

DPA–ESDIP–JSDP Task Force for Worldwide Adoption of Digital Pathology

KEY MESSAGES

The worldwide taskforce created by Digital Pathology Association (DPA), European Society of Digital and Integrative Pathology (ESDIP), and Japanese Society of Digital Pathology (JSDP) aims to catalyze digital pathology workflow transformation through joint educational and awareness activities.

The success of the digital transformation that occurred in Medicine is illustrated by its ubiquitous deployment in radiology.^[1] Although mature digital imaging technology exists to support a similar digital transformation in pathology, many pathology laboratories around the world remain skeptical about the adoption of digital workflow in routine clinical practice.^[2] In recent years, the digital method of practicing pathology has been proven by several pathology laboratories to represent a viable business model. Moreover, ample validation studies have proven that whole slide imaging (WSI) is noninferior in diagnostic performance to the classic method of using glass slides and a conventional microscope.^[3–5] There is a high concordance between diagnosis performed under the microscope and the WSI in several subspecialties of human pathology,^[5] including cytopathology^[6,7] and intraoperative consultation.^[8,9] If properly implemented, carefully validated, and safely utilized, digital pathology can enable laboratories worldwide to undergo a comprehensive digital transformation and thereby allow them to capitalize on its many advantages such as automation of workflow, increased quality of diagnosis, and the creation of an integrated ecosystem that supports computational pathology.^[10,11]

We envision the usage of WSI in the daily life of the pathologist to include connecting people and resources, as well as creating the ecosystem for computational and integrative pathology deployment.

The coronavirus disease-2019 (COVID-19) pandemic challenged pathology laboratories to maintain continuity of care from a safe distance, by promoting isolation.^[11] Thanks to WSI, during the pandemic certain pathologists who had access to this technology were able to still render primary diagnosis from home, obtain second opinions via teleconsultation, and continue to teach virtually or to help vulnerable laboratories suffering from staff losses. Pathologists were able to continue performing their daily jobs as they were now connected to a network via digital means. They did not need to be anchored to a microscope.

This is an excellent proof of concept that digital pathology works in the real-world setting.

There is much known, and perhaps even more unknown data contained within the millions of pixels present in a WSI. Not surprisingly, these large digital pathology datasets are swiftly catching the attention of everyone interested in computer vision.^[12,13] Coupling WSI with artificial intelligence (AI) tools is one of the hot topics in the medical literature today. Computational pathology likely represents the next big revolution in Pathology after immunohistochemistry and molecular pathology.^[14] AI-based algorithms are being developed to not only provide computer-assisted diagnosis,^[15] but also to augment the practice of pathology by permitting predictions and prognosis to be made directly from H&E pathology images.^[16] The potential for AI to be used in discovery to widen our knowledge about human diseases may challenge the way pathologists practice by altering how diseases are classified and also generating new biomarkers of diseases.^[17] Of course, such transformational new perspectives can only be understood and developed within the setting of clinical trials. However, first transitioning onto a digital pathology platform is a prerequisite to exploiting AI tools. As physicians trained broadly in disease and having intimate familiarity with tissue architecture and disease, pathologists are rightly the diagnostic experts in tissue-critical diseases. Pathologists need to foster the deployment of these capabilities, not only to improve the efficiency and quality of patient care but also to ensure the longevity of our profession in this worldwide digital transformation.

We are pleased to announce an enthusiastic alliance among the Digital Pathology Association (DPA), European Society of Digital and Integrative Pathology (ESDIP), and Japanese Society of Digital Pathology (JSDP) to promote the global adoption of digital pathology. DPA is a nonprofit organization comprised of pathologists, scientists, technologists, and industry representatives dedicated to advancing the field of digital pathology. The organization's mission is to facilitate awareness, education, and adoption of digital pathology and AI applications in healthcare and life sciences. Members are encouraged to share best practices and promote the use of the technology among colleagues in order to show efficiencies, share knowledge, and its ultimate benefits to patient care (<https://digitalpathologyassociation.org/about-the-dpa>). The Pathology Visions Conference is the annual conference for the DPA and is focused on providing opportunities to learn about cutting-edge,

