

Academic Seminar
Khon Kaen University
25 July 2018



X-ray Tomography Microscopy (XTM) *for Physical Science Applications*

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*Beamline manager
SLRI, Thailand

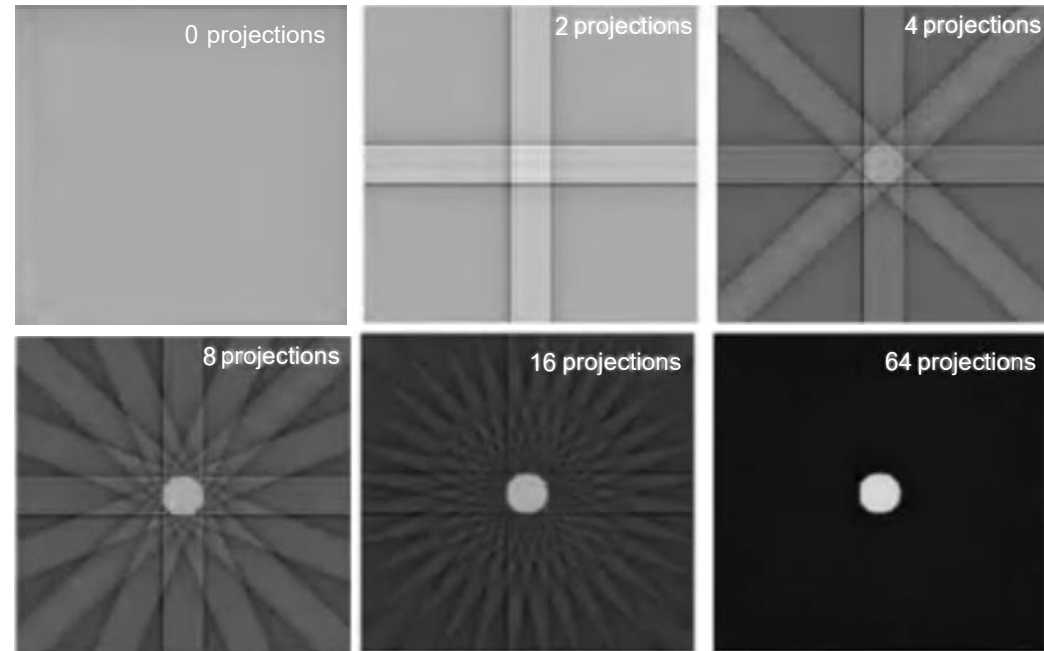
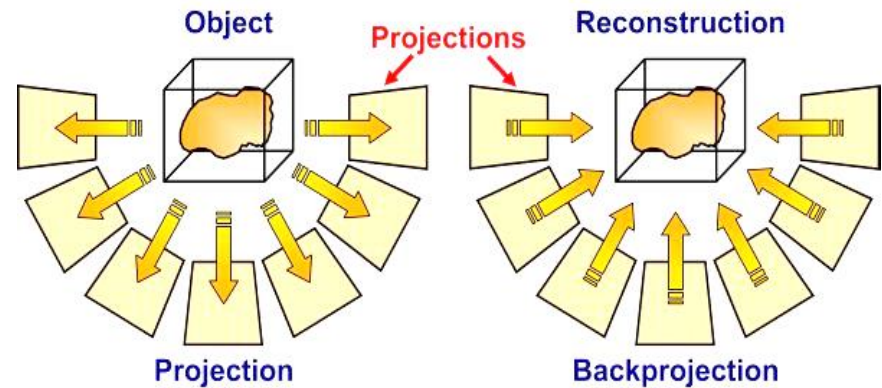
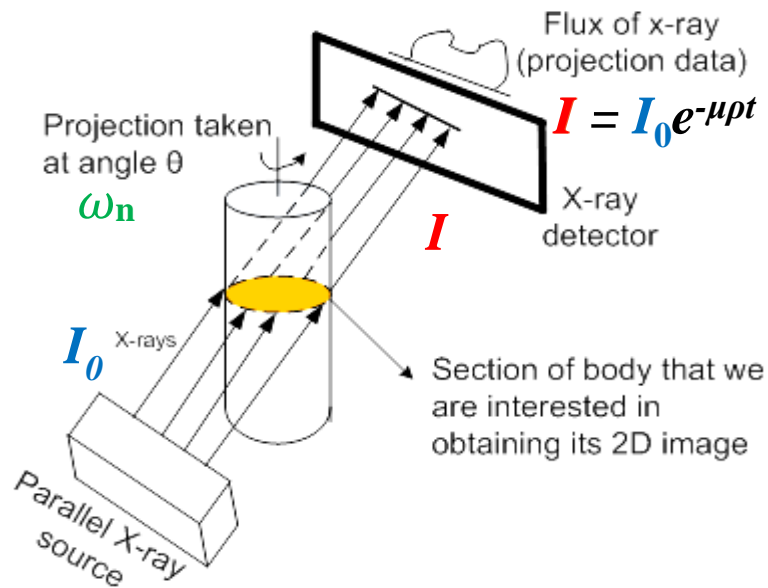
Technical consultants:

Beamline 1.2W

1. **Catleya Rojviriya** catleya@sri.or.th (Cat)
2. **Phakkhananan Pakawanit** phakkhananan@sri.or.th (Own)
3. **Chalermluck Phoovasawat** chalermluck@sri.or.th (Whan)



