



NETLAS NEWSLETTER 3-2022

NETLAS Winter School



NETLAS Winter school
took place at Technical
University of Denmark
(DTU), Denmark
1st ~ 4rd March 2022

The School at DTU was delayed several times due to the COVID19 pandemic but finally materialized March 1-4, 2022. The number of newly infected in Denmark was high in the months leading up to the school, but the number of people hospitalized due to COVID was very low, so the restrictions had been lifted. However, the risk of quarantine and possibly new variants meant that the planning of the school was difficult since the number attending physically was uncertain and the format had to be hybrid with the possibility to go all-online on short notice. The venue was therefore chosen to be DTU campus where the impact of a cancellation would be the least.

In the end 14 out of the 15 NETLAS ESRs and a couple more students made it to DTU which was more than we had hoped for. The event was also broadcasted by zoom so the ESR at home and a number of seniors could participate.

The first and last days of the event were devoted to general skills while the two middle days were aimed at the technical skills including a 3-hour tutorial by Robert Huber and the presentations from all the ESRs (see program on page 2). There was also a tour to the optical labs and the [cleanroom](#).

The organizers had also ensured exercise for everyone with long walks for the dinners 😊.

In our view, the event was highly successful. It was clear that the students have missed physical meetings. It was a pleasure to encounter the old problem of getting people back from the coffee breaks to the presentation room.

See you in Darmstadt if not before...

The DTU organizers:

Kresten, Liza, Lotte, Masoud, Haris, Esteban, and Arnhold.

Wishing the best for the Ukrainian people and the restoration of peace in Europe

Programme

Day 1 – TUESDAY, MARCH 1

8:00–12:00	Arrival to Copenhagen
12:00–13:00	Lunch
13:00–13:20	Welcome by Kresten Yvind
13:20–14:50	Stuart Wright, AIS sprog (DK, external): How to write a scientific paper (1 st part)
14:50–15:10	Break
15:10–16:40	Stuart Wright, AIS sprog (DK, external): How to write a scientific paper (2 nd part)
16:30–18:00	Free time, NETLAS Discussion
18:30–20:00	Dinner

Day 2 – WEDNESDAY, MARCH 2

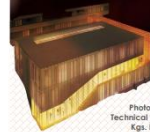
8:00–9:00	Breakfast at hotel and travel to DTU
9:00–12:00	Robert Huber, University of Lübeck (DE): Swept Source Optical Coherence Tomography: Systems and Light Source Technology (Online)
12:00–13:00	Lunch
13:00–15:00	ESR presentations 1
15:15–16:00	Kresten Yvind, DTU (DK): MEMS VCSELs
16:00–17:00	Poster session
17:00–18:00	Free time, Discuss Secondments etc.
18:30–20:00	Dinner

Day 3 – THURSDAY, MARCH 3

8:00–9:00	Breakfast at hotel and travel to DTU
9:00–9:45	Taran Talia, London NW UNIV (UK): OCT for ear, nose, and throat
10:00–12:00	ESR presentations 2
12:00–13:00	Lunch
13:00–15:00	Photonics department lab tour
15:15–16:00	Mette Mogensen, Bispebjerg hospital (DK): Diagnostic imaging of skin cancer and other skin diseases
16:15–16:45	Herman Kahle, Tampere University (FI): Gain media and devices
17:00–17:30	Julien Camard, Kent University (UK): Experiences from organizing a student lead conference
18:30–20:00	Dinner

NETLAS Winter School 2022

Next generation of Tunable LASers
for optical coherence tomography



Photonics Department,
Technical University of Denmark,
Kgs. Lyngby Denmark



1- 4 March 2022



ESR Presentations

ESR Presentations 1 – WEDNESDAY, MARCH 2

Time	Speaker	Title	Affiliation
13:00 – 13:15	Alejandro Martinez Jimenez	Passive mode-locking lasers using the nonlinear polarization rotation effect as a saturable absorber	Kent Uni.
13:15 – 13:30	Marie Klüts	850 nm Fourier-Domain Mode-Locking Laser	Univ. of Lübeck
13:30 – 13:45	Irene Rodriguez Lamoso	Large tuning range Lasers based on FP-MEMS and MEMS-VCSELs for OCT applications	TUDA
14:00 – 14:15	Gopika Venugopal	Development of Swept Source using a galvo scanner spectral filter in the wavelength ranges 670 and 850 nm	Kent Uni.
14:15 – 14:30	Andrey Anikeev	High Power Master Oscillator Power Amplifier (MOPA) devices based on QW structures at 1060 nm	Superlum Diodes
14:30 – 14:45	Rene Rha	Dual resonance sweeping mechanism in laser swept sources for OCT	Kent Uni.
14:45 – 15:00	Julien Camard	OCT and multimodal approach to characterize the dynamics of early-stage mammalian embryos	Kent Uni.

