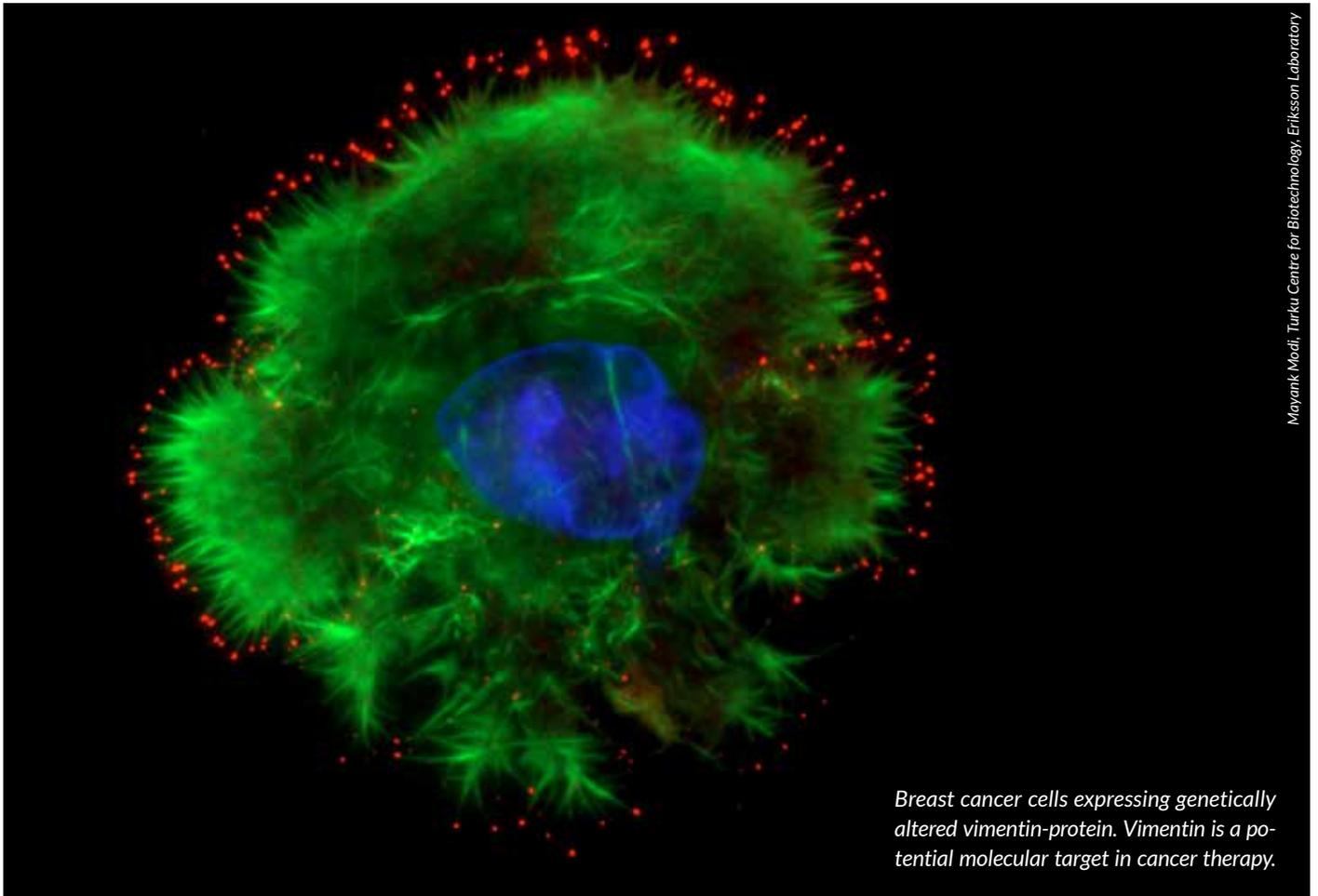


## Euro-BiolMaging: imaging infrastructure

An infrastructure has been created in Europe to enable European researchers and companies to utilise various organisations' technologies and services related to bioimaging. Euro-BiolMaging, headquartered in Turku, Finland, currently consists of 29 service units, called nodes, and involves 12 member countries and the European Molecular Biology Laboratory EMBL.