Principle of XTM

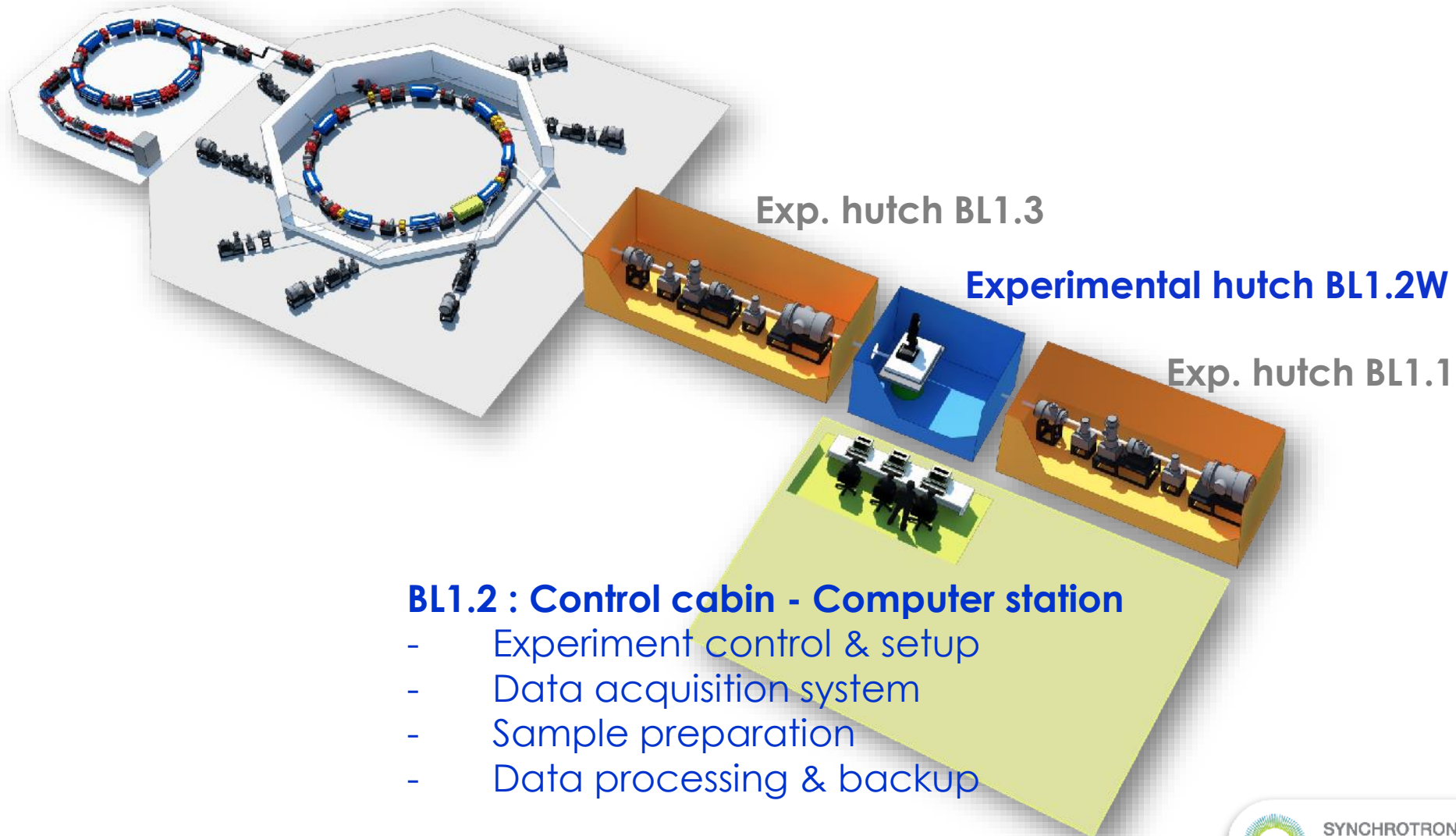


XTM Beamline

X-ray Tomographic Microscopy

Beamline 1.2W

Experimental station

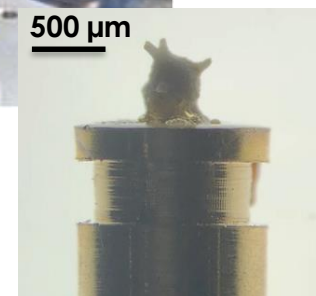
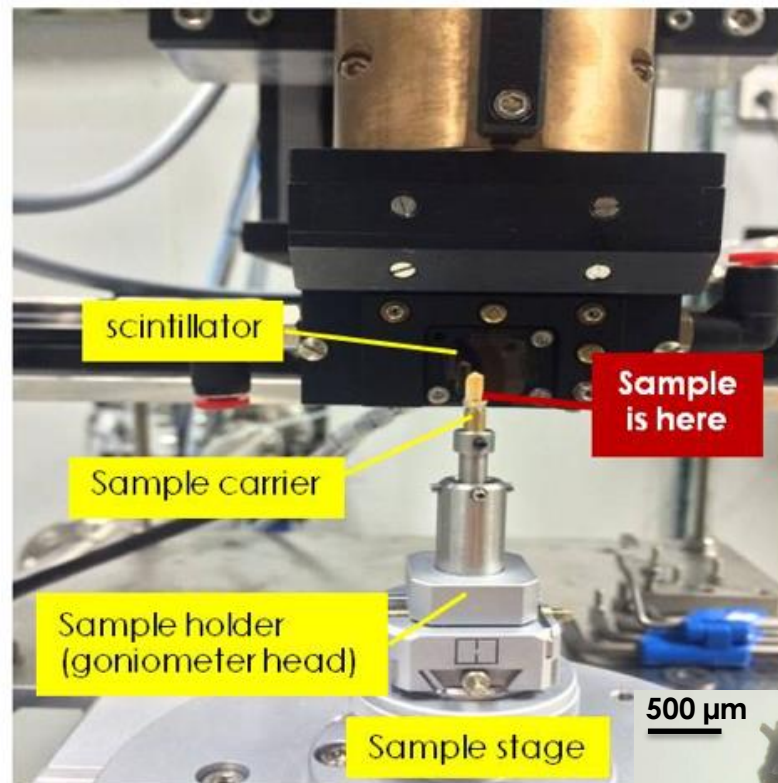
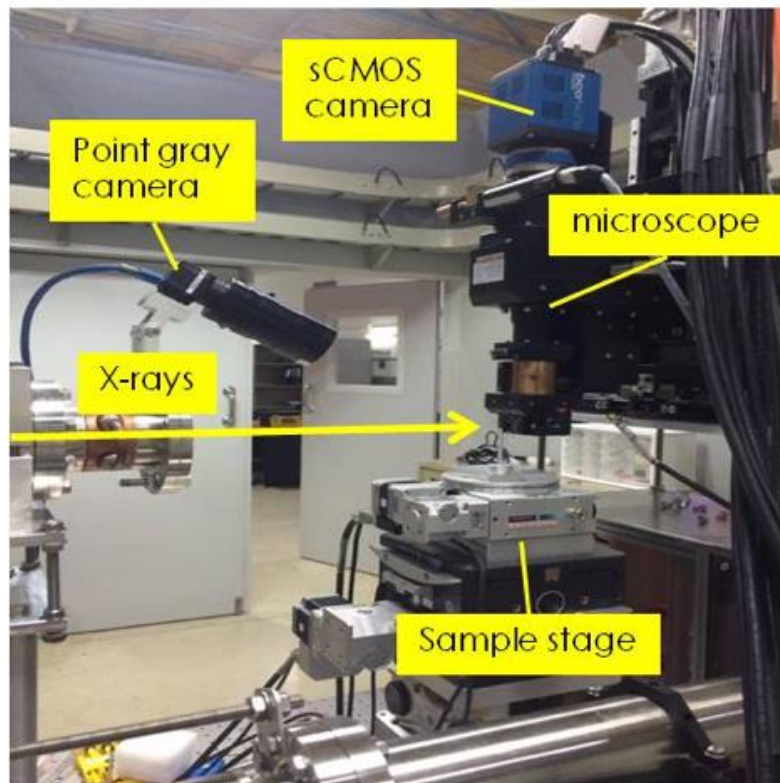


Experimental hutch of **XTM** Beamline

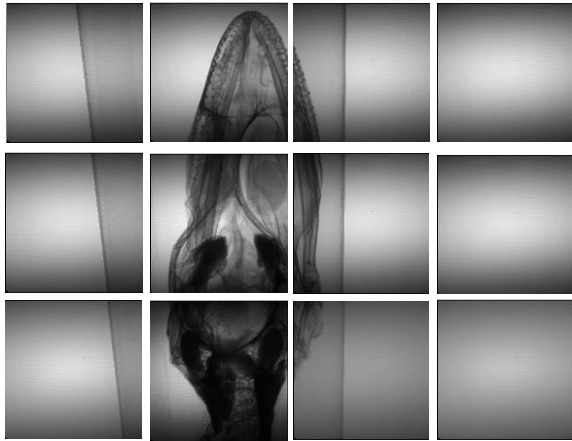


PCO.Edge (sCMOS chip) (2560 X 2160 pixels)	Magnification		
	x2	x5	x10
Horizontal Objective field (mm)	9.24	2.47	1.85
Vertical Objective field (mm)	7.80	2.08	1.56
Pixel size (μm)	3.61	0.96	0.72
\pm Depth of focus (μm) (Optic + Camera)	146	8.5	4.8
Max. Resolution (μm)	5	3	1.5

