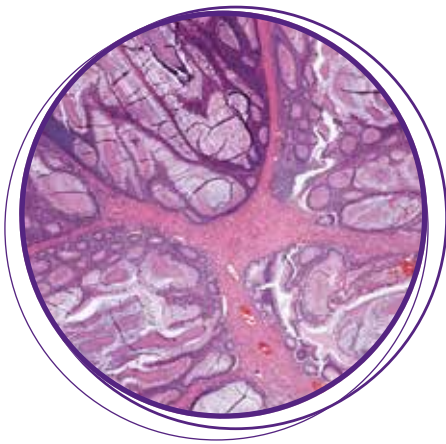


4TH DIGITAL PATHOLOGY & AI CONGRESS: USA

NEW YORK CITY
June 26-27, 2018



#DigiPathGE

www.global-engage.com



It is an exciting time for digital pathology in the US, following on the FDA's 2017 approval of Philips' IntelliSite Pathology Solution. Attracting experts working in all areas of digital pathology, the conference will examine the latest advancements in digital imaging technology and image analysis techniques like machine learning. There will also be an entire track focused on digital pathology adoption, practicalities and strategies for successful implementation across the workflow.

Highlights of the 2018 meeting include lectures from over 30 experts in the field, as well as several interactive sessions to facilitate collaboration between attendees. Highlights include 9 roundtables, 3 panel discussions and over 7 hours of networking time. To complement the scientific content, there will be a dynamic exhibition room filled with technology providers showcasing their technologies and solutions.

EVENT SUMMARY

- 30+ presentations from industry and academic leaders
- 7+ hours of dedicated networking time
- 3 extended senior-level panel discussions
- 9 interactive roundtable discussions
- A buzzing exhibition hall featuring all technology and solution providers in the field
- Poster presentations and competition
- Site visit to the Department of Pathology, Memorial Sloan Kettering Cancer Center to see Digital and Computational Pathology initiatives

EXPERT SPEAKERS Include:



ANANT MADABHUSHI

F. Alex Nason Professor II, Department of Biomedical Engineering; Director, Center for Computational Imaging & Personalized Diagnostics, Case Western Reserve University



ULYSSES BALIS

Professor of Pathology, Director, Division of Pathology Informatics & Computational Pathology Laboratory Section, Michigan Medicine, University of Michigan



GEORGE LEE

Digital Pathology Informatics Lead / Data Scientist, Translational Medicine, Bristol-Myers Squibb



YUKAKO YAGI

Director of Pathology Digital Imaging, Department of Pathology, Memorial Sloan Kettering Cancer Center; Director of Digital Imaging Laboratory, The Warren Alpert Foundation Center for Digital and Computational Pathology at MSK

COMPUTATIONAL PATHOLOGY & AI

- Overcoming challenges in image analysis
- New imaging modalities
- User interfaces
- Acquisition, processing, archiving & retrieval of WSI
- Cloud computing, data storage and management
- Integration with LIMS / LIS; PACS
- Scoring & annotation tools
- Fully-automated image analysis
- Deep learning pattern recognition
- Case studies & applications in pre-clinical research and in the clinic
- **Panel:** The potential for digital pathology & AI
- **Panel:** How do we move digital pathology forward?

IMPLEMENTATION & PRACTICALITIES

- Regulation
- Barriers to adoption
- Making the business case for digital pathology – developing an RFP
- How readers interact with digital pathology systems
- Challenge of form factors
- Interoperability
- Improving WSI workflow efficiency
- Telepathology & international consultations
- **Panel:** Biggest challenges in day-to-day use of digital pathology

