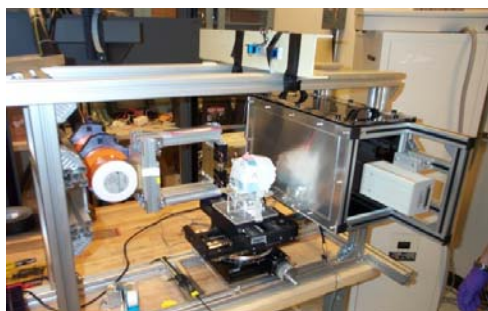
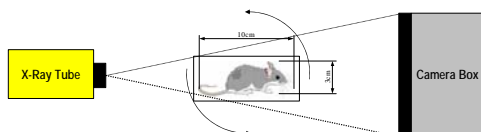


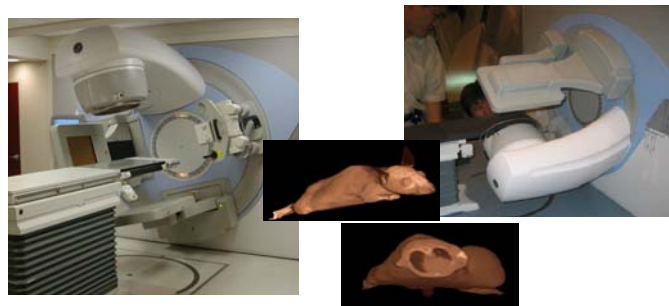
# Image-Guided Small Animal Radiation Research Platform (SARRP)

## The Problem

- Cancer research with small animals allows detailed study of biological processes, disease progression, and response to therapy.
- Image-guided radiation therapy systems for small animals are needed to bridge “mice to men” translation.



Experimental setup including x-ray tube and linear stages



Down-sizing an Image-guided radiation therapy system to small animals

## THE SOLUTION

- Construction of SARRP which integrates imaging, radiation delivery and treatment planning capabilities:
  - Robotic system to position animal for imaging and treatment
  - X-ray source and shutter for radiation treatment
  - X-ray source and camera (or panel) for 2D imaging
  - Software package to reconstruct 2D projection images into 3D volumetric representation
  - GUI for display and manipulation of 2D/3D images

## THE IMPACT

- Development of algorithms for precise small animal irradiation
- Full combinations of imaging and irradiation capabilities
- Highly localized treatment planning, dose calculation and verification
- Benchtop system allows operation within animal containment barrier

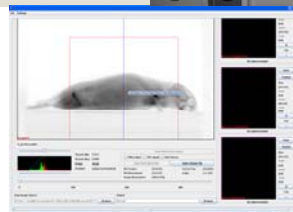
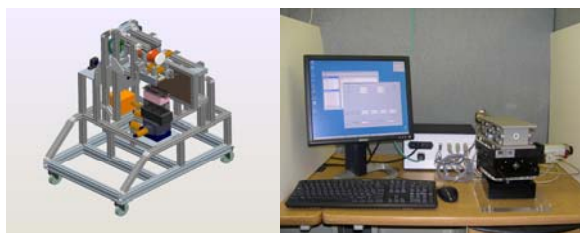
## THE FUTURE

- Engineering construction, validation and calibration of the system
- Implementation of the robotic controller and cone-beam CT software package
- Gantry version for larger animals

## PUBLICATIONS

Three abstracts accepted for AAPM 2006:

- The Small-Animal Radiation Research Platform (SARRP): Focused Pencil Beam Dosimetry
- The Small-Animal Radiation Research Platform (SARRP): Commissioning a 225 KVp “small-Field” X-Ray Source for Monte Carlo-Based Treatment Planning
- The Small Animal Radiation Research Platform: Benchtop Cone-Beam CT



Mechanical design of SARRP, Robotic control sub-system, Image reconstruction software package

## PEOPLE INVOLVED

- Graduate Student: Babak Matinfar
- ERC Faculty/Staff: Peter Kazanzides, Iulian Iordachita
- Radiation Oncology: John Wong, Chris Kennedy, Todd McNutt, Eric Ford, Elwood Armour

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