



# ARDENT MEETING

Andrej Sipaj

October 14<sup>th</sup>, 2013

# ABOUT ME

- ▶ Born and raised in Slovakia
- ▶ Studied: BEng in Mechanical Engineering at UOIT, Canada  
MAsc in Nuclear Engineering (Radiation science) at UOIT



# RESEARCH PROJECT

- ▶ Work at AIT, Health & Environment department, Biomedical Systems
- ▶ Enrolled at the Medical University of Vienna, PhD in Medical Physics

**Development of a heterogeneous, breathing thorax phantom with moveable tumor for treatment planning system verification**



# PROJECT BACKGROUND

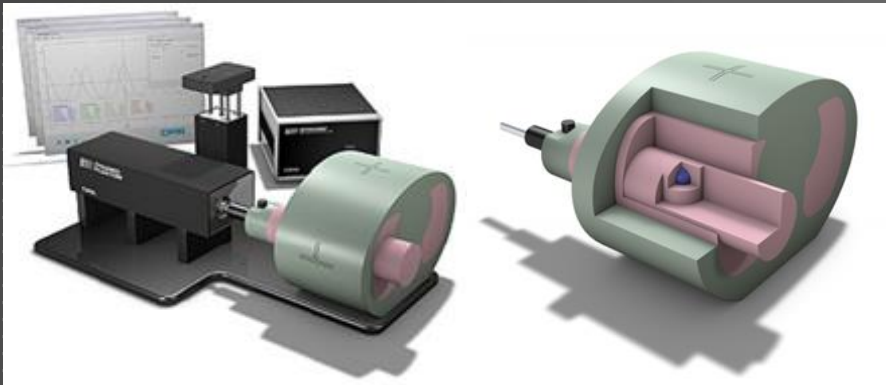
- ▶ Objective: Measure dose to moving lung tumor (online and offline) in order to validate treatment planning system
  - ▶ The tumor is not moving alone in human body



