The 6th Stanisław Gorczyca European School on Electron Microscopy and Tomography

12 – 15 July 2022, AGH UST, Kraków Poland

Tuesday 12 July 2022

8:00 - 9:00	**Registration**		
9:00 - 9:15	**Opening**		**Adam Kruk**
9:15 - 10:30	**Lecture_1:** ***TEM Basics***		**Oleksandr Kryshtal**
10:30 - 11:45	**Lecture_2:** ***Principles of microscope alignment***		**Sebastian Arabasz**
11:45 - 12:15	Coffee break		
12:15 - 13:30	**Lecture_3:** ***Conventional electron diffraction and 3D ED***		**Joke Hadermann**
13:30 - 14:45	Lunch		
14:45 - 16:15	**G1**: TEM Basic - Tecnai	**L1**	AGH UST staff
	G2: Diffraction analysis, JEMS	**L2**	AGH UST staff
	G3: HR TEM Imaging and spectroscopy – Titan	**L3**	AGH UST staff
	G4: Conventional and FIB sample preparation	**L4**	AGH UST staff
16:15 - 16:30	Cofee Break		
16:30 - 18:00	**G1:** Diffraction analysis, JEMS	**L2**	AGH UST staff
	G2: TEM Basic - Tecnai	**L1**	AGH UST staff
	G3: Conventional and FIB sample preparation	**L4**	AGH UST staff
	G4: HR TEM Imaging and spectroscopy – Titan	**L3**	AGH UST staff
18:30 - 20:30	**Magic Krakow - city tour**		

GX - Training group, LX - laboratory exercise number

Wednesday 13 July 2022

9:00 - 10:15	**Lecture_4:** ***TEM Basics Part 2***		**Bogdan Rutkowski**
10:15 - 11:30	**Lecture_5:** ***High-resolution TEM imaging and image simulation***		**Angus Kirkland**
11:30 - 12:00	Coffee break		
12:00 - 13:15	**Lecture_6***: Scanning Transmission Electron Microscopy and 4D-STEM*		**Peter Nellist**
13:15 - 14:45	Lunch		
14:45 - 16:15	**G1:** Conventional and FIB sample preparation	**L4**	AGH UST staff
	G2: HR TEM Imaging and spectroscopy – Titan	**L3**	AGH UST staff
	G3: Diffraction analysis, JEMS	**L2**	AGH UST staff
	G4: TEM Basic - Tecnai	**L1**	AGH UST staff
16:15 - 16:30	Coffee break		
16:30 - 18:00	**G1:** HR TEM Imaging and spectroscopy – Titan	**L3**	AGH UST staff
	G2: Conventional and FIB sample preparation	**L4**	AGH UST staff
	G3: TEM Basic - Tecnai	**L1**	AGH UST staff
	G4: Diffraction analysis, JEMS	**L2**	AGH UST staff
18:00 - 18:30	Break		
18:30 - 20:30	**Rapid Fire Presentation**		

Thursday 14 July 2022

9:00 - 10:15	**Lecture_7:** ***Electron energy loss spectroscopy, Fundamentals and Applications***		**Gerald Kothleitner**
10:15 - 11:30	**Lecture_8:** ***3D imaging in EM***		**Miguel Lopez-Haro**
11:30 - 11:45	Coffee break		
11:45 - 13:00	**Lecture_9:** ***Introduction to Analytical Electron Microscopy from Theory to Practice***		**Stephen T. Kelly**
13:00 - 14:00	Lunch		
14:00 - 15:15	***Lecture_10: EDS and WDS spectroscopy***		**Michał Żelechower/Bartosz Chmiela**
15:30 - 17:00	**G1:** FIB-SEM Tomography	**L6**	AGH UST staff
	G2: Visualization and analysis of 3D TEM data	**L5**	Thermo Fisher
	G3: SEM imaging and SEM-XEDS analysis	**L8**	AGH UST staff
	G4: Orientation and phase mapping in TEM	**L7**	AGH UST staff
17:00 - 17:15	Coffee break		
17:15 - 18:45	**G1:** Visualization and analysis of 3D TEM data	**L5**	Thermo Fisher
	G2: FIB-SEM Tomography	**L6**	AGH UST staff
	G3: Orientation and phase mapping in TEM	**L7**	AGH UST staff
	G4: SEM imaging and SEM-XEDS analysis	**L8**	AGH UST staff
19:30	**School Dinner**		

Friday 15 July 2022

09:00 - 9:30	**Lecture_C1**: ***New applications enabled by combining a femtosecond laser with a FIB-SEM***		**Stephen T. Kelly**
9:30 - 10:00	**Lecture_C2**: ***Scanning Electron Microscopy: Easier Than You Think***		**Maciej Bazarnik**
10:00 - 11:15	**Lecture_11:** ***SEM/EBSD - How far we can go***		**Marek Faryna**
11:15 - 12:30	**Lecture_12:** ***Machining learning techniques in electron microscopy***		**Benedykt Jany**
12:30 - 13:00	Coffee break		
13:00 - 14:15	**Lecture_13:** ***Specimen preparation for SEM & TEM***		**Grzegorz Cempura**
14:15 - 15:15	Lunch		
15:15 - 16:45	**G1:** Orientation and phase mapping in TEM	**L7**	AGH UST staff
	G2: SEM imaging and SEM-XEDS analysis	**L8**	AGH UST staff
	G3: Visualization and analysis of 3D TEM data	**L5**	AGH UST staff
	G4: FIB-SEM Tomography	**L6**	AGH UST staff
16:45 - 17:00	Coffee break		
17:00 - 18:30	**G1:** SEM imaging and SEM-XEDS analysis	**L8**	AGH UST staff
	G2: Orientation and phase mapping in TEM	**L7**	AGH UST staff
	G3: FIB-SEM Tomography	**L6**	AGH UST staff
	G4: Visualization and analysis of 3D TEM data	**L5**	AGH UST staff
18:30	**Closing and Farewell**		