ESR Posters – WEDNESDAY, MARCH 2

Time	Speaker	Title	Affiliation
16:00 – 17:00	Muhammad Ammar Javid	Sampled Grating Distributed Bragg Reflector Laser Diodes for Optical Coherence Tomography	Innolume
16:00 – 17:00	Muhammad Asim Bashir	Super Broadband FDM-L Swept Source for Optical Coherence Tomography	Univ. of Lübeck
16:00 – 17:00	Mojdeh Vikali	Development of electro optically tunable LASERS with large frequency coverage	TUDA
16:00 – 17:00	Ifte Kharul Alam Bhuiyan	Progress in the development of broadband gain chips operating at 2-3 μ m wavelength range (Online)	Tampere Uni.
16:00 – 17:00	Haris Ashraf	Ultra-narrow linewidth swept sources at 850 nm based on acousto-optical tunable filter (AOTF) technology	DTU

ESR Presentations 2 – THURSDAY, MARCH 3

Time	Speaker	Title	Affiliation
10:00 – 10:15	Masoud Payandeh	Long Wavelength MEMS VCSEL for Swept Source OCT	DTU
10:15 – 10:30	Sacha Grellet	High-speed all-normal dispersion supercontinuum time-stretched pulse swept source for OCT at 1 μ m	NKT and Kent Uni.
10:30 – 10:45	Esteban Andres Proano	Electrically pumped MEMS VCSEL	DTU
10:45 – 11:30	Philipp Talar-Mathes	Red semiconductor membrane external-cavity surface-emitting lasers as potential coherent SS for OCT	Tampere Uni.
11:15 – 11:30	Adrian Fernandez Uceda	Axial Motion Compensation for Master/Slave Optical Coherence Tomography	Kent Uni.
11:30 – 11:45	Arnold Simonson	Bi-directional electrostatic MEMS tunable VCSELs	DTU



NETLAS Winter School 2022

Day 4 – FRIDAY, MARCH 4

8:00–9:00	Breakfast at hotel and travel to DTU
9:00–11:00	Merian Merian Skouwe Haugwitz-Hardenberg-Reventlow, DTU (DK): Responsible conduct in science
11:15–12:00	George Dobie, Kent University (UK) Recent developments in laser safety
12:00–13:00	Lunch
13:00–	Departure

Meeting location: DTU building 101, Meeting center S01, Kgs. Lyngby, Denmark.

Hybrid access:



Contacts:

Kresten Yvind, mobile +45 23712241, kryv@dtu.dk, office building 345A/174
Elizaveta Semenova, mobile +45 28770360, esem@dtu.dk
Secretary: Lotte Lykke Pedersen, Phone +45 45255706, lottp@dtu.dk
Haris Ashraf, Phone +45 31867621, h.ashraf@dtu.dk





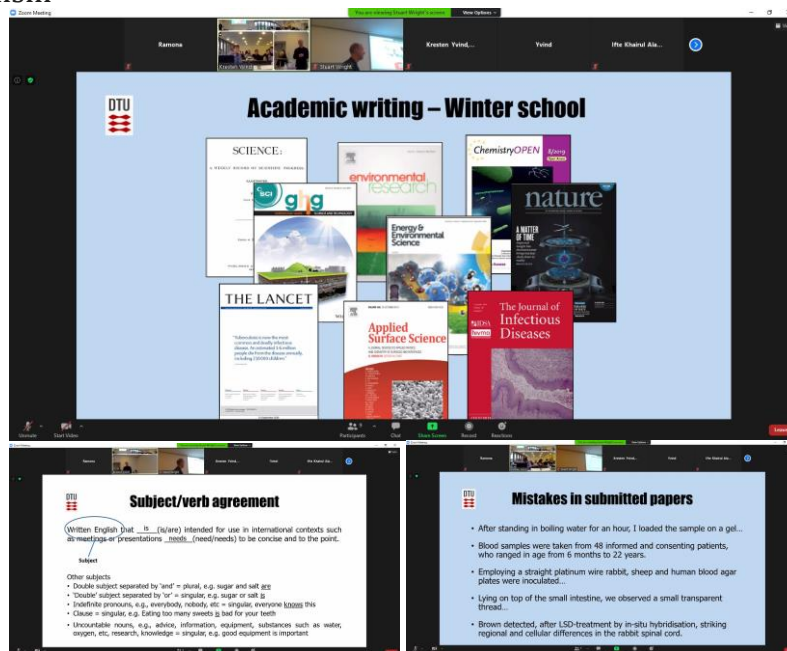
A lecture called “Academic English for scientific papers” took place on the first day of the Winter School. The lecture was given by a native English speaker with specialization in scientific writing, working in the company called AIS Sprog ([AIS Sprog \(ais-sprog.dk\)](http://ais-sprog.dk)), lecture organized and paid by DTU. To prepare for this course the ESRs were asked to get ready with two tasks:

