



## NETLAS NEWSLETTER 10-2022

### NETLAS Autumn School Technical University of Darmstadt (TUDa)



NETLAS Autumn School took place at Technical University of Darmstadt (TUDa), Germany, **04-07 October 2022**

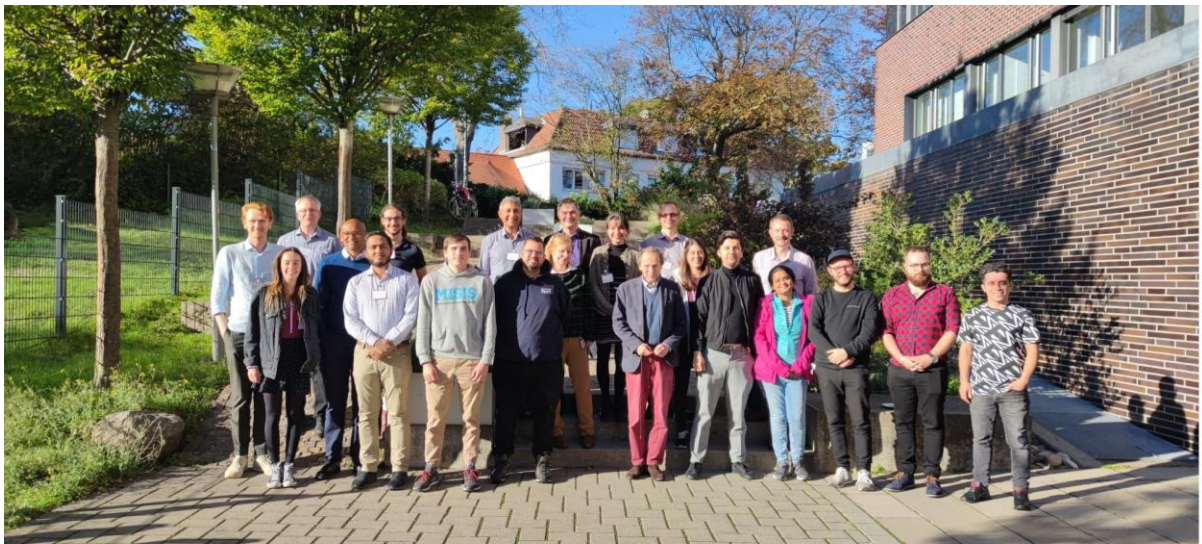
The NETLAS Autumn school was almost on schedule with the dates listed in the Grant agreement. It took place in person with only a few speakers contributing remotely due to the still ongoing Corona pandemic. 14 out of 15 ESRs were present, though two ESRs, present in person at the opening, needed to attend remotely due to Corona regulations. They presented their progress and participated in a “student teaches student” training activity. Further training, provided by Mrs Simone Lühl ([INGENIUM](#)) and Dr. Maximilian Knaus ([WSL Patent Attorneys](#)) focused on patenting, IP, and spinning off new enterprises. Several, internationally highly reputed speakers gave an insight in their work. Besides several PIs of the NETLAS consortium, there were presentations given by the NETLAS associated partners [Dr Ranjan Rajendram](#), Consultant Ophthalmic Surgeon, Moorfields Eye Hospital/UCL, London, [Dr Taran Tatla](#), Consultant ENT Surgeon, Northwick Park Hospital, Associate Director for Research & Development at his NHS trust London, as well as NETLAS-external speakers [Dr Anirban](#)



[Mukhopadhyay](#) (TUDa) and Dr. [Zachary Taylor](#) (Aalto). Please check the program on the [NETLAS website](#).

The “Industry morning” on Thursday was very well received. It was dedicated to industrial speakers, including NETLAS Beneficiary Dr. Vladimir Shidlovsky from [Superlum](#) and an external company [VERTILAS](#). Common networking was fostered at the Autumn School dinner in Grohe on Wednesday evening. From our perspective, we were very happy with the event, and it was a pleasure to meet everyone in person!

**Main TU Darmstadt organizers: Sascha Preu, Mojdeh Vakili Tabatabaei, Maria Kaiser**



**NETLAS Autumn School  
Technical University of Darmstadt (TUDA), Germany  
04-07 October 2022**

Thank you, [Technical University of Darmstadt](#),  
&  
thank you, [Prof. Sascha Preu](#) & your team,  
for organizing the event!

**Thank you everyone involved in the Autumn School  
2022 for your great contribution! @[NETLAS](#)**



## NETLAS PhD Students' experience at the NETLAS Autumn School 2022, Darmstadt, Germany

"I really enjoyed this Autumn school, most of the projects are now more mature, and you can have a rich conversation with the NETLAS students that will help to understand properly their point of view. Moreover, I think is quite essential that figures like Taran Tatla, Robert Huber, etc... come to the school since their presence makes the school even more interesting. I was not sure how was going to be the student activity on Friday, but the fact that we had a friendly environment made that an enjoyable moment. So overall, I think it was nicely organized. Congratulations to all the team that make it possible and looking forward to the next one.

Maybe as a comment aside, not as feedback, I have read a lot of papers from Robert Huber and meeting him in person at the Autumn Schools is an incredible experience. I had some of his papers as my "bible" on fast OCT, so meeting him in person and discussing different topics was incredibly rewarding".

PhD13 Alejandro Martinez Jimenez,

Recruited by: University of Kent, [Applied Optics Group \(AOG\)](#)

At present in the Secondment at [NKT Photonics](#)

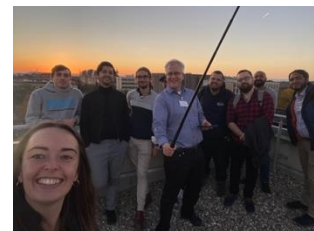
"The Autumn School in TUDa has been very inspiring and I'm really feeling delighted to have been able to be a part of it. Well organized school, good scale, solid content in presentations. Totally enjoyed and learned a lot from the ESRs and the keynote speakers in a comfortable environment. Thank you, organizers, for hosting such a wonderful school. I am looking forward for the next year school."

PhD5 Masoud Payandeh

Recruited by [Technical University of Denmark](#) (DTU)



“NETLAS Autumn School in Darmstadt was an excellent opportunity to meet everyone from the NETLAS consortium. We had the chance to have many presentations on different topics, such as the VECSELS, the research conducted at NKT or some exercise on entrepreneurship. I also personally enjoyed the more medically oriented presentations, which allowed us to see the direct applications that our research can lead to. Apart from that, the organization led by TUD was great, we had the chance to share excellent lunch and some ma for dinner. I'm looking forward to seeing everyone again”.



[PhD9 Marie Klufts,](#)

Recruited by: University of Lübeck, [Institute of Biomedical Optics](#), Germany

At present in the Secondment at University of Kent, [Applied Optics Group \(AOG\)](#)

“This October was the NETLAS Autumn school in TU-Darmstadt. We attended different lecturers arranged by the organizers, also all PhD Students presented their own work. As always, it was a great opportunity to share our research results with the colleagues from NETLAS. I am very happy that the school was taking place in Darmstadt so I had the opportunity to show my colleagues why I love this city so much. I also did a tour in the cleanroom for the participants in the school what I really enjoyed, and I think that my colleagues enjoyed too. Looking forward for the next NETLAS School!”

[PhD7 Irene Rodriguez Lamoso](#)

Recruited by: **Technical University of Darmstadt** (TUDa), Germany



“After the great experience at the previous school, I was excited to travel to Darmstadt for the Autumn School organized by the TUDa. It was a great pleasure to see all my colleagues there. Listening to the presentation of their project on the first day, I was impressed by the progress everyone made during the previous six months. It was also enjoyable to realize I understand more and more about each of these technologies, even the ones that are significantly different from my project.

During the rest of the week, a large spectrum of experts gave us introductions to their work. From the technicalities of patents to the real application for clinicians, we covered the whole process of research for biomedical. We also had an overview of some other topics, like THz. I always enjoy discovering technologies I know very little about and realize how interesting they could be for numerous applications.

The school was quite intense, but we found time to visit the city and enjoy the history of Darmstadt (big thanks to Mojdeh and Irene!). We also had delicious dinners together in different German traditional restaurants, some of which were immortalized with pictures with wiiiiiiide angle (thanks Robert!).

It was a wonderful experience and I want to thank all the organizers and the Netlas coordinators for that. I am looking forward to our next event”.

[PhD12: Sacha Grelet](#)

Recruited by [NKT Photonics, Denmark](#)

At present in the Secondment at University of Kent, [Applied Optics Group \(AOG\), UK](#)



“Attending the NETLAS Autumn School in Darmstadt was a lovely time. The program included interesting talks and a chance to catch up on the research of my fellow PhD-students. It was a pleasure to see all the progress. Most of all I really enjoyed seeing everyone again.”

PhD Student Rasmus Eilkær Hansen

Technical University of Denmark, DTU

“It was very exciting to be the part of Autumn school. I unfortunately got sick with COVID and had to attend the event in hybrid mode. Even then there were many interesting talks that were given at the event. I had the opportunity to learn about the latest research and techniques being implemented in the field of OCT and Lasers. It was a very good experience to see the presentations of other students and student activity organized was a very good thing which provided a lot of knowledge on how to express your ideas. Also presenting my work gave me a lot of confidence. I am looking forward to our next event to see everyone again and learn about their research from them.”