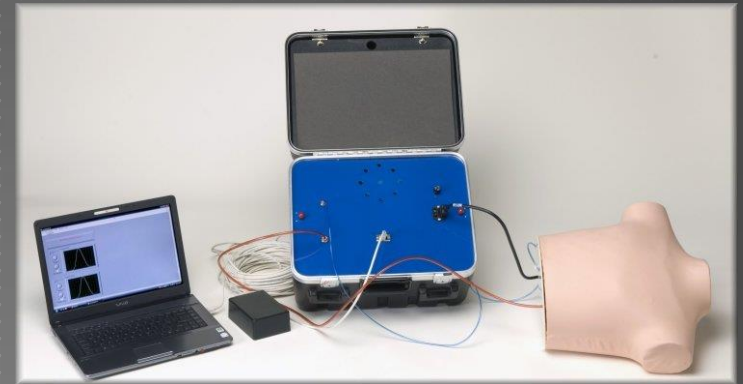


# PROJECT BACKGROUND

- ▶ Current state of the art radiation therapy phantoms



CIRS - Dynamic Thorax Phantom



RSD - Dynamic Anatomical Respiring Humanoid Phantom

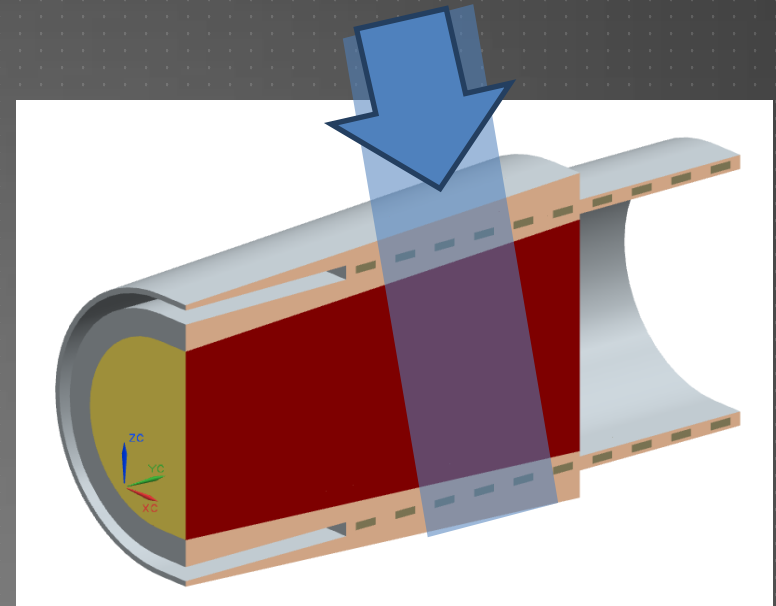
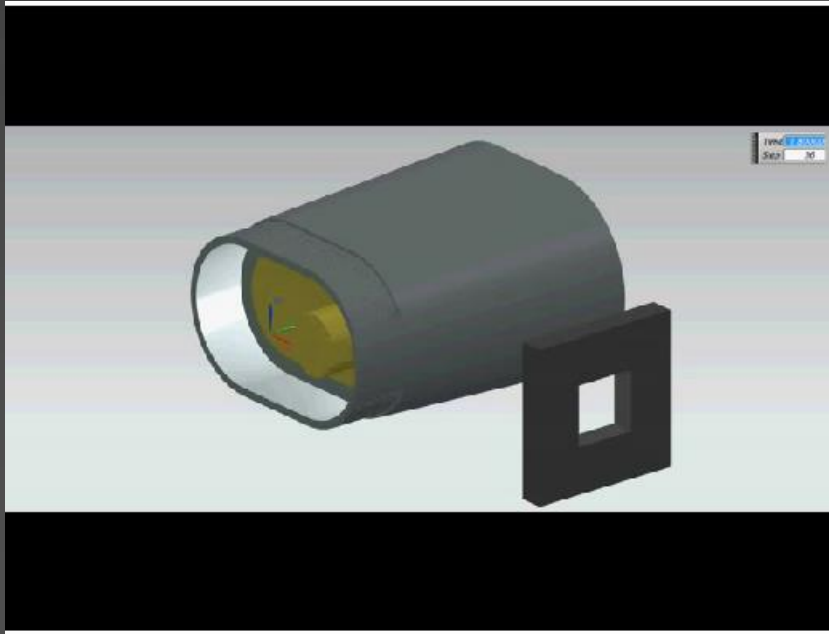
## Limitations

