

Your Ticket to making a difference in the world of Digital Pathology **PATHOLOGY 101** FOR TISSUE IMAGE ANALYSIS

Aleksandra Żuraw DVM, PhD, DACVP



DIGITAL PATHOLOGY PLACE

Master Pathology Principles & Tissue Image Analysis, Unlock Computational Pathology Expertise! Become a Leader, Make a Global Impact, Analyze Slides, Develop Algorithms, and Communicate Effectively.

Master the Principles of Pathology and Tissue Architecture –Make It Easier Than Ever to Unlock Your Computational Pathology Expertise! Let me take you by the hand and make it easy for you to:

1	Become a Computational Pathology Leader.
2	Make a Difference in Patient Care Worldwide.
3	Know What is Relevant on the Slide and What Is Not.
4	Develop Tissue Image Analysis Algorithms Faster.
5	Confidently Communicate with Pathologists and Other Computational Pathology Team Members.
6	Understand Tissue and Develop Better Algorithms Without The Necessity to Deeply Understand Medicine.
7	Confidently Approach Any Pathology Image Analysis Problem.
8	Do It All Without Paying for College Courses or Burying Yourself in Pathology Books for Months and Much, MUCH More!



Duration: 5 hrs. 24 mins



Method: eLearning



Certificate of Completion







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This course for computer scientists and professionals starting their journey in image analysis algorithm development for digital pathology will help you understand tissue and develop better algorithms faster, accelerate your research, and ultimately benefit the patients without the necessity to deeply understand medicine.

TOPICS

01	How to Lose Fear and Have Fun in Pathology	02	Journey of a Tissue Sample
	Digital Pathology Workflow	04	Hematoxylin & Eosin
05	Special Stains 101	06	Immunohistochemistry
07	Computer Vision to Pathology Translation	80	Pathology Glossary
09	How to Distinguish Tumor from Normal Tissue		Epithelial vs Mesenchymal - How to Distinguish Different Types of Tissue within a Tumor
11	Epithelial Tumors	12	Tumor Epithelium and Tumor Stroma. Understanding the Tumor Microenvironment
13	What is Necrosis & how does it look? (H&E & IHC)	14	Ten Best Pathology Resources for Designing Tissue Image Analysis Algorithms



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Pathology can be intimidating, especially when you think how many years pathologists study to get specialized. Is it even possible to extract the knowledge necessary for digital pathology and tissue image analysis projects in a short time? Yes, it is, and it starts with the mindset. This module is about the right mindset that will help you assimilate the knowledge provided in this course and have fun with it!

02. Journey of a Tissue Sample

This module covers what happens with the tissue sample from the moment when it is excised from the body to the moment of being ready to be evaluated by a pathologist under the microscope. You will also learn about the variables that might affect the future tissue image quality.

03.Digital Pathology Workflow

In order to use image analysis, digital tissue images need to be acquired. In this module, you will learn the workflow leading to digitization of glass slides and creation of whole slide images.

04.Hematoxylin & Eosin

In this module, you will learn about the most popular pathology stain used for initial evaluation of every pathology sample - the hematoxylin and eosin (H&E) stain. You will learn what chemical properties of the stain as well as what properties of the tissue contribute to the various shades of pink and blue visible in the H&E slide.

05.Special Stains 101

Sometimes H&E is not enough, and to highlight specific elements in tissue, different stains need to be used. In this module, you will learn about the chemical special stains that mark specific tissue elements with different colors. You will also learn how this can be very useful in tissue image analysis models.



06.Immunohistochemistry

A molecular technique designed to mark specific tissue proteings with contrasting colors based on the antibody and antigen interactions is called immunohistochemistry (IHC). In this module, you will learn about the principles of IHC and what factors influence the appearance of the final IHC stained slide.



07.Computer Vision to Pathology Translation

Tissue image analysis applies the principles of computer vision to solving (mostly quantitative) pathology problems. In this module, you will learn which computer vision tasks are most appropriate for which pathology problems. After this module, you will know when it makes sense to use object detection and semantic segmentation and when instance segmentation is the best choice.



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NORMAL TISSUES

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08.Pathology Glossary

Pathology, like any medical specialty, uses specific terminology. If you are working closely with a pathologist, the key to good communication is being familiar with this technology. And this is exactly what you will learn in this module. Not only will you be more confident describing your struggles to the pathologist, but you will also gain instant trust by using "insider language."

09.How to Distinguish Tumor from Normal Tissue

Tissue image analysis has become an integral part of cancer research. In order to design quality tissue image analysis algorithms and models, the first necessary skill is to distinguish the relevant region where the analysis should take place - the tumor mass. In this module, you will learn how to distinguish tumor from non-neoplastic tissue.

10.Epithelial vs mesenchymal - How to Distinguish Different Type of Tissue within a Tumor

When looking at a tissue section of a tumor mass, you will see different types of cells that will need to be addressed with tissue image analysis. In this module, you will learn what those different types of tissue are and how to distinguish them.

11.Epithelial Tumors

Most of the diagnosed cancers are of epithelial origin. In this module, you will learn which entities fall into this category and how epithelial tumors look.

12.Tumor Epithelium and Tumor Stroma. Understanding the tumor Microenvironment.

Immune-oncology is a subdiscipline of oncology that investigates the behavior of our immune system in cancer. The power of immune system can be harnessed to fight cancer, and the immune-oncology research relies heavily on immune cell quantification and tumor microenvironment characterization. In this module, you will learn about the different immune cell players as well as other components of the tumor microenvironment, and how to visually recognize them.

13.What is Necrosis & how does it look? (H&E & IHC)

Dead tissue is called necrosis. It differs chemically and visually from living tissue. Those differences can be a source of tissue image analysis traps, where strong visual signals could get quantified in an entirely irrelevant area of the image. In this module, we will learn about the appearance of necrotic tissue and how to avoid the pitfalls caused by necrosis.

14. Ten Best Pathology Resources for Designing Tissue Image Analysis Algorithms.

In this bonus module, I walk you through 10 best external resources that will help you complement the knowledge acquired in this course and make you a tissue image analysis pro.





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