PhD11: Muhammad Ammar Javaid

Recruited by **Innolume**, Germany



"It was nice to see again all the ESR students. Every student had prepared a short presentation about his progress in research. I found very interesting talks on medical application of OCT principles by partners of the NETLAS. Visitors to University of Darmstadt were also guided through the laboratories and shown the facilities of the university. After the schedule, students had an opportunity to spend together in more casual way at common dinners or leisure activities. I personally fancied the hotel we stayed in during the conference. I must also appreciate the organization and thank for all the work and preparation carried out by the staff and students."

PhD14: Rene Riha

Recruited by University of Kent, [Applied Optics Group \(AOG\), UK](#)  
At present in the Secondment at [Superlum](#), Ireland

"I was glad to meet all the students again. There were many speakers with interesting presentations about various ways to use OCT, and I gained helpful knowledge and a lot of experience. I liked the part of this event when students explained their thesis in simple words so that it would be understandable to the general public. I hope we can organize and get together at the next NETLAS school.!"

PhD1: Andrei Anikeev

Recruited by **Superlum Diodes** , Ireland



“Once again, NETLAS autumn school was a fantastic opportunity to meet all the ESRs and others involved in the ITN. Also, got to meet some of them who weren't there for the previous meeting. It was great listening to the ESRs talks and to learn about their progress in research. The other talks were also equally interesting. Due to time restrictions, I was unable to engage in the ESR activity, but I greatly liked listening to the other ESRs which presented their research in a non-technical way. I enjoyed the dinner with Netlas colleagues every day after the school and got to try some delicious food. Since the school was in Darmstadt, it also gave me the chance to see some of Darmstadt city”.



[PhD15: Gopika Venugopal](#)

Recruited by University of Kent, [Applied Optics Group \(AOG\), UK](#)

At present in the Secondment at [RECENDT](#), Austria



It was great to meet the rest of the ESRs in the project and share our work. It was also a valuable experience to attend the talks from different companies and I especially liked that at the end we had the opportunity to share our project in a way that was understandable for the general public. It is good to practice this kind of presentations to be able to generate more interest in our research and all the ESRs should do it.

PhD4: Esteban Andres Proano Grijalva

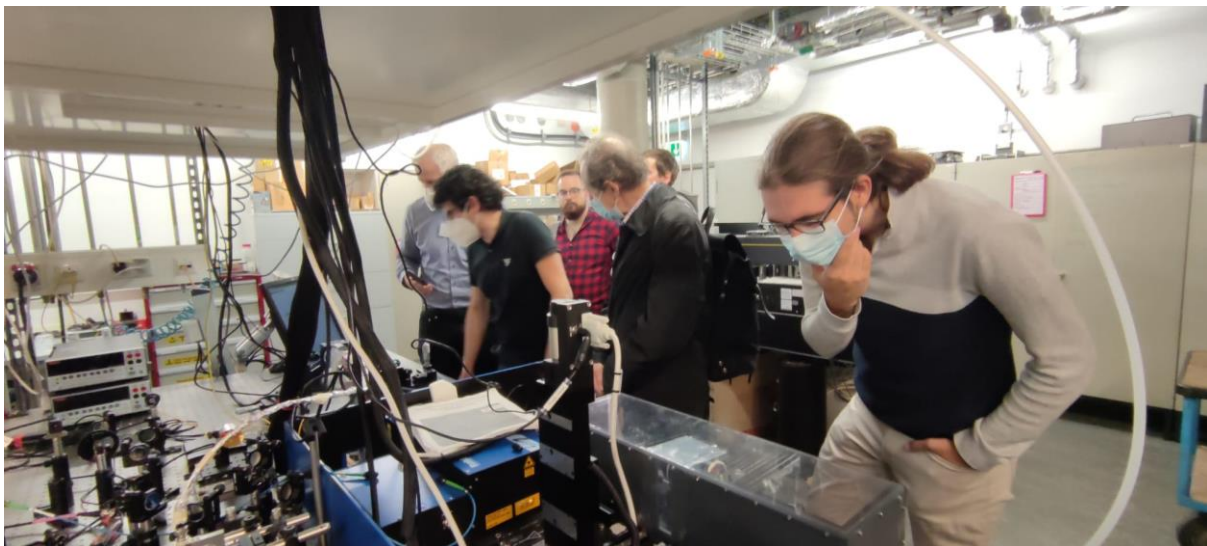
Recruited by **Technical University of Denmark** (DTU)

“I was excited to attend the Darmstadt NETLAS Autumn School, but at last moment, unfortunately I got covid positive. Although, I attended student presentations via zoom, It was nice to see the progress of all students. I was unable to present in person, but presenting online was also a good experience for. Moreover, there were few nice talks which I really like, in this way I came to know that how these technologies are implemented in practical life.”

PhD10: Muhammad Asim Bashir

Recruited by **University of Lübeck**, Germany

“First of all, meeting almost all ESRs after Winter School which was held in Denmark was great. And that was a pity that 2 ESRs had COVID from the beginning of the event and couldn't join in person. About the organization, Prof. Sascha Preu did a lot to make sure that everything will go smoothly. I should mention that I loved the food and that opened new horizons of German food for me 😊 . Like the previous NETLAS school, one of the advantages of these events is that we can see the other side (medical applications), too. I enjoyed talk of Zac Taylor (Aalto) very much. And hope that everyone had spent a nice time in Darmstadt. I would like to attach a photo which is from the lab tour”.



[PhD8: Mojdeh Vakili Tabatabaei](#)

Recruited by **Technical University of Darmstadt** (TUDa), Germany



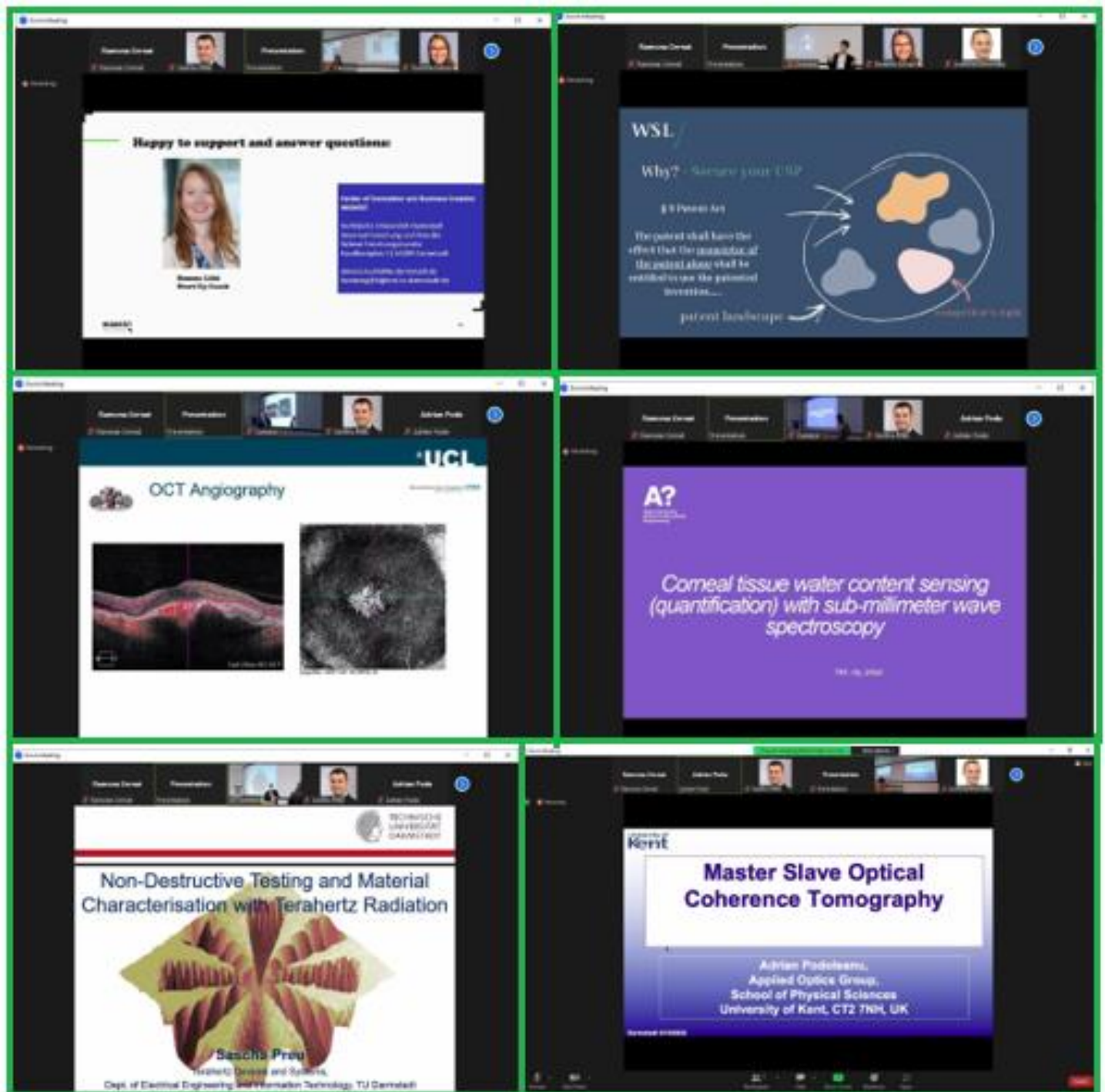
"I would like to start by expressing my thanks to Prof. Sascha Preu and TU Darmstadt-based ITN fellows to make the Autumn School 2022 quite fruitful and exciting. Especially, I am very glad to be able to attend my first in-person meeting with our bright people. The scientific talks and technical sessions from expert people helped me understand the progress and different applications of LASERs, especially in medical sciences and mid-IR OCT applications in Industries. I enjoyed the city tour and conference dinner with young and exceptionally talented and open minds. For me, meeting, presenting, and exchanging ideas about my research works at Tampere University got a quite clear direction in terms of OCT applications. I cannot be more thankful to Prof. Mircea Guina, Dr. Jukka Viheriälä, and Prof. Adrian Podoleanu for their unconditional support so far. Such events can certainly make our efforts in science more meaningful."

