



THE UNIVERSITY OF
CHICAGO
BIOLOGICAL
SCIENCES

Office of Shared Research Facilities

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for
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Associate Dean of Research Resources

June 21st, 2018

Office of Shared Research Facilities



Functional Genomics

Next-Gen and Micro-Array Sequencing
DNA Sequencing and Genotyping

Bioanalytics and Bioinformatics

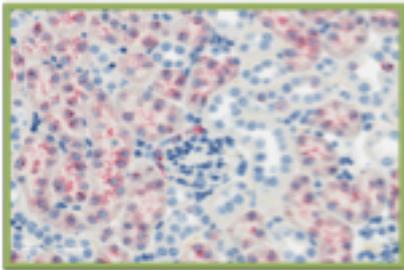
Cellular Screening Center

Biophysics
Biostatistics
Nuclear Magnetic Resonance
CRI Bioinformatics Core



Clinical Research

Human Tissue Resource Center
Cellular and Tissue Based Processing cGMP Facility
Human Immunological Monitoring
Human Imaging Research Office
Pharmacology - Analytical and Biofluids



Imaging and Flow Cytometry

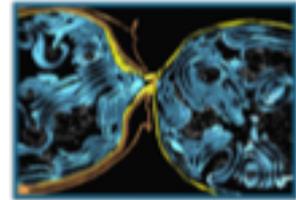
Advanced Electron Microscopy: Cryopreservation & Tomography
Cytometry and Antibody Technology

Cyclotron

Integrated Microscopy
MRI Research Center

PaleoCT
XROMM

Integrated Small Animal Imaging Research Resource



Animal Related

Transgenic/ES Cell Technology
Animal Microsurgery Center
Fly Kitchen

Engineering and Fabrication

Machine and Engineering Shops
MRSEC Materials Prep & Measurement Lab
Pritzker Nanofabrication Facility
Searle Cleanroom and Nanofabrication Facility
Soft Matter Characterization Facility

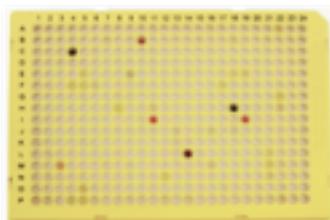
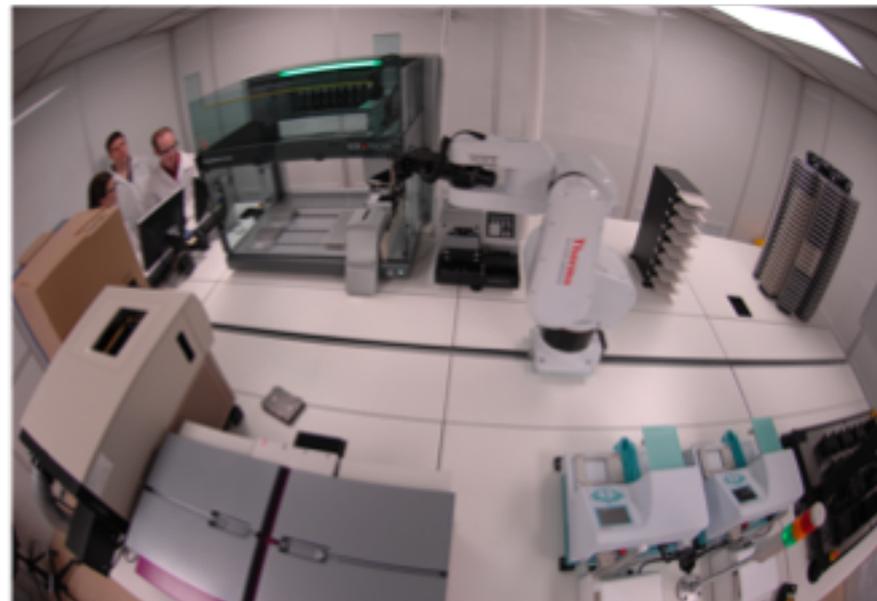


Cellular Screening Center



The CSC provides high throughput cell and non cell based screening for researchers throughout Chicago area. Both small molecules and siRNA libraries are offered for such screens.

The CSC is the only screening facility in the Chicago area that is housed in a clean room environment. A ThermoFisher F3 robotic arm runs on a three meter track to reach five liquid handlers and three readers on a unique workstation in the clean room. This allows around the clock walkaway screens.



Siquan Chen, Scientific Director
(here today)

Cytometry and Antibody Technology



Helios, a new CyTOF System

- Mass Cytometry combines mass spectrometry with the antibody labeling and detection mechanics of traditional flow cytometry.
- Metal-labelled antibodies allows 135 detection channels with minimal signal overlap and background noise. 37 metal isotope tags available, and cells are turned into ions.
- Extracts more information from limited samples.
- Technical staff will assist with experiment and panel design. David Leclerc, Technical Director (here today).



UC Cyclotron

- Cyclotron in vault
- 8 possible targets
- 2.2 m thick walls
- 1.95 m thick ceiling
- Cyclotron weighs 27T



Cyclotron is operational!

