

# 20<sup>th</sup> International Conference on Breast Pathology and Cancer Diagnosis

April 11<sup>th</sup>, 2023 | Webinar

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## Expansion pathology: Physical tissue expansion for advanced investigation of clinical specimens.

### Abstract

#### Background

In diagnostic pathology, conventional optical microscopy is critical to diagnosis. Unfortunately, due to physical limitations, optical microscopy can reach only ~250 nm in resolution, making the use of higher resolution imaging strategies (such as electron microscopy) required for investigation, diagnosis and/or confirmation of certain pathologies. In a Harvard-MIT multidisciplinary collaboration, we developed a pathology-optimized form of physical tissue expansion named **Expansion Pathology (ExPath)**, which enables homogenous and isometric tissue expansion (approximately 100-fold in three-dimension) that can push the optical resolution limit of the optical microscopes to ~70-80 nm.

We used **ExPath** to demonstrate high precision discrimination between early breast neoplastic lesions that to date have challenged pathological classification and for optical investigation and diagnosis of kidney nephrotic lesions, which were previously diagnosed or confirmed with an electron microscope.

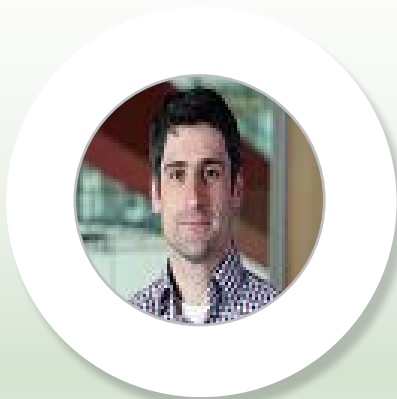
Expansion Pathology is an inexpensive, fast, reliable method which may open up the routine use of **nanoscale** imaging in pathology, enabling advanced investigation of clinical specimens and improved diagnosis of pathologies such as cancer.

#### Biography:

Dr. Octavian Bucur, MD, PhD, is an Associate Investigator at the Viron Molecular Medicine Institute in Boston, MA, USA and Editor in Chief of the journal *Discoveries*.

He has over a decade of training and research experience at the Harvard Medical School: Postdoctoral Fellow at BIDMC and Harvard Medical School, Instructor in Pathology (Faculty), Harvard Medical School (2017-2018); Associate Member, Wyss Institute of Biologically Inspired Engineering at Harvard (2014-2015), Associate Member of the Ludwig Cancer Center at Harvard University, Boston, MA (2016-2018), affiliated with Broad Institute of MIT and Harvard, Boston, MA (2016-2018).

Dr. Octavian Bucur has made impactful contributions in several research fields, being one of the main developers of Expansion Pathology (*Nature Biotechnology* 2017 (in the top 5% of all research outputs scored by Altmetric), *Nature Protocols* 2020; 3 patents). This method extends the current resolution limit (250 nm) of the optical microscopes to 70 nm, enabling visualization of smaller nanoscopic structures with inexpensive optical microscopy in preserved tissue specimens, after physical tissue expansion. Expansion-related technologies have tremendous implications in several biomedical fields, including diagnostic pathology, neuroscience and molecular medicine.



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Among the honors and awards received over the years are: Recognition of Outstanding Achievement in Translational and Basic Science Research from the Harvard Medical School Pathology Department; ranked 1st out of >100 - Best Scientific Poster Award (2017, Harvard Medical School Pathology Retreat of MGH, BIDMC, BWH, DFCI, Children's Hospital Boston); The American Association for Cancer Research (AACR)-Millennium Pharmaceuticals Award (2015, Philadelphia, PA), IUBMB Travel Fellowship (2010, Melbourne, Australia), The American Association for Cancer Research (AACR)-Aflac Award (2008, San Diego, CA); Lady Tata Memorial Trust International Award for Leukemia Research (2007, London, UK); European Union - Leonardo da Vinci Research Award (2004, Magdeburg, Germany); Invited Keynote Speaker/Special Lectures (conferences in San Francisco, Chicago, London (UK), Bucharest (Romania), BIDMC, Harvard Medical School - Boston, Wayne State University - Detroit, Carol Davila University, Romania); Chair of the Scientific Selection Committee for the RAL's Grand Rounds competition, Research Assistant Learning Initiative, Boston (2017-2018); Invited Judge for many undergraduate/graduate research competitions; International grant evaluator.

Dr. Octavian Bucur is a Co-Founder, major stakeholder and was the first CEO of Viron Therapeutics, Boston, MA and QPathology, Boston, MA. He is also leading a prolific research group at the Victor Babes National Institute of Pathology in Bucharest, selecting and training some of the most promising students and young researchers from Romania ([nextgenpathology.eu](http://nextgenpathology.eu)).

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