[PhD2: Ifte Khairul Alam Bhuiyan](#)

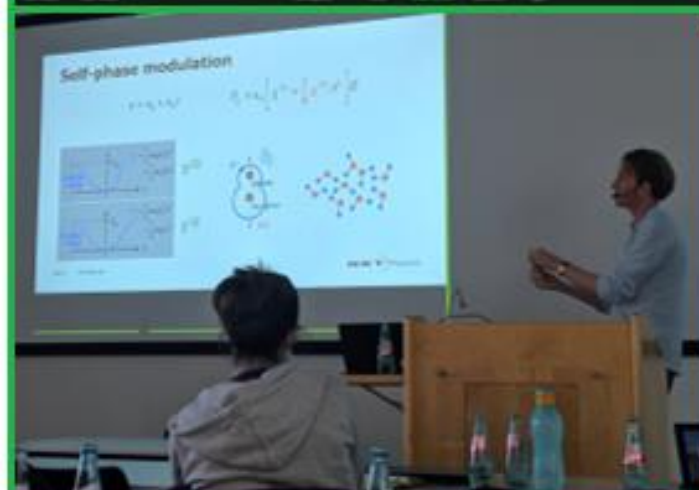
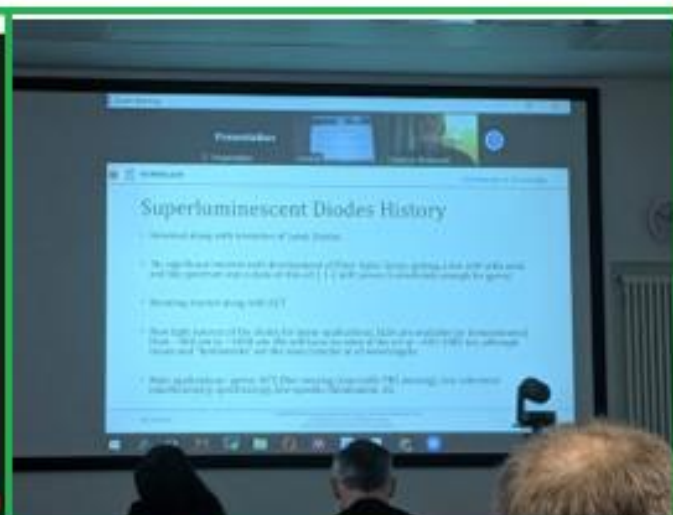
Recruited by **Tampere University**, Finland



Print screens and photos from the event will follow, more photos from the event can be found on the [NETLAS webpage](#).



@ Print screens & Photos by NETLAS members



@ Print screens & Photos by NETLAS members



@ Print screens & Photos by NETLAS members



@photos by Robert Huber



@photos by Robert Huber



## European Researchers' Night 30th September 2022

With the occasion of **European Researcher's Night 2022**, **12 NETLAS PhD students together with 2 other PhD students** from Applied Optics Group (AOG), University of Kent, have organized a **live broadcast event on YouTube on Friday 30th September 2022 at 6 pm UK time**.

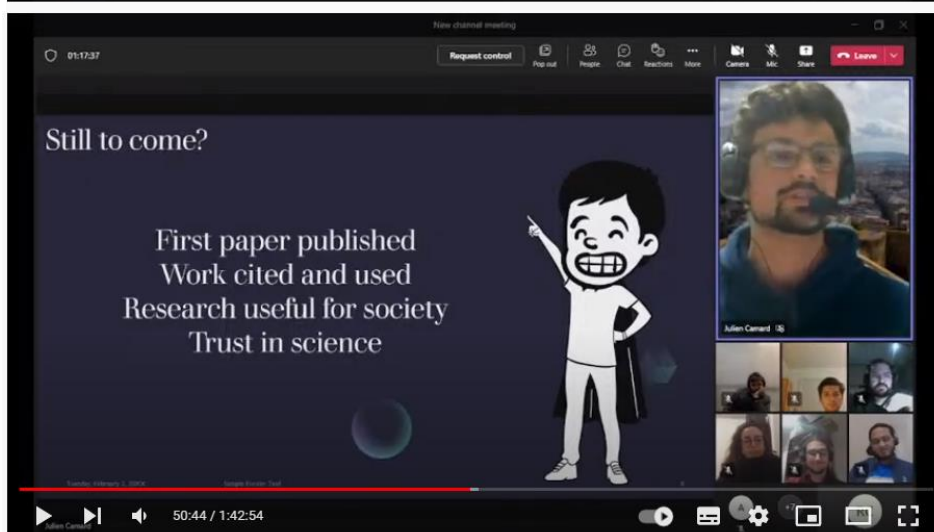
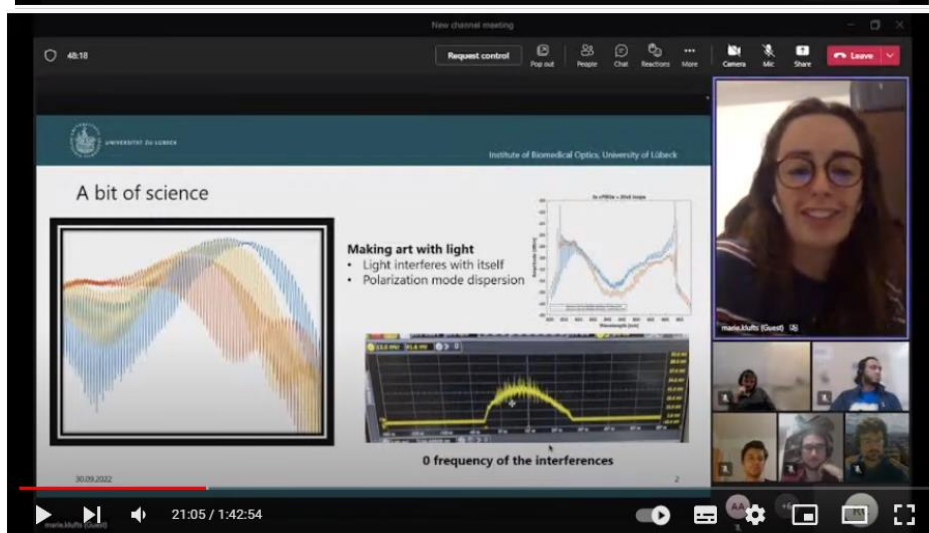
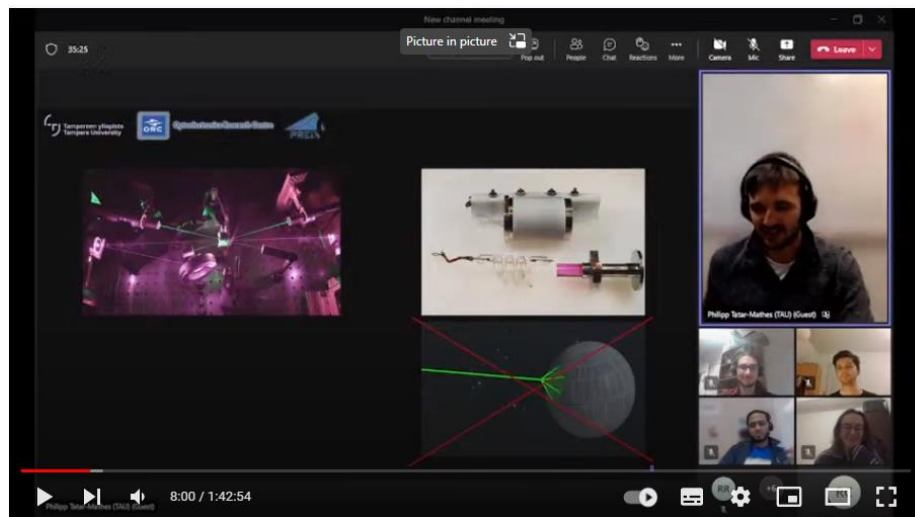
This was a student lead event, where the students aimed to increase the interest of young people in science and research careers by telling their unique stories about their research and life dominated by research, their happy/or less happy experience while working in a lab, any events they had during their secondments or attending conference memories.