Only tumor motion

Chest wall motion but only 1D tumor motion

Metal components

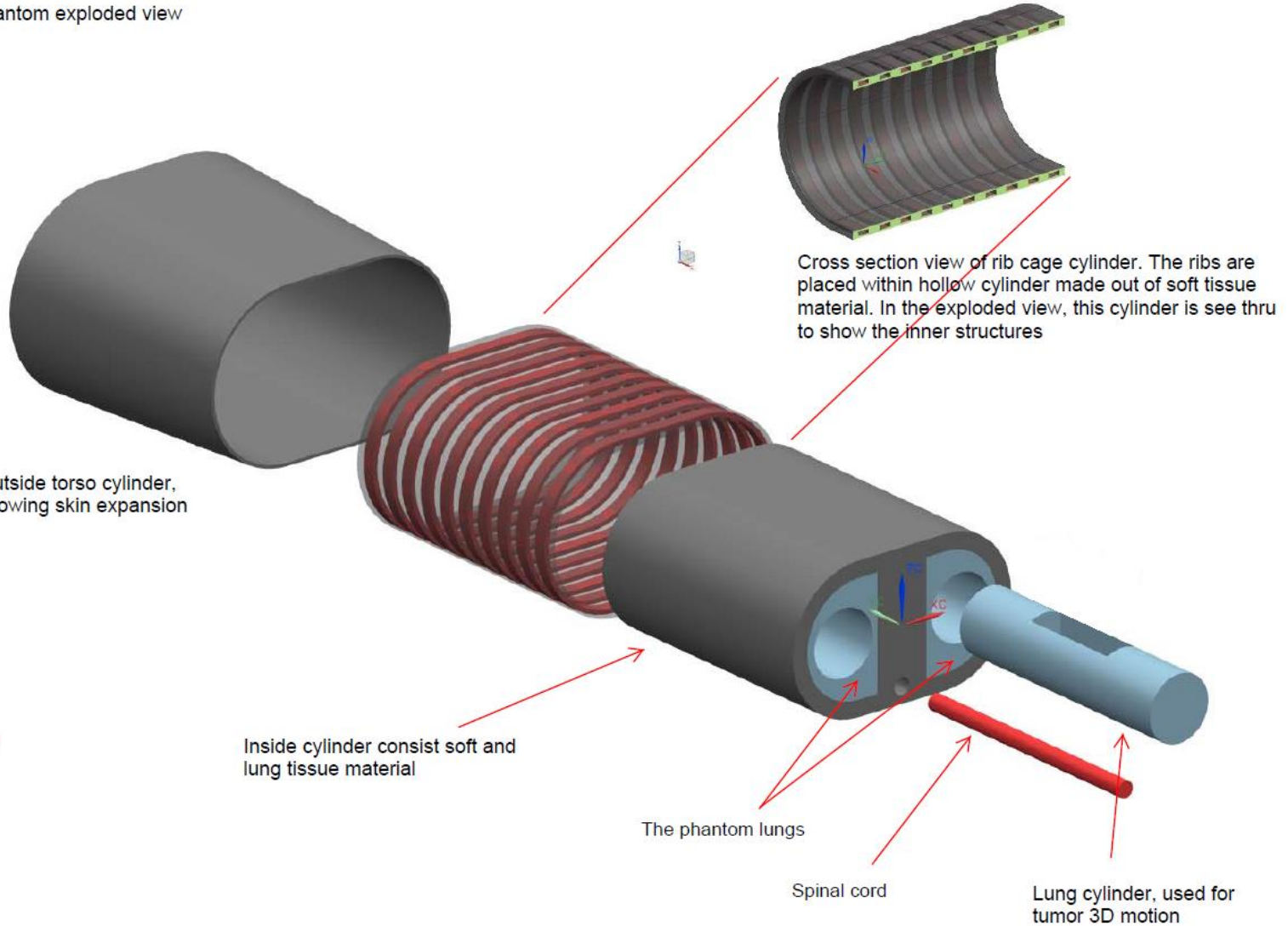
# RECENT WORK



- ▶ Proposal submitted on 3<sup>rd</sup> of June for FFG Bridge project
  - ▶ Industrial partner: Elimpex (Austrian medical supplies retail and research company)
  - ▶ University partner: Medical University of Vienna (Part of the Vienna General Hospital)

