The MU Vienna Department of Pathology
&
The Nottingham Molecular Pathology Node

Molecular Diagnostics Training School

25-28 February 2024

Digital Pathology & Image Analysis Training School

29 February – 02 March 2024

These Training Schools will be delivered as HYBRID Events !

ALL TIMES ARE CET !

DEPARTMENT OF PATHOLOGY
MEDICAL UNIVERSITY OF VIENNA
Vienna Healthcare Group University Hospital Vienna

The University of Nottingham
UNITED KINGDOM · CHINA · MALAYSIA

Supported by the Austrian Society of Pathology and the European Microscopy Society

ÖG PATH KLIN MOL

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Foreword
Molecular Diagnostics Training School 2024
Digital Pathology & Image Analysis Training School 2024

From Prof. Renate Kain

I would like to welcome you all to the sixth **Molecular Diagnostics Training School** and the fifth **Digital Pathology & Image Analysis Training School**, both to be held as hybrid events this year. The school is supported by the **Austrian Society of Pathology**, the **Nottingham Molecular Pathology Node** and the **European Microscopy Society**.

Established in co-operation with the University of Nottingham, the Molecular Diagnostics Training School and Digital Pathology & Image Analysis Training School have developed into a highly successful joint venture. For this year, we have introduced – thank you for your constructive feedback – a few changes to our program. Covering ever-increasing and rapidly evolving fields, both Training Schools have now become too short to give all the novel and exciting topics the space they deserve. We have therefore decided to cover the basics of molecular diagnostics, digital pathology and image analysis in pre-recorded lectures that provide the foundation for those of you who have little or no experience in either biological background or technical/methodological approaches. These pre-recorded lectures will be available to you before the beginning of the Training Schools and are the basis for the specialized lectures on recent developments in technological approaches as well as worked examples.

As for the **Molecular Diagnostics Training School** (MDTS) I would like to begin with the following statement:

Molecular Diagnostics is the foundation for precision medicine.

The MDTS is aimed at persons who may have little experience with molecular diagnostics but also those who are looking for a refresher course or want updates on novel developments. The training school will introduce you to common concepts which underpin the tests, including the panoply of tests which are currently used in diagnostic practice. We will also discuss the importance of getting good template and of having robust quality assurance for your tests. The school will also cover new methodologies such as digital spatial profiling and it will conclude with an overview of current applied molecular diagnostics in a variety of different organ systems.

And an apt introduction to our **Digital Pathology & Image Analysis Training School** is the statement:

Digital Pathology and Image Analysis: Prepare, the future is here!

The DP&IATS is aimed at both, Trainee and Consultant Pathologists and non-clinical scientists/computer experts, who may have some experience with digital pathology and platforms, but are looking to deepen their knowledge. Thus the training school aims at bringing together histopathologists and computational scientists to foster mutual understanding and collaboration. As digital technologies are transforming histopathology diagnosis and research, the training school will outline some of the basic challenges encountered during image analysis and introduce the concepts of stereology and segmentation analysis. In view of the rapid need for integration of image analysis with molecular diagnostics development, we shall explore both the spatial reasoning of imaging and assessment of multiple biomarkers on digital platforms.

We have a world class faculty to deliver the teaching materials and to deal with any questions.

I hope you enjoy and benefit from the two training schools. We will not make you into a card-carrying molecular biologist in these three days, and can only hope that the basic language of image analysis is no longer alien and the clinical perspective contextualized after the three-day DP&IATS, but if you come away agreeing with my introductory statements, then the school will have achieved its aims!

Best wishes,

Renate Kain

Renate Kain
Professor of Pathology
Medical University of Vienna

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Molecular Diagnostics Training School 2024

Sunday, 25 February 2024

Pre-Conference Tutorials (Optional)

ONLINE ONLY

Tutorials for the Molecular Diagnostic Training School (optional)

Registered attendees can watch the tutorials below via the links emailed to them.

The Basic Principles of PCR
Prof. Mohammad Ilyas – University of Nottingham, UK

Basics of FISH
Prof Ana-Iris Schiefer - Medical University of Vienna, Austria

Variant Nomenclature (HGVS Nomenclature/Human Genome Variation Society)
Prof Leonhard Müllauer – Medical University of Vienna, Austria

The Basics of Genetics, Genomics
Prof Martin Bilban - Medical University of Vienna, Austria

Quality Control in NGS
Dr Antonios Koussounadis - Saphetor SA

Integrative Genome Viewer
Dr Raheleh Sheibani Tezerji, Medical University of Vienna, Austria

Tutorials for the Digital Pathology & Image Analysis Training School

Basics of Digital Imaging Including Lexicons
Prof Vincenzo Della Mea - University of Udine, Italy

What is a Whole Slide Image?
Dr Christopher Kaltenecker– Medical University of Vienna, Austria

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Molecular Diagnostics Training School 2024