The moderator of the event was [Sacha Grelet](#), recruited by NKT Photonics, Denmark, currently doing his secondment at AOG, University of Kent, who volunteered and took the lead of the event.

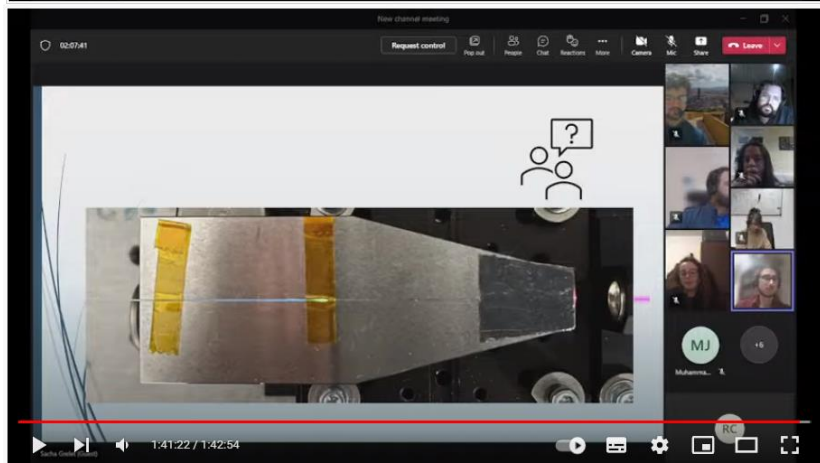
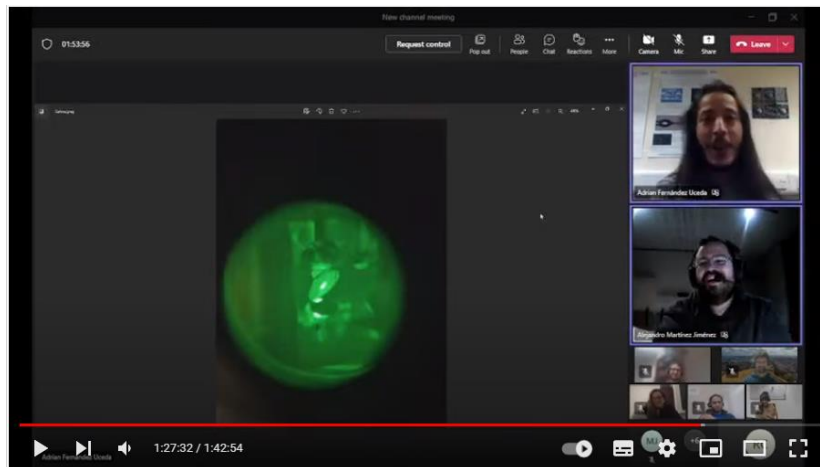
The live event started with a short introduction of NETLAS presented by Sacha, followed by his colleagues which presented their route and motivation towards joining a trans-European PhD on Photonics with emphasis on lasers for optical coherence tomography, their research hot topics results, experience accumulated so far, and their advice for potential PhD Students. **The students participated from ten different locations in academia and industry in Europe:** [Tampere University](#), Finland, four locations in Germany ([Univ of Luebeck](#), [Technical Univ of Darmstadt](#), [Immolume](#), [Optores](#)), [Technical University of Denmark](#) (DTU) [RECENDT](#) Linz, Austria, [Superlum](#), Ireland, [NKT Photonics](#), Denmark and [University of Kent](#), UK (<https://netlas.aogkent.uk>).



The event was advertised on **Twitter, LinkedIn, Univ of Kent Student mailing list**, by **NETLAS beneficiaries and partners**, and other scientists in the OCT field from all over the world. So far, by today 31/10/2022, the broadcast had 125 views. Print screens from the event are presented below.

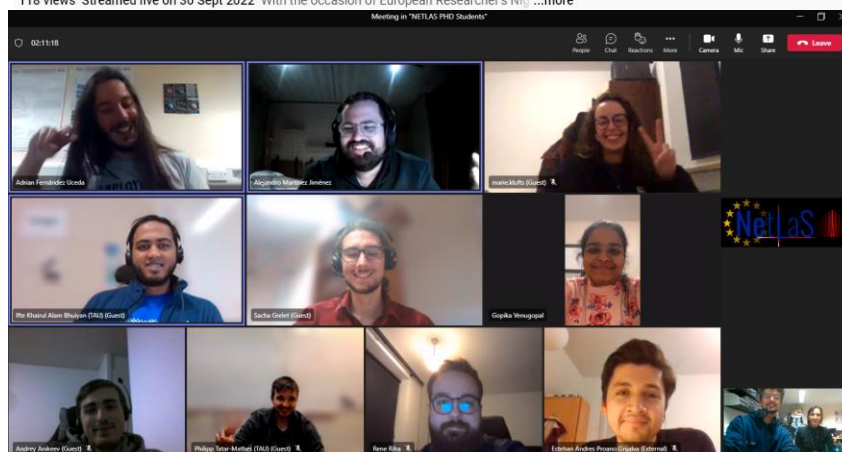


Print screens from the European Researcher's Night, live broadcast event on 30th September 2022



#### European Researchers' Night - 30 September 2022

118 views Streamed live on 30 Sept 2022 With the occasion of European Researcher's Night ...more



Print screens from the European Researcher's Night, live broadcast event on 30th September 2022

**Please enjoy our 2nd NETLAS video product recorded on YouTube:**

[European Researchers' Night - 30 September 2022 - YouTube](#)



## SECONDMENTS

Netlas PhD 10 [Marie Klufts](#)

Recruited by: University of Lübeck  
(Uzl) Germany

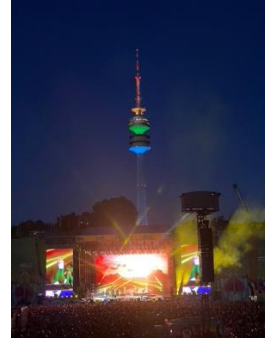
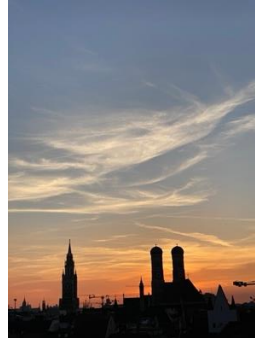
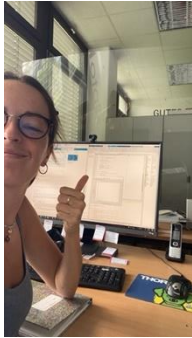
Secondments started on 3<sup>rd</sup> July 2022 at  
[Optores GmbH](#), ended on 30<sup>th</sup>  
September 2022



**PhD Project: Short wavelength FDML laser**

END OF MY 1<sup>st</sup> SECONDMENT IN MUNICH

“Working at [Optores GmbH](#) was a great opportunity to see the research side of a startup. I had the chance to work with three great people who were always willing to help me with my research and share their knowledge, Tom Pfeiffer, Alexander Mlynek and Wolfgang Wieser. It was very rewarding to see how their commercial FDML lasers were made. I was able to get some hints on how to improve my laser in the future, and also to know more precisely the characteristics needed to meet the market demand. However, my laser has some stability issues, hence my research and work, it will still have a long way to go before it can be commercialized”.



Photos by @ [Marie Klufts](#)

“I would also like to thank my friends and roommates in Munich without whom these 3 months stay would not have been the same. They made me feel at home from the first day and made me discover Bavaria and Munich a little more every day. I had the chance to live the life of a real Bavarian by going to a FC Bayern match, by participating in the Oktoberfest wearing my dirndl, or by going for a hike in the alps to admire different lakes. It was a great experience, and I can't wait to go back to Munich for a holiday. I leave you now with some pictures summarizing my 3 months in Munich”.



Photos by @ [Marie Klufts](#)



## SECONDMENTS

Netlas PhD 10 [Marie Klufts](#)

**Recruited by: University of Lübeck (Uzl)**

Germany

**2<sup>nd</sup> Secondment at Kent started on 10<sup>th</sup> October 2022, University of Kent, UK,**  
**[Applied Optics Group \(AOG\)](#)**



**Duration: seven months**

“Me, my car, and my laser travelled from Darmstadt (where the NETLAS Autumn School took place this year) to Canterbury, crossing 5 countries in 8 hours. We were able to experience the journey through the Channel Tunnel which was quite impressive. The borders were also something else quite impressive and stressful! lots of paperwork and documents to be signed by the German, French and English customs. I'll spare you the details but be prepared to spend some mental energy. But thanks to two colleagues in Lübeck and a more than honorable man at the English customs everything went well, and I was able to arrive in Canterbury and join my new house with my 7 new roommates. On Monday I had the pleasure of joining the AOG offices and seeing everyone again. It was nice to be surrounded by all these nice people when I found out that I had to leave the country again as I had entered before the start date of my VISA. But luckily, 4 days later I was leaving on holiday, which solved all other problems. I'm looking forward to coming back so I can finally start working in the labs and hopefully do some OCT”.