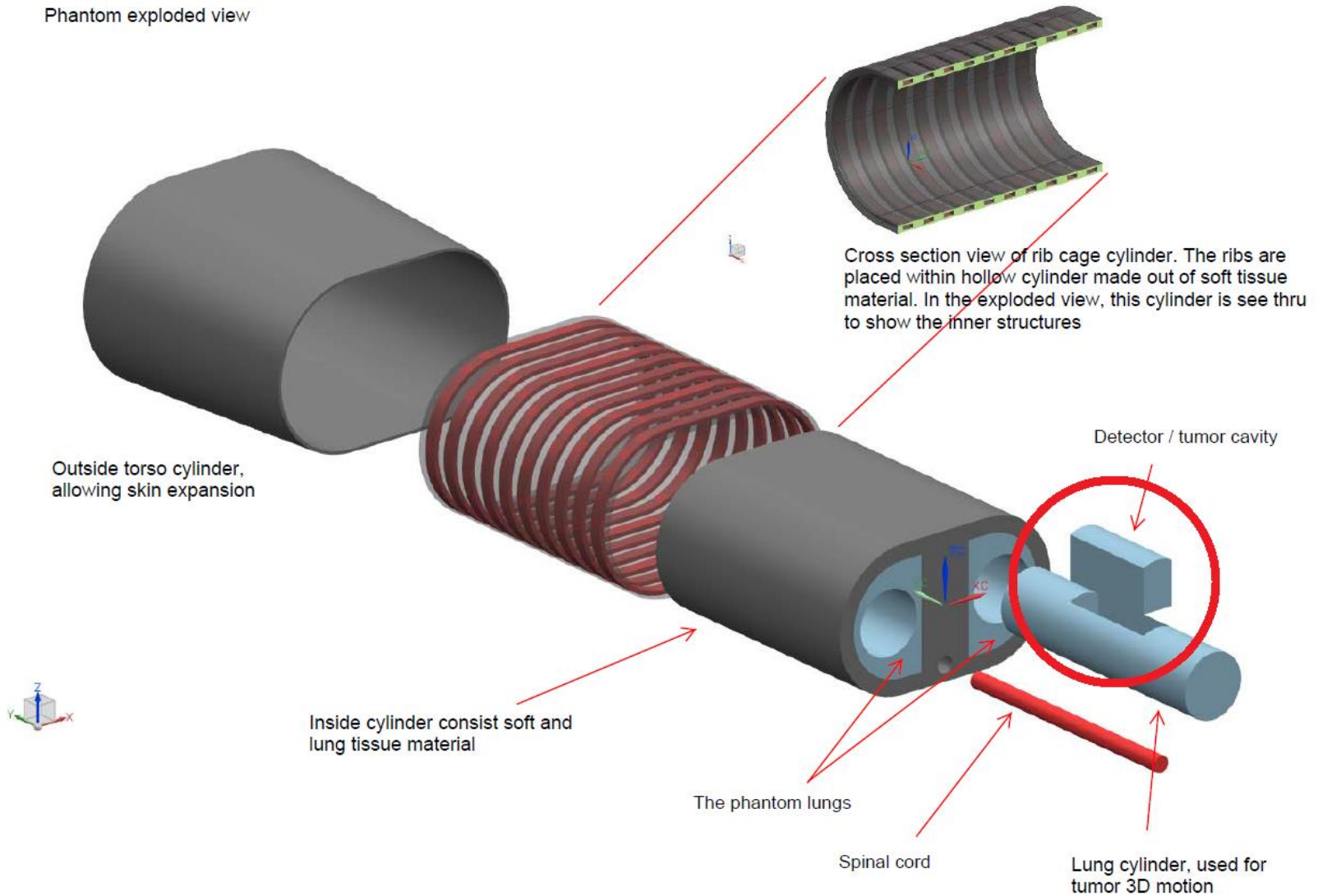
# RECENT WORK

Phantom exploded view



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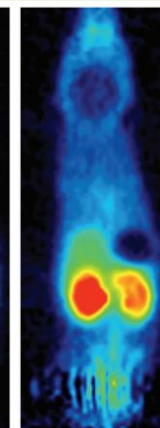
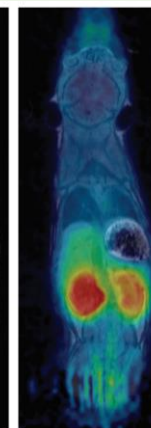
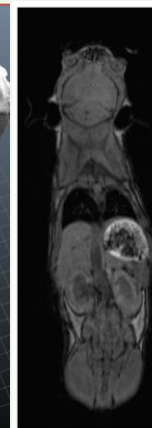
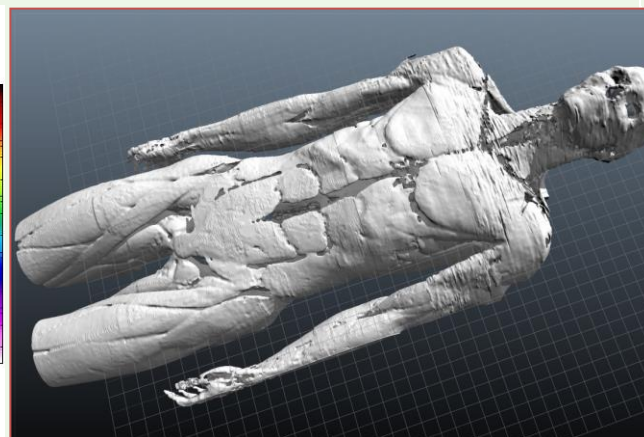
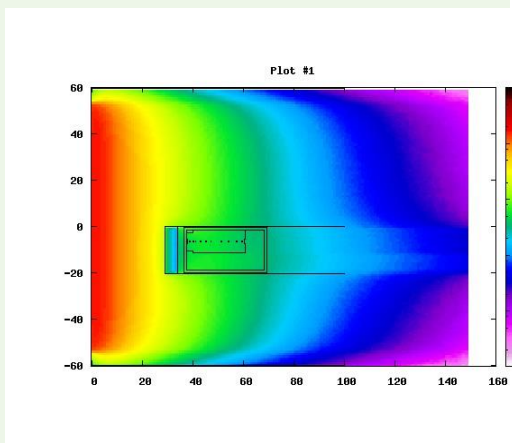
Phantom exploded view