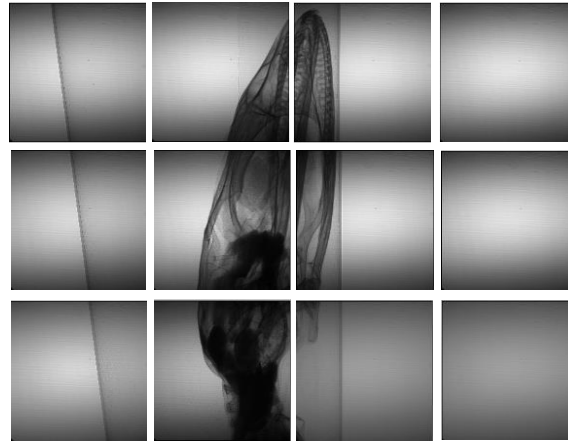
Experimental setup & Sample preparation



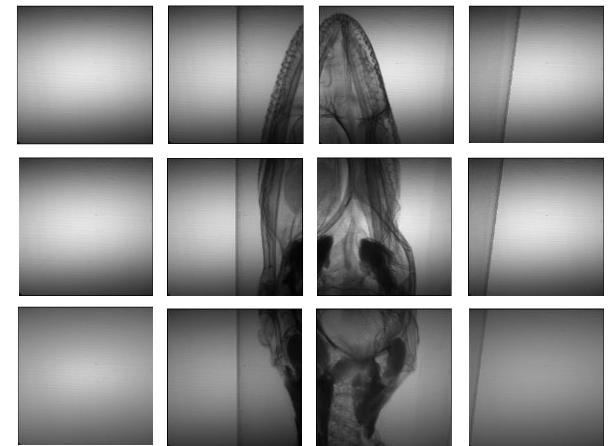
Experimental setup & Sample preparation



0 degree



90 degrees

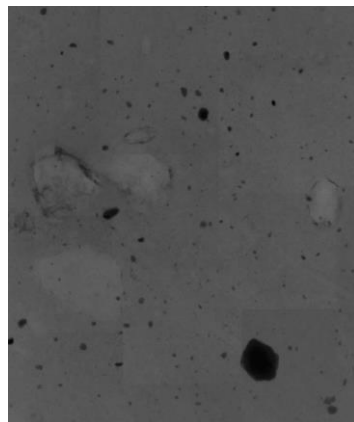


180 degrees

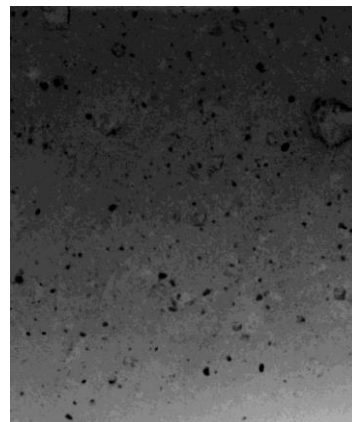
X-ray imaging



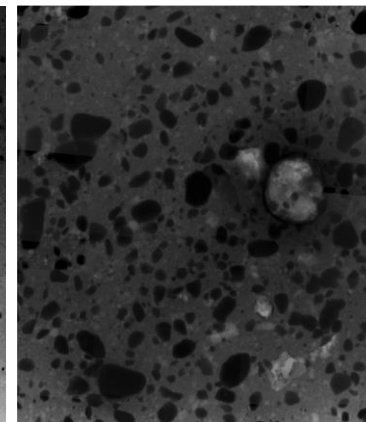
12 wt% PZT



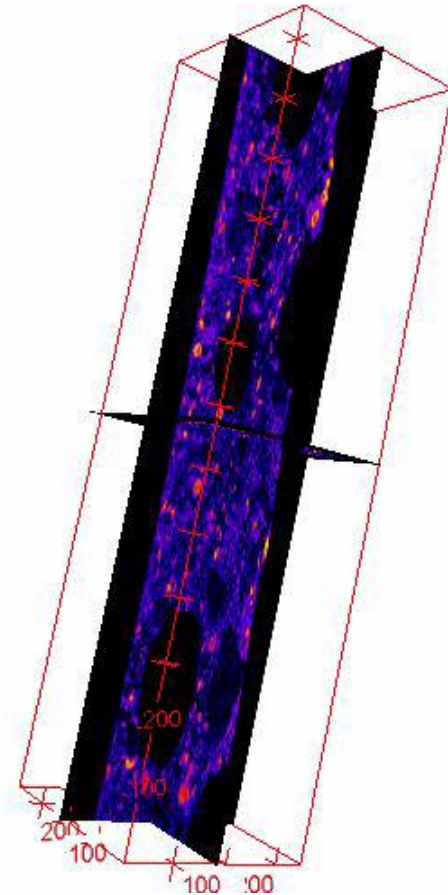
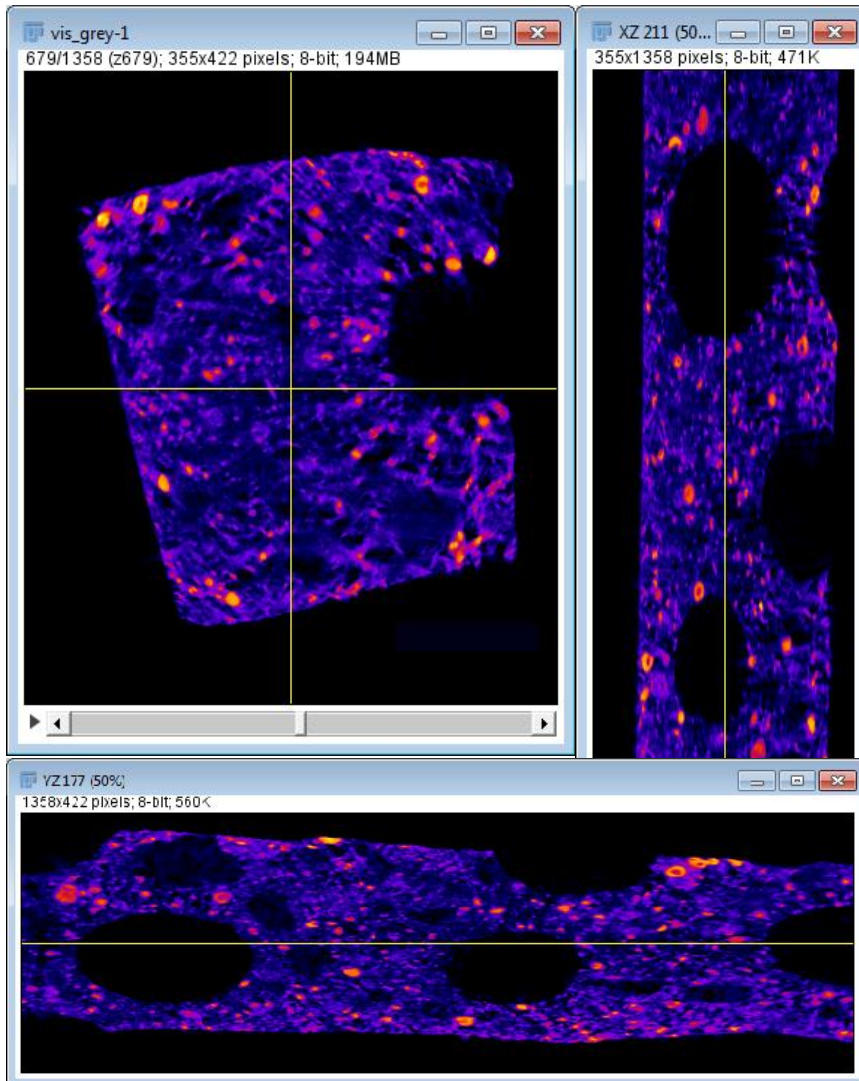
20 wt% PZT