real-world, practical applications in the ever-evolving field of digital pathology (<https://digitalpathologyassociation.org/pathology-visions-conference>). The ESDIP is the nonprofit, scientific association in Europe that brings together pathologists and computer scientists from industry and academia to foster digital and integrative pathology in

research and routine settings (<https://digitalpathologysociety.org/>). It was founded in 2016, having its roots in the fields of telepathology and virtual microscopy back to 1992. ESDIP's annual meeting, the European Congress on Digital Pathology (ECDP), hosts individual and joint meetings of IHE PaLM WG and DICOM WG-26 to support standardization of systems (<https://www.ecdp2021.org/>). The JSDP is a leading professional society of digital pathology in the Asia-Pacific region with almost 20 years of history of contribution to the field of telepathology, and more recently, AI (<https://www.jsdp.ai/index.php/jsdp2021/?lang=en>). JSDP organizes an annual meeting every summer, to which are added other educational and research events throughout the year. The number of active members of JSDP is approaching 200, including pathologists, computer scientists, medical technicians, students, health administrators, and industry representatives. JSDP serves as a key hub for disseminating knowledge about digital pathology in Asia.



Figure 1: DPA–ESDIP–JSDP task force for worldwide adoption of digital pathology

To address the need to support the entire pathology community with accelerating the digitization of Pathology laboratories, the ESDIP promoted a program of inter-institutional collaboration.^[18] This culminated in April 2021 with the constitution of a DPA–ESDIP–JSDP task force with the intent of promoting the worldwide adoption of digital pathology [Figure 1]. The DPA–ESDIP–JSDP task force established formal agreements and has already begun sharing speaking engagements and moving towards achieving their goal [Figure 2]. The plan of activities of the task force includes regular meetings as well as joint