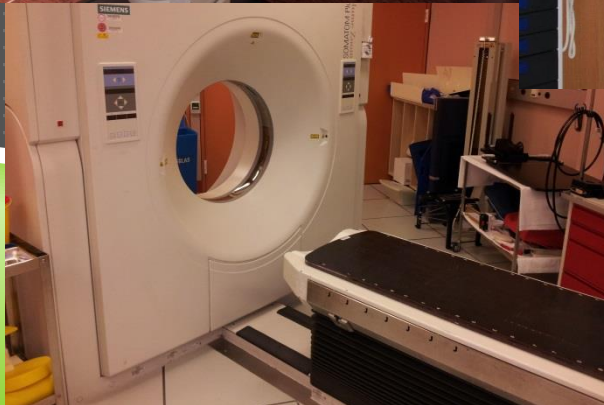
# TRAINING AT AIT

<b>Title</b>	<b>Introduction to FLUKA/FLUPID</b>	<b>Introduction to voxel and surface phantoms</b>	<b>Molecular imaging and nuclear medicine</b>
<b>Supervisor</b>	<b>Dr. Rollet S</b>	<b>Dr. Blaickner M</b>	<b>Dr. Kuntner C</b>



# TRAINING AT MUV

- ▶ Vienna General Hospital oncology department
  - ▶ 100-120 treated patients per day
  - ▶ 5 LINACs



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# TRAINING AT MUV

## ► PhD courses


Title	Lasers in medicine	Advanced radiotherapy techniques	Physical fundamentals of radio oncology
Supervisor	Prof, Leitgeb R, Prof. Pircher M.	Prof. Dietmar G.	Prof. Dietmar G. Dr. Stock M.
Description	Introduction to physics, working principles and medical applications of various kind of lasers	Journal club, new trends in radiotherapy including photon/ ion beams delivery techniques, imaging and clinical studies	Operational principles of beam delivery units, dose calculation, dosimetry, treatment planning and advanced radiotherapy techniques
Note	Mandatory first year courses		



# OTHER TRAINING ACTIVITIES

- ▶ FLUKA courses
  - ▶ 14th Fluka Course, Dresden, Germany
- ▶ Lung phantoms
  - ▶ Durham Cancer Centre, Dr.Aaron Vandermeer
  - ▶ Overview of currently used lung phantoms in hospitals
- ▶ Garfield++ tritium simulation
  - ▶ Continues collaboration with Dr.Waker (UOIT) based on my Master thesis project
- ▶ Language course
  - ▶ Diplomatic academy of Vienna (Language, culture, history, politics and economy)

# UPCOMING ACTIVITIES

- ▶ Continuation of PhD courses at MUV
  - ▶ Start construction part of the dynamic phantom project
  - ▶ Radiation protection training
  - ▶ Quality assurance training for conventional RT
  - ▶ Secondment at IBA
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THANK YOU FOR  
YOUR ATTENTION

