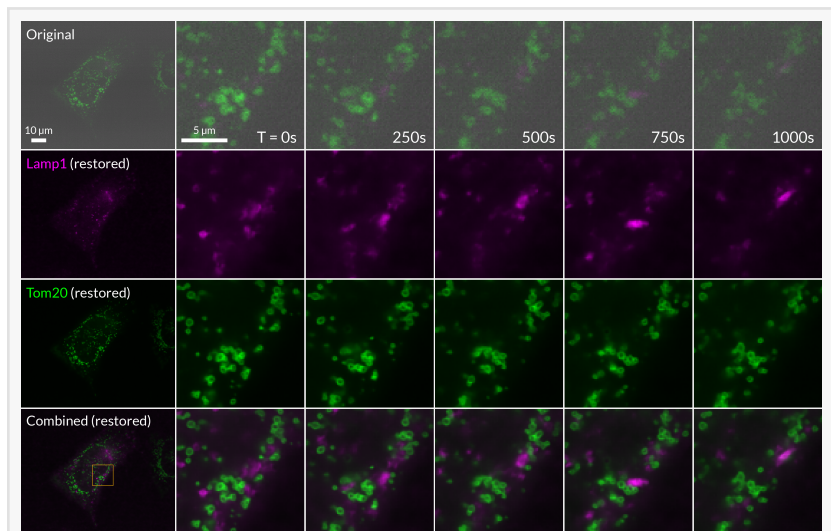


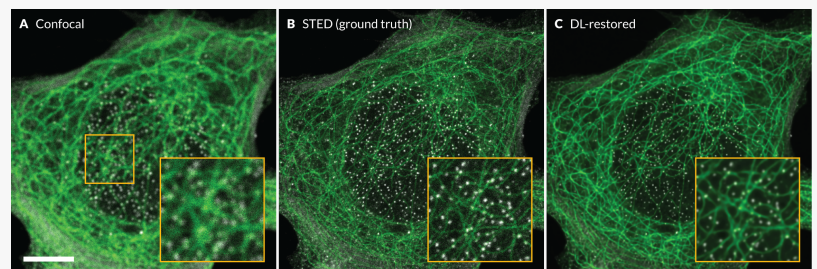
DRVISION wins NIGMS collaborative research grant to accelerate the adoption of AI in microscopy

BELLEVUE, WA, US, April 17, 2020 /EINPresswire.com/ -- DRVISION Technologies LLC, a pioneer in computer vision and the world's leading AI microscopy software company has been awarded up to 2.16 million USD from the National Institute of General Medical Sciences (NIGMS) to develop the AI Restoring and Staining platform (AIRS). The R&D funded by this Fast-Track collaborative research grant (# 1U44GM136091-01) will further boost the machine learning enabled solutions currently available in Aivia and Aivia Cloud. The project will be conducted in collaboration with Dr. Hari Shroff (National Institute of Biomedical Imaging and Bioengineering, (NIBIB)), his wider team and a consortium of seven world-class imaging centers across the USA.

Over the last two years, DRVISION researchers in collaboration with Dr. Hari Shroff and his team have successfully created and tested a wide range of deep learning (DL) models for restoration and/or improvement of image resolution and quality. These early studies illustrated how this technology can be used to run experiments that were previously impossible and have uncovered several potential limitations including usability, robustness, data friendliness, trustworthiness, effectiveness, versatility and scalable computing. Addressing these will enable the wider microscopy community to adopt and routinely use AI Microscopy approaches with greater confidence.



Restoration of live, two-color iSIM (Instant Structured Illumination Microscopy) images. Ground Truth data was captured at 0.37 kW/cm² power on an iSIM. First column shows a full field of view. Subsequent columns depict zoomed-in region. Each column is one time point.



Resolution enhancement of two-color confocal images. Ground Truth data was created using STED (Stimulated Emission Depletion) microscopy. Scale bar represents 5 µm and applies to all full frame images. Zoomed in inset location shown in (A).

"We hope that this work becomes a valuable resource for the field, and spurs further technical developments and applications in image restoration." mentioned Dr. Hari Shroff, a NIH Senior Investigator, Chief of the Laboratory of High Resolution Optical Imaging, Managing Director of the trans-NIH Advanced Imaging and Microscopy Resource and the key academic collaborator on

the AIRS project.