- 1) to take the Oxford Placement Test, in order to adjust the course level (the instructions were given before the School started)
- 2) to write a synopsis of their PhD project in two pages or 1,000 words and send it to the lecturer before the School started.

These documents gave the lecturer a sample of the ESRs academic writing, an insight into the possible mistakes the ESRs could make and allowed him to select suitable topics for the course. A week after the course, the lecturer has returned the marked ESRs texts with feedback and mistake explanations.

The four hours’ lecture with breaks contained the following elements:

- What is good scientific writing: identifying an example and highlighting the features. Using reading ease statistics in Word.
- The Paramedic Method for editing texts
- Punctuation - quick guide to comma usage
- Text cohesion - linking words
- Hedging - cautious writing
- Subject/verb agreement
- Parallelism



All the scientific and general skills talks were recorded with the presenter’s consent. They are accessible for the ESRs under the NETLAS Teams channel created for the NETLAS students.



NETLAS PhD Students' experience at the Winter School

"Winter School March 2022 at DTU has exceeded all my expectations. Being surrounded by so much knowledge, learning from one another, discovering new topics, new research, has been a very rewarding experience. The organization managed by DTU was perfect, we didn't need to think about anything, plenty to eat, enough tea and coffee for at least 3 more winter schools.

Getting to know all the PhD students was the most important goal for me. I was so happy to wake up every morning to come and join you, to learn a little bit more about each projects, even if the get-going mornings were not that easy, some of the ESRs might recall this.

Long story short, it was wonderful to meet you all, I was very sad to leave, but knowing that our future summer school is coming very soon fills me with joy. I can't wait to see everyone's progress in Darmstadt!

-I hope I got my commas right-

PhD9 Marie Klufts,

Host: University of Lübeck "



“The Winter School at DTU March 2022 has been the first in-person event for most early-stage researchers (ESRs) since the beginning of the PhD. It was an opportunity to exercise the soft skills we learned during the first year and show our research to the NETLAS community. We have done that using science meetings and all sorts of virtual meetings; however, this cannot be compared to in-person meetings. Sometimes people don’t want to add some pressure to your presentation and don’t ask their questions; in those cases, in-person meetings are ideal because they can talk to you after the presentation, not to add the pressure. For this kind of networking, in-person meetings are pretty valuable. And in my case, not many questions were asked during the presentation. However, in the coffee breaks, the people from my secondment started to propose new things to my project, which was quite helpful! Apart from that, the confidence between the NETLAS community has improved and for that reason, more collaboration will happen”!

PhD13 Alejandro Martinez Jimenez,

Host: University of Kent, Applied Optics Group (AOG)

“Winter School was a great experience to meet all ESRs together (well, almost all, apart from one!) and have the chance to chat with them from scientific but also social point of view. I think that other scientific talks than ESRs, especially scientific writing on the first day was good to have. Before school I personally had a tough time doing all preparations and required tasks but now I think that it was really worth it. The only objection that I can say, is that I would have preferred to have more experimental and lab parts than they were prepared, because I was really fascinated with the cleanroom facility of DTU and I wanted to spend more time than just seeing through a window and a short explanation. But I completely understand the timetable and it was a good idea that was included in the program.”

PhD8: Mojdeh Vakili Tabatabaei,

Host: Technical University of Darmstadt (TUDA)



‘Winter School at DTU was a very interesting experience for me. I had never been in an event like this before. It was really great meeting in person all our colleagues from the ITN and being able to share with them and the rest of assistance, which are professionals in our topic from one angle or the other. The school was very active, with a variety of proposals that made it pleasant. We did enjoy the workshop and all the presentations. I found specially fascinating the ERS presentations, I liked being able to present my work to my colleagues and learning about what they are doing and how they are doing. I feel that I have learned a lot in just a few days in a very relaxed way. We came back with a bunch of ideas for the Summer School that will be here in TU-Darmstadt’.

