

INTERVIEW #2

Precision Histology

The interview with the team leader
Dr. Johannes Schmid and **PhD Bernhard Hochreiter**
of the Center for Physiology and Pharmacology,
the Institute of Vascular Biology and Thrombosis Research
in Vienna, Austria.



PRECISION HISTOLOGY

1

Precision medicine necessitates precision diagnostics, which is still underdeveloped in many medical fields. Routine histology for example, the microscopic evaluation of tissue samples, usually involves the staining of a single molecular target, followed by manual examination and assessment by a pathologist.

We are proud to collaborate in [FEG-BRIDGE Precision Histology Project](#) with the team leader [Ao.Univ.Prof. DI Dr. Johannes Schmid](#) and [PhD Bernhard Hochreiter](#) of the [Center for Physiology and Pharmacology, the Institute of Vascular Biology and Thrombosis Research in Vienna, Austria](#).

This project focuses on prostate cancer research, the most common cancer type, and the second leading cause for cancer-related death of men. Investigations are combined with an automated identification of distinct tissue areas based on artificial intelligence and deep learning on the IKOSA Platform.

Find out more about this field, its challenges and how our interviewees approach them.

The interview was conducted by [Polina Vinogradova](#).



Polina: Dear Johannes and Bernhard, as you know, our cooperation with the Center for Physiology and Pharmacology, namely with the Institute of Vascular Biology and Thrombosis Research in Vienna, began at the end of 2018. We were not the only ones in the life sciences [artificial intelligence](#) market, however, we had our innovative IKOSA platform for image data management and automated image analysis.

Johannes, on the part of the institute, you made a decision in this cooperation. *Why did you choose us? What were the reasons for your part?*

Johannes: The first time I met Michael and Philipp was at some conference in Vienna. They had posters about artificial intelligence in image analysis. I have always been interested in this area because we work a lot with microscopic images. And pretty soon I got the feeling that it would be interesting to know more about their service since this is not just an unknown company somewhere in Boston.

I like the concept of “**think globally, act locally**” because, in my opinion, it is much more efficient to build cooperations with companies in your own country. Remote work can be very convenient but, for example, if there is a big-time difference, then you need to constantly shift your schedule, especially, if some obstacles arise.

For me personally, face-to-face meetings are very important, even if they are not so relevant at the moment due to COVID-19 reasons. Seeing people live makes it easier to understand how serious cooperation can be, who is behind the

organization and so on. Mainly, it builds trust.

Of course, for a company with online services, it doesn't really matter where the customer is located, in California or Austria. And therefore, we wish KML Vision many clients all over the world.

However, in our case, it was much easier to get funding with a local company. If I would propose a project, for example, with an American company, then [FFG](#) probably would not be so glad about this decision, because obviously, they want to support the local market.