Researchers are offered an opportunity to utilise, for example, cell and tissue imaging technologies and animal and preclinical imaging services. The services of the Euro-BiolMaging infrastructure consists of the best selection of top-quality imaging centres in Europe. Users can access dozens of biological and medical imaging technologies. These include positron emission tomography (PET), magnetic resonance imaging (MRI) and various super resolution techniques based on light microscopy. More than 200 research instruments are available.

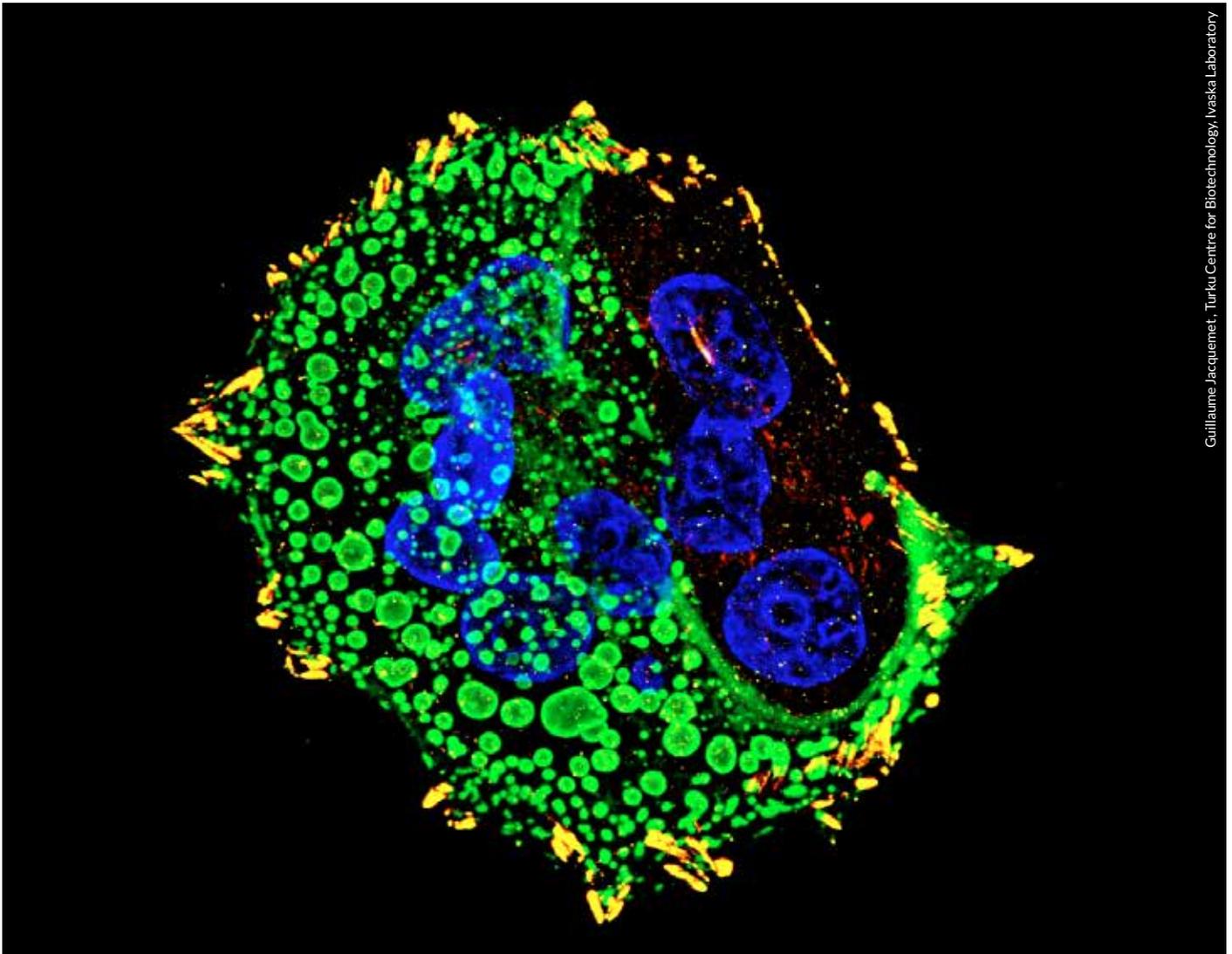
The infrastructure headquarters are in Turku. Turku BiolMaging (TBI) shares administrative responsibility with EMBL's Heidelberg unit and the University of Turin. EMBL focuses on biological imaging and Turin on medical imaging. TBI is responsible for the coordination of the entire infrastructure and the development of the Euro-BiolMaging Web Portal. Through the portal, researchers can utilise technologies, data collections and educational opportunities within the infrastructure.