PhD7: Irene Rodriguez Lamoso,

Host: Technical University of Darmstadt (TUDA)

‘This was my first experience in international speaking. it was definitely a valuable experience. I liked the organization of this event and the selection of interesting lectures. I remember the tour of the laboratories of the Institute, it was informative. I was also impressed by the scale of the clean room and the campus as a whole. And of course I met interesting people from different parts of the world, I hope next time at the summer school it will be exciting. I liked Denmark and I think that someday I will return here for a trip’.

PhD1: Andrei Anikeev,

Host: Superlum Diodes



“The winter school at DTU was very unique learning opportunity for me, it helped me to feel a bit more confident. The writing course delivered helped me better understand how to structure my technical writing. Lectures from experts on OCT swept lasers and medical use provided insight on how to use our research in real world. Also, it was great to be at DTU and visit some places in Copenhagen. The school provided me with an opportunity to make new friends and connect with other PhD students. I was much inspired from other researchers and felt very fresh to go back and focus on my research. I hope we have more events like this in our NETLAS community”.

PhD11: Muhammad Ammar Javaid,

Host: Innolume

‘Overall it was a great experience to get to know my colleagues from the NETLAS project in person and to share our advances in our respective projects. Now I have a better idea about what are they doing and the challenges they have encountered so far. Besides the knowledge gained from the presentations and lectures, the event helped to build up the spirit of collaboration’.

PhD4: Esteban Andres Proano Grijalva,

Host: Technical University of Denmark (DTU)



"I was kindly invited by Netlas to take part into the Winter School, even though I am not a member of the network. I really enjoyed the event, and I made the most of this great opportunity! I especially liked the interaction with the other students, they are all a very talented and friendly bunch! I paid close attention to their presentations, and I was really amazed by the innovative nature of their various projects. My project is a little bit more oriented towards life sciences, as I am more a laser user than a laser maker. The technicity of the talks was sometimes challenging, but nevertheless very much among my research interests.

I had the chance to present my experience at organising a student conference, along with my AOG colleague PhD Student Adrián Fernández Uceda during a full hour. We chose to design a dynamic, colourful presentation, because it was a non-research talk, and because it was scheduled late in the day! We really hope that we managed to demonstrate that any group of students can craft such event with a bit of motivation and organisation. Most eyes were still open when the presentation ended so we believe it aroused interest in the audience!

It was a very enriching experience overall! It was really impressing to visit the clean rooms and learn about the multitude of fabrication processes at DTU. Thanks to all organisers, the Netlas committee, and especially to Kresten for hosting a successful event at DTU!"

PhD Student Julien Camard,

Host: Applied Optics Group (AOG)



"NETLAS winter school at DTU was a great experience for me. It gave me an opportunity to meet field experts and other PhD students in my field. The technical writing session will help me with observations, instructions, and suggestions in a more logical and technical manner, as well as in conveying my own ideas. The technical lectures from field experts were amazing, and I came to know how I could use my research ideas in industry, which can help mankind. I also experienced top-notch facilities in the DTU, which was my first experience. To cut the whole story short, it was one of my best experiences where I gained tons of knowledge and boosted my interest and confidence, which will help me focus more on my research topic. Such kinds of fruitful events are essential, so I hope the NETLAS community will have more events like this".

PhD10: Muhammad Asim Bashir,

Host: University of Lübeck

"From applying for a visa to receiving the visa only 5 days just for the school, to travelling to Denmark and meeting all the wonderful Netlas members, my experience at the Netlas winter school was fantastic. This was my first Netlas event in person, and I enjoyed meeting my fellow ESRs and hearing about their research and experiences. All the talks were highly interesting and informative, and it was a great opportunity for me to meet new people doing research similar to me. I really enjoyed the lab visits especially visiting the clean room and getting a small insight about the same. Because I enjoy visiting new places, this event also provided me with the opportunity to tour some sites of the beautiful Copenhagen city with my AOG members and fellow ESRs".

PhD15: Gopika Venugopal

Host: University of Kent, Applied Optics Group (AOG)



“Attending NETLAS winter school 2022 was my first experience since I started my PhD program at DTU. It was a professionally rewarding experience for me. In addition to socializing with colleagues from other institutions the two main reasons to attend this winter school were to hear presentations and to converse with other researchers. Listening to presentations informed me of what others are doing, inspired research ideas of my own, and exposed me to different styles of presentation.

