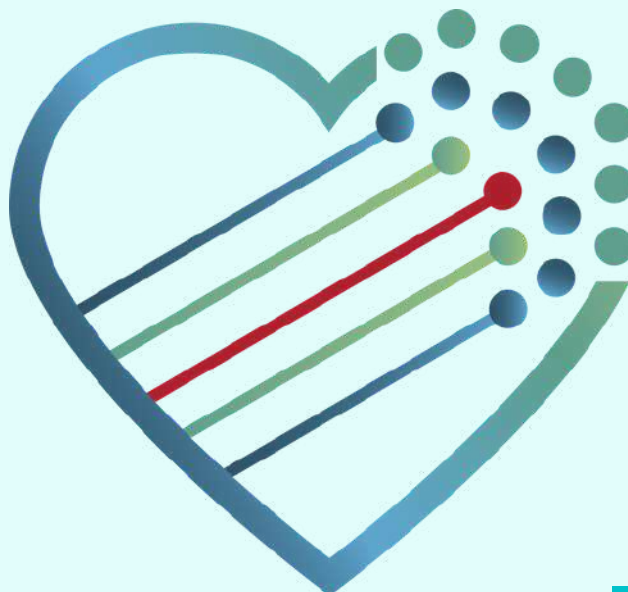


# PHAST-NEWS



## WORK PACKAGE 1 PHAST-ETN project

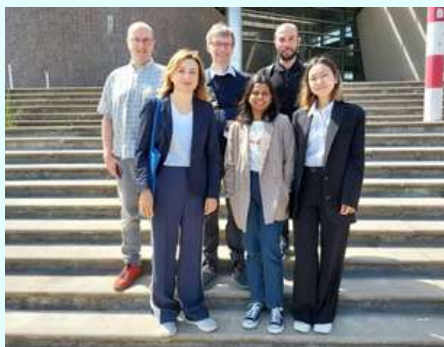
By the PHAT-ETN Team

Dear reader, welcome back to PHAST NEWS!

In this issue we are going to introduce the **Work Package 1 team**, focused on 'Optical IN VITRO/EX-VIVO diagnosis of cancer'.

**Aizhan Issatayeva** (ESR 1), **Edoardo Farnesi** (ESR 2) and **Pooja Girish** (ESR 3) are working on the study of Raman Spectroscopy (RS) for the early detection of tumors through the study and development of novel SERS-based optofluidic devices and Standard Operating Procedures (SOP) for point-of-care RS to detect optical cancer markers in body fluids and for an ex-vivo spectroscopic tissue characterization for cancer diagnosis and survey. Their respective objectives are:

- Aizhan on developing of a novel SERS-based optofluidic devices for cancer diagnostics via genomic markers detection in body liquids
- Edoardo on developing spectral acquisition protocols for Raman spectroscopic analysis of body liquids
- Pooja on using linear and non-linear Raman imaging for hyperspectral tissue analysis.



**WP 1 ESR fellows with their supervisors (from top left corner): Sebastien Legendre (HORIBA), Michael Schmitt (FSU), Edoardo Farnesi, Annamaria Cucinotta (UNIPR), Pooja Girish , Aizhan Issatayeva.**

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## WP1 PHAST-ETN PROJECT

## WP1 ESR FELLOWS

## MEET PROF. MICHAEL SCHMITT

## INTERNATIONAL GRADUATE SUMMER SCHOOL: BIOPHOTONICS



**THIS PROJECT HAS RECEIVED FUNDING FROM THE EUROPEAN UNION'S HORIZON 2020 RESEARCH AND INNOVATION PROGRAMME UNDER THE MARIE SKLODOWSKA-CURIE GRANT AGREEMENT NO 860185**

## WP1 ESR FELLOWS

### Aizhan Issatayeva

I came from Kazakhstan, where I received my Bachelor in Electrical Engineering and Master in Engineering Management. My interest in optics and photonics started in 2017 when I had an internship at KAUST (Saudi Arabia) working on a project about wireless data center networks. I was also interested in medicine, so I participated in a project aimed at creating a prototype of the equipment for people with needs. My two interests merged when I started working in the Biosensors Lab on the development of fiber-optic sensors for biomedical applications. Now, my Biophotonics path brought me into the PHAST project, where I am working on the Surface-Enhanced Raman Spectroscopy application for the detection of cancer biomarkers and doing my Ph.D. at the University of Parma (Italy).



### Edoardo Farnesi

I received my BSc and MSc degrees at University of Perugia (Italy) in 2014 and 2017, respectively in Biotechnology and Industrial and Molecular Biotechnology. In 2018, I took a second MSc degree in Big Data and Machine Learning for Biomedical Research at University of Padua (Italy).

From 2019 to 2021, I worked as research assistant in the BioPhotonics and Nanomedicine Lab at the Institute of Applied Physics (IFAC-CNR) of the CNR in Florence.

In May 2021, I joined the Spectroscopy/Imaging group at Friedrich-Schiller University Jena (Germany) to pursue my PhD degree. My current research interests include plasmon-enhanced spectroscopies, sensing and machine learning/AI for biomedical studies.