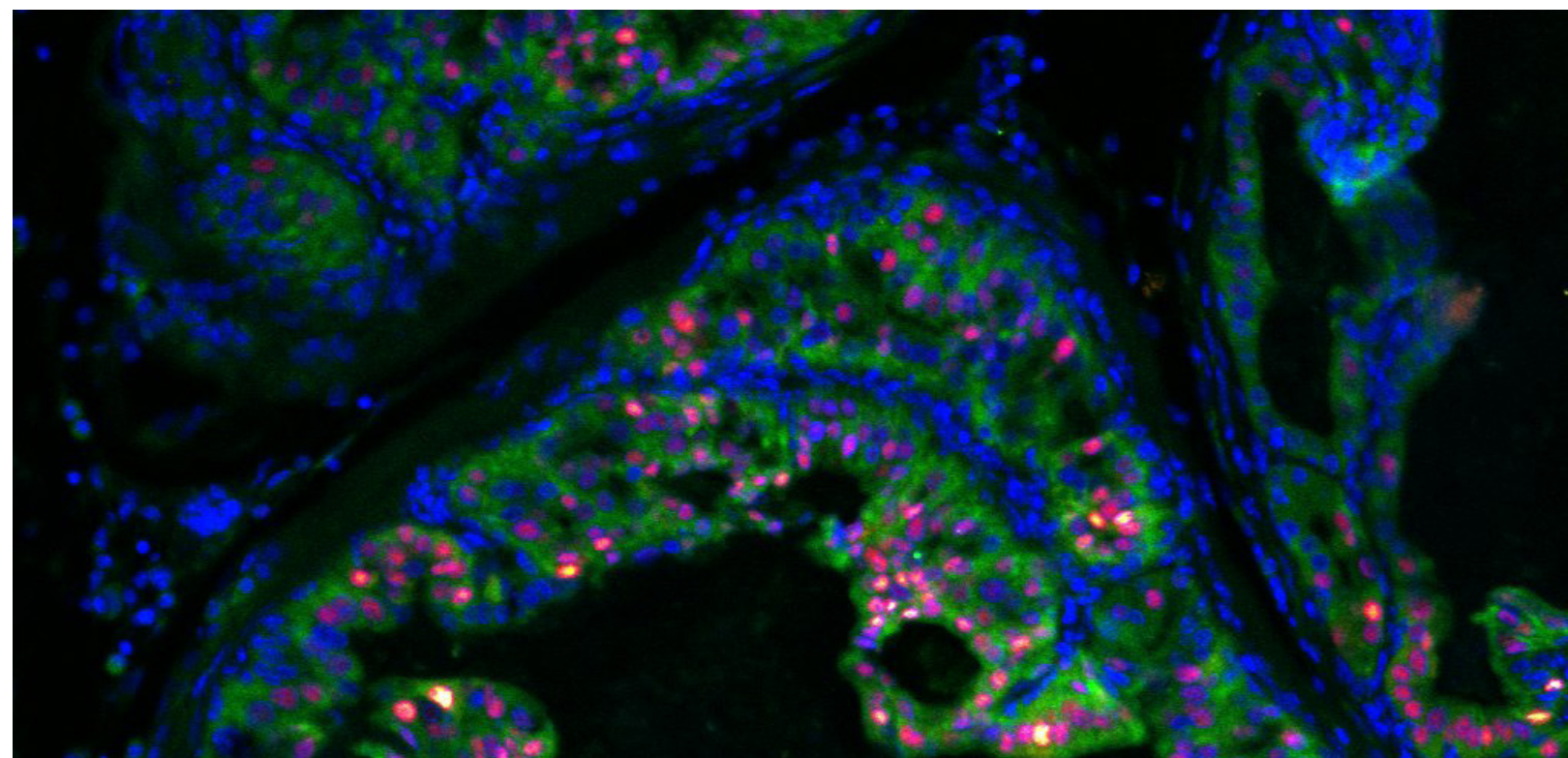
Also, my students, and Bernhard in particular, are

“It was much easier to get funding with a local company.”

Dr. Johannes Schmid

very much into microscopy, image analysis and so on. And I thought that such a product would be perfect for their professional growth. They can establish new connections, find out common interests and work more effectively on the project. Therefore, that conference back in 2018 played a significant role in our cooperation.

Fluorescence Antibody staining of murine prostate tissue. Nuclei(blue), IKK1 (green) and c-Myc(red). See: Moser, B., Hochreiter, B., Basílio, J. et al. The inflammatory kinase IKK α phosphorylates and stabilizes c-Myc and enhances its activity. Mol Cancer 20, 16 (2021). <https://doi.org/10.1186/s12943-021-01308-8>





Polina: Bernhard, and *how did it feel to start working with the new software?*

Bernhard: The point is that we are constantly working with large-scale datasets. And it is always difficult to manage such large files, especially when you have to collaborate with people on distance.

Of course, at first, we had to get used to the new tool. There were difficulties with transforming the images into the desired format since we work with various microscopes that produce different types of files. With the latest IKOSA upgrades and your great support, we developed a workflow

that enabled us to progress easier and faster. We have everything online, which is obviously a great advantage nowadays.

So, yes, we had to get used to the new software,

“I was pleasantly surprised that images of various sizes can be easily managed on the web platform.”

Dr. Johannes Schmid

just like in any other situation when something new appears in life. But I would say it happened without any major obstacles.

