Digital pathology now, and where to from here

December 2022—*Nearly 800 registrants were at the Digital Pathology Association's Pathology Visions meeting this fall, and 54 companies exhibited. "There was a great vibe at the meeting. People were mingling, collaborative. Digital pathology is picking up," says DPA president Esther Abels. Her term as president will end this month and Liron Pantanowitz, MD, PhD, MHA, of the University of Michigan, will step in as president on Jan. 1.*

Both spoke with CAP TODAY *publisher Bob McGonnagle in October after the meeting (in separate conversations) about digital pathology and artificial intelligence, and Dr. Pantanowitz shared what is at the top of his agenda for the DPA that is now more than 3,000 members strong.*

Next year's Pathology Visions meeting will take place Oct. 29–31 in Orlando.

The Pathology Visions meeting was said to be the most successful thus far, with a large uptake of exhibits and people in attendance. What is your characterization of the meeting?

Dr. Pantanowitz

Liron Pantanowitz, MD, PhD, MHA, professor of pathology and director of the Division of Anatomic Pathology, University of Michigan: It was enormously successful and had the largest attendance in number of participants, including exhibitors, which reflects the emphasis being given to digital pathology. A large component was artificial intelligence, which reflects the hype around it and the many AI startup companies and the interest labs have in artificial intelligence, which serves as a catalyst.

Several factors contributed to its success. One, it was one of the first in-person and not hybrid meetings post-COVID, and people wanted to connect. Two, there was a larger-than-usual number of pathology trainees at the meeting. For the first time I saw a large number of posters and many people applying for travel awards. It's good that we're reaching not just the pathology community but also trainees; it helps push the science.

I also saw a lot of business meetings. Some partnerships caught my eye that I hadn't thought about coming together. The venue not only promoted the field but also brought people in, so the networking and business opportunities were good.

The scientific content is also good, as usual. The show has moved from a show-and-tell vendor meeting to a full-on scientific meeting.

I was surprised that pathologists were only about 19 to 20 percent of all attending. It means a lot of other people are interested in digital pathology besides pathologists—certainly vendors, exhibitors, and industry but also veterinary people, scientists, computer scientists, and others.

Quite a few laboratory executives attended, which shows that digital pathology is becoming more mainstream in the thinking of health systems and departments. In the early days and for a number of years, it seemed like digital pathology interests were talking to one another and not to too many others. But we're well along the adoption curve now. Can you comment on that?

Dr. Pantanowitz: If one thinks of the Gartner hype cycle, where new technology is introduced, then you move to the top, where everyone's excited, and then you hit the trough of disillusionment—I think we're back to a plateau phase and it's mainstream. The people who attend now no longer see digital pathology as a niche. They see it as a

technology with tools that support the practice of pathology itself. It's not special; you just can't do what you want to do—strategize, plan for the future, and address some of the needs in medicine today—without using these tools. There are people who are less interested in the tools and more interested in the application to the practice of pathology, whether it's on the research or clinical side.

I saw an announcement that Tribun Health and GE Healthcare are going to collaborate, with GE Healthcare excited about digitizing pathology images and having pathology in its oncology offering. That is another milestone in digital pathology. There is an increasing interest, based on press releases and what I'm hearing from people, in companies coming together to offer what I might call a critical mass of solutions and one-stop shopping, not only for digital pathology and its many components but also in combination with AI. Can you speak about that and where we are today?
Dr. Pantanowitz: There are good and bad aspects to the vendors coming together to offer an interoperable solution. One of the main barriers in this field up front was, number one, these systems are not interoperable. They do not interface or interact with each other well. The burden was often left on the client to get systems to fit together and plug and play.

Second is we didn't push standards—for their own with proprietary software, such as viewers, file formats, et cetera. It's nice to see the industry players coming together to provide an end-to-end solution. However, it speaks to the fact that there are few vendors that provide an end-to-end solution. And the criticism of those that do is they have locked-down systems. They don't want anyone else to plug into their systems, which is not a great environment in which to practice. It's still a patchwork. Although they may shake hands on the exhibit floor to work together, when you try to deploy it, it's still not easy and doesn't work well. A lot of burden falls to the lab itself. I'm not complaining—we're moving in the right direction, but maybe not enough.