ROUNDTABLES SESSION 1

Roundtable 1: Clinical Utility of AI for Differential Diagnosis

Roundtable 2: LIMS/LIS & PACS

Roundtable 3: Use of digital pathology to support personalized oncology

Roundtable 4: Digital Pathology in Pharma

Roundtable 5: Regulation of Digital Pathology

ROUNDTABLES SESSION 2

Roundtable 1: Integration of Digital Pathology Across the Workflow

Roundtable 2: Global Use of Digital Pathology

Roundtable 3: Standardization

Roundtable 4: Novel Deep Learning Applications

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CONFIRMED SPEAKERS



ANIL PARWANI

Professor of Pathology and Biomedical Informatics, Vice-Chair of Anatomic Pathology, Wexner Medical Center, The Ohio State University



THOMAS FUCHS

Associate Professor, Computational Pathology, Memorial Sloan Kettering Cancer Center; Weill Cornell Medicine



DAVID WEST

CEO, Proscia



ULYSSES BALIS

Professor of Pathology, Director, Division of Pathology Informatics & Computational Pathology Laboratory Section, Michigan Medicine, University of Michigan



DOUGLAS HARTMAN

Associate Professor of Pathology & Associate Director, Pathology Informatics, University of Pittsburgh



DRAZEN JUKIC

Consultant Dermatopathologist, Georgia Dermatology and Skin Cancer Center



JOEL SALTZ

Cherith Professor and Founding Chair, Department of Biomedical Informatics, Stony Brook University



GEORGE LEE

Digital Pathology Informatics Lead / Data Scientist, Translational Medicine, Bristol-Myers Squibb



ANANT MADABHUSHI

F. Alex Nason Professor II, Department of Biomedical Engineering; Director, Center for Computational Imaging & Personalized Diagnostics, Case Western Reserve University



YAIR RIVENSON

Postdoctoral Scholar, Ozcan Nano/Bio Photonics Lab, University of California Los Angeles



JOHN TOMASZEWSKI

SUNY Distinguished Professor, Peter A. Nickerson Professor and Chair, Department of Pathology and Anatomical Science, University at Buffalo



GUSTAVO KUNDE ROHDE

Associate Professor, Department of Biomedical Engineering, Department of Electrical and Computer Engineering, University of Virginia



RAJAN DEWAR

Clinical Associate Professor, Hematopathology, Molecular and Genetic Pathology, Michigan Medicine, University of Michigan



MEHRVASH HAGHIGHI

Assistant Professor of Pathology & Cell Biology, Columbia University Medical Center



LAURA BARISONI

Professor of Pathology, Division Chief, Renal Pathology Service, Miller School of Medicine, University of Miami



RAJENDRA SINGH

Associate Professor, Pathology, Icahn School of Medicine at Mt. Sinai



ERIC WIRCH

Chief Technology Officer and Managing Director, Corista



STEVEN HART

Assistant Professor of Biomedical Informatics, Mayo Clinic



SIMON KIRBY

Assistant Professor, Departments of Laboratory Medicine and Surgery, Faculty of Medicine, Memorial University of Newfoundland, Canada



GERARDO FERNANDEZ

Associate Professor, Department of Pathology, Medical Director, Center for Computational and Systems Pathology, Icahn School of Medicine at Mount Sinai & The Mount Sinai Hospital



JAIME RODRIGUEZ-CANALES

Senior Pathologist, MedImmune



BEATRICE KNUDSEN

Professor, Biomedical Sciences and Pathology and Laboratory Medicine, Director, Translational Pathology, Cedars Sinai Medical Center



JASON HIPPI

Medical Brain team, Lead Pathologist and Consultant, Google Research



MARTIN STUMPE

Staff Software Engineer & Technical Lead, Google Research



JENNIFER GILTNAME

Pathologist, Genentech



YUKAKO YAGI

Director of Pathology Digital Imaging, Department of Pathology, Memorial Sloan Kettering Cancer Center; Director of Digital Imaging Laboratory, The Warren Alpert Foundation Center for Digital and Computational Pathology at MSK



RICHARD LEVENSON

Professor and Vice Chair for Strategic Technologies, Department of Medical Pathology and Laboratory Medicine, UC Davis Medical Center



ANTHONY MAGLIOCCO

Chair of Anatomical Pathology, Anatomical Pathology Department, Moffitt Cancer Center