As my career advances, I learned that even though listening to the talks is extremely valuable, hallway conversations can be even more fruitful. Do everything I can to cultivate such conversations: that is one of my chief jobs at the conference and workshop.

During the winter school, I also told others about my research. Think about how to frame my work to convey how interesting it is. This is an important skill not just for a conference but in general. Plan my pitch, practice it with my friends, then further refine it through interactions at the conference. I learned a lot from talking about my work — seeing what confuses people and receiving their ideas and suggestions. I also learned a lot by listening and by asking questions. Keep an open mind, and try to deeply understand their research”.

PhD5: Masoud Payandeh,

Host: Technical University of Denmark (DTU)



“The winter school was a unique experience to finally achieve a first get together with the other ESRs included in NETLAS. We have already had some previous actions, such as meetings in which we would talk about our work, or a common podcast. But I can now tell, that none of it was comparable to how much networking was achieved within one week of a winter school. In my opinion, having in-person-events is a crucial necessity, and a winter school like this highlights the importance it has to develop cutting-edge technology. Most of the networking is not done by listening to talks (which were extremely fruitful, given by important developers of the OCT-technology), but by talking to others within the breaks and evenings.

I attended workshops that were not even remotely as inspiring as this winter school was! I came back full of ideas that I was thrilled about to further discuss and test the most promising in the labs.

It was a unique experience, and I am very much looking forward to having the summer school in Darmstadt also in person”.

PhD3: Philipp Tatar-Mathes

Host: Tampere University



"This winter school demonstrated the power of an Innovative Training Network in all aspects. On the aspect of training, we - the students - had the opportunity to learn from experts on very different topics, from the technical fundamentals of laser science to the end-use by clinicians, including communication, safety, and ethics. We also presented our research during talks, practicing this difficult task that is central to a scientist's journey.

Yet, more than only delivering efficient training, this school succeeded in gathering most of the ESRs at DTU, in a single room. This gave me, more than ever, the feeling that we are a community, a Network. We are a group of young scientists excited by innovation, motivated to push the limits of science and bring answers to challenges that our society faces. It also exhibited that we are working on different aspects of one topic. Getting the big picture gave me even more motivation and excitement for my research. Also, the multiple small chats in the hallway were very productive to combine our experiences to answer the issues that one ERS is facing or to imagine future collaborations. This winter school was a fantastic event, and I am looking forward to joining the next NETLAS meetings."

PhD12: Sacha Grelet,

Host: [NKT Photonics](#)



"This is my pleasure to share my experience about the Winter School arranged in DTU. In this event, I got an opportunity to share a scientific poster based on my PhD works and I was able to interact scientific minds of interests. I, especially, liked the lectures delivered by the expert people around Europe. It was also quite intriguing to listen my Marie Curie Fellows who are driving their skills up in building next generation tunable laser devices for OCT imaging in extended domain. Though I joined the event online but during some specific parts of it, I was just not listening but also participating the interactive sessions. NETLAS consortium has brought me to a scientifically diverse platform to meet expert people from both Academia and Industries. For me, the Winter school is big space just not for learning but also socializing with scientific bright minds. I hope, I would be able to contribute more to such future events. My sincere gratitude to Prof. Kresten Yvind, Prof. Adrian Podoleanu and Dr. Ramona Cernat for their great contribution behind organizing the event".

PhD2: Ifte Khairul Alam Bhuiyan,

Host: Tampere University



"I am really glad of having had the chance to attend NETLAS' Winter School. It was very interesting to learn about the newer laser technologies being developed by everyone in the program, opening the possibility to exciting collaborations and ideas, even more when my line of research is in the other end, using such technologies for imaging devices. DTU's facilities were incredible and the program structure was really well executed. One of the most impressive bits of the event was actually the commitment and joy of the NETLAS' students regarding their research, showing such a strong stance in their respective fields. Overall it was a fantastic experience and hope that the talks in the application of these lasers were as eye-opening for them as their talks were to me!"

PhD Student Adrián Fernández Uceda,

Host: Applied Optics Group (AOG)



“Winter School at DTU was the first-ever event for me where I met so many people working on utilizing Photonic Technology for the development of the OCT system – that is what I love. I not only learned different ideas, research problems, and ongoing research by listening to the technical talks from peers and professors but also gained a direction for my own project. The training session on Academic English for Scientific Writing was very helpful and I believe it will help the participants in writing their research papers. Apart from that, meeting and greeting other NETLAS fellows, discussing their projects and future plans was a wonderful experience”.