50 wt% PZT

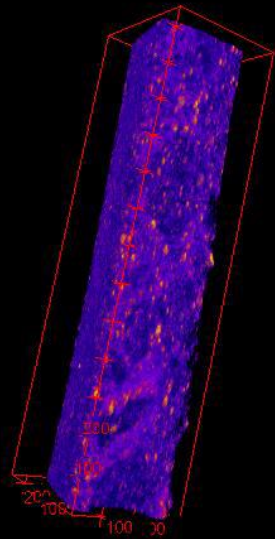


: Distributions and pores

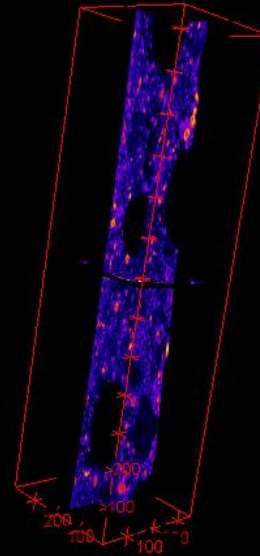


BaTiO₃/polydimethylsiloxane

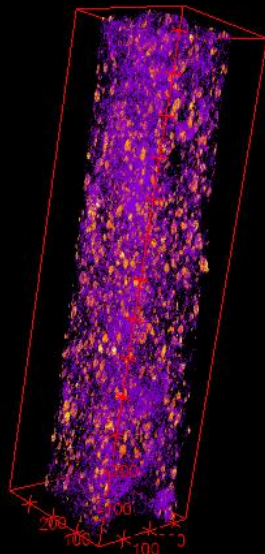
volume



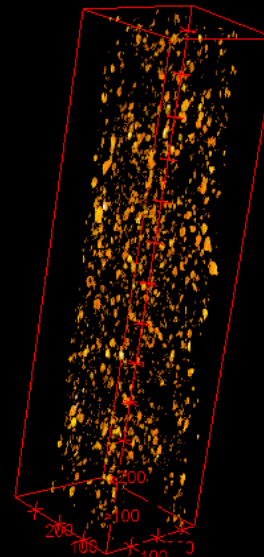
orthoslice



Threshold 110



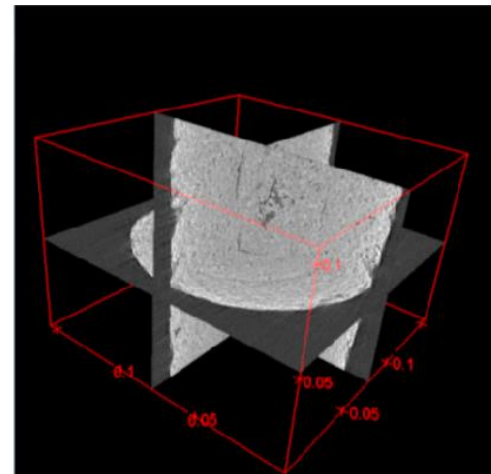
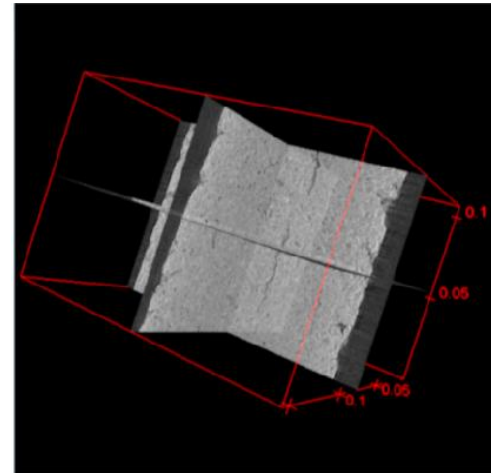
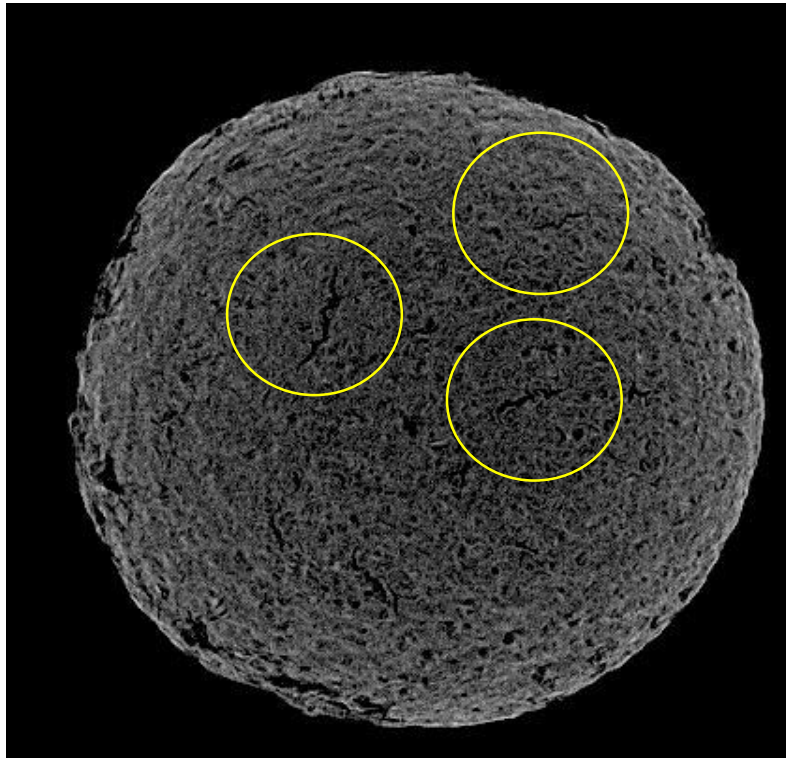
Threshold 120