8:00-8:50

Registration & Refreshments

8:50-9:00

Global Engage Welcome Address and Morning Chair's Opening Remarks

9:00-9:35

**KEYNOTE ADDRESS:****ANIL PARWANI**

Professor of Pathology and Biomedical Informatics, Vice-Chair of Anatomic Pathology, Wexner Medical Center, The Ohio State University

Breaking the barriers: Whole Slide Imaging for Primary Diagnosis and Artificial Imaging Applications

- Overview of whole slide imaging, applications and challenges
- Recognize how artificial intelligence/deep learning is an enabling technology for clinical diagnostics
- New imaging tools for cancer diagnostics

9:35-10:10

**KEYNOTE ADDRESS:****THOMAS FUCHS**

Associate Professor, Computational Pathology, Memorial Sloan Kettering Cancer Center; Weill Cornell Medicine

What Does It Take to Build a Petabyte Scale AI?

- Artificial Intelligence
- Computational Pathology
- Deep Learning

Pathology is in the midst of a revolution from a qualitative to a quantitative discipline. This transformation is fundamentally driven by machine learning in general and computer vision and deep learning in particular. At Memorial Sloan Kettering we are building a computational pathology decision support system based on hundreds of GPUs and one petabyte of image and clinical data. The goal is not only to automate cumbersome and repetitive tasks, but to impact diagnosis and treatment decisions in the clinic.

10:10-10:40

**SPONSORED PRESENTATION:****SENIOR REPRESENTATIVE**

Indica Labs

Title TBC

10:40-11:50

Morning Refreshments / Even Numbered Poster Presentations / One-to-One Meetings

AI FOR IMAGE ANALYSIS

11:50-12:15

**JOEL SALTZ**

Cherith Professor and Founding Chair, Department of Biomedical Informatics, Stony Brook University

Whole Slide Imaging and High-End Computing Come Full Circle

Presentation will describe evolution of whole slide imaging Pathology technology from its 1990s HPC origins to the present. I will describe the HPC origin of the early infrastructure developed by my group at Johns Hopkins Pathology – the first whole slide imaging software system – and go on to describe National Cancer Institute supported infrastructure for visualization, management and analysis of information derived from whole slide Pathology images. Finally, I will describe the role of whole slide Pathology Informatics in Precision medicine giving examples of studies that make use of traditional machine learning and deep learning algorithms.

12:15-12:50

PANEL DISCUSSION:**The Potential for Artificial Intelligence in Digital Pathology****THOMAS FUCHS**

Associate Professor, Computational Pathology, Memorial Sloan Kettering Cancer Center; Weill Cornell Medicine

IMPLEMENTATION & PRACTICALITIES

11:50-12:15

DRAZEN JUKIC

Consultant Dermatopathologist, Georgia Dermatology and Skin Cancer Center

Topic: Telepathology

12:15-12:50

PANEL DISCUSSION:**How do we move digital pathology forward?**

A discussion on strategies for advancing digital pathology for clinical use, covering topics such as regulation, practicalities of implementation, identifying hurdles.

12:50-1:20	 SPONSORED PRESENTATION: DAVID WEST CEO, Proscia Title TBC 	12:50-1:20	SPONSORED PRESENTATION For sponsorship opportunities contact Gavin Hambrook / Nick Best at Email: sponsorship@globalengage.co.uk Tel: +44 (0) 1865 849841
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1:20-2:20

