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Developing new multimodal imaging systems

For unmet clinical and research needs

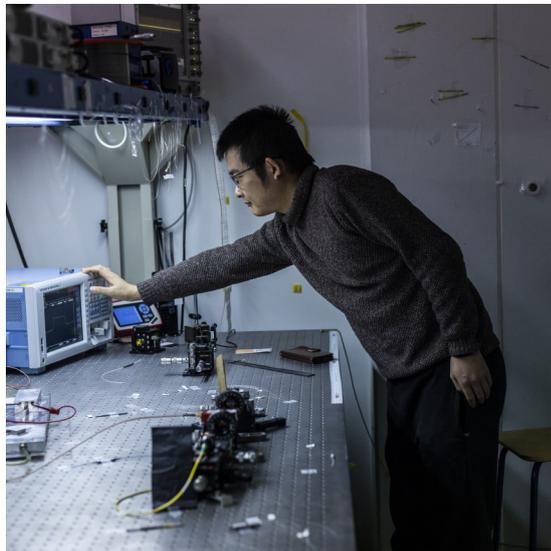
Current Work

Development of new lasers

COVID-19 has had a huge impact on Amplitude's laser development, as global supply chains slowed to a near halt, causing shortages in essential components. Work is steadily returning to normal though, and progress is being made once again.

In recent months, the first new lasers have been developed, operating around 1700nm, and are in the process of being packaged into more manageable setups for use by Amplitude partners. Designs for the packaging have been prepared and agreed, and awaits only the components to produce.

Based on the results generated using these packaged lasers, frequency doubling capabilities can then be integrated into the packaged lasers for research usage and for integration with the complete microscopic and endoscopic systems. Frequency doubling will allow multiple modes from the same laser, for optimal efficiency.



New Laser Product

Once fully packaged, the Amplitude 1700nm laser will be ready for productization by our OEM partner Ampliconyx. Customers should be able to purchase the Amplitude laser system within the coming year. The system will be useful for bioimaging and spectroscopy purposes in a compact and affordable setup, similar to its application as part of the Amplitude project. The wavelengths generated also offers benefits for environmental monitoring, thanks to potential sensitive and specific detection of methane.



The Project

Amplitude aims to develop compact and affordable multimodal microscopy and endoscopy platforms that use novel ultrafast light sources operating at wavelengths around 1700nm, to deliver a new concept of deep tissue, label-free, multi-modal imaging.

For further details, visit our website at:

www.amplitude-imaging.com

And follow us at:

LinkedIn: Amplitude-Project

Twitter: @AMPLITUDEProje1

The Partners

Coordinator:
Tampere University - Finland

Partners:
Aston University - United Kingdom
CNR - Italy

Amplyconyx - Finland
Femtonics - Hungary
ICFO - Spain
University of Milano Bicocca - Italy
University of Florence - Italy

WEINERT Industries - Germany

HC Photonics - Taiwan
Modus Research and Innovation - United Kingdom

Contact Details

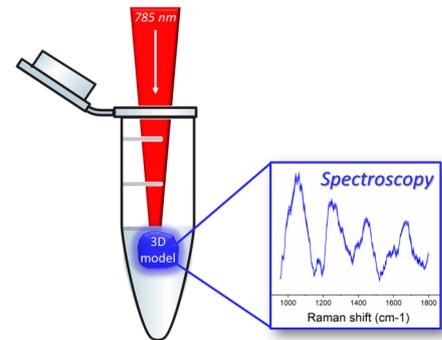
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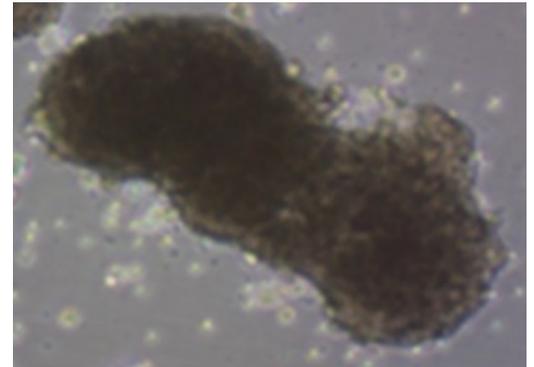
Current Work

Identifying bladder cancer biomarkers

It's not yet clear precisely which molecules Amplitude lasers will detect, although there are several molecules anticipated to be detected around 1700nm. Amplitude partners have already used Raman spectroscopy to identify several potential bladder cancer biomarkers, that should be detectable using the Amplitude system. Once the lasers have arrived, they will be ready to begin seeking out these potential biomarkers (see Future Work below).