Day 1 – Monday, 26 February 2024

Basics of Technologies

Morning Session Chair: ***Prof. M. Ilyas***

08:25	**Introduction - Welcome**
08:30	**Real-Time PCR and Data Interpretation** Prof. Mohammad Ilyas – University of Nottingham, UK
10:00	**Comfort break**
10:30	**The Highs / Lows and Data Interpretation of Sequencing** Dr Susan Richman – St James University Hospital, Leeds, UK / Dr Antonios Koussounadis - Saphetor SA
12:00	**The Liquid Biopsy** Prim. Prof. Karl Sotlar – University Hospital Salzburg, Austria
12:30	**Lunch break**

Afternoon Session Chair: ***Prof. L. Müllauer***

13:30	**Chromogenic In-Situ Hybridisation** Prof. Elizabeth Soilleux - Dept of Pathology, University of Cambridge, UK
14:00	**The Molecular Tumour Board** Prof Leonhard Müllauer – Medical University of Vienna, Austria
14:30	**Next Generation Sequencing – Worked Examples** Prof Martin Bilban - Medical University of Vienna / Dr Sophia Petschnak - Klinik Favoriten, Vienna
15:30	**Comfort break**
16:00	**NEQAS – Ensuring Standards in Molecular Diagnostics** Dr Jenni Fairley – UK NEQAS, UK
16:30	**NGS – Principles & Platforms** PD Dr Gregor Hörmann - MLL Munich Leukemia Laboratory, Germany
17:30	**Wrap-up Day 1 of MDTS**

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Molecular Diagnostics Training School 2024

Day 2 – Tuesday, 27 February 2024

Worked Examples I

Morning Session Chair: ***Prof. R. Kain***

08:45	**Day 1 Recap (optional)** Prof Mohammad Ilyas - University of Nottingham, UK
09:00	**Programmed Cells – Machine Learning for Molecular Medicine** Prof Christoph Bock - CeMM Research Center for Molecular Medicine of the Austrian Academy of Sciences / Medical University of Vienna, Austria
10:00	**Homologous Repair Deficiency** Prof Leonhard Müllauer, Prof Christoph Grimm - Medical University of Vienna, Austria
10:30	**Comfort break**
11:00	**Hereditary Tumour Syndrome** Prof Katharina Wimmer- Medical University of Innsbruck, Austria
11:45	**Rubbish in=Rubbish out: The Importance of Template** Dr Abhik Mukherjee - University of Nottingham, UK
12:15	**Functional Profiling** Prof Philipp Staber - Medical University of Vienna, Austria
13:00	**Lunch break**

Afternoon Session Chair: ***Prof. A-I Schiefer***

14:00	**Molecular Diagnostics in Soft Tissue Tumours** Dr Suk Wai Lam - Leiden University Medical Center, The Netherlands
14:30	**Molecular Diagnostics in Lung Cancer** Prof Leonhard Müllauer - Medical University of Vienna, Austria
15:00	**Molecular Diagnostics in Melanoma** Prof Ana-Iris Schiefer - Medical University of Vienna, Austria
15:30	**Molecular Diagnostics in Male Genitourinary Cancers** Prof Clare Verrill - University of Oxford, UK
16:15	**Comfort break**
16.30	**Molecular Diagnostics in Gynaecological Cancers / Worked Examples** Prim. Prof. Sigurd Lax– Medical University of Graz, Austria
17:30	**Wrap-up Day 2 of MDTS**

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Molecular Diagnostics Training School 2024

Day 3 – Wednesday, 28 February 2024

Worked Examples II

Morning Session Chair: ***Prof. Zs. Bago-Horvath***

08:30	**Molecular Diagnostics in CNS Cancers** Dr Zane Jaunmuktane - UCL Queen Square Institute of Neurology, UK
09:15	**Molecular Diagnostics in Lymphoid Cancers** Prof Ming Du - University of Cambridge, UK
10:00	**Molecular Diagnostics in Mesothelioma** Dr Luka Brcic - Medical University of Graz, Austria
10:30	**Comfort break**
11:00	**Scientific Databases and Software in Diagnostic Molecular Pathology** Dr André Oszwald- Medical University of Vienna, Austria
11:30	**Molecular Diagnostics and Immuno-Oncology** Dr Alexander Haragan - Royal Liverpool University Hospital, UK
12:15	**Lunch break**

Afternoon Session Chair: ***Prof. R. Kain***

13:00	**Prognostic and Predictive Molecular Tests for Breast Cancer** Prof Zsuzsanna Bago-Horvath - Medical University of Vienna, Austria
13:45	**Molecular Diagnostics in Breast Cancers** Prof Emad Rakha -University of Nottingham, UK
14:30	**Molecular Diagnostics in Gastrointestinal Cancers** Prof Gerald Höfler - Medical University of Graz, Austria
15:15	**Comfort break**
15:30	**Logistics of Genetic Testing in Renal Disease Based on Worked Examples** Dr Katherine Benson, RCSI University of Medicine and Health Sciences, Dublin, Ireland
16:00	**Pharmacogenomics** Prof Henk Jan Guchelaar– Leiden University Medical Center, The Netherlands
16.45	**Homologous Recombination Deficiency, a Novel Biomarker in Cancer** PD Dr Theo Kraus- University Hospital Salzburg, Austria
17:30	**Wrap-up Day 3 and Close of MDTS**