PhD6: Haris Ashraf,

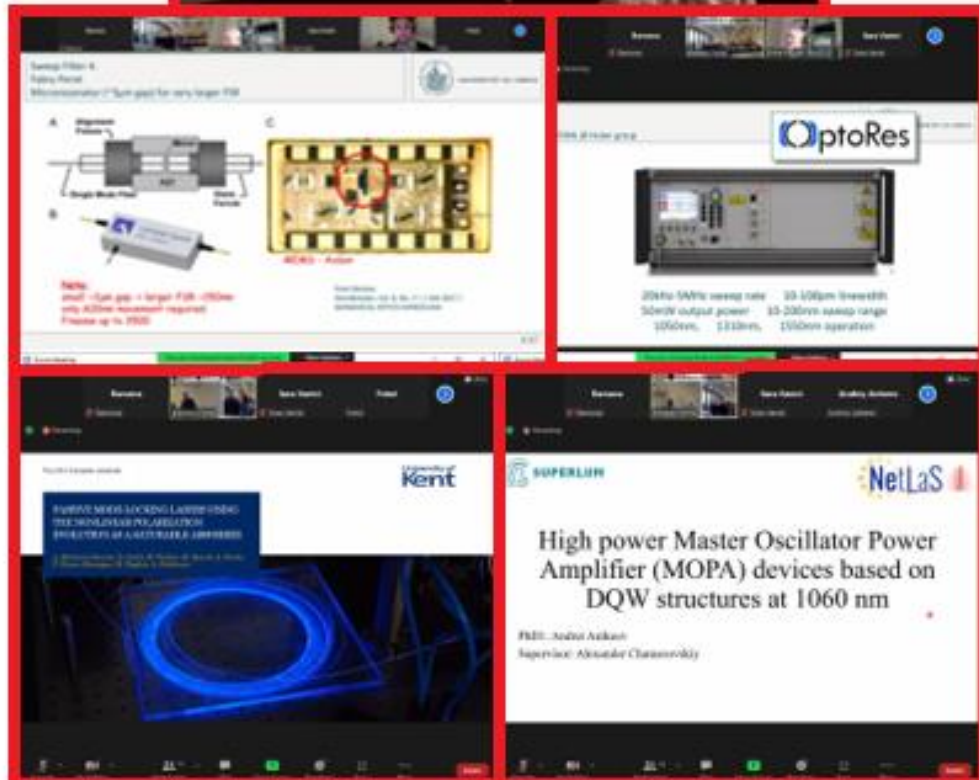
Host: Technical University of Denmark (DTU)

"Winter school 2022 in Copenhagen was the first time I met the other NETLAS students and collaborators in person. For four days, we attended helpful talks, including English lecture and general talks on OCT. Every student had prepared a short presentation about his research and so it was possible to get familiar with the topics within the NETLAS project. Students outside DTU were also guided through the laboratories and shown the facilities of the university. After the schedule, students had an opportunity to get known each other in more casual way at common dinners or leisure activities. I also personally very fancied the hotel we stayed in during the conference. I must appreciate the organization and thank for all the work and preparation carried out by the staff and students."

PhD14: Rene Riha,

Host: University of Kent, Applied Optics Group (AOG)

Photos taken during the event





Photos taken by AOG PhD Student Julien Camard



Photos taken by AOG PhD Student Julien Camard



Thank you DTU for organizing the event!



SECONDMENTS

PhD6: Haris Ashraf

Host: [Technical University of Denmark](#) (DTU)

Secondment is planned to start 1st of April 2022 at
[Superlum Diodes](#) for two weeks

PhD Project: Ultra-narrow linewidth swept sources at 850 nm
based on acousto-optical tunable filter (AOTF) technology

Haris said: “The initial plan is to gain hands on experience working with AOTF Tunable Laser, understand the basic concepts and underlying challenges etc. After this short initial training, I will continue my research on this laser at DTU”.

Good luck Haris!!





Outreach Activity – Kent University

Kent and [Discovery Planet](#) open innovative community space in Ramsgate

[Discovery Planet](#) is a non-profit organisation which was set up to animate spaces and bring exciting learning and creative experiences directly to the local community

On 10 March, the innovative and welcoming community space was opened, where regular interactive workshops delivered by research scientists from Kent will take place over the coming years. The space opening was timed to coincide with **British Science Week 2022** (11-20 March), a ten-day celebration of science, technology, engineering and maths.

