

Biological Imaging at NSLS-II



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Science Themes

Plant and Microbial Biology

- Biofuel production, plant metabolism and signaling, phytoremediation, plant-microbe interactions

Environmental Health Science

- Toxicology of contaminants, heavy metals, low dose radiation

Biomedical Imaging

- Soft-tissue imaging (breast, cartilage, lung), addiction, bone structure and composition, neurological diseases

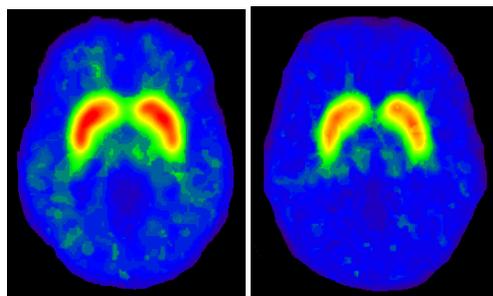
Radiation Therapy

- Tumor irradiation, spinal cord repair

Applications and Needed Capabilities

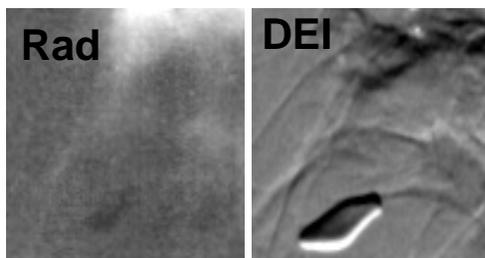


Plant radiotracers for metabolism and cell signaling (Ferrieri – Chemistry)

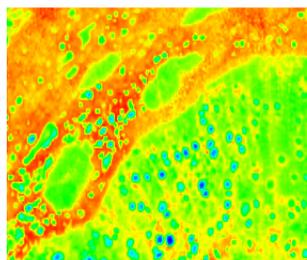


Dopamine receptors in addiction (Fowler – Chemistry)

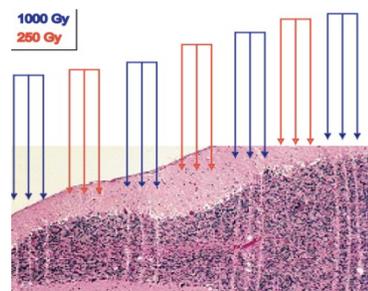
- Multi-department activities
- Complementarity with:
 - Positron emission tomography (PET)
 - Magnetic Resonance Imaging (MRI)
 - NASA Space Radiation Lab (NSRL)
 - STEM, cryo-EM



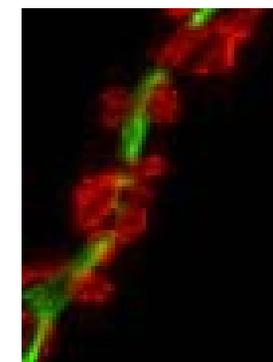
Spiculations in breast cancer (Zhong - NSLS)



Lignin recalcitrance and plant composition (Liu – Biology)



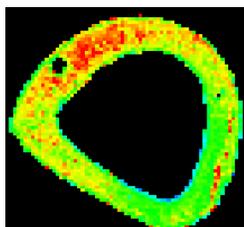
Microbeam radiation therapy for central nervous system research (Dilmanian – Medical)



Biomass and phytoremediation (Tappero - NSLS)



Effects of low-dose radiation on cells and tissues (Wilson – Biology)



Bone structure and composition (Miller – NSLS)

Future Biological Imaging Beamlines

Approved beamlines

	Name	PI	Funding
HXN	Hard X-Ray Nanoprobe	Yong Chu	NSLS-II Project
SRX	Sub-micron Resolution X-ray Spectroscopy	Juergen Thieme	NSLS-II Project
FXI	Full-Field X-Ray Imaging	Jake Socha	NEXT
LIX	High Brightness X-Ray Scattering	Lin Yang	NIH
CDI	Coherence Diffraction Imaging	Ian Robinson	
MXD	Multiscale X-Ray Diffraction	Kenneth Evans-Lutterodt	
XFM	X-Ray Fluorescence Microscopy	Tony Lanzirotti	NxtGen
TES	Tender Energy X-Ray Spectroscopy	Paul Northrup	NxtGen
AIM	Advanced Infrared Microspectroscopy	Lisa Miller	NxtGen
IRI	Full-Field Infrared Spectroscopic Imaging	Lisa Miller	NxtGen

Proposals submitted in 2011

	Name	PI
MIT	Medical Imaging and Therapy	Avraham Dilmanian
STX	Scanning Transmission X-Ray Microscopy	Juergen Thieme

WHAT'S MISSING?