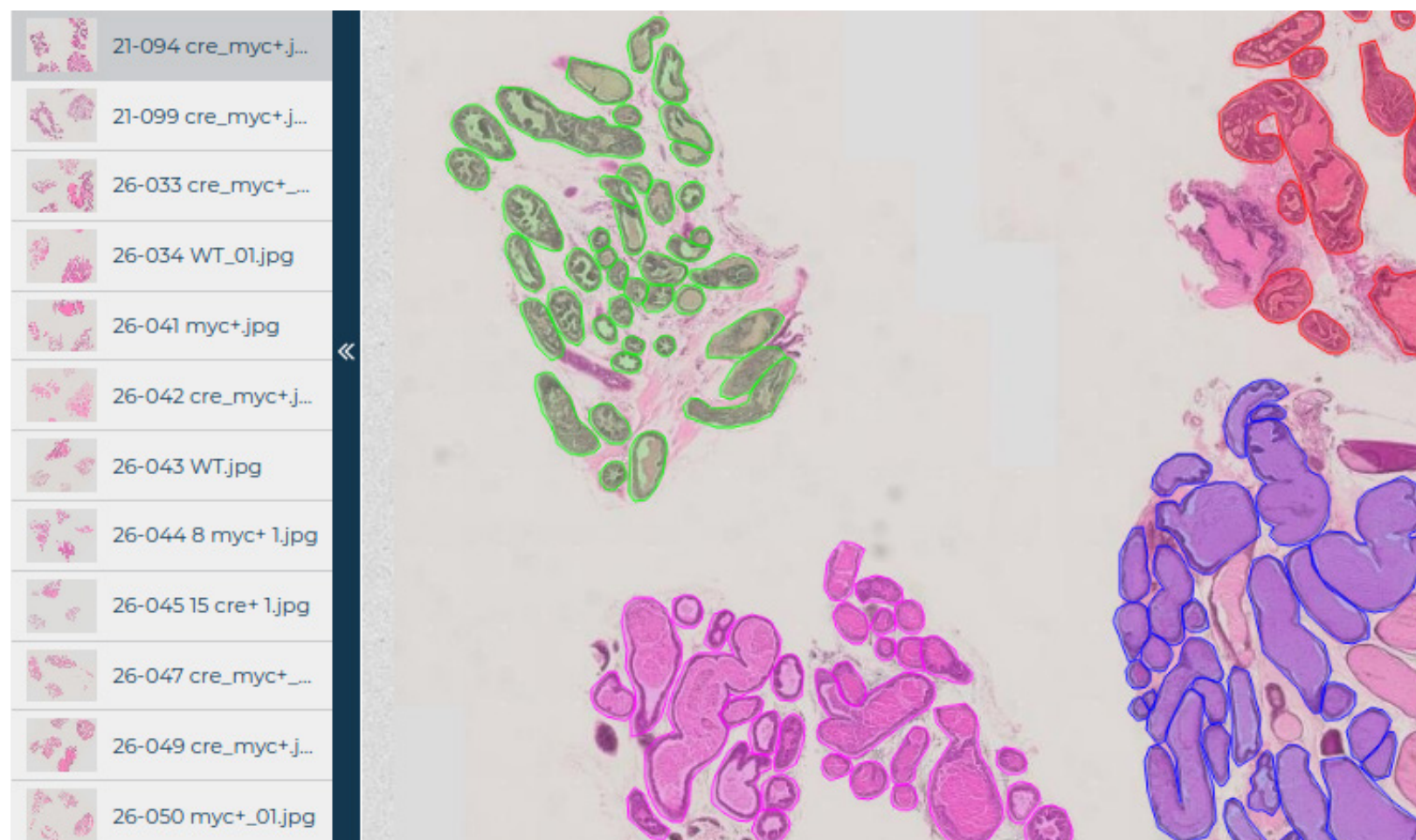
Polina: Due to the COVID-19, most companies and, of course, universities had to send their employees to the home offices. As we know, some of your research group members also worked remotely. *Johannes, how has the IKOSA platform supported your team during this challenging time?*

Johannes: I believe that the online platform in our case is a great advantage because we have access to it from anywhere. Also, if suddenly we all have to start working remotely again due to the closure of the institute because of COVID-19, we will be able to proceed without any interruption.