Lectures

Lecture_1: ***TEM Basics 1 (Column, Modes)***

Professor Oleksandr Kryshtal
AGH University of Science and Technology
Faculty of Metals Engineering and Industrial Computer Science
Poland

Lecture_2: ***Principles of microscope alignment (corrected systems + aberration correction)***

Sebastian Arabasz,Ph.D.
Labsoft & Łukasiewicz Research Network – PORT Polish Center for Technology Development
Poland

Lecture_3: ***Conventional electron diffraction and 3D ED***

Professor Joke Hadermann
University of Antwerp
EMAT Electron microscopy for Materials Science
Belgium

Lecture_4: ***TEM Basics 2 (Contrast, e-specimen interaction)***

Bogdan Rutkowski, Ph.D.
AGH University of Science and Technology
Faculty of Metals Engineering and Industrial Computer Science
Poland

Lecture_5: ***High-resolution TEM imaging and image simulation***

Professor Angus Kirkland
Department of Materials
University of Oxford
Great Britain

Lecture_6: ***Scanning Transmission Electron Microscopy and 4D-STEM***

Professor Peter Nellist
Department of Materials
University of Oxford
Great Britain

Lecture_7: ***Electron energy loss spectroscopy. Fundamentals and Applications***

Professor Gerald Kothleitner
Institute of Electron Microscopy and Nanoanalysis of the TU Graz (FELMI)
Graz Centre for Electron Microscopy (ZFE Graz)
Austria

Lecture_8: ***3D imaging in EM***

Miguel Lopez-Haro, Ph.D.
Universidad de Cádiz UCA
Department of Material Science and Metallurgy Engineering and Inorganic Chemistry
Spain

Lecture_9: ***Introduction to Analytical Electron Microscopy from Theory to Practice***

Stephen T. Kelly, Ph.D.
ZEISS Research Microscopy Solutions
Germany

Lecture_10: ***EDS and WDS Spectroscopy***

Professor Michał Żelechower
Bartosz Chmiela, Ph.D.
Politechnika Śląska
Wydział Inżynierii Materiałowej, Katedra Technologii Materiałowych
Poland

Lecture _11: ***SEM/EBSD - How far we can go***

Professor Marek Faryna
Institute of Metallurgy and Materials Science of Polish Academy of Sciences
Poland

Lecture_12: ***Machining learning techniques in electron microscopy***

Benedykt Jany, Ph.D.
Jagiellonian University in Kraków
Faculty of Physics, Astronomy, and Applied Computer Science
Poland

Lecture_13: ***Specimen preparation for SEM & TEM***

Grzegorz Cempura, Ph.D.
AGH University of Science and Technology
Faculty of Metals Engineering and Industrial Computer Science
Poland

Lecture_C1: ***New applications enabled by combining a femtosecond laser with a FIB-SEM***

Stephen T. Kelly, Ph.D.
ZEISS Research Microscopy Solutions
Germany

Lecture_C2: ***Scanning Electron Microscopy: Easier Than You Think***

Maciej Bazarnik, Eng.
PIK Instruments
Poland

Laboratory

L1: ***TEM Basic – Tecnai (demo, BF, DF, diffraction, column alignment)***

Grzegorz Cempura, Ph.D.
AGH University of Science and Technology
Faculty of Metals Engineering and Industrial Computer Science

Poland

L2: ***Diffraction analysis, JEMS (hands-on)***

Kinga Majewska-Zawadzka, Ph.D.
AGH University of Science and Technology
Faculty of Metals Engineering and Industrial Computer Science

Poland

L3: ***HR TEM Imaging and spectroscopy – Titan (demo, TEM/STEM, EELS)***

Professor Oleksandr Kryshtal
AGH University of Science and Technology
Faculty of Metals Engineering and Industrial Computer Science

Poland

L4: ***Sample preparation (hands-on and demo)***

Sebastian Lech, Ph.D.
AGH University of Science and Technology
Faculty of Metals Engineering and Industrial Computer Science

Poland

L5: ***Visualization and analysis of 3D TEM data (Amira, hands-on)***

Jan Giesebrecht, **Ph.D.**
Sergej Dück, **Ph.D.**
Materials & Structural Analysis
Thermo Fisher
Germany

L6: ***FIB-SEM Tomography (hands-on, ImageJ, quantification, metrology)***

Piotr Szewczyk, Ph.D.
AGH University of Science and Technology
Faculty of Metals Engineering and Industrial Computer Science

Poland

L7: ***Orientation and phase mapping in TEM (demo, ASTAR, Precession electron diffraction)***

Bogdan Rutkowski, Ph.D.
AGH University of Science and Technology
Faculty of Metals Engineering and Industrial Computer Science

Poland

L8: ***SEM imaging and SEM-EDS analysis (demo, SE, BSE, EDX, EBSD)***

Maciej Ziętara, Ph.D.
AGH University of Science and Technology
Faculty of Metals Engineering and Industrial Computer Science

Poland

Sponsors

THIS PROJECT HAS RECEIVED FUNDING FROM THE EUROPEAN UNION'S HORIZON 2020 RESEARCH AND INNOVATION PROGRAMME UNDER GRANT AGREEMENT NO **823717**

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