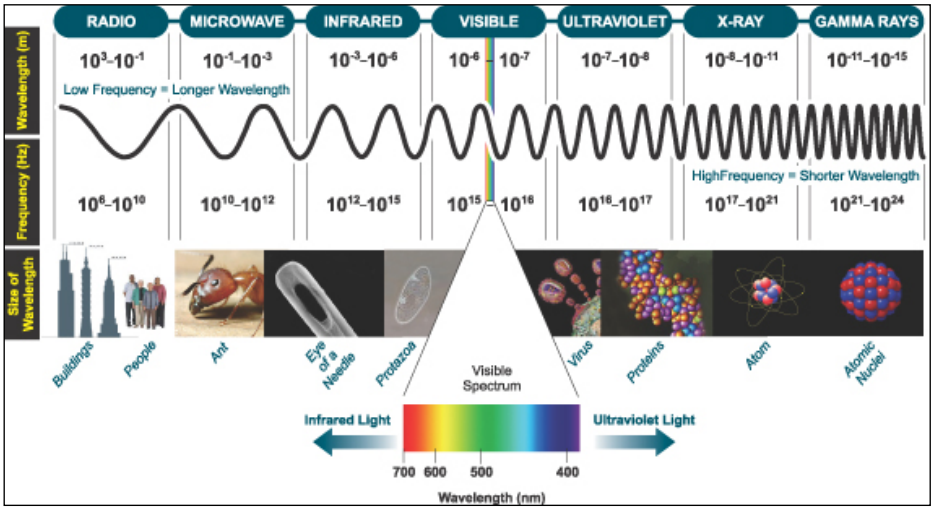
- **Electron Microscope:** Uses electrons to illuminate and electrostatic and electromagnetic lenses in forming the image



- **Telescopic:** Measures spectra

Electro-Magnetic Spectrum

- We only see a small part of the spectrum but we can measure more

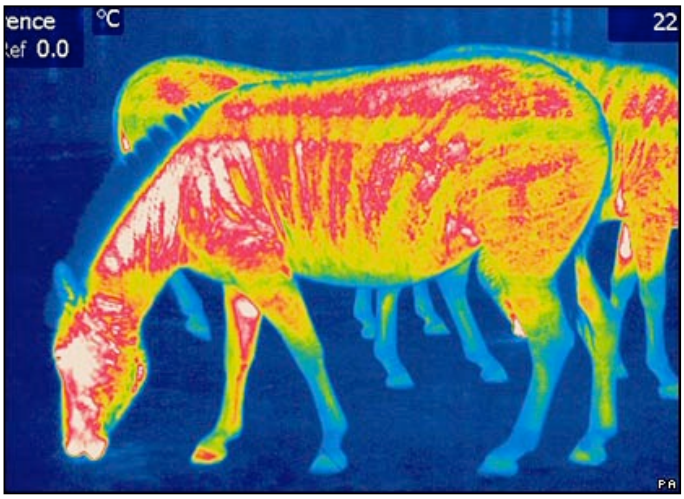


X-Ray (Röntgen)

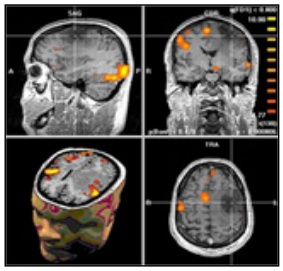
- A form of electromagnetic radiation with atom size wavelengths

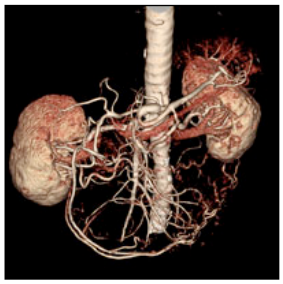
Infra red

- Longer then visible light, heat responsive used in night vision, spectroscopy, weather

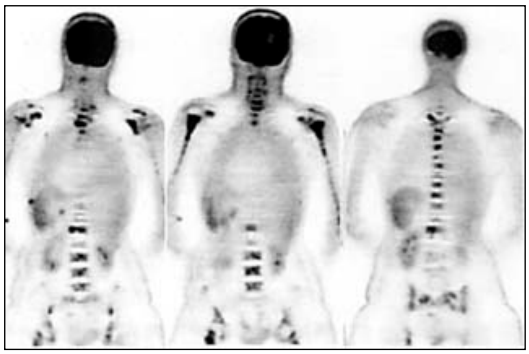


Tomography (MRI, CT, PET, etc.)

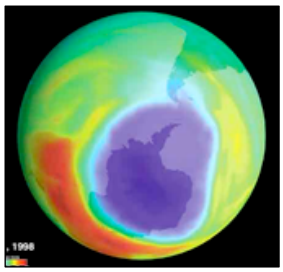




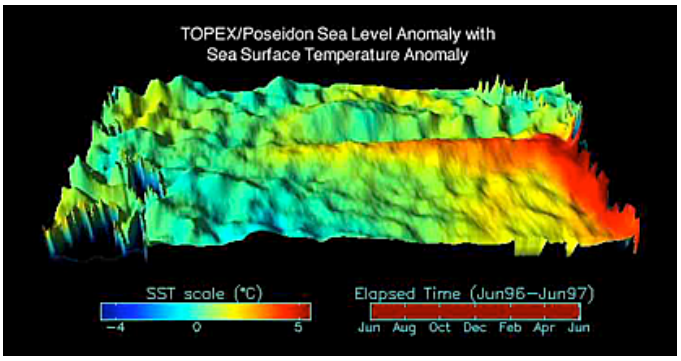
- Imaging by sections, assembled through algorithms



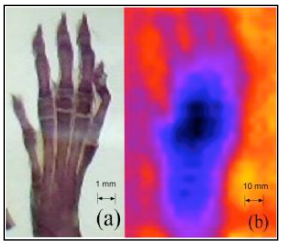
Satellite Imaging



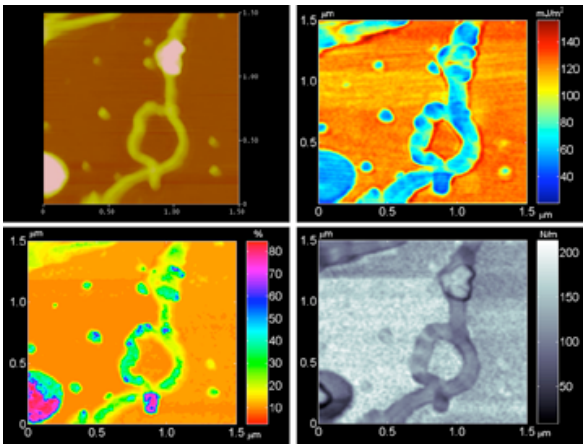
- Composite assembled images for weather, land use, ecology, etc.
- Google Tools: Google Earth, Google Sky, Google Ocean



Other Forms of Imaging



- Neutron instead of light
- Nano imaging: Microphone used to make movies of molecules



Course Workload & Grading

- **Attendance, readings, etc. 40%**
- **Research project: 30%**
- **Final project: 30%**