We **already** produce

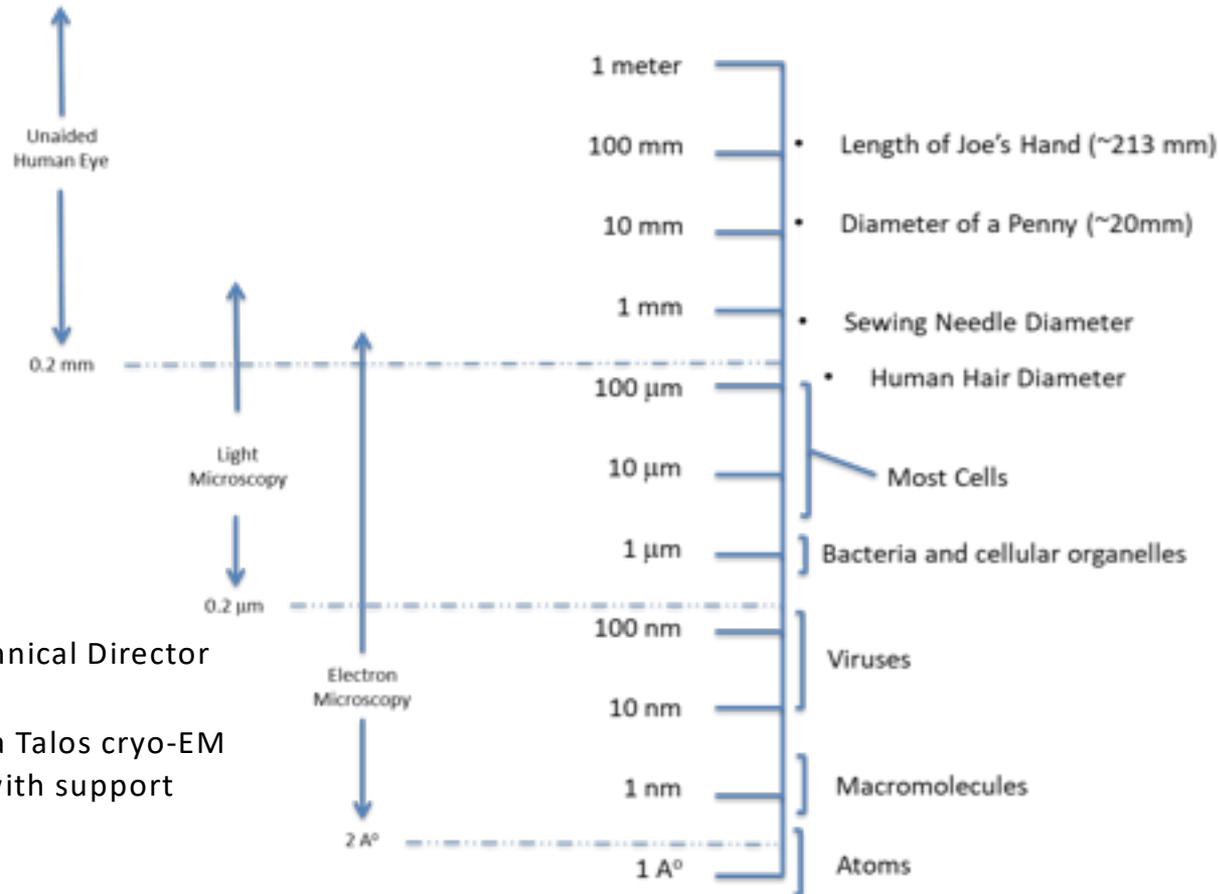
- ^{18}F -FDG Oncology: solid tumor, lungs, brain tumors (not clinical!)
- ^{18}F -NaF Bone cancer
- ^{18}F -FLT Proliferation marker, oncology
- ^{18}F -F-Miso Hypoxic tumors
- ^{18}F -FAP nicotinic receptors
- ^{18}F -JW576, ^{18}F -JW-199, Chemistry: R. Moellering @ UC
- ^{18}F -3F4AP Multiple Sclerosis demethylation marker. Awarded \$225,000 by Innovation Fund in 7/2015.
- Investigating pancreatic tumor tracer with UIC, Pin1
- ^{48}V production of vanadyl insulin mimetic that doesn't respond to inflammation like FDG does
- Richard Freifelder, Program Manager (not present)
 - Email: freifeld@uchicago.edu



Advanced Electron Microscopy



Resolving Power of Various Magnifying Tools

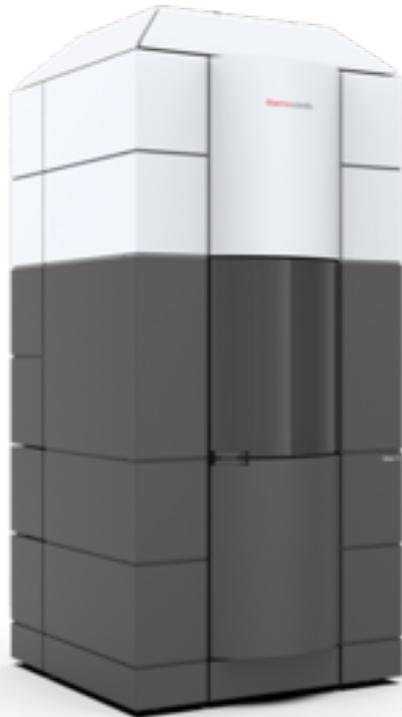


Jotham Austin, Technical Director
(here today).
We currently have a Talos cryo-EM
purchased in part with support
from CBC.