Lunch / One-to-One Meetings

2:20-2:45	 ULYSSES BALIS Professor of Pathology, Director, Division of Pathology Informatics & Computational Pathology Laboratory Section, Michigan Medicine, University of Michigan Topic: Fully-automated WSI differential diagnosis generation as made possible by deep learning	2:20-3:10	 DOUGLAS HARTMAN Associate Professor of Pathology & Associate Director, Pathology Informatics, University of Pittsburgh Determining how to integrate digital pathology into your lab
2:45-3:10	JASON HIPP Medical Brain team, Lead Pathologist and Consultant, Google Research	3:10-3:35	STEVEN HART Assistant Professor of Biomedical Informatics, Mayo Clinic Title TBC
3:10-3:35	 MARTIN STUMPE Staff Software Engineer & Technical Lead, Google Research Topic: Cancer diagnostics using deep learning	3:35-4:00	GERARDO FERNANDEZ Associate Professor, Department of Pathology, Medical Director, Center for Computational and Systems Pathology, Icahn School of Medicine at Mount Sinai & The Mount Sinai Hospital Artificial intelligence methods for grading human cancer - Large accurate ground truth training is critical in pathology AI applications - Review spectrum of applications of automated grading algorithms - Normalizing for tissue variability in automated pathology analysis
3:35-4:00	PETER CAIE (Reserved) Senior Research Fellow, University of St Andrews, UK Topic: Automated tumor microenvironment profiling using machine learning		Speaker TBC

4:00-4:50

Afternoon Refreshments / Odd Numbered Poster Presentations / One-to-One Meetings

4:50-5:20	SPONSORED PRESENTATION For sponsorship opportunities contact Gavin Hambrook / Nick Best at Email: sponsorship@globalengage.co.uk Tel: +44 (0) 1865 849841	4:50-5:20	SPONSORED PRESENTATION For sponsorship opportunities contact Gavin Hambrook / Nick Best at Email: sponsorship@globalengage.co.uk Tel: +44 (0) 1865 849841
5:20-6:10	ROUNDTABLE DISCUSSIONS: Table 1: Clinical Utility of AI for Differential Diagnosis  ULYSSES BALIS Professor of Pathology, Director, Division of Pathology Informatics & Computational Pathology Laboratory Section, Michigan Medicine, University of Michigan	5:20-5:45	 RICHARD LEVENSON Professor and Vice Chair for Strategic Technologies, Department of Medical Pathology and Laboratory Medicine, UC Davis Medical Center Topic: Slide-free, non-destructive MUSE microscope technique

ROUNDTABLE DISCUSSIONS

Table 2: LIMS/LIS & PACS**MEHRVASH HAGHIGHI**

Assistant Professor of Pathology & Cell Biology,
Columbia University Medical Center

- What are different methods of LIS/WSI implementation? Pros and Cons of each method?
- Discuss the feasibility of using PACS in integral model
- Why PACS adoption is important?
 - Workflow support, even for heavier volume
 - Integration in healthcare IT environment
 - Anywhere access because of central storage
 - Offering stability and performance
 - Better patient care
- What are lessons learned from Radiology and their journey to full digitalization?
 - Choose a vendor-neutral solution
 - Ensure system robustness
 - Ensure there are clinical references that testify to good support and vendor relationship
 - Ensure the internal engagement
 - Focus on the workflow
- How do we properly prepare for integrating WSI in pathology lab workflow?
 - LIS operational pre-requisites
 - Implementing additional quality control measure
 - Optimizing the pathology workstations: Challenges and solutions
 - Comprehensive training

**Table 3: Use of digital pathology to support personalized oncology****ANTHONY MAGLIOCCO**

Chair of Anatomical Pathology, Anatomical Pathology
Department, Moffitt Cancer Center

**Table 4: Digital Pathology in Pharma****JAIME RODRIGUEZ-CANALES**

Senior Pathologist, MedImmune

Table 5: Regulation of Digital Pathology

ADVANCEMENTS IN IMAGING

**YAIR RIVENSON**

Postdoctoral Scholar, Ozcan Nano/Bio Photonics
Lab, University of California Los Angeles

Deep Learning Microscopy for Enhanced Digital Pathology

- We demonstrate that deep learning can be used to provide a significant enhancement in imaging throughput of pathology slides, by extending the depth-of-field and resolution of images acquired using a standard brightfield imaging optical microscope, without any hardware modifications.
- The enhanced result image is inferred using a single input image. This proposed deep learning approach is computationally efficient and outputs an image, corresponding to a 40x sample field-of-view in <1 second using a laptop.
- We demonstrate the universal nature of the approach, using a model that was created with a deep neural network which was trained on a specific tissue and stain type, to enhance microscope images that were taken with different tissues, stains and magnifications.