This project aims to systematically address the limitations identified in our pilot studies as well as by the research community. Addressing these will accelerate the adoption of DL to greatly benefit the microscopy and the wider AI communities. Namely this project aims to provide (1) a comprehensive suite of validated DL models for microscopy applications; (2) a plug-and-play solution for common imaging routines; (3) semi-automatic update training to tailor pre-trained DL models to match new imaging experiments; (4) user friendly support for new DL model training; (5) confidence scores to assess the output results created by DL models; (6) DL models that avoid image artifacts and allow continuous learning and evolution; (7) streamlined access to the required computing and data storage resources.

“To accelerate the adoption of DL for broad microscopy communities, we have thoroughly studied and defined the optimal DL pipeline and computing workflow to benefit most labs in advanced microscopy experiments. This project is enabled by DRVISION's innovative technologies (patents pending) that can handle paired and unpaired Ground Truth, can match models to data and can reject image artifact. The technology also allows continued model improvement through active learning. We look forward to starting this exciting 3-year project to push the frontiers of what is possible in microscopy” stated Dr. James Lee, DRVISION's Founder, President and CEO and the principal investigator of the project.

“Our team has a single objective – help advance scientific discovery. Deep Learning – primarily convolutional neural networks – can be used to enable microscopy experiments that would previously be impossible, and thus herald in a wave of new discoveries. In this ambitious project we will focus on the hard task of quantifying and addressing (mitigating) the limitations that are intrinsic to the use of AI technology for microscopy applications. Aivia users will be the first to experience the results of this exciting R&D effort” said Dr. Luciano Lucas, DRVISION's Executive Vice President and AIRS' Project Manager.

DRVISION will work closely with Dr. Hari Shroff and his wider team at the NIBIB in addition to 7 other collaborating sites from across the USA (Columbia University, Rockefeller University, Princeton University, Texas A & M, The Marine Biology Laboratory – University of Chicago, University of Michigan and Wake Forest University). The collaborating sites will provide test data sets, detailed user feedback and validate AIRS' platform using a variety of imaging modalities, samples and experimental set ups for applications including SNR restoration, super resolution restoration, spatial deconvolution, spectral unmixing, 2D to 3D images and organelle virtual staining.

Read about the pilot studies that led to this project: [2018 ASCB-EMBO poster](#) and [2019 ASCB-EMBO poster](#)

About DRVISION

DRVISION works with scientists and engineers at the technological frontier, and pioneers image-based decision technologies that propel major breakthroughs in the life science, electronics and materials industries. DRVISION is a technological innovator with 50 issued US patents, and commercial interests in X-ray inspection, survey, search / alignment, video inspection and life sciences. DRVISION makes and markets Aivia microscopy image analysis software. Aivia development is partially funded by the National Institutes of Health (NIH) under multiple Small Business Innovative Research (SBIR) programs worth over \$15 M. For more information, visit www.drvttechnologies.com.

About the Laboratory of High Resolution Optical Imaging (HROI)

HROI develops novel technologies for studying biological processes at unprecedented speed and resolution. Research includes improving the performance of 3D optical imaging microscopes, particularly with respect to resolution and depth (e.g. instant structured illumination microscopy,

iSIM) and speed and phototoxicity (e.g. light-sheet microscopy). HROI collaborates closely with intra- and extramural researchers (both academic and commercial) to ensure that our microscopes are easily and widely used, and are steadily improved. Dr. Hari Shroff is the Chief of HROI and the Managing Director of AIM. <https://www.nibib.nih.gov/labs-at-nibib/high-resolution-optical-imaging-hroi>

About the Advanced Imaging and Microscopy (AIM) Resource

The AIM is a trans-NIH shared resource that houses, operates, disseminates, and improves non-commercial, prototype optical imaging systems developed at the NIH. The facilities at AIM are available for use by the entire NIH intramural research community. AIM is a constantly evolving facility. As microscopes housed here become widely and commercially available, they will be phased out and replaced with the next generation of imaging technology. Dr. Jiji Chen is the Co-Operating Director of AIM. <https://www.nibib.nih.gov/labs-at-nibib/advanced-imaging-and-microscopy-aim-resource>

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