Novel imaging application illuminates processes in cancer, COVID-19 and other diseases

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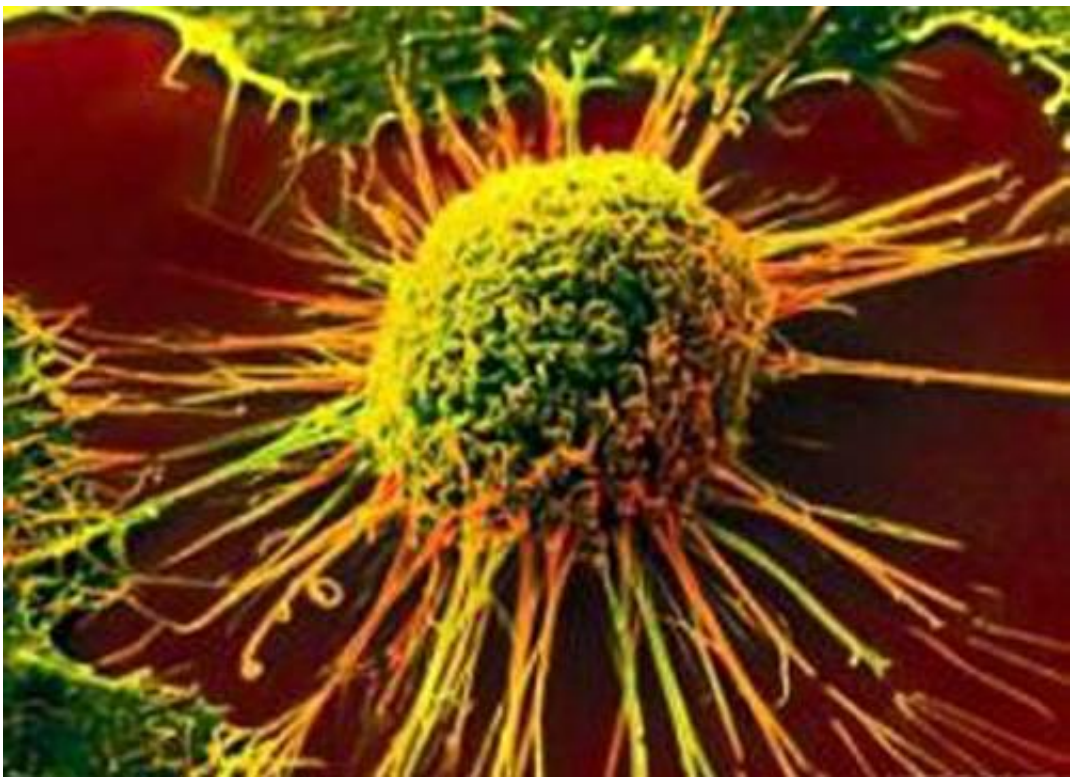

Medical images for a wide range of diseases, including coronavirus 19 (COVID-19), can now be more easily viewed, compared, and analyzed using a breakthrough web-based imaging platform developed by Massachusetts General Hospital (MGH) and collaborating researchers.

The Open Health Imaging Foundation (OHIF) web viewer was originally developed with grant support from the National Cancer Institute's Informatics Technology for Cancer Research (NCI-ITCR) program for use in cancer imaging research and clinical trials, where it is already adopted by several leaders in the field. However, the OHIF Viewer and its underlying Cornerstone libraries and tools can also be used for any disease and are increasingly being used for COVID-19 projects.

"This viewer provides performance that you typically only get from an installed application [software], but we do it through a web browser," says Gordon J. Harris, Ph.D., the corresponding author of an upcoming paper about this viewer in *Journal of Clinical Oncology: Clinical Cancer Informatics*. "This is a free, open-source extendable platform that is already being used by projects worldwide."

Dr. Harris is director of the 3-D Imaging Service at MGH and a professor of radiology at Harvard Medical School. OHIF was founded in 2015 and is led by a team including Dr. Harris and co-author collaborators Chris Hafey, Rob Lewis, Steve Pieper, Trinity Urban, and Erik Ziegler.

The already popular free program is interoperable, commercial grade, user-friendly and requires less technical support than a typical commercial product. The software is "zero footprint," meaning it can be run in a web browser from any computer without any software being downloaded. It can be launched from a web server on a local computer, or in the cloud. It is also accessible for a user to access from multiple locations.

In addition, researchers can freely download, modify, and contribute to the source code for the program (www.ohif.org; www.cornerstonejs.org). Overall, the platform has been downloaded more than 8,500 times, and has been translated into several languages.

Three examples of projects using the OHIF Viewer and/or its underlying Cornerstone libraries for COVID-19 imaging applications are:

- From Australia, the DetectED-X CovED virtual clinical environment platform providing education on COVID-19 appearances on CT scans to radiologists worldwide;
- From South Korea, the VUNO Med LungQuant and VUNO Med Chest X-ray artificial intelligence (AI) programs for diagnosis of COVID-19;
- From Germany and Brazil, the Nextcloud DICOM Viewer—an open source, secure, fast, cloud-based, and simple web-based medical image viewer being used to diagnose COVID-19 from sites across Brazil, where it allows secure and fast diagnosis.

All of these applications are being provided for free to help support efforts to address this worldwide pandemic.

Meanwhile, the OHIF Viewer has become a mainstay for an elite set of cancer centers, through the Precision Imaging Metrics program developed at MGH and the Dana-Farber/Harvard Cancer Center (https://www.precisionmetrics.org/our-story/). Users of this program perform over 25,000 oncology imaging assessments per year for over 1,000 active clinical trials with Precision Imaging Metrics. The NCI-designated Cancer Centers who are members and using this platform for clinical trials imaging informatics include:

- Dana-Farber/Harvard Cancer Center
- Yale Cancer Center
- Fred Hutchinson Cancer Research Center at University of Washington
- Huntsman Cancer Institute at University of Utah
- Winship Cancer Institute at Emory University
- Massey Cancer Center at Virginia Commonwealth University

- Medical College of Wisconsin
- Karmanos Cancer Center at Wayne State University
- Nationwide Children's Hospital (launching 2020)

"Many academic and industry projects are also using the OHIF platform and associated Cornerstone tools for developing novel web-based imaging applications, and machine learning companies are now also tapping into it. We only hear about a fraction of the companies that are using it since it is free for anyone to download and customize. Hundreds of software developers around the world have adopted our platform and we welcome contributions from the user community," says Harris.

Provided by Massachusetts General Hospital