"For the time being, Euro-BiolMaging operates on the basis of voluntary resour-

es, but an official infrastructure should be established, under a European Commission decision, in 2019. The infrastructure will be headquartered in Finland and take the form of an European Research Infrastructure Consortium (ERIC)," says TBI's Administrative Director **Pasi Kankaanpää**.

### Image analysis developed vigorously

Euro-BiolMaging offers not only research instruments but also image analysis tools and general services, such as image collections, related to image storage and data. The colle-



Breast cancer cell visualised. EOSC Life (European Open Science Cloud) is a project coordinated by the ELIXIR infrastructure with the objective of offering all European researchers a wide selection of bioindustry IT services. Its purpose is to integrate various federal infrastructures and data services.

ctions contain images by the terabyte, which can be used as reference data, for example.

“Our objective is that in future all published image data will be stored in the cloud and centralised services. We already have a fair amount of material, ranging from plankton imaging to cancer cells,” says Kankaanpää.

“Image analysis services and methods will also increasingly be used in various technologies and data collections. Researchers can, for example, look at how the images stored in the collections have been analysed previously.”

Image Data Resource (IDR) already shows the biological significance of the stored image sample. The data available on

**“With a single password and their own organisation’s user ID, researchers will gain secure and reliable access to infrastructures.”**

an image sample may, for example, reveal what aspects of the sample’s genes have been studied, and how.

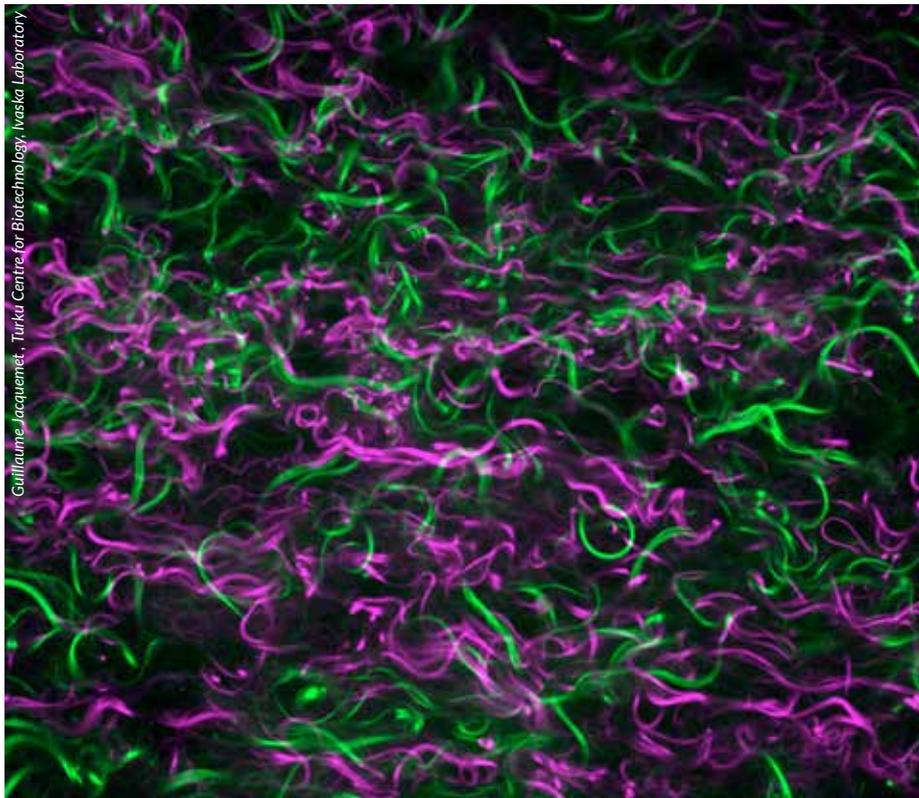
According to Pasi Kankaanpää, IDR and other Euro-BioImaging data services are under active development.