The hands-on workshops for school children and members of the community launched with a free three-day event called [Light Fantastic](#), which explores the amazing properties of light. The Light Fantastic sessions were delivered by Kent's [Applied Optics Group](#) (Dr Adrian Bradu, Dr. George Dobre, Dr. Mike Hughes, Dr. Manuel Marques, NETLAS PhD Students [Alejandro Martinez Jimenez](#) and [Gopika Venugopal](#) and touched on the fact that light science has many medical applications, such as enabling an examination of people's eyes. There were 500 participants over the three days, including 242 students between the ages of 8-14 from nine schools and over 100 members of the public. A few photos from the event are presented below (photo credit: Pete Bateson and NETLAS ESR [Gopika Venugopal](#)). [Read More](#)

NETLAS PhD Student [Alejandro Martinez Jimenez](#) said: *"Building a periscope and later enjoying a light maze using mirrors and beam splitters, this activity allows the children to have some fun and learn science! In my opinion I think*



this kind of outreach events are important during our PhD. At first, we need to help with the organization and design the event. This gives us a perspective in how we should organize our events, where to make publicity and who to contact. Once the event is ongoing we must talk in a non-technical environment, speak in-person to a general audience about our research, which is always a step more to express ourselves. All these skills together are quite valuable for the PhD students and also is important keep connection with the society”.



A few photos from the event, photo credit: Pete Bateson, UK and NETLAS ESR [Gopika Venugopal](#)



**Congratulations to our NETLAS PI,
Professor Adrian Podoleanu,
on his appointment as a member of the executive
committee of the International Commission for
Optics (ICO) as Associated Secretary**

Congratulations to Professor Adrian Podoleanu from the Division of Natural Sciences for his appointment as a member of the executive committee of the International Commission for Optics (ICO), as Associated Secretary. This is from a secret vote of worldwide territories of the ICO after the ICO General Assembly on the 13th September 2021. Professor Podoleanu will hold this post for the next three years.



"I can bring to ICO my enthusiasm to serve the community of Optics and identify modalities to match the expectation of society members to the best that ICO can deliver in an ever changing world."

Professor Podoleanu has a long association with the ICO having been elected Chair of the IUPAP Young Scientist Prize in Optics in 2017, 2018, 2019 and again in 2021. He was also one of the eight elected Vice-Presidents from 2017-2021.

The role of Associated Secretary involves continuous activity with emphasis on two aspects. One being a judge for applications to conferences submitted by ICO territories. There are two deadlines for application in April and October. You can find further information under the sponsorship page on the ICO website. [Read More](#)

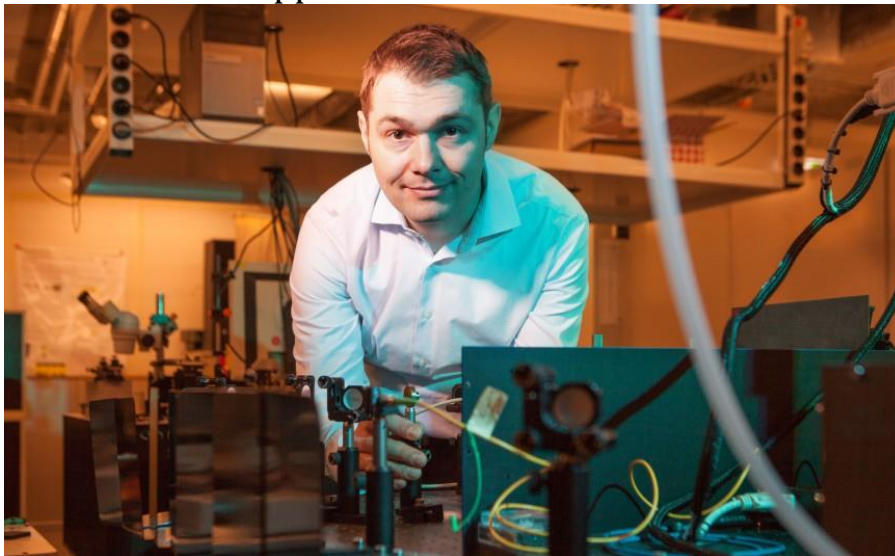


TECHNISCHE
UNIVERSITÄT
DARMSTADT

Future technology: Innovation for terahertz analysis

EU Research Council funds project by TU Darmstadt Professor Sascha Preu (NETLAS Beneficiary) with 150,000 euros

TU Professor Sascha Preu is awarded a “Proof of Concept” grant of 150,000 euros by the European Research Council (ERC). This will fund his “PhoSTer THz” project, which focuses on the development of systems for the spectral analysis of powerful terahertz sources. One of the important uses of the latter will be for applications in 6G mobile networks.