In terms of more industry discussion, collaboration, and agreement, we still have well-known financial challenges in digital pathology. And part of that is, will there be room for huge success for multiple vendors or will we need to have alliances, even consolidation, of vendors and offerings, just to have the financial throwaway to survive? Do you think that's a plausible theory?
Dr. Pantanowitz: I'm never in favor of monopolies because not everyone can use them, prices are higher, and they're often less flexible in customizing to clients' needs. I am in favor of a much broader offering of hardware and software solutions, which is where we are now, even though we need to get them connected. It's interesting we have both in the field of digital pathology—some monopolies that have been around for a while and many smaller vendors that are coming up with alternative, novel solutions.

What amazed me at the meeting was there were vendors whose names or products I'd never seen, and the products were quite mature. And yet I'm involved in the field, connected, on several subcommittees, and vendors talk to me about their products. It's good to see innovation still happening and that the field's not stagnant.

Digital pathology took off in Europe in particular when there was a serious shortage of surgical pathologists, and digital pathology, whatever its expense or technical challenges, was proving to be a solution to the shortage. Do you think some of the current excitement around digital pathology in the United States is owing to what is now a severe shortage of surgical pathologists in the U.S.?
Dr. Pantanowitz: Some of it is. But COVID has also been a catalyst in that pathologists can now work from home. And some of the folks in leadership roles see the business-use case in using telepathology to support their businesses—regional centers of excellence, peripheral networks of pathologists to get cases read out. It doesn't make sense for large reference labs and large, interconnected health care systems to ship slides around.

The narrow margin in health care is also forcing this. Why have redundant labs? Let's use technology. You need just one central histology lab and several pathologists working remotely as opposed to giving every pathologist their own histology lab with their own slides in the room next door. That doesn't make sense anymore. People have been looking to find their return on investment, and now they have found a business opportunity. It's hard to get pathologists, especially senior pathologists, to come into labs every day. So why not let them sign out remotely?

It makes sense even for academic medical centers to go digital, because who wants to train at a center that has instruments they were using a century ago? Medical students don't want to go into something that's archaic; they want something sexy, modern, attractive. Trainees are looking for programs that are digital. They make sure they have looked at their program and checked off "Do they have digital capability? Will I be trained for the future?"

Do you have a fair number of senior or associate professors in pathology at Michigan who are doing remote sign-out?
Dr. Pantanowitz: We have a minority—about three people have signed out from home.

Your department at the University of Michigan has a huge business in consultations and second opinions. How has digital pathology been influencing the way that's worked in the past year or so?
Dr. Pantanowitz: Unfortunately we haven't capitalized on that. Digitizing our consultation business is one of the things I'll be doing. We have close to 900 labs sending us their consult cases, and they're still doing so by mail. We have had one or two clients who have purchased a scanner and asked if we'd be willing to accept their whole slide images instead of glass slides. So I'm in the process of converting this department to fully digital, hopefully by next year. Part of that plan will be not just to address our in-house primary diagnosis needs but also to receive digital consult slides.

For the reference lab business it works both ways. A client sends you a case digitally, because they have a scanner, and it expedites the process for them, saves on mailing costs, and they don't worry about the slide getting lost or broken in the mail. From a reference lab point of view, MLabs has clients who send us their tissue blocks to be stained. They want us to do the technical component and then they want the slide back so they can interpret it themselves and bill for the professional component. Once the slide gets stained, we'd like to offer to scan the slide and make it immediately available digitally so they can sign it out right away and bill for their professional component, rather than have to wait for the slides to be mailed back.

What few things will be at the top of your agenda once your term as DPA president starts?
Dr. Pantanowitz: Number one, it's time for the DPA to extend its global reach, membership, activities, and so forth. We've done an excellent job within the United States, but I don't want people to view the DPA as an American or U.S.-centric organization because it's not. Under my presidency we'll assemble a global task group to do that, perform a gap analysis, partner with other organizations—Japanese and European societies, et cetera—and then collaboratively promote digital pathology that way.

Number two, the digital pathology community has always been about education, and I'd like to extend the education about pathology itself using digital pathology. Coming out of COVID we realized that virtual education is feasible, and that's exactly how it's being used in the U.S. and abroad. But there are countries with major shortages of pathologists, like Vietnam and elsewhere, that are in dire need of being educated about pathology, not just digital pathology. One way to teach them is with digital pathology tools. People have been creating nonprofit organizations—there's one called OPEN [Open Pathology Education Network] that is assembling training courses and modules and using digital pathology to train people in Vietnam and elsewhere. And the DPA has DAPA, the Digital Anatomic Pathology Academy, which has a large repository of educational slides in partnership with PathPresenter. We've been building and creating content. It's now time to deliver it broadly.