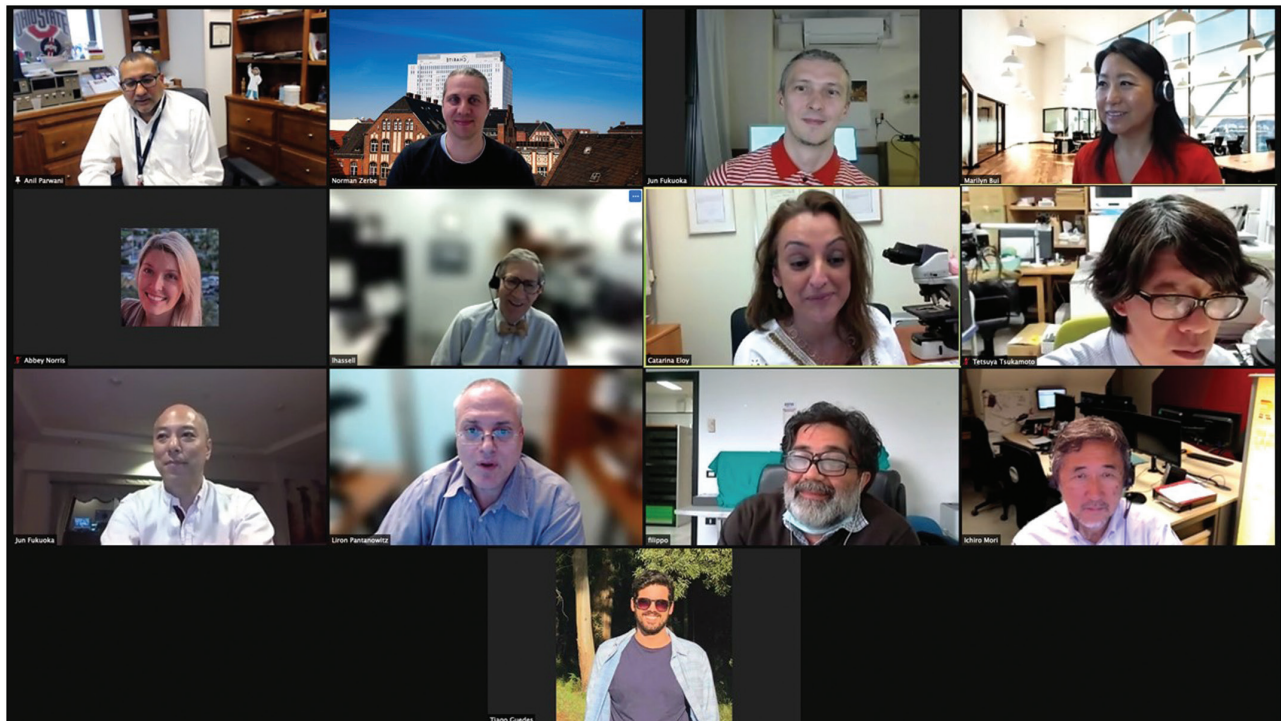


Figure 2: Online meeting of the DPA–ESDIP–JSDP task force, May 5, 2021 (from top to bottom and left to right: Anil Parwani, Norman Zerbe, Andrey Bychkov, Marilyn M. Bui, Abbey Norris, Lewis Hassell, Catarina Eloy, Tetsuya Tsukamoto, Junya Fukuoka, Liron Pantanowitz, Filippo Frassetto, Ichiro Mori, and Tiago Guedes)

educational initiatives. This alliance aims to boost the exchange of knowledge across borders, unify concepts and standardization, and help break down political, social, and economic barriers,^[19] including things as basic as mistrust in digital pathology.

The time to strike is now when the current technological and regulatory climate is favorable to support the digital transformation of pathology.

Financial support and sponsorship

Nil.

Conflicts of interest

The authors are active members of the societies herein presented as part of the task force (AP, LP, MMB, and LH from DPA; CE, NZ, and FF from ESDIP; and AB and JF from JSDP). Liron Pantanowitz consults for Hamamatsu and is on the medical advisory board for Ibex. Marilyn M. Bui is a scientific advisory board member of Aiforia, ContextVision, and Visiopharm.

REFERENCES

- Nitrosi A, Borasi G, Nicoli F, Modigliani G, Botti A, Bertolini M, *et al.* A filmless radiology department in a full digital regional hospital: Quantitative evaluation of the increased quality and efficiency. *J Digit Imaging* 2007;20:140-8.
- Griffin J, Treanor D. Digital pathology in clinical use: Where are we now and what is holding us back? *Histopathology* 2017;70:134-45.
- Jahn SW, Plass M, Moinfar F. Digital pathology: Advantages, limitations and emerging perspectives. *J Clin Med* 2020;9:3697.
- Hanna MG, Reuter VE, Hameed MR, Tan LK, Chiang S, Sigel C, *et al.* Whole slide imaging equivalency and efficiency study: Experience at a large academic center. *Mod Pathol* 2019;32:916-28.
- Araújo ALD, Arboleda LPA, Palmier NR, FONSECA JM, de Pauli Paglioni M, Gomes-Silva W, *et al.* The performance of digital microscopy for primary diagnosis in human pathology: A systematic review. *Virchows Arch* 2019;474:269-87.
- Girolami I, Pantanowitz L, Marletta S, Brunelli M, Mescoli C, Parisi A, *et al.* Diagnostic concordance between whole slide imaging and conventional light microscopy in cytopathology: A systematic review. *Cancer Cytopathol* 2020;128:17-28.
- Bongaerts O, Clevers C, Debets M, Paffen D, Senden L, Rijks K, *et al.* Conventional microscopical versus digital whole-slide imaging-based diagnosis of thin-layer cervical specimens: A validation study. *J Pathol Inform* 2018;9:29.
- Dietz RL, Hartman DJ, Pantanowitz L. Systematic review of the use of telepathology during intraoperative consultation. *Am J Clin Pathol* 2020;153:198-209.
- Cima L, Brunelli M, Parwani A, Girolami I, Ciangherotti A, Riva G, *et al.* Validation of remote digital frozen sections for cancer and transplant intraoperative services. *J Pathol Inform* 2018;9:34.
- Pallua JD, Brunner A, Zelger B, Schirmer M, Haybaeck J. The future of pathology is digital. *Pathol Res Pract* 2020;216:153040.
- Williams BJ, Frassetto F, Hanna MG, Huang R, Lennerz J, Salgado R, *et al.* The future of pathology: What can we learn from the COVID-19 pandemic? *J Pathol Inform* 2020;11:15.
- Harrison JH, Gilbertson JR, Hanna MG, Olson NH, Seheult JN, Sorace JM, *et al.* Introduction to artificial intelligence and machine learning for pathology. *Arch Pathol Lab Med* 2021;145:1228-54.
- Sakamoto T, Furukawa T, Lami K, Pham HHN, Uegami W, Kuroda K, *et al.* A narrative review of digital pathology and artificial intelligence: Focusing on lung cancer. *Transl Lung Cancer Res* 2020;9:2255-76.