**Good luck Marie!**





## SECONDMENTS

[Netlas PhD Student Rene Riha](#)

**Recruited by:**

[Applied Optics Group \(AOG\)](#)

University of Kent, UK



**Secondment started on 11<sup>th</sup> October 2022**

[Superlum](#), Ireland

**Duration: two months**

**PhD Project:** Akinetic dispersive cavity mode locked laser (ADCML) tunable laser, with dual mode locking

**Secondment plan:**

1. Training in an industrial setting, organisation of research in a company combining manufacturing with research
2. Testing of emitters and optical component
3. Failure root cause investigation
4. Qualification testing of the light sources and understanding the quality control imposed by an industrial environment
5. The process of electronics and driver assembly, debugging and testing

*Good luck Rene!*





## AOG Journal Club

21st October 2022, 1 pm UK time

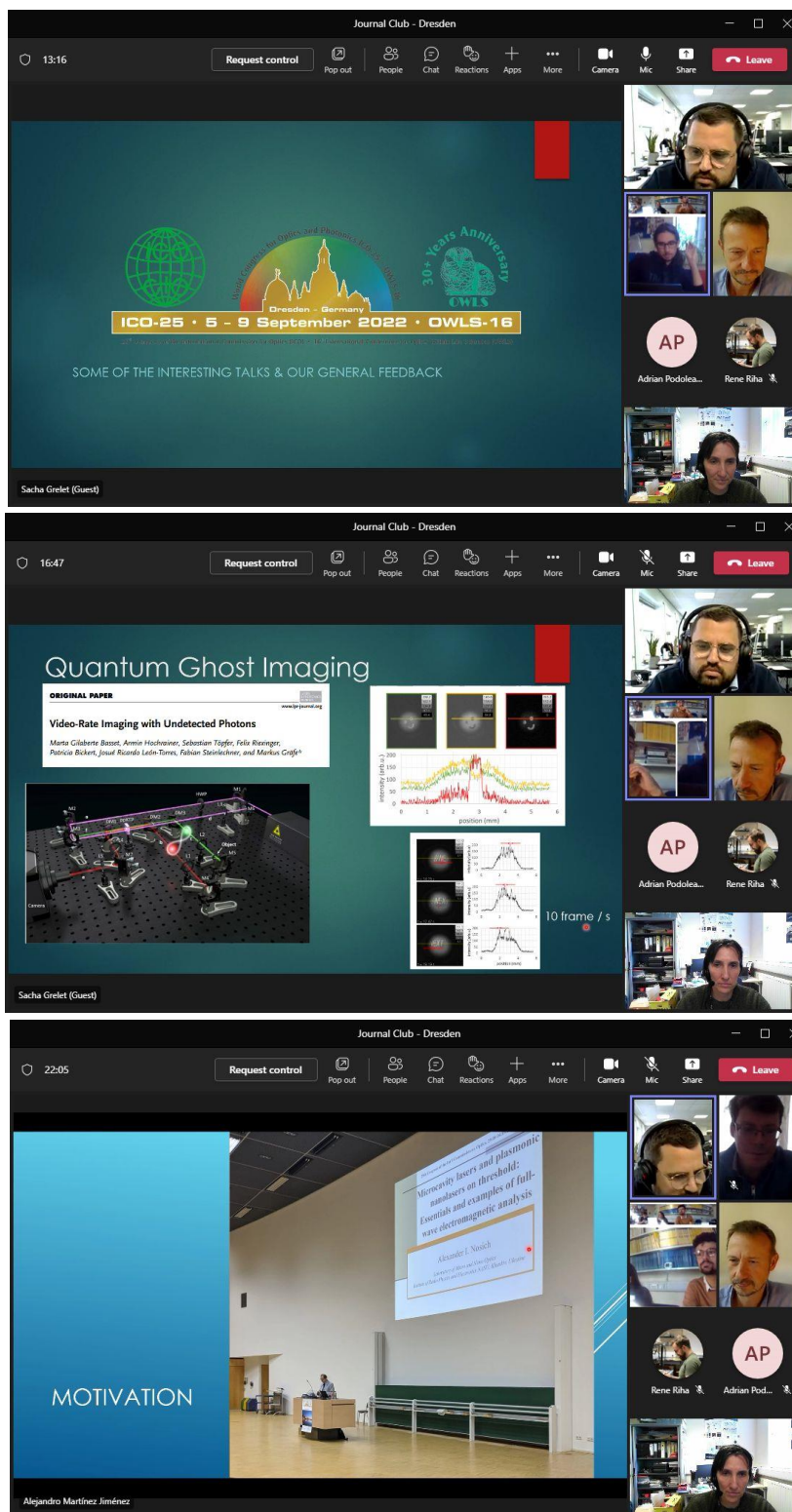
Feedback presentation from the [ICO-25 Conference](#) in  
Dresden (5-9 Sept 2022)



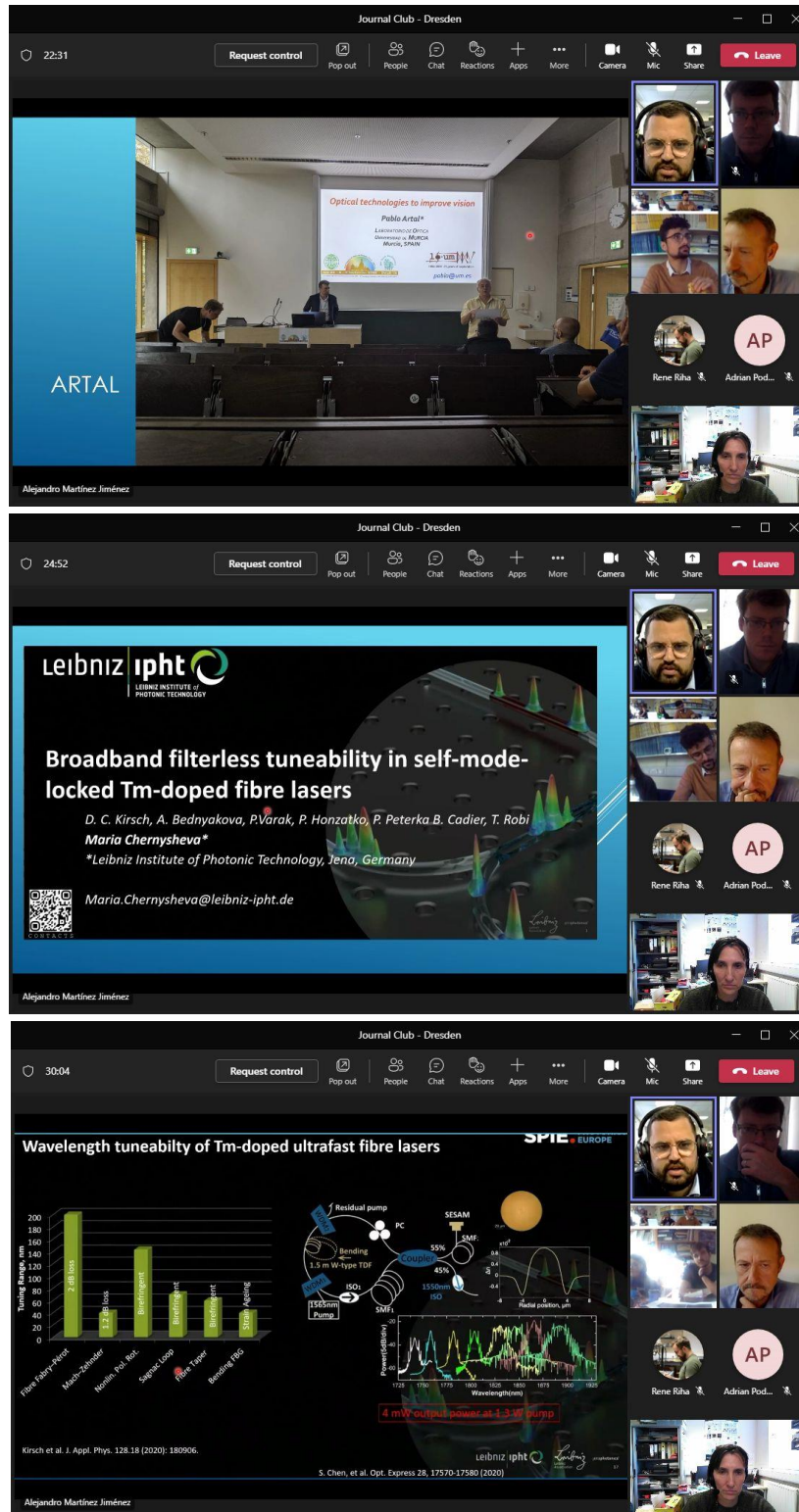
25<sup>th</sup> Congress of the International Commission for Optics (ICO) • 16<sup>th</sup> International Conference on Optics Within Life Sciences (OWLS)

With the occasion of the 25th Congress of the International Commission for Optics [ICO-25 Conference](#), Dresden, Germany (5-9 Sept 2022), a delegation of NETLAS PhD Students attended the event: Irene Rodriguez Lamoso and Mojdeh Vakili Tabatabaei from [Technical Univ of Darmstadt](#), Germany; Muhammad Ammar Javaid from [Immolume](#), Germany; Sacha Grelet from [NKT Photonics](#), Denmark; Alejandro Martinez Jimenez, Gopika Venugopal, and Rene Riha from AOG, [University of Kent](#), UK, together with NETLAS PI Coordinator Prof. Adrian Podoleanu and NETLAS Deputy Dr. George Dobre. You can find the conference online program [here](#): Plenary Speaker program [here](#), Plenary Award program [here](#), and the Keynote and Invited speakers [here](#).