5:20-6:10

5:45-6:10

6:10

Chair's Closing Remarks / End of Day 1

6:10-7:10

Networking Drinks Reception

8:20-9:00

Refreshments

8:50-9:00

Global Engage Welcome Address and Morning Chair's Opening Remarks

9:00-9:35


**KEYNOTE ADDRESS:
ANANT MADABHUSHI**

F. Alex Nason Professor II, Department of Biomedical Engineering; Director, Center for Computational Imaging & Personalized Diagnostics, Case Western Reserve University

The case for hand-crafted features: Not another deep learning in pathology talk

- Handcrafted features represent feature engineering approaches which provide interpretability.
- Handcrafted features may offer advantages over deep learning approaches by being more transparent
- Handcrafted features can enable computational pathology based companion diagnostics for precision medicine.

9:35-10:15

PANEL DISCUSSION:
Challenges & strategies for day-to-day use of digital pathology

YUKAKO YAGI

Director of Pathology Digital Imaging, Department of Pathology, Memorial Sloan Kettering Cancer Center; Director of Digital Imaging Laboratory, The Warren Alpert Foundation Center for Digital and Computational Pathology at MSK


ANIL PARWANI

Professor of Pathology and Biomedical Informatics, Vice-Chair of Anatomic Pathology, Wexner Medical Center, The Ohio State University


BEATRICE KNUDSEN

Professor, Biomedical Sciences and Pathology and Laboratory Medicine, Director, Translational Pathology, Cedars Sinai Medical Center


DOUGLAS HARTMAN

Associate Professor of Pathology & Associate Director, Pathology Informatics, University of Pittsburgh

Questions to be submitted to naomi@globalengage.co.uk

10:15-10:45


**SPONSORED PRESENTATION:
ERIC WIRSCH**

Chief Technology Officer and Managing Director, Corista

Migrating algorithms beyond the development sandbox

Machine-learning algorithmic development initially occurs in tight conjunction with a single research partner and heavily reflects the protocols of that partner's laboratory. Migrating an algorithm from being effective at a single site to a cross site environment, with differences in human factors, processing, stains, imaging and calibration, necessitates the application of additional AI & Computer Vision steps and techniques. We will discuss experiences encountered while performing this migration, including initial results and the techniques employed or being tested for overcoming these hurdles.



10:45-11:55

Morning Refreshments / Odd Numbered Poster Presentations / One-to-One Meetings

COMPUTATIONAL PATHOLOGY & AI

11:55-12:25

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JOHN TOMASZEWSKI

SUNY Distinguished Professor, Peter A. Nickerson Professor and Chair, Department of Pathology and Anatomical Science, University at Buffalo

Topic: Traditional AI approaches to computational histopathology

GUSTAVO KUNDE ROHDE

Associate Professor, Department of Biomedical Engineering, Department of Electrical and Computer Engineering, University of Virginia
Interpretable discriminative modeling of cellular phenotypes for digital pathology

Image-based phenotypic assessment in digital pathology typically rely on parametric numerical features to describe the state of each cellular measurement. In recent years, numerous modeling frameworks for image-based cell phenotypes. We will describe how non-parametric methods based on the continuity equation can be

12:25-12:50

12:50-1:15

ROUNDTABLE DISCUSSIONS

11:55-12:25

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ROUNDTABLE DISCUSSIONS:

Table 1: Expanding your diagnostic capabilities with digital pathology
DOUGLAS HARTMAN

Associate Professor of Pathology & Associate Director, Pathology Informatics, University of Pittsburgh


Table 2: Global Use of Digital Pathology
RAJAN DEWAR

Clinical Associate Professor, Hematopathology, Molecular and Genetic Pathology, Michigan Medicine, University of Michigan


Table 3: Standardization
YUKAKO YAGI

Director of Pathology Digital Imaging, Department of Pathology, Memorial Sloan Kettering Cancer Center;

12:25-1:15

used to build non-parametric end to end systems that utilize all pixel information directly in statistical modeling. We will show that the modeling framework can not only obtain predictive models of higher accuracies, but due to the invertibility of the modeling framework, allow for biologically interpretable results. Applications in cancer diagnosis using histology and cytology will be shown.