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Digital Pathology & Image Analysis Training School 2024

Day 1 – Thursday, 29 February 2024

Exploring Terms and Technologies I

Morning Session Chair: ***Prof. M. Ilyas***

08:25	**Introduction** Prof. Mohammad Ilyas - University of Nottingham, UK
Whole Slide Image Generation	
08:30	**Roadmap to Digitize Pathological Workflows** Dr Anna Bodén– Linköping University, Sweden
09:15	**Quality Control** Catriona Dunn– Leeds Teaching Hospitals NHS Trust, UK
10:00	**Comfort break**
10:30	**Information Management and Standardization** Dr Maximilian Koeller– Medical University of Vienna, Austria
11:15	**Implementing Digital Pathology: The Step from Research to Diagnostics** DI Markus Plass - Medical University of Graz, Austria
12:00	**Lunch break**

Afternoon Session Chair: ***Prof. R. Kain***

13:00	**Digital Pathology in Diagnostic Services / Image Analysis in Digital Pathology – What are the Main Challenges?** Prof. Mohammad Ilyas - University of Nottingham, UK
Thinking Like a Computational Pathologist – Methods in Computational Pathology	
14:30	**From Pixel to Tissue - Introduction to Computational Pathology for Pathologists** Prof Andrew Janowczyk - Emory University, Atlanta, USA
15:15	**Quantitative Histo-Morphometry – from Pixels to Diagnosis** Dr Alain Pitiot - Ilixa Ltd, Ludwig Boltzmann Institute, Austria; University of Nottingham, UK
16:00	**Comfort break**
16:30	**Introduction to Graph Models** Dr Simon Graham- Histofy, UK
17:15	**Convolutional Neural Networks: Leaving the Field of Histomorphometry** Prof Vincenzo Della Mea - University of Udine, Italy
18:00	**Vision Image Transformers: Attention Is All You Need** Prof Faisal Mahmood, Harvard Medical School, Boston, USA
18:45	**Wrap-up Day 1 of DP&IATS**

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Digital Pathology & Image Analysis Training School 2024

Day 2 – Friday, 01 March 2024

Exploring Terms and Technologies II

Morning Session Chair: *Prof. M. Ilyas*

What Is Machine Learning in the Context of Computational Pathology?	
08:30	**General Introduction to Machine Learning for Pathologists** Prof Vincenzo Della Mea - University of Udine, Italy
09:15	**Data Augmentation and Stain Normalisation** Stephan Dooper– Radboudumc, The Netherlands
10:00	**Machine Learning Tasks in Computational Pathology (Segmentation, Classification, Regression)** Prof Andrew Janowczyk - Emory University, Atlanta, USA
10:45	**Comfort break**
11:15	**Obtaining Ground Truth in the Field with High Interobserver Variables** Prof Junya Fukuoka, Nagasaki University, Japan
12:00	**Deep Learning in Computational Pathology** Prof Jakob N Kather, Technical University Dresden, Germany
12:45	**Lunch break**
	Afternoon Session Chair: *Prof. R. Kain*
13:45	**How to Create a Dataset for Computational Pathology and What Points to Consider** Dr Christof Bertram, PhD - Veterinärmedizinische Universität Wien
14:30	**High-Throughput Quality Control, Annotation, and Labeling in Digital Pathology Repositories for Biomarker Discovery** Prof Andrew Janowczyk - Emory University, Atlanta, USA
15:15	**Comfort break**
How to Translate a Pathological Question into Computational Pathology	
15:45	**Assessing Immunohistochemistry – Scoring Methods and Pitfalls** Dr Abhik Mukherjee - University of Nottingham, UK
16:30	**Histogenic Molecular Mapping – Multivariate Analysis of IHC Biomarkers** Dr Alain Pitiot - Ilixa Ltd, Ludwig Boltzmann Institute, Austria; University of Nottingham, UK
17:15	**Industrial presentation – TBC**
17:30	**Wrap-up Day 2 of DP&IATS**

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Digital Pathology & Image Analysis Training School 2024

Day 3 – Saturday, 02 March 2024

Worked Examples

Session Chair: *Prof. R. Kain*

How to Translate a Pathological Question into Computational Pathology	
08:30	**Prostate – Computational Pathology in Uropathology** Prof Jeroen van der Laak - Radboudumc, The Netherlands
09:00	**Breast – Computational Pathology in Senology** Prof Zsuzsanna Bago-Horvath - Medical University of Vienna, Austria
09:30	**GI Tract – Computational Pathology in Gastroenterology** Sophia J. Wagner, Technical University Munich, Helmholtz AI, Germany
10:00	**MALDI Imaging – Applications in Pathology** Dr Kristina Schwamborn - Technical University Munich, Germany
10:45	**Comfort break**
11:00	**Digital Intelligence for Tissue Pathology** Prof Arvydas Laurinavičius - VUHSK, Vilnius, Lithuania
11:45	**Future Outlook - The Remarkable Potential of Deep Learning for Histopathology** Prof Jeroen van der Laak - Radboudumc, The Netherlands
12:30	**Wrap-up Day 3 and Close of DP&IATS**

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