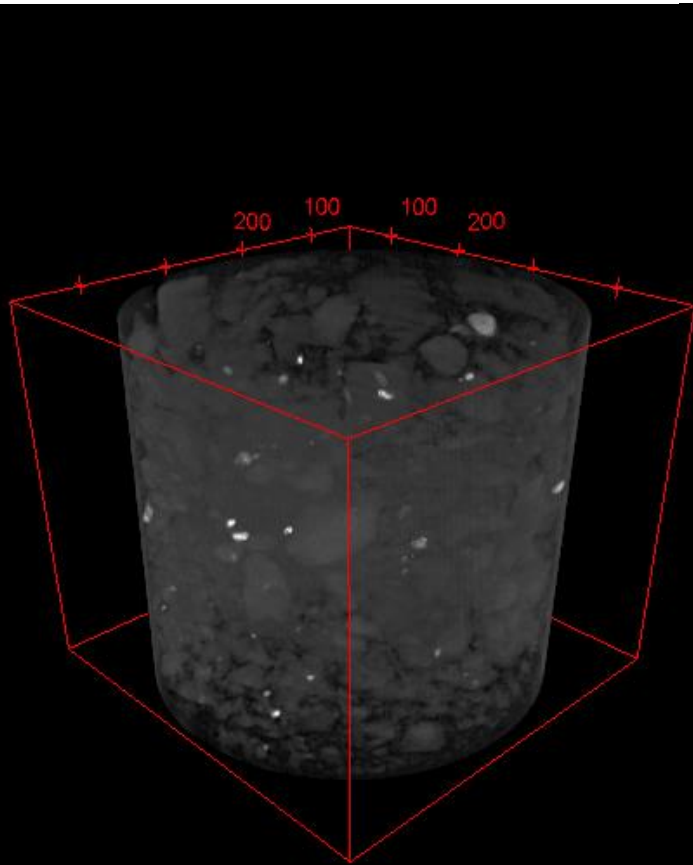


X-ray tomography

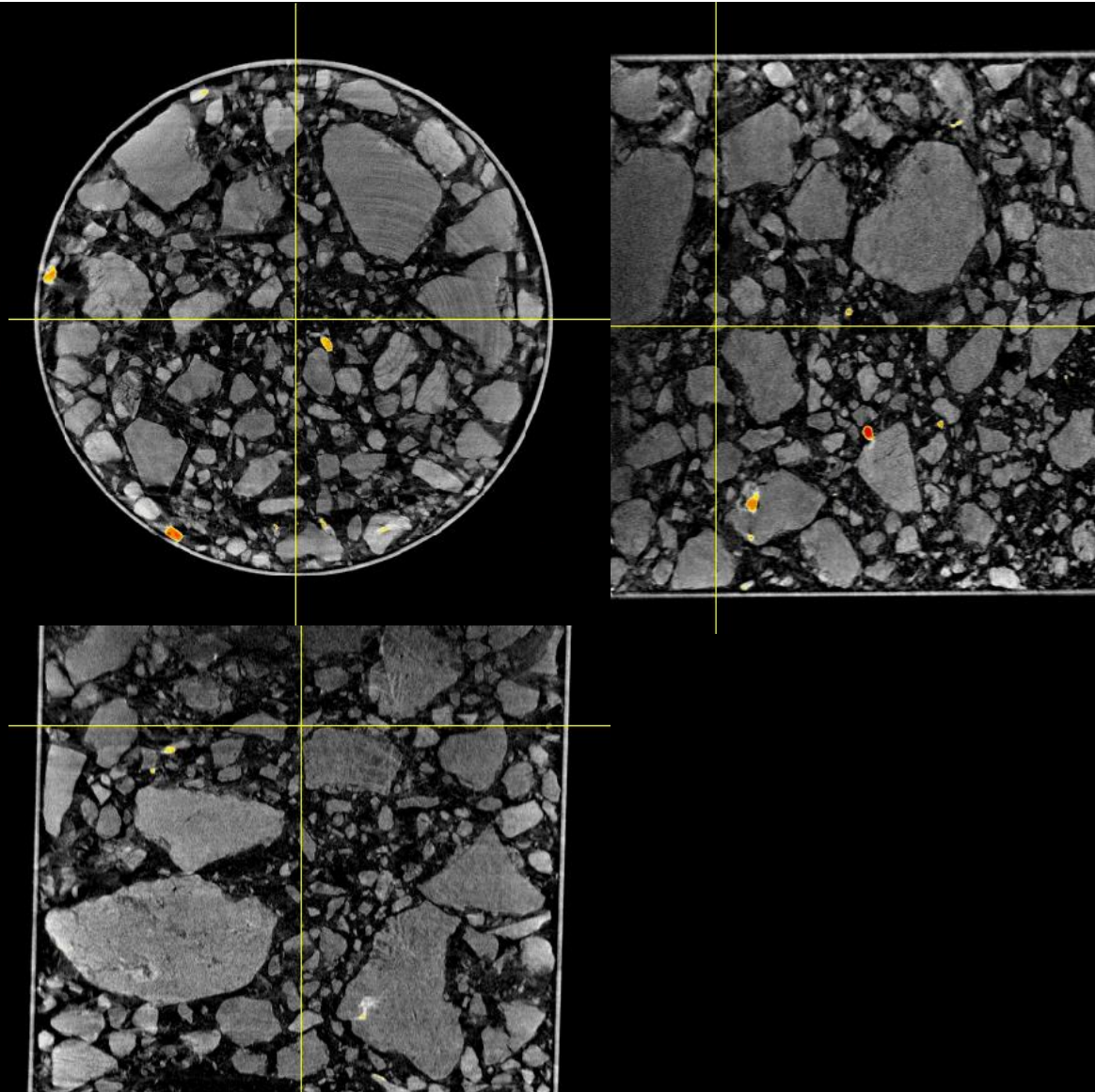
Polymer

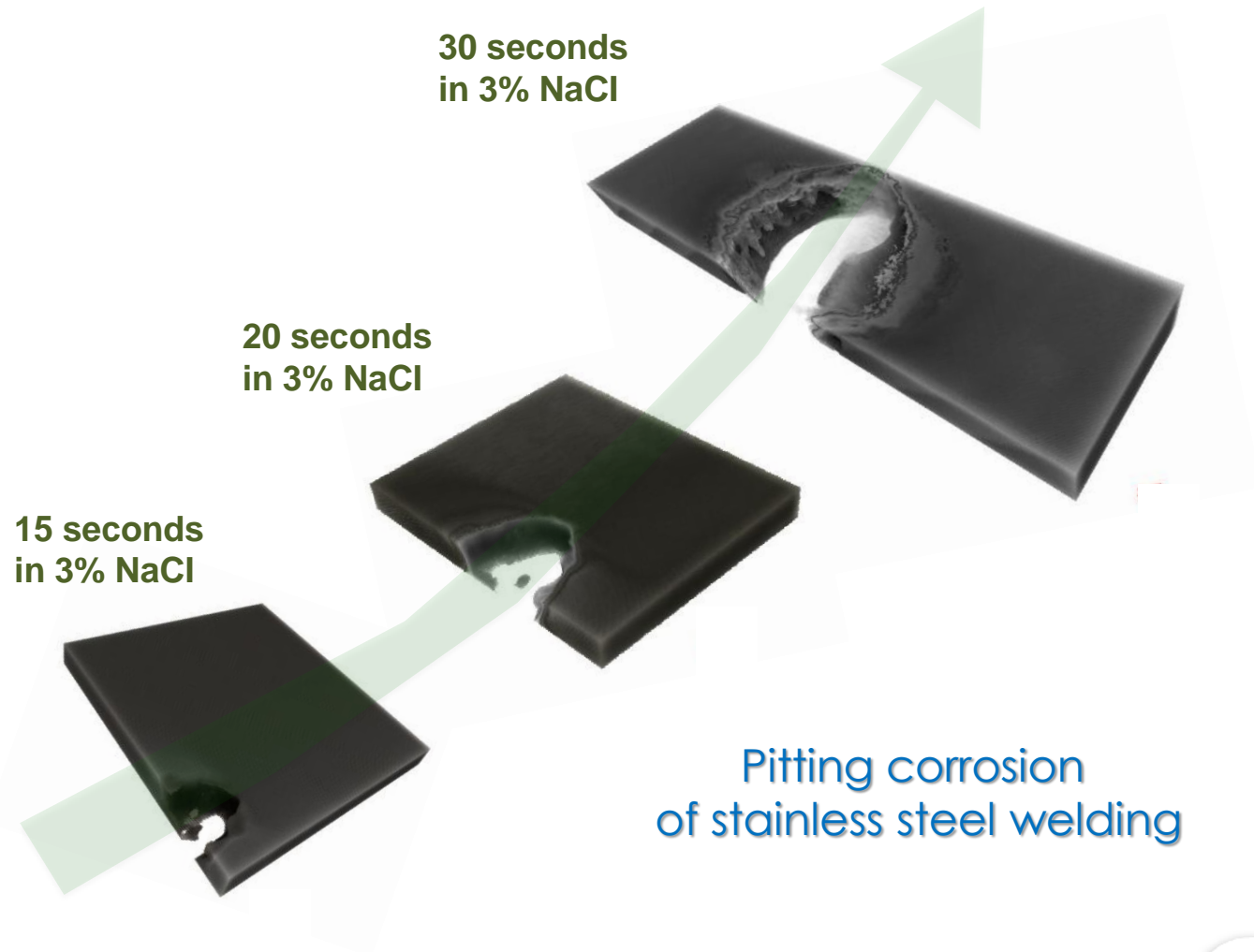
: Crack

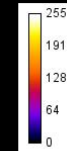
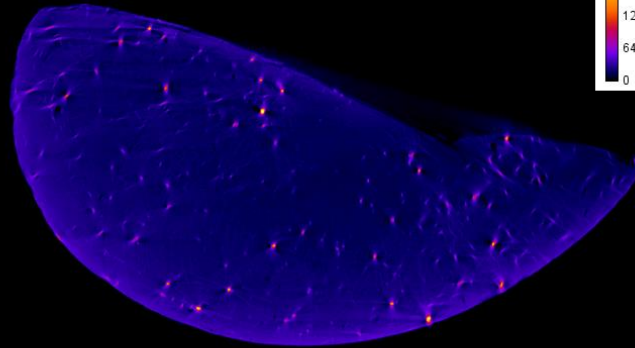
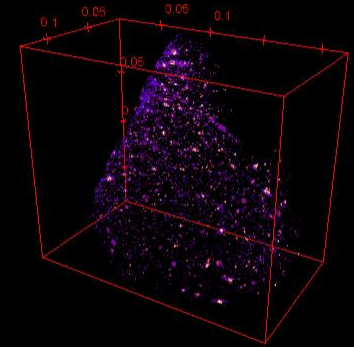
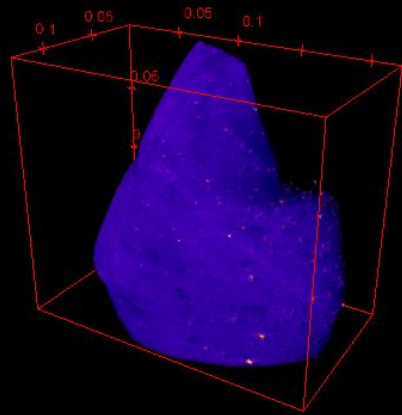




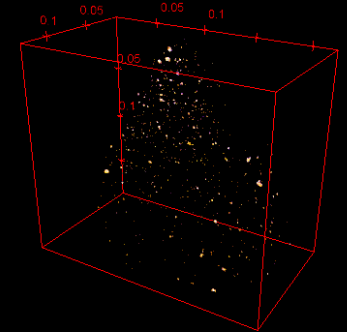
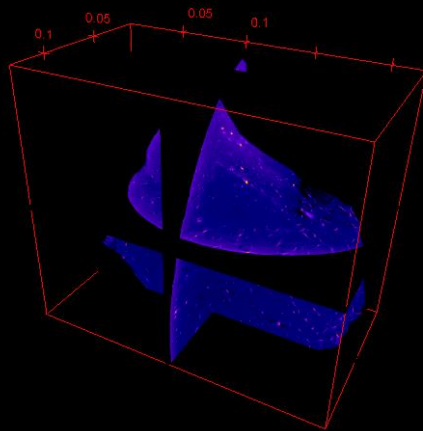
Biochar-soil
(Biomass + Charcoal)







100 μm



Advantages and limitations

- 3D visualization
- Pores, cracks and corrosion
- Phase distribution
- Non-destructive technique
- Size of sample
- Biology sample
- Dense sample





ASEAN Workshop on X-ray Tomography

21 - 23 August 2018

Synchrotron Light Research Institute
(Public Organization)
Nakhon Ratchasima, THAILAND



The 1st AWXTM2018 workshop organized by SLRI aims to introduce and promote the synchrotron-radiation application of X-ray tomography. The three-day program includes lectures on basics of synchrotron-radiation X-ray tomography, and