In fact, at the very beginning, when we first started the discussion with your company, I couldn't believe that large image data could be easily processed and analyzed over the web. Because from my previous experience, we always had to have it locally on the computer. The transfer of the files also was possible only with the external hard disk.

So I was pleasantly surprised that images of various sizes can be easily managed on the web platform. It was unexpectedly nice indeed. But I myself have not done image analysis during COVID, so perhaps Bernhard can add something else.

Whole slide scan of H&E staining of murine prostate tissue. Including manual annotation of distinct prostate ducts.



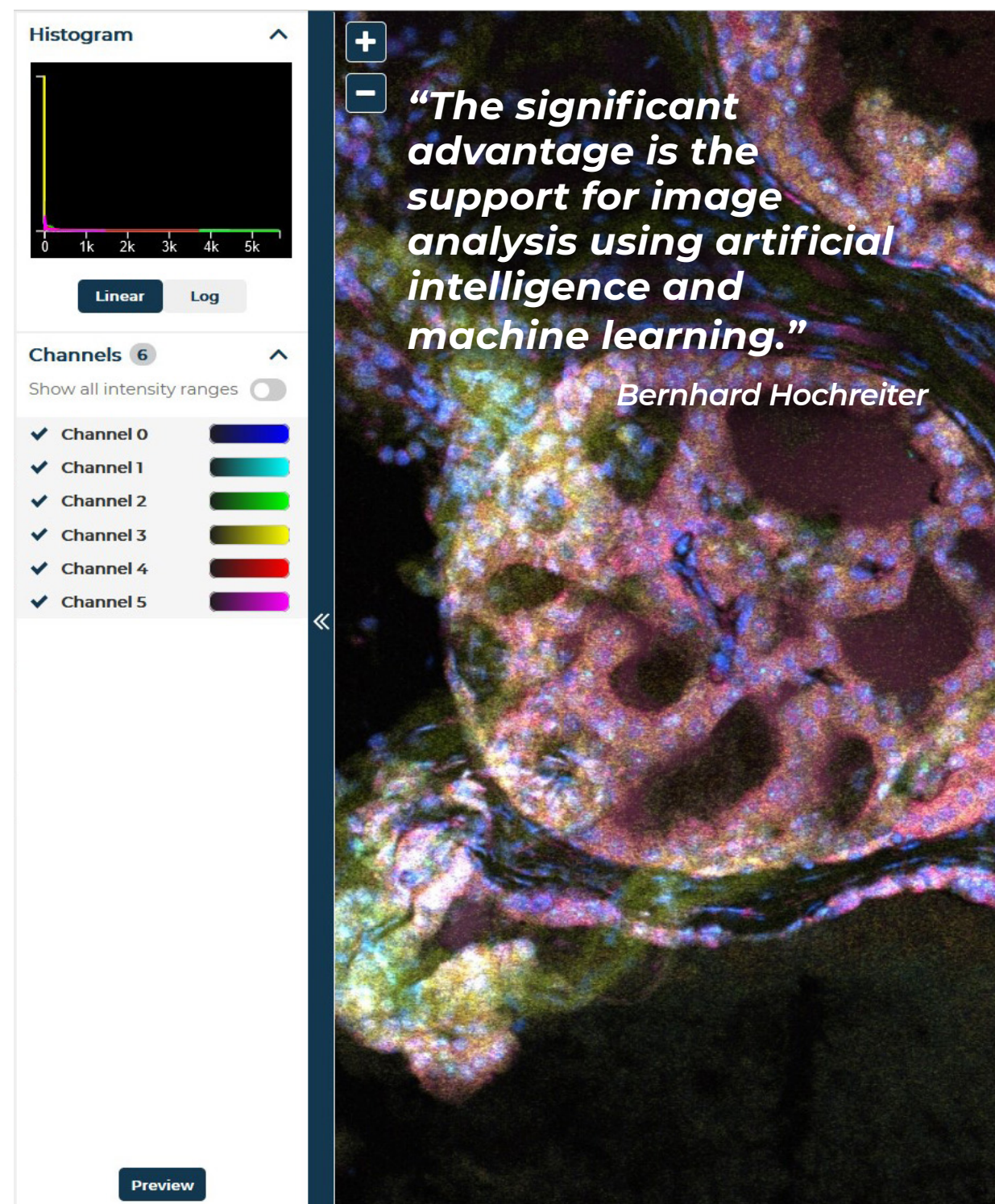


PRECISION HISTOLOGY

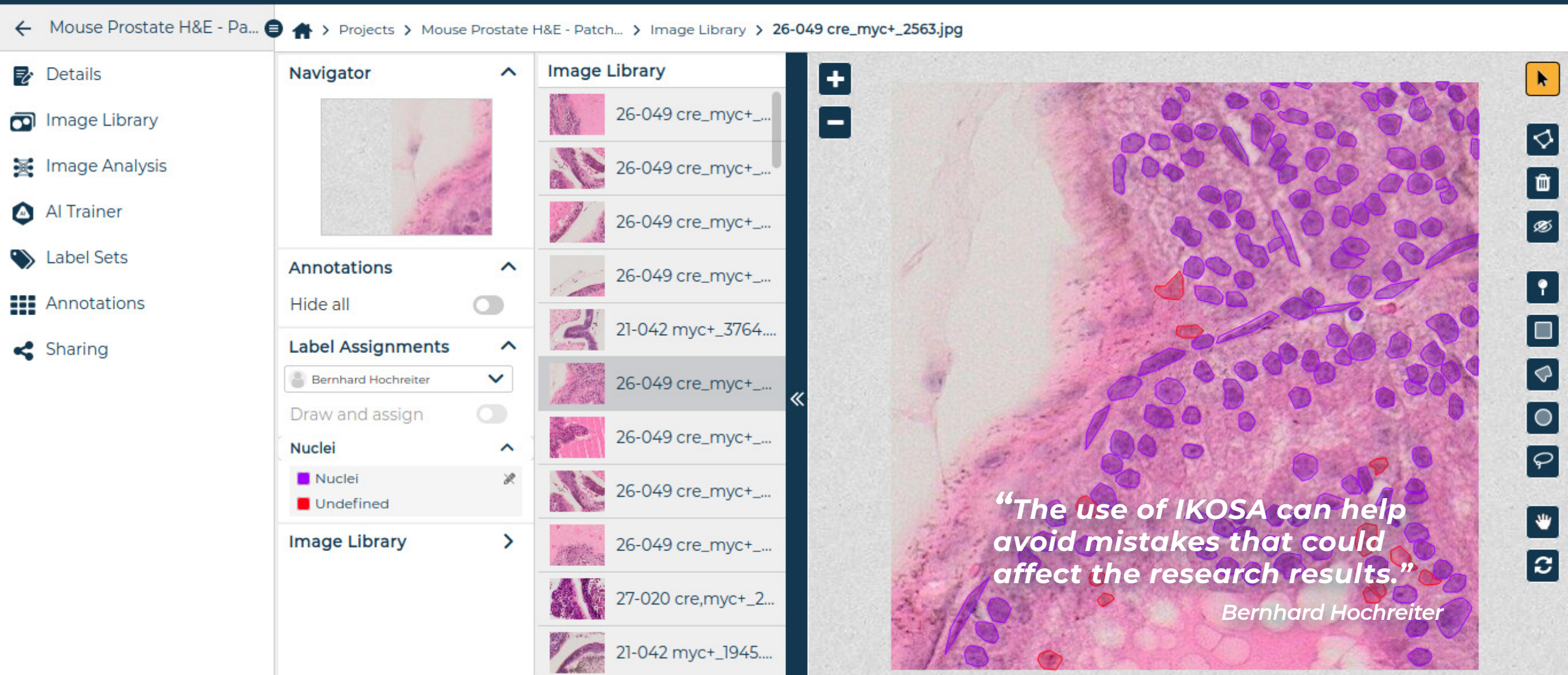
Bernhard: Yes, in general, we had a big advantage, since we do not work in a clinic. Also, we did not have long-term isolation and could return to work earlier. But still, the cooperation via [the IKOSA platform](#) made this process less stressful. When the lockdown began, and this happened literally in one day, I did not need to check any data, because it was all available online. And I've been doing all the image annotations from home from day one. So our team handled this situation with least amount of effort.