- Salto-Tellez M, Maxwell P, Hamilton P. Artificial intelligence-the third revolution in pathology. *Histopathology* 2019;74:372-6.
- Polónia A, Campelos S, Ribeiro A, Aymore I, Pinto D, Biskup-Fruzynska M, *et al.* Artificial intelligence improves the accuracy in histologic classification of breast lesions. *Am J Clin Pathol* 2021;155:527-36.
- Humphries MP, McQuaid S, Craig SG, Bingham V, Maxwell P, Maurya M, *et al.* Critical appraisal of programmed death ligand 1 reflex diagnostic testing: Current standards and future opportunities. *J Thorac Oncol* 2019;14:45-53.
- Echle A, Rindtorff NT, Brinker TJ, Luedde T, Pearson AT, Kather JN. Deep learning in cancer pathology: A new generation of clinical biomarkers. *Br J Cancer* 2021;124:686-96.
- Eloy C, Zerbe N, Frassetto F. Europe unites for the digital transformation of pathology: The role of the new ESDIP. *J Pathol Inform* 2021;12:10.
- Lujan G, Quigley JC, Hartman D, Parwani A, Roehmholdt B, Meter BV, *et al.* Dissecting the business case for adoption and implementation of digital pathology: A white paper from the Digital Pathology Association. *J Pathol Inform* 2021;12:17.

Catarina Eloy^{1,2}, Andrey Bychkov³, Liron Pantanowitz⁴, Filippo Frassetto⁵, Marilyn M. Bui⁶, Junya Fukuoka⁷, Norman Zerbe⁸, Lewis Hassell⁹, Anil Parwani¹⁰

¹Department of Pathology, Institute of Molecular Pathology and Immunology of University of Porto (IPATIMUP), Porto, Portugal, ²Department of Pathology, Medical Faculty of Porto University, Porto, Portugal, ³Department of Pathology, Kameda Medical Center, Kamogawa, Japan, ⁴Department of Pathology, University of Michigan, Ann Arbor, Michigan, USA, ⁵Pathology Unit, ASP Catania, "Gravina" Hospital, Caltagirone, Italy, ⁶Department of Pathology, Moffitt Cancer Center & Research Institute, Tampa, Florida, USA, ⁷Department of Pathology, Nagasaki University Graduate School of Biomedical Sciences, Nagasaki, Japan, ⁸Charité – University Medicine Berlin & Research IT Services, Berlin Institute of Health & Institute of Pathology, Berlin, Germany, ⁹Department of Pathology, University of Oklahoma Health Sciences Center, Oklahoma City, Oklahoma, USA, ¹⁰Department of Pathology, The Ohio State University Wexner Medical Center, Columbus, Ohio, USA

Address for correspondence: Prof. Catarina Eloy, IPATIMUP, Rua Júlio Amaral de Carvalho n45, 4200-135 Porto, Portugal. E-mail: celoy@ipatimup.pt

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

Submitted: 19-09-2021

Accepted: 15-11-2021

Published: 16-12-2021

Access this article online	
Quick Response Code: 	Website: www.jpathinformatics.org
	DOI: 10.4103/jpi.jpi_65_21

How to cite this article: Eloy C, Bychkov A, Pantanowitz L, Frassetto F, Bui MM, Fukuoka J, *et al.* DPA-ESDIP-JSDP task force for worldwide adoption of digital pathology. *J Pathol Inform* 2021;12:51. Available FREE in open access from: <http://www.jpathinformatics.org/text.asp?2021/12/1/51/332680>