On 21<sup>st</sup> October 2022 during the Journal Club organized by AOG, NETLAS PhD Students Sacha Grelet, Alejandro Martinez Jimenez, Gopika Venugopal, NETLAS PI Prof. Adrian Podoleanu and NETLAS Deputy Dr. George Dobre presented their feedback from the ICO-25 Conference in Dresden to the other AOG members. Print screen from their presentations will follow.



Print screens from the AOG Journal club on 21<sup>st</sup> October 2022



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## PUBLICATIONS

### 400 Hz volume rate swept-source optical coherence tomography at 1060 nm using a KTN deflector

**Alejandro Martínez Jiménez; Sacha Grelet;** Veronika Tsaturian; **Patrick Bowen Montague; Adrian Bradu and Adrian Podoleanu**

**Published in:** [IEEE Photonics Technology Letters](#) (Early Access)

04 October 2022

**DOI:** [10.1109/LPT.2022.3212015](#)

#### Abstract:

In this Letter, a swept-source optical coherence tomography (SS-OCT) instrument employing an innovative scanning protocol for high-speed volumetric rate imaging is demonstrated. The optical source is a tunable laser based on a supercontinuum source pumped with femtosecond pulses, followed by a time-stretched delay fiber. The instrument is equipped with an ultra-fast lateral scanner, based on a KTN crystal, driven at 100 kHz. The paper proves the utility of combining an ultra-fast lateral scanner with an ultra-fast swept laser to provide A-scans at a repetition rate of 40 MHz and an unprecedented 3D-OCT volume acquisition rate of 400 Hz. [Read More](#)

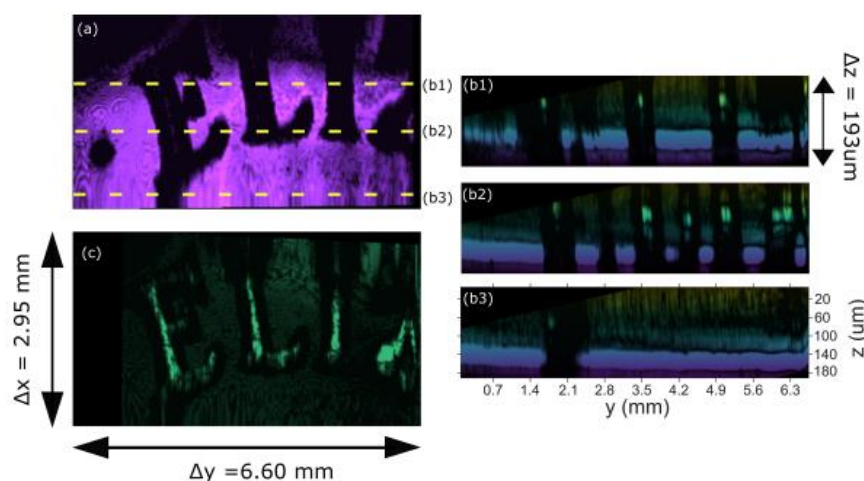


Fig. 5. **Tilt corrected OCT images.** (a) *En-face* image of the bottom of the letters. (b1-3) B-scans at lateral positions as indicated by dashed yellow lines in (a). (c) *En-face* image of the top of the letters.

## Case report: Optical coherence tomography for monitoring biologic therapy in psoriasis and atopic dermatitis

Ha-Wissel L, Yasak H, **Huber R**, Zillikens D, Ludwig RJ, Thaçi D and Hundt JE  
*Front. Med.* 9:995883.

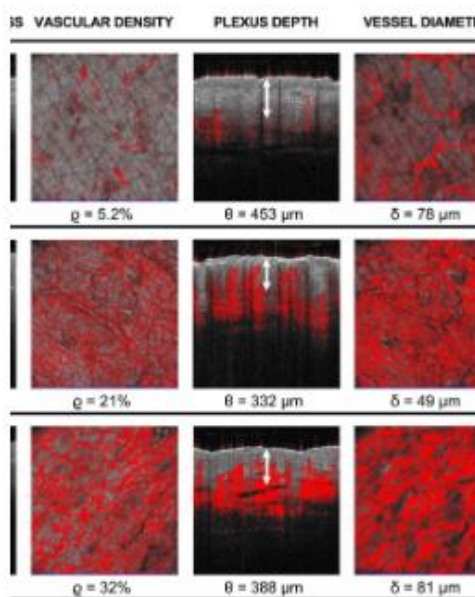
[doi: 10.3389/fmed.2022.995883](https://doi.org/10.3389/fmed.2022.995883)

**Published:** 27 September 2022.

Biologic therapies are increasingly used to treat chronic inflammatory skin diseases such as psoriasis and atopic dermatitis. In clinical practice, scores based on evaluation of objective and subjective symptoms are used to assess disease severity, leading to evaluation of treatment goals with clinical decisions on treatment initiation, switch to another treatment modality or to discontinue current treatment. However, this visual-based scoring is relatively subjective and inaccurate due to inter- and interobserver reliability. Optical coherence tomography (OCT) is a fast, high-resolution, *in vivo* imaging modality that enables the visualization of skin structure and vasculature. We evaluated the use of OCT for quantification and monitoring of skin inflammation to improve objective assessment of disease activity in patients with psoriasis and atopic dermatitis.

[Read More](#)

Figure 2



**Figure 2.** Optical coherence tomography (OCT) imaging parameters for objective quantification of skin inflammation. Epidermal thickness ( $ET$ ), vascular density  $\rho$ , plexus depth  $\theta$ , vessel diameter  $\delta$ , and vessel count  $N$  were calculated in unaffected skin (control) and in target lesions (psoriasis and atopic dermatitis) at baseline. Lesional inflammatory skin exhibited increased epidermal thickness denoted by green lines and alterations in vasculature in comparison to control sites. The vascular density is exemplarily shown at  $400 \mu\text{m}$  depth and the vessel diameter is shown at  $600 \mu\text{m}$  depth. The plexus depth is indicated by white arrows. The vessel count was performed at  $200 \mu\text{m}$  depth.

## [Intravascular optical coherence elastography](#)

Tianshi Wang, Tom Pfeiffer, Ali Akyildiz, Heleen M. M. van Beusekom,  
**Robert Huber**, Antonius F. W. van der Steen, and Gijs van Soest

Biomed. Opt. Express Vol 13, Issue 10, pp 5418-5433, September 2022

<https://doi.org/10.1364/BOE.470039>

Optical coherence elastography (OCE), a functional extension of optical coherence tomography (OCT), visualizes tissue strain to deduce the tissue's biomechanical properties. In this study, we demonstrate intravascular OCE using a 1.1 mm motorized catheter and a 1.6 MHz Fourier domain mode-locked OCT system. We induced an intraluminal pressure change by varying the infusion rate from the proximal end of the catheter. We analysed the pixel-matched phase change between two different frames to yield the radial strain. Imaging experiments were carried out in a phantom and in human coronary arteries in vitro. [Read More](#)

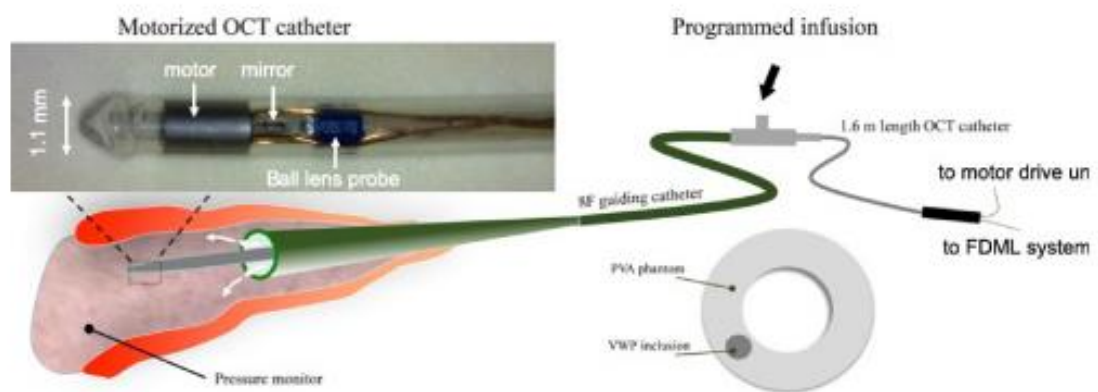


Fig. 2. Schematic diagram of the experimental set-up, shown with a photo of the motorized catheter, and cross-sectional diagram of the imaging phantom. PVA: poly(vinyl alcohol), VWP: VeroWhitePlus. The catheter is positioned via a guiding catheter, through which the flush media is delivered at a prescribed flow rate (white arrows) for pressure application.