Polina: That is great to hear! Now I wanted to ask you about the [FFG-BRIDGE Precision Histology Project](#), where we are working together. You are investigating whole slide scans of brightfield microscopy as well as multichannel images from fluorescence microscopy. In short, you are working with a lot of complex, large-scale image data from different imaging modalities. Bernhard, *what features of our platform help you to work with these different types of images and requirements?*

Bernhard: I think the most important reason for using IKOSA is the convenience of having everything in one place. Obviously, it's helpful. But the significant advantage is the support for image analysis using artificial intelligence and machine learning. Because it's hard to do it centralized when you don't have people who actually understand it. So this, I would say, is the most essential quality for us. We are already working with this feature on brightfield images and hope to do the same with fluorescence images this year.



Channel and LUT adjustment within the IKOSA interface.
Image shows 6-Target multistaining of murine prostate tissue.



Polina: In such a project, team members working remotely have to review images and give feedback to specific regions or objects within the images, so these regions and objects have to be highlighted. *How does IKOSA help you in this case?*

Bernhard: There is one particular story, which explains that well. One of my master degree students annotated some of the nuclei for the segmentation, and then [Thomas Ebner](#) ([KML Vision's computer vision and machine](#)

[learning engineer](#)) checked them while he was in Salzburg. He contacted me and asked to examine some of the regions he marked, as they seemed strange. I reviewed them directly from home and gave the appropriate comments. With this example, it becomes clear that the use of IKOSA can help avoid mistakes that could affect the research results.

Annotations of nuclei within scans of mouse prostates with H&E staining. Annotations which are labeled as nuclei are shown in purple, while annotations labeled as undefined are shown in red.



PRECISION HISTOLOGY

Polina: And the last two questions: *What makes us different from other companies and why would you recommend working with us?*

Johannes: I would like to share one story from the past.

I was in contact with one company that does image analysis, and also provides equipment for the microscopy system with an object stage, where you can take images on a microscope with a colour or monochrome camera and so on. And I know they've been working on image segmentation and cell recognition for years. But I had a feeling that they were not particularly involved in artificial intelligence, but rather focused on conventional cell segmentation combined with analysis of many cells.

At the institute where I worked before, the [Ludwig Boltzmann Institute for Cancer Research](#), we had some equipment from this company. I think their concept of providing both hardware and image analysis software was probably vulnerable, because they had to optimize two completely different fields at the same time.

Most likely, it was not easy to maintain both options at a decent level. And at that time, it was from 2005 to 2008, their product was rather in a development phase than being routinely used.

A critical point, in my opinion, was the quite high price of their software, which was not easy to justify given that scientific freeware such as ImageJ could do almost the same.

Therefore, in my opinion, it's probably best to focus on just one thing. In a way, when I compare their case, I think it is a wise decision of KML Vision to specialize only on image data management and analysis. Because no matter what microscope and what images the researchers use, you help generate quality results faster and easier. And this is your strength.

Bernhard: I would also like to add that when we met before at congresses and exhibitions, communication has always been very professional. It was clear from the outset that the entire KML Vision team is interested in advancing science, not just getting the most out of customers. Your strength is definitely in research progress and productive collaboration.

Polina: Thank you for this interview, we really appreciate your time and support! It's a pleasure to work with your research group.

“Because no matter what microscope and what images the researchers use, you help generate quality results faster and easier.”

Dr. Johannes Schmid

Annotations of ducts from different lobes of murine prostates: Anterior Prostate (AP) and Dorsal Prostate (DP) lobes.





KMLVISION

GENERAL INFORMATION

KML Vision GmbH

Nikolaipplatz 4/II

8020 Graz, Austria

Visit us online: www.kmlvision.com

Call us: +43 680 156 7596

Schedule a meeting with us: <https://calendly.com/kmlvision/free-consultation>

© 2021 KML Vision GmbH

Image Rights

We would like to thank the research group of Johannes A. Schmid <http://www.meduniwien.ac.at/user/johannes.schmid/> for the opportunity to use images in this interview.

References

Special research area SFB-54: "InThro" <https://inthro.meduniwien.ac.at/>