Number three, I'd like to see artificial intelligence become more mainstream and have pathologists adjust their mindsets and not feel threatened by AI—help the industry and pathology community better understand AI because we need to get to the point where people have trust in it. Yes, there's a lot of hype around it, but at the end of the day, will a pathologist accept a diagnosis from a computer algorithm? I think we have a way to go around that. All of that requires the might of the DPA, with the regulatory groups and so forth, to push the agenda of AI.

Esther Abels, are we coming to a greater maturity and adoption cycle for digital pathology in your estimation?

Abels

Esther Abels, MSc, precision medicine and biomedical regulatory health science expert: Yes. Not only was the number of meeting registrants high but the distribution is picking up from different areas—AI companies, pathologists, histotechnologists, students, biotech companies, and pharma.

Leica started Pathology Visions and had a lot of pharma attendees. Then pathologists and different industry took it over and it became the Digital Pathology Association, and the number of pharma registrants dropped. Now we're seeing pharma pick up again. They still use it in research, but now they're seeing the potential of bringing it into their product development pipeline. Digital pathology can be used for, among others, quality purposes and objective quantification to enrich a clinical trial population, which could result in a reduction of number needed to treat in those trials. If you use quantitative algorithms in digital pathology, you can become more accurate—that's the hypothesis. You can better predict who responds and who doesn't, and with that you can have a higher success rate in your trials and accelerate your trials, for example. That is what they envision now. They also envision multiplexing more easily with digital pathology, something that pathologists cannot do, or spatial biology, looking more into the tumor microenvironment.

It's also picking up within health care providers and pathologists. Look at what Mayo Clinic is doing with regard to its Mayo Clinic Platform. They're seeing the added value as well.

I asked Liron if he thought the shortage of pathologists in the U.S. was increasing interest in digital pathology. What is your view? Do you think it's fueling the uptake of digital pathology in the U.S.?
Esther Abels: It's difficult to say yes or no. We hear there might be a shortage of pathologists, but do we really use digital pathology to the extent it can be used and with the support of pathologists? David Rimm [MD, PhD, Department of Pathology, Yale University School of Medicine] said something interesting: If we're not going to use it as pathologists, then someone else will, so let's start using it. If there is a shortage, we need to make sure we embrace digital pathology and use it to support us—for example, to measure—and then pathologists can take care of the other complex things, such as reading, which the machine cannot do, and focus on being the medical expert.

A prominent theme at the American Society of Clinical Oncology annual meeting and many other cancer and pathology meetings was the disparity in cancer care between what's provided to patients in academic and tertiary care centers versus in community practice. In particular, there's a smaller percentage of patients getting adequate biomarker testing for their initial cancer diagnosis. Might digital pathology be seen as a way to help bridge the gap between the academic medical centers and community centers? Do you see a value in that idea?
Esther Abels: Absolutely. It's also an ethical obligation of medical practitioners and of all mankind. It will contribute to adoption and help underserved and rural areas, but also level the difference between academic centers and reference labs and community centers. It might be possible now for a patient in an underserved area or a community center to get access to reference labs. Their slides or images could easily be reviewed by someone else.

I would like to refer again to what we see at Mayo Clinic. They have included products in their platform for this type of diversity [https://bit.ly/MayoPlatform]. For example, their partnership with Mercy will ensure that the data set for algorithms being developed and validated represents the targeted population. In other words, when AI is used to develop algorithms, you also need to ensure that when you have applications run they fit the intended purpose.

You saw that at the beginning of digital pathology. We knew in certain geographic areas, not only between

academic and community centers, that they were having difficulty seeing all the patients. That's how teleconsulting started. And with the pandemic we have seen this become more efficient and effective.

We know this can be done, so it's up to us to ensure that patients are informed, know it's an option, and request it. And then it will level out the differences.

Would you say the understanding and application of artificial intelligence is increasing? And is its definition becoming clearer in the minds of people who observe the field?
Esther Abels: People are accepting it more and seeing its benefits and what it can do. I don't know if they understand it more. I'm still learning a lot about artificial intelligence, how it can and will be used and what you should consider. There are pitfalls in using it but also a lot of opportunities. I don't think we have discovered even half of it.

You can use artificial intelligence for more than digital pathology. You can use it in pathology, to link it to other data, patient reports, outcome data, which I'm a strong believer in because then you can serve patients by getting more effective treatments because you have better diagnoses and you can monitor treatments. The hope is to eventually use it to predict who will respond and what their prognosis is, and even more to identify who might be at risk and how you then can prevent disease or manage the patient.

I believe in AI. It will be beneficial to people, to patients, and that's why we're doing it.