## Crosstalk-free all-optical switching enabled by Fano resonance in a multi-mode photonic crystal nanocavity

Quentin Saudan, Dagmawi A. Bekele, Gaoneng Dong, Yi Yu, **Kresten Yvind**, Jesper Mørk, and Michael Galili

Opt. Express Vol. 30, Issue 5, pp 7457-7466 (2022)

<https://doi.org/10.1364/OE.449588>

We demonstrate all-optical switching using a multi-mode membranized photonic crystal nanocavity exploiting the free-carrier induced dispersion in InP and the sharp asymmetric lineshape of Fano resonances. A multi-mode cavity is designed to sustain two spatially overlapping modes with a spectral spacing of 18 nm. The measured transmission spectrum of the fabricated device shows multiple asymmetric Fano resonances as predicted by optical simulations. The capabilities of the device are benchmarked by comparing a wavelength conversion from 1538.2 nm to 1565.2 nm with a single-mode wavelength conversion at 1566.2 nm on the same device.

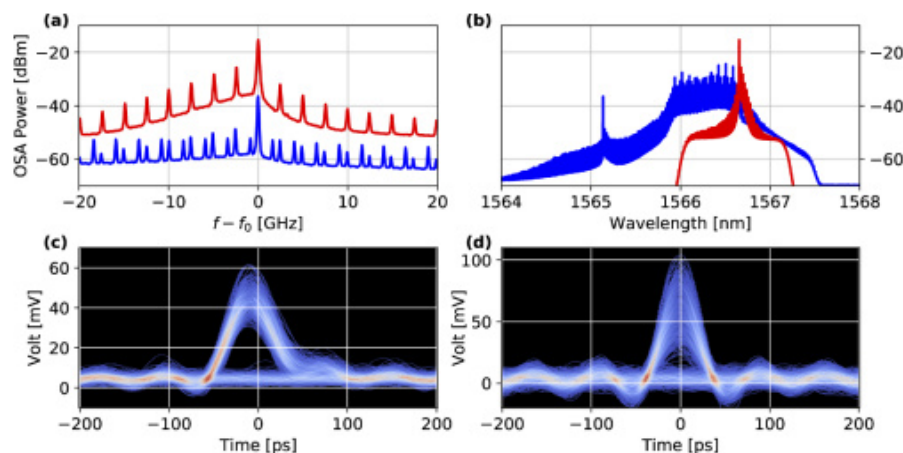


Fig. 6. a) High-resolution spectra of the output modulated signal centered at the probe wavelength for the self-mode(blue) and cross-mode(red) experiment. b) Full unfiltered spectrum showing the pump and probe in blue and the probe in red for their respective cases. b) and c) Eye diagrams respectively for cross-mode and self-mode experiments at  $-37.9$  dBm received power.



## **Student Theses -Optical Coherence Tomography News**

### Applications of Visible-Light Optical Coherence Tomography in the Eye and Brain

By Lisa Beckmann



Northwestern University, Evanston, Illinois,  
USA

Optical coherence tomography (OCT) is a non-invasive, label-free technology that can image biological tissues in vivo with micrometer-scale resolution. Since its development in 1991, OCT has been successfully commercialized and widely adopted in the clinic for the diagnosis and monitoring of retinal diseases. A typical commercial OCT system may have an axial resolution of 5-10 micrometers. By shortening the wavelength range of the light source, visible-light OCT (vis-OCT) enables an improved axial resolution of 1-micrometer, improved tissue scattering contrasts, and additional functional information. The bulk of this dissertation focuses on vis-OCT imaging of the Schlemm's canal and limbal vascular network in mice in vivo. To this end, necessary system modifications, experimental methods, and image processing algorithms are presented. The size of the Schlemm's canal in response to IOP changes and the presence of blood reflux was quantified. A machine learning model was developed to automatically segment the Schlemm's canal from vis-OCT datasets. Ultimately, vis-OCT was used to analyze the role of FOXC2, a transcription factor implicated in congenital glaucoma, in Schlemm's canal morphogenesis. The potential of vis-OCT in imaging other aspects of the anterior segment, such as the cornea and limbal stem cell niche, are also included, laying the groundwork for future studies in animal disease models. Beyond the anterior segment, a method to overcome vis-OCT's limitations in retinal imaging in young mice is shown and vis-OCT is applied to long-term monitoring of the mouse cortex following temporary ischemic stroke, demonstrating its ability to track vessel density and oxygen saturation changes over time.

[Read full dissertation](#)



**NETLAS PI Prof. Adrian Podoleanu**  
**elected to the Royal Academy of**  
**Engineering, UK**

*Fellows are recognized for their outstanding research and scholarly contributions across the optical sciences*

**Professor Adrian Podoleanu FREng**

Head of the Applied Optics Group, Professor of Biomedical Optics,  
University of Kent



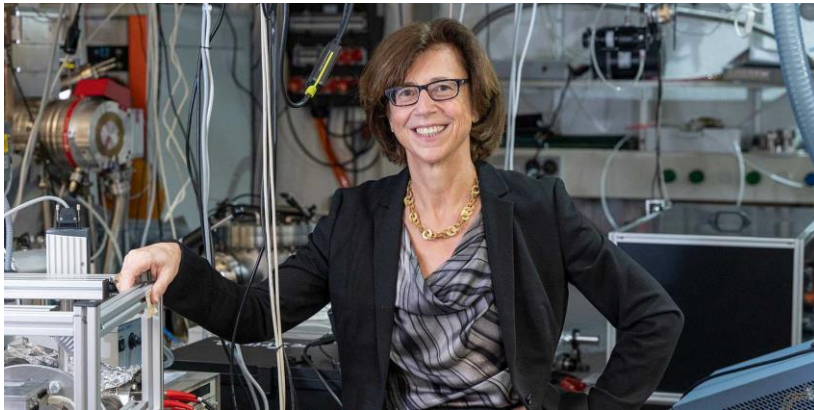
Professor Adrian Podoleanu has made outstanding contributions to engineering research, education and practice for the last three decades.

He has developed **unique en-face optical coherence tomography (OCT) applied to high resolution non-invasive medical imaging**, especially of the human retina. His impact on the OCT field is evidenced by his **significant research funding, research publications, large numbers of inventions, translation of en-face OCT technology to industry and clinic, awards and fellowships**. He has established and leads **major national and international consortia and collaborations**, generating innovative advances in engineering with significant industrial impact whilst training and supporting many early-stage researchers.



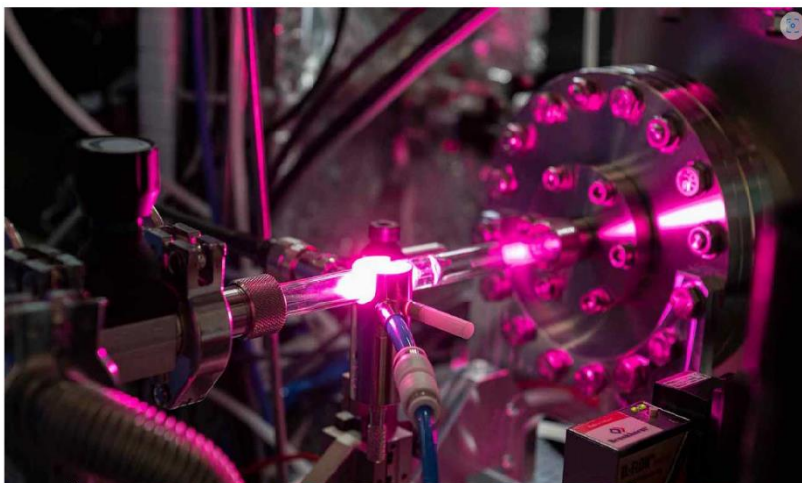
## “Swiss Nobel Prize” for Ursula Keller

The physics **professor Ursula Keller** has received the **Swiss Science Prize Marcel Benoist** for her pioneering work in ultrafast lasers. Her theoretical models and experimental discoveries have repeatedly tested the boundaries of ultrafast laser physics.