tutorial sessions covering all operations from collecting data, reconstructing, visualizing, and analysis of CT data. Plus, the participants will have an opportunity to visit a new facility - XTM beamline at the Synchrotron Light Research Institute (SLRI).

AWXTM2018 workshop is addressed to graduate students and scientists from ASEAN countries with an interest in applying X-ray tomography in their research. This will offer a fruitful opportunity for researchers to establish collaborations and to share their experiences with the experts in the field.

Registration fee

- 1,000 THB for Lecturer/Researcher
- 500 THB for Graduate student
- (Number of participants is limited to 30)

Financial support

10 grants available for Thai and ASEAN participants



Online registration
<http://www.slri.or.th/AWXTM2018>

Contact

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Synchrotron Light Research Institute (Public Organization)
P.O. Box 93, Nakhon Ratchasima 30000, THAILAND
Tel.: 66 44 217 040 ext 1602 and 1605, Fax: 66 44 217 047
Email: useroffice@slri.or.th

Invited Lecturers



Dr. Andrew
Stevenson



Dr. Chris
Hall



Assist. Prof.
Dr. Sarawut
Kumphune

Lead Scientist - Micro-Computed
Tomography (MCT beamline),
Australian Synchrotron

Beamline Scientist - Imaging
and Medical Beamline (IMBL),
Australian Synchrotron

Faculty of Allied Health Science,
Naresuan University

Lectures and tutorials

- Basics of X-ray tomography: Clinical CAT scan vs Research CT
- Synchrotron tomography: Medical & Micro-CT beamlines
- CT data collection: mounting & moving sample
- CT reconstruction and artefact management
- CT data analysis: Calculation of void/porosity in volume
- 3D render and how to present CT data
- Software tutorials:

Octopus software: CT reconstruction, visualization, and analysis.
ImageJ: basic visualization

DrishTi software: 3D render, movie and animation

- Applications of X-ray tomography

Important Dates

Submission deadline: 15 July 2018

Announcement for Acceptance: 20 July 2018



Thank you for your attention