12:50-1:15

Director of Digital Imaging Laboratory, The Warren Alpert Foundation Center for Digital and Computational Pathology at MSK
There are many different levels and areas of focus with regards to standardization of Digital Pathology. This discussion will cover all aspects of standardization for successful operation of WSI systems in clinical and research areas.

- Instrument/Industrial Standard: for interoperability
- WSI system standardization to have optimal, consistent quality and reliable images
- Establishing Operational Standard

12:25-1:15



Table 4: Novel Deep Learning Applications

RAJENDRA SINGH

Associate Professor, Pathology, Icahn School of Medicine at Mt. Sinai

1:15-2:15

Lunch / One-to-One Meetings

TRACK CHAIR: SIMON KIRBY

Assistant Professor, Departments of Laboratory Medicine and Surgery, Faculty of Medicine, Memorial University of Newfoundland, Canada

CASE STUDIES

2:15-2:40



GEORGE LEE

Digital Pathology Informatics Lead / Data Scientist, Translational Medicine, Bristol-Myers Squibb

Applications of Artificial Intelligence for Immuno-oncology and Precision Medicine

Convolutional neural networks have revolutionized image analysis and digital pathology to uncover insights in medicine which could not previously be performed reliably at scale. At Bristol-Myers Squibb, we are using artificial intelligence to quantify the tumor micro-environment in histopathology images and to inform the best treatment options for patients considering immunotherapies.

2:40-3:05

JENNIFER GILTNAME

Pathologist, Genentech

Topic: Digital pathology in immuno-oncology

3:05-3:30



JAIME RODRIGUEZ-CANALES

Senior Pathologist, MedImmune

Validation of multiplex immunofluorescence panels using multispectral microscopy for immune-profiling of formalin-fixed and paraffin-embedded human tumor tissues

3:30-3:55



BEATRICE KNUDSEN

Professor, Biomedical Sciences and Pathology and Laboratory Medicine, Director, Translational Pathology, Cedars Sinai Medical Center

Nuclear morphometry and cancer biomarker development

- Novel tools to analyze nuclei in H&E slides
- Multiplex tissue staining for high throughput detailed slide annotation
- Data integration and prediction modeling for biomarker discovery

3:55-4:20



LAURA BARISONI

Professor of Pathology, Division Chief, Renal Pathology Service, Miller School of Medicine, University of Miami

Digital pathology in nephrology clinical trials, translational research and clinical practice

During this presentation, we will discuss a) the application of the recent advancements in digital technology and computational engineering to nephropathology, in the setting of clinical research, trials, and practice; b) the overall benefits and challenges of the new digital ecosystem; c) digital nephropathology in kidney precision and predictive medicine.

4:20

Conference Close

MAKING A POSTER PRESENTATION

Poster presentation sessions will take place in breaks and alongside the other breakout sessions of the conference. Your presentation will be displayed in a dedicated area, with the other accepted posters from industry and academic presenters. We also issue a poster eBook to all attendees with your full abstract in and can share your poster as a PDF after the meeting if you desire (optional). Whether looking for funding, employment opportunities or simply wanting to share your work with a like-minded and focused group, these are an excellent way to join the heart of this congress.

In order to present a poster at the congress you need to be registered as a delegate. Please note that there is limited space available and poster space is assigned on a first come first served basis (subject to checks and successful registration). We charge an admin fee of \$100 to industry delegates to present, that goes towards the shared cost of providing the poster presentation area and display boards, guides etc. This fee is waived for those representing academic institutions and not for profit organisations.





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