Ursula Keller has received the Swiss Science Prize Marcel Benoist for her pioneering work in ultrafast lasers. (Image: Heidi Hostettler)

Ever since the laser was invented, scientists have been keen to use the technology – to transform materials, for example. Unfortunately, this was not possible with continuous-wave lasers, as they were too imprecise, and unsuitable for heat-sensitive materials. The eventual solution was to use a pulsed laser beam, although this required more complex technology. **ETH Professor Ursula Keller** solved the problem by using semiconductors, and in **1991 invented SESAM technology** (Semiconductor Saturable Absorber Mirror). [Read More](#)



**ETH-Professor Ursula Keller** invented in 1991 **SESAM technology** (Semiconductor Saturable Absorber Mirror). SESAM makes it possible to send light pulses from solid-state lasers at femtosecond intervals. (Image: Heidi Hostetter / ETH Zurich)

## Nobel Prize in Physics 2022

The Nobel Prize in Physics 2022 was awarded jointly to [Alain Aspect](#), [John F. Clauser](#) and [Anton Zeilinger](#) "for experiments with entangled photons, establishing the violation of Bell inequalities and pioneering quantum information science"

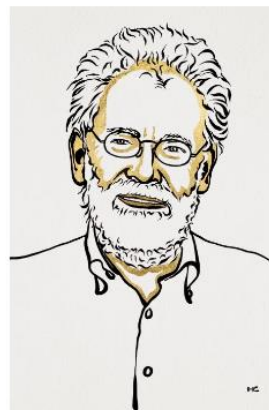
### The Nobel Prize in Physics 2022



III. Niklas Elmehed © Nobel Prize Outreach  
Alain Aspect  
Prize share: 1/3



III. Niklas Elmehed © Nobel Prize Outreach  
John F. Clauser  
Prize share: 1/3



III. Niklas Elmehed © Nobel Prize Outreach  
Anton Zeilinger  
Prize share: 1/3

## Announcement of the 2022 Nobel Prize in Physics

[Read more about this year's prize:](#)

**Popular science background:** [How entanglement has become a powerful tool \(pdf\)](#)

**Scientific Background:** ["For experiments with entangled photons, establishing the violation of Bell inequalities and pioneering quantum information science" \(pdf\)](#)



# OPTICS & PHOTONICS NEWS



## [Optics & Photonics News Magazine](#) [October 2022 Issue](#)

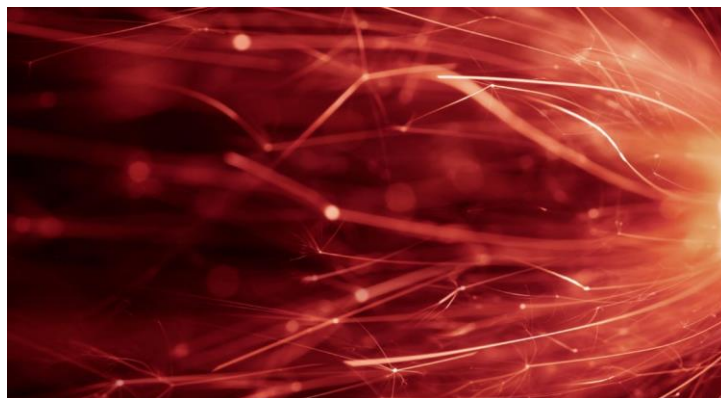
- [The Quest for Noninvasive Glucose Monitoring](#)
  - [New Aids for Color Vision Deficiency](#)
- 

[Browse all Issues](#)



## [Flexible lasers for two-photon holographic optogenetics](#)

In [optogenetics](#) (a genetic method to turn select neurons on or off with light), it is essential to have access to femtosecond optical power with high reliability.



The [aeroPULSE FS laser portfolio](#) provides neuroscientists with flexible power choices and peace of mind that the laser can be relied upon to perform on demand.

The aeroPULSE FS laser is an essential photostimulation tool in any optogenetics lab!

[Read More](#)



## Webinars

We recommend our NETLAS PhD students to attend these upcoming webinars (part of the free Thorlabs webinar series). Thorlabs' Digital Webinars are covering a variety of topics, each with a dedicated live Q&A session, and have a common goal of providing educational, engaging, and valuable content.

**THORLABS**  
**Recorded**  
**Webinars**

See what you missed in 2021!

Mid-IR White-Light Laser:  
Design and Applications

Presented by  
Dr. Raza Islam,  
Fiber Laser Division Manager

Serving the Intellectually Curious **THORLABS**

### [Thorlabs Previously Recorded Webinars](#)

Thorlabs' Digital Webinar series began in mid-2020. Each webinar and Q&A session is recorded and added to the archive on [Thorlab's web page](#).



[Coming Soon!](#)

## [Fluoride Optical Fibers for the Mid-IR](#)

Thorlabs manufactures an extensive family of mid-IR fluoride fiber using proprietary techniques that provide world-class purity, precision, and strength. These techniques give us excellent control over the fibers' optical and mechanical properties, allowing a wide range of configurations to be drawn. Dave Gardner, Senior Engineer, returns to highlight these techniques, the history of fluoride fiber R&D, and the state of fluoride fiber technology today and in the future.



Presented by Dave Gardner, Senior Engineer,  
Thorlabs Advanced Photonics

[Bio](#)

**Click to  
Register!**



[Fluoride Fibers](#) Are Manufactured In-House



**Coming Soon!**

## Quantum Optomechanics at the Standard Quantum Limit

Professor Thomas Corbitt of Louisiana State University (LSU) joins us to talk about his experience and knowledge working with measurements of quantum noise. He will discuss a series of experiments using microfabricated epitaxial mirrors suspended on single-crystal cantilevers, a method to reduce the limits to the sensitivity of interferometers using squeezed lights, and more.



Presented by Thomas Corbitt, Professor, Louisiana State University

[Bio](#)

**Click to Register!**



Thorlabs Provides Photonics Equipment for [Quantum Technologies](#) and Applications



## CONFERENCES

NETLAS Beneficiary [Innolume](#) has visited the exhibition **European Conference on Optical Communication (ECOC)**, Basel, Switzerland, 18 – 22 September 2022.



[Innolume](#): “It was unique to meet so many professionals in field of optical communications. If you did not get a chance to talk to us, please learn more about our [Datacom solutions](#) “.





## CONFERENCES



### 5th World Congress on Lasers, Optics and Photonics June 21-22, 2023 Valencia, Spain

*5th World Congress on Lasers, Optics and Photonics (WCLOP 2023)* during *June 21-22, 2023* at *Valencia, Spain* with the subject of “*An Insight into the Recent Research Technologies in Lasers, Optics and Photonics*”. *WCLOP 2023* conference will strive hard to create a platform of collaborations and meetings where all the scientists, academicians, lab experts, industry people and young researchers will meet at one place to share and gain knowledge through panel discussions, technical scientific sessions, workshops and Poster presentations.

Laser Optics and Photonics is a wide subject which has its unique properties through which it has its own role in different fields such as *Medical Surgeries, Medical Treatments, a wide variety of Industrial Applications, Laser Ablation, and Communication, Network Field, Photonics Advancements and much more.*

**Abstract Submission Deadline :**

**March 25, 2023**

**Early Bird Registration :**

**January 30, 2023**

**Mid Term Registration :**

**May 24, 2023**

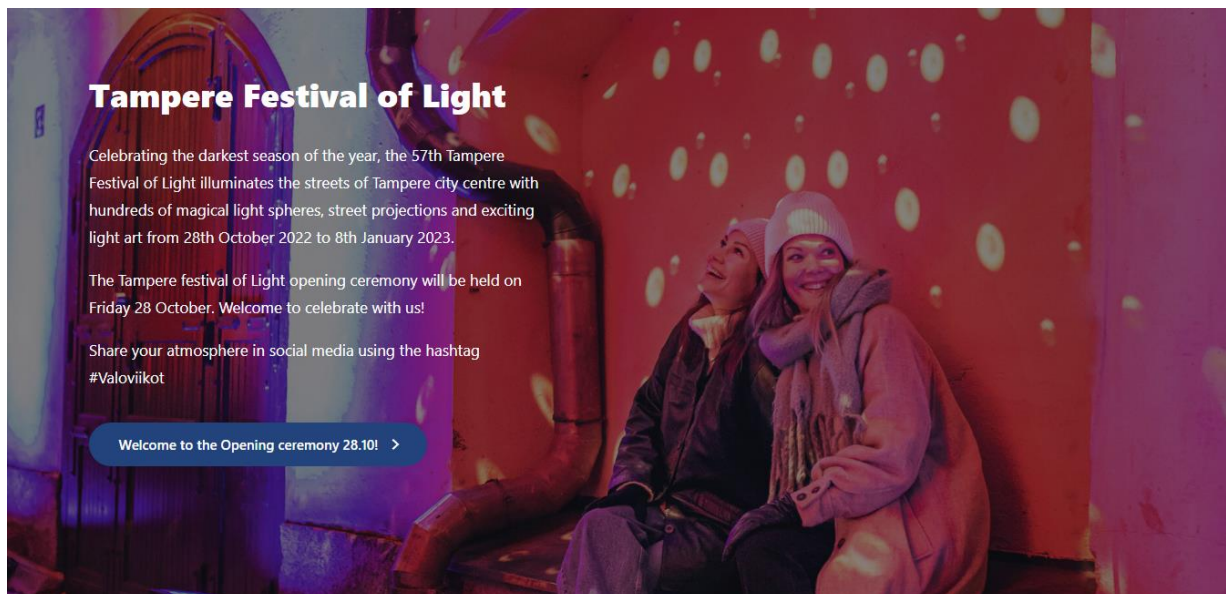


## **Tampere Festival of Light**

**Celebrating the darkest season of the year, the 57th Tampere Festival of Light in Finland illuminates the streets of Tampere city centre with hundreds of magical light spheres, street projections and exciting light art from 28th October 2022 to 8th January 2023.**

**The Tampere festival of Light opening ceremony was held on Friday 28 October.**

**Read about the History of the Festival [here](#) and see the Light Gallery Exhibition [here](#).**





## NETWORK EVENTS

**We invite all partners to communicate events and ideas to place in our newsletter**

**Please send any piece of news, on NETLAS activities or anything else happening that may be of interest to the NETLAS community, to Ramona Cernat: [R.Cernat@kent.ac.uk](mailto:R.Cernat@kent.ac.uk) and to Adrian Podoleanu: [ap11@kent.ac.uk](mailto:ap11@kent.ac.uk)**