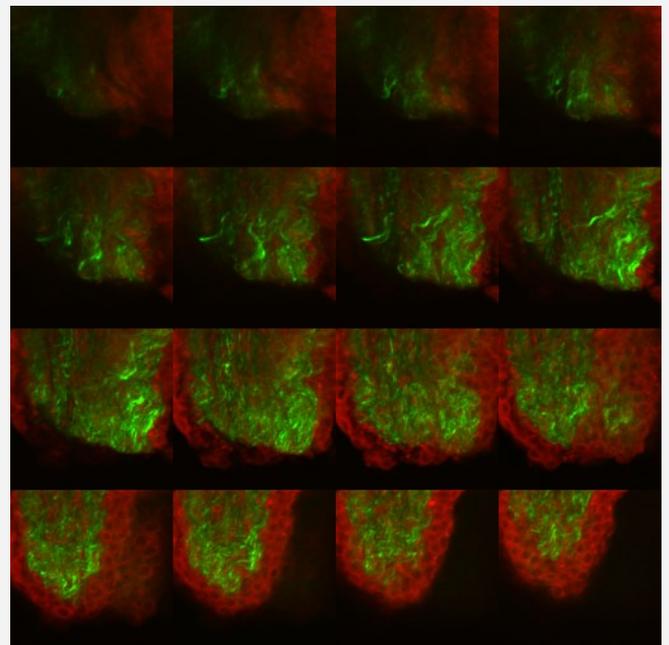
3D cell models of spheroids (from cell lines) and organoids (from clinical samples) necessary for this work are currently under development, which will allow for in depth identification of biomarkers over the coming year. Organoids have been difficult to produce over the last year though, due to a lack of patients undergoing surgery during the COVID pandemic. By the end of the Amplitude project, around 10 different organoids should be available, which should be sufficient to help robustly identify novel bladder cancer biomarkers.



Future Work

Deep tissue imaging in the Third Biological Window

Amplitude partners have now identified the optimal wavelength within the third biological window, which should achieve the deepest and clearest image possible. Soon, imaging experts will receive the Amplitude lasers tuned to this specific wavelength, which they will then use to produce deep tissue images of bladder tissue. Currently, deep tissue images in the third biological window do not exist anywhere, so these images will be a great public demonstration of the potential of the Amplitude project, and a fascinating insight into what it looks like to view so deeply into tissue. These results will be essential to allow the development of the complete microscope and endoscope systems during the Amplitude project, opening the door to better bladder cancer diagnosis and monitoring.



Recent and Upcoming Events

Consortium Meeting in Budapest

Between May 5th-6th, the complete Amplitude consortium came together in person for the first time since project kick-off, following COVID restrictions. Kindly hosted by Amplitude partner Femtonics, the group discussed progress with all aspects of the project. Although the group have encountered various difficulties largely due to the pandemic, good progress has been made and there were detailed discussions of the plans for the next phase of the project. Watch this space!



Photonics Meets Biology Summer School

Amplitude partners are hosting the 6th Annual 'Photonics Meets Biology' Summer School and Workshop at Spetses Island, Greece, between the 27th July- 1st August 2022. The summer school is an excellent opportunity to expand perspectives, promote interdisciplinarity, and is especially valuable to up-and-coming young researchers. The school is open to any willing attendees, so if it sounds like something you or someone you know would be interested in, you can register and read more at

<https://www.farsarilab.com/summerschool>



Opportunities to Meet Us

Amplitude will be presenting at the events below in the coming year. Come say hello!

- SPIE Optics and Photonics. August 21st-25th 2022 at San Diego CA
- Multinational Congress on Microscopy. September 4th-9th 2022 at Brno Czech Republic
- Optics and Photonics Days. September 6th-8th 2022 at Tampere Finland
- SPIE Photonics West. January 31st-February 2nd 2023 at San Francisco CA

Be sure to visit our website, and join us on Twitter and LinkedIn

www.amplitude-imaging.com

<https://www.linkedin.com/in/Amplitude-Project>

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