### Pooja Girish

I come from Kerala, a southern state in India. I have a masters in photonics from Cochin University of science and technology. As a biology major in high school and a postgraduate in the field of photonics I always had a keen desire to work in the field of bio-inspired physics and build a research career in it. This was my motivation to join the PHAST project. The title of my project is 'Spectral tissue imaging for ex-vivo cancer diagnosis and survey' and I am doing my PhD at Horiba SAS France

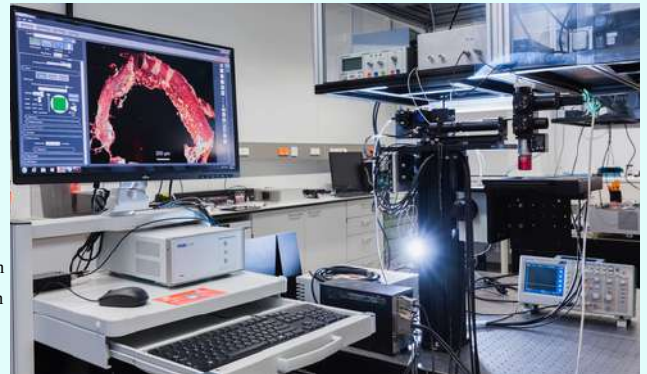


# Meet Prof. Michael Schmitt (Friedrich Schiller University, Jena, Germany)



## – What is your role in the PHAST project and why did you decide to be involved in the PHAST?

Michael Schmitt: 'I am the supervisor of Edoardo Farnesi (ESR2) and also co-supervisor during the secondment of Aizhan Issatayeva (ESR1). The topic of PHAST to utilize photonic approaches for cancer diagnosis is extremely exciting and highly topical and I am very much interested in this exciting research area. I am very glad that I have the chance to be part of this great consortium of leading European researcher on this research topic. I am convinced that photonic technologies will play an important role in the future in medical diagnosis and therapy and therefore it is important to have highly skilled researchers in the vibrant field of Biophotonics. The European Training Network PHAST provides an excellent education and training programme to 15 early-stage researchers and I am very glad to be part of this training programme since teaching and training students alongside research has always been very close to my heart.'



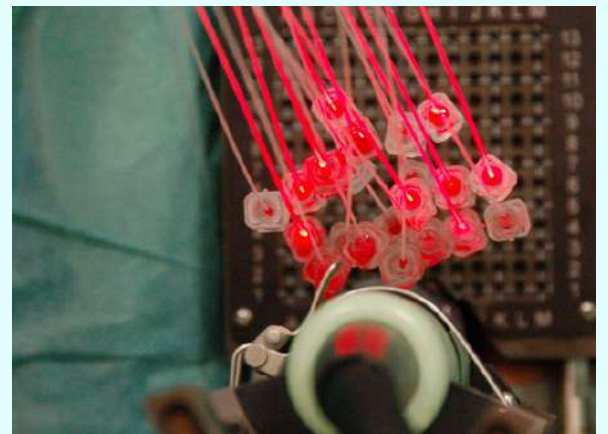
## – Could you tell us about your background and how have you started working with Raman?



'I studied chemistry at the University of Wuerzburg and did my PhD with one of the pioneers in Raman spectroscopy Prof. Dr. Wolfgang Kiefer. At that time, I worked on femtosecond time-resolved coherent Raman scattering on very small molecules. This was purely basic research. After my PhD I spend 20 months as a postdoc in Ottawa Canada at the National Research Council where I was working on time-resolved photoelectron spectroscopy. After that I returned to Wuerzburg University where I finished 2004 my habilitation on Time-resolved coherent Raman spectroscopy to study excited state dynamics. In 2004 I joined the group of Prof. Popp at Jena University where we are researching spectroscopic methods with focus on linear and non-linear Raman spectroscopy to address biomedical questions.'

## – What is the Future of Raman, in your opinion?

Raman spectroscopy has developed within the last 10-20 years to one of the most important spectroscopic methods entering almost all natural scientific disciplines like physics, chemistry, biology, pharmacy, geology, life sciences but also areas like art. Most importantly Raman spectroscopy has also shown its huge potential for applied clinical diagnosis. Numerous proof-of-concept studies on how Raman spectroscopy can overcome unmet medical needs are available. Now its time where these proof-of-concept studies must be translated in clinical studies. I am convinced that we will witness Raman spectroscopy as a routine clinical diagnostic tool in the near future. In general, I am convinced that Raman spectroscopy will develop in the future from a niche technology to a routinely applied analytical method with a broad manifold of applications.'



PICTURES BY SVEN DÖRING



# The Summer School in Biophotonics

The PHAST-ETN fellows attended the Summer School in Biophotonics in June 2022, which is at the 10th edition. This was a unique opportunity for them to be trained in the exciting field of biophotonics at the highest international level.



Overall 64 students attended and 14 renowned lecturers were invited from all over the world.

The educational programme allowed enhancing exchange of scientific ideas and technological advances within the fields of biomedical optics and closely related areas.

The school duration was one week and besides lectures and discussions our fellows also had the opportunity to showcase their current research activities and related results during a dedicated poster session.



*Pooja discussing her activity with a lecturer*



*PHAST ESRs in Ven with supervisors Stefan Andersson-Engels and Wolfgang Drexler*



*Aizhan at the poster session*

More info about PHAST-ETN are available at [www.phast-eu.unipr.it](http://www.phast-eu.unipr.it)