“It is important to ensure that the services are compatible with the Euro-BioImaging Web Portal. How can researchers access the

data and how has the data been stored and linked to various imaging technologies? This is where metadata comes in.”

**New authentication service on its way**

Data collections and research instruments needed by researchers are available in a number of European research infrastructures. Access to such resources often requires an authorisation process. Federal user identity management is a simple and administratively agile solution. With a single password and their own organisation’s user ID, researchers will gain secure and reliable access to infrastructures.



Guillaume Jacquemet, Turku Centre for Biotechnology, Iwasaka Laboratory

The Euro-BioImaging portal uses the ELIXIR AAI service for identification and authorisation. In the future, its name may change to the Life Science Authentication and Authorisation Infrastructure service. This is the next step in the authentication service developed within the ELIXIR infrastructure. Infrastructure from various bioindustries, such as ELIXIR and Euro-BioImaging, are included in the EOSC Life project, which

involves the implementation of this new and more comprehensive identification service. TBI and Finland's ELIXIR have, for example, been working on the technical requirement specifications of Life Science AAI. TBI is also one of the pilot testers.

"Euro-BioImaging's current data services are entirely public, requiring no permit process or login. This may change if we use central storage for other than public data and

link such data to user applications created by users in our portal, for example."

The Finnish service centre of the Euro-BioImaging infrastructure operates from three locations: Turku, Oulu and Helsinki. It has built high-quality and comprehensive light microscopy services. Finland's ELIXIR has been developing cloud-based computing and user management for a long time.

According to Pasi Kankaanpää, these two infrastructures have many aspects in common, especially in terms of data management principles and authentication solutions concerning users.

"Cooperation between various infrastructures can also be possible when sharing educational material or developing other online solutions. I think we should also be able to develop solutions further, offering users services in cooperation. For example, a user could produce image data with Euro-BioImaging and process it further through ELIXIR."

Data management and its further processing require more and more capacity. According to Pasi Kankaanpää, the current amount of data in the Finnish service centres alone can total around 100 terabytes a year. On the other hand, the forthcoming imaging equipment can produce similar data volumes in just a week.

"This means that we will probably need plenty of data processing, as well as the computing capacity offered by the ELIXIR infrastructure."

**Ari Turunen**

#### MORE INFORMATION:

**Turku BioImaging (TBI)**  
<http://www.bioimaging.fi>

**Euro BioImaging**  
<https://www.eurobioimaging-interim.eu>

**CSC – IT Center for Science**  
 is a non-profit, state-owned company administered by the Ministry of Education and Culture. CSC maintains and develops the state-owned, centralised IT infrastructure.  
<http://www.csc.fi>  
<https://research.csc.fi/cloud-computing>

**ELIXIR**  
 builds infrastructure in support of the biological sector. It brings together the leading organisations of 21 European countries and the EMBL European Molecular Biology Laboratory to form a common infrastructure for biological information. CSC – IT Center for Science is the Finnish centre within this infrastructure.  
<http://www.elixir-finland.org>  
<http://www.elixir-europe.org>