

2024 Provisional Course Plan ‘Chemical Imaging and Tomography’

Thursday 25th April

Online drop-in session for software installation/troubleshooting 13:00-15:00

Day 1: Introduction to scientific programming and machine learning with python (OPTIONAL)

Monday 29th April

Location: Hamilton Room (RAL, Building R112)

Time	Title
10:00 – 10:50	Introduction to Numpy, Scipy and Matplotlib
10:50 – 11:00	Break
11:00 – 12:00	Data processing, data formats and data types
12:00 – 13:00	Lunch Break at the Canteen
13:00 – 13:50	Introduction to machine learning (covering SVD, PCA, NMF, and K-means)*
13:50– 14:00	Break
14:00 – 14:50	Introduction to machine learning (continued)
14:50– 15:00	Break
15:00 – 16:40	Hands-on sessions, exercises
16:40– 17:00	Conclusions and Q&A Session

* datasets will be provided on a USB memory stick

Day 2: X-ray Computed Tomography & Chemical Imaging

Tuesday 30th April

Location: Hamilton Room (RAL, Building R112)

Time	Title
10:00 – 10:15	Introduce the course / introduce the participants (informal)
10:15 – 11:00	X-ray interactions with matter, beam geometries, mapping / chemical imaging (not tomography)

Finden Ltd, Company Number 8254352 Merchant House, 5 East St Helen Street, Abingdon, Oxfordshire. OX14 5EG.

11:00 – 11:10	Break
11:10 – 12:00	Computed Tomography, XRD-CT, hypercube
12:00 – 13:00	Lunch Break at the Canteen
13:00 – 14:00	Tour to the Diamond Light Source (TBC)
14:00 – 14:30	Learning objectives and installation/troubleshooting (informal with coffee)
14:30 – 17:30	X-ray CT practical*
17:30 – 17:45	Conclusions and Q&A Session
18:00	Dinner in the pub

Day 3: X-ray powder diffraction Computed Tomography

Tuesday 1st May

Location: Hamilton Room (RAL, Building R112)

Time	Title
09:00 – 09:10	Recap of Day 1 and Learning objectives
09:10 – 09:50	XRD-CT, practical considerations and deep learning methods
09:50 - 10:00	Break
10:00 - 10:50	XRD-CT practical (integration)*
10:50 - 11:00	Break
11:00 - 12:00	XRD-CT practical (reconstruction)*
12:00 – 13:00	Lunch Break at the Canteen
13:00 - 13:50	XRD-CT practical (phase ID)*
13:50 - 14:00	Break
14:00 - 14:50	XRD-CT practical (peak fitting, dimensionality reduction)*
14:50 - 15:00	Break
15:00 - 16:45	Software Beamstop for XRD-CT analysis
16:45 - 17:00	Conclusions and Q&A Session

Finden Ltd, Company Number 8254352 Merchant House, 5 East St Helen Street, Abingdon, Oxfordshire. OX14 5EG.