Advanced Electron Microscopy



Electron Microscope(s) Coming Soon to The University of Chicago



The Titan Krios for Cryo-EM
Single protein analysis and
Cellular 3-D tomography



The Apreo VS for
Serial Block Face
Volume reconstructions



The Aquilos Cryo-FIB for
preparing cryo-lamella
Samples for high resolution
3D tomographic imaging

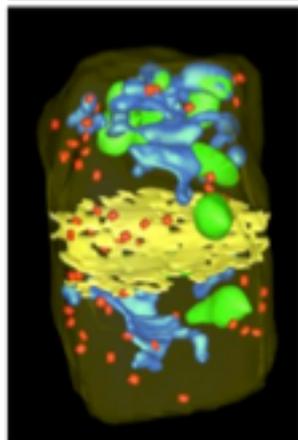
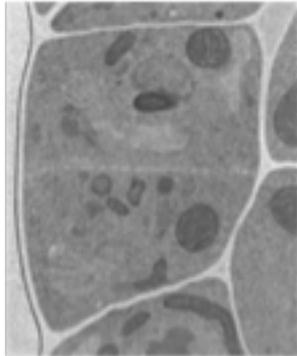


Advanced Electron Microscopy



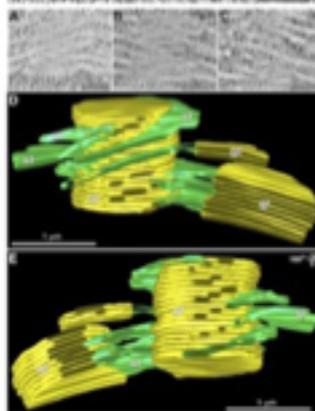
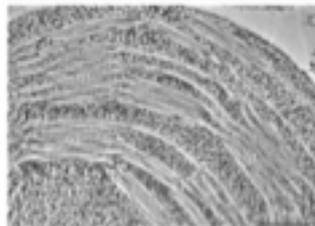
EM Core

Volume Imaging
TEM Serial Section of an entire Plant cell



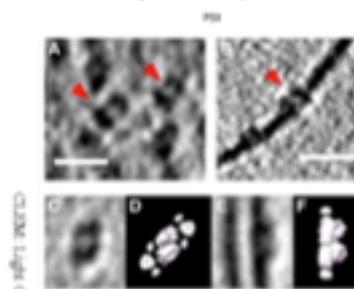
ApereoVS:
Volume imaging of large volumes

Cryo-preservation + Plastic Tomography:
Electron tomogram of a high-pressure-frozen and freeze-substituted chloroplast.



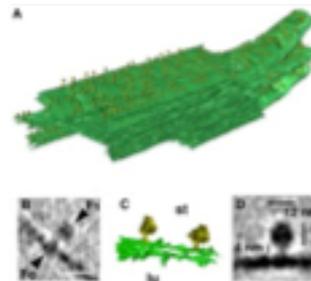
High Pressure Freezing and Plastic Tomography

Cryo-tomography + Volumetric averaging
Cryo-tomography:
Organization of PSII and ATP synthase in thylakoids



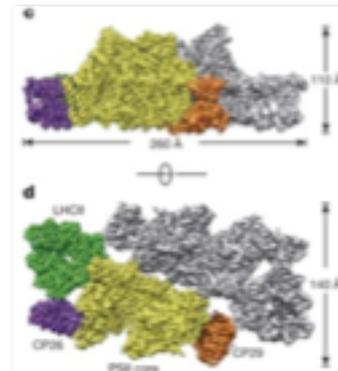
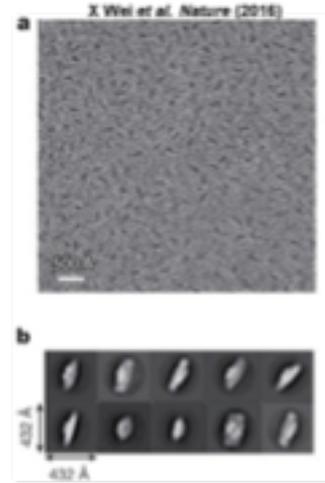
Serial Light Opt

ATP synthase



Krios + Aquilos

Single Particle
Single-particle cryo-EM analyses of spinach PSII-LHCI supercomplex: 3.2Å



Krios:
Single Particle