**Professor Dr
Sascha Preu
in the
laboratory at
the
Department
of Electrical
Engineering
and
Information
Technology**

Many European countries are lagging behind other highly developed nations in terms of internet availability and digitalisation. Catching up here requires the availability of large-scale 5G networks, whose hardware is essentially based on microwave technology. However, it is already foreseeable that 5G will not be able to satisfy the appetite for data in the long term. 6G technologies, which are expected to be developed in the next ten years, target frequency ranges beyond microwaves, in particular the terahertz range, which is between microwaves and infrared waves. [Read More](#)

PUBLICATIONS

[Spectroscopic thermo-elastic optical coherence tomography for tissue characterization](#)

Aaron Doug Deen, Heleen M. M. Van Beusekom, Tom Pfeiffer, Mathijs Stam, Dominique De Kleijn, Jolanda Wentzel, **Robert Huber**, Antonius F. W. Van Der Steen, Gijs Van Soest, and Tianshi Wang

Biomedical Optics Express Vol. 13, Issue 3, pp. 1430-1446 (2022)

<https://doi.org/10.1364/BOE.447911>

Abstract

Optical imaging techniques that provide free space, label free imaging are powerful tools in obtaining structural and biochemical information in biological samples. To date, most of the optical imaging technologies create images with a specific contrast and require multimodality integration to add additional contrast. In this study, we demonstrate spectroscopic Thermo-elastic Optical Coherence Tomography (TE-OCT) as a potential tool in tissue identification. TE-OCT creates images based on two different forms of contrast: optical reflectance and thermo-elastic deformation. [Read more](#)

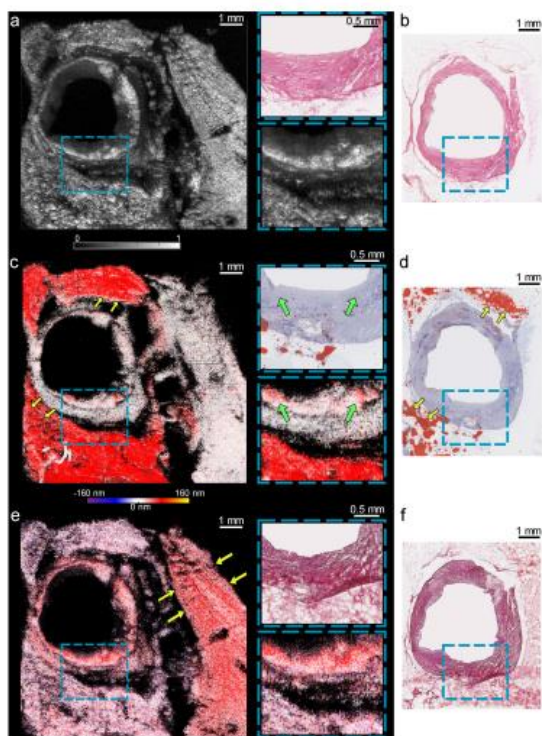


Fig. 5. TE-OCT images of coronary artery (region1) compared to histology. (a) Conventional OCT image of coronary artery. (b) H&E-stained histology of coronary artery. (c) Surface displacement image of artery excited at 1720nm. (d) ORO-stained section of coronary artery. (e) Surface displacement with 1590 nm excitation. (f) RF-stained section of coronary artery.

A Fully Optoelectronic Continuous-Wave 2-Port Vector Network Analyzer Operating from 0.1 THz to 1 THz

Anuar D. J. Fernandez Olvera; Amlan K. Mukherjee; **Sascha Preu**

Published in: IEEE Journal of Microwaves (Volume: 1, Issue: 4, Oct. 2021)

DOI: [10.1109/JMW.2021.3107472](https://doi.org/10.1109/JMW.2021.3107472)

Abstract:

We present a 2-port terahertz vector network analyzer (VNA) based on four continuous-wave (CW) photomixers and a pair of telecom-wavelength CW lasers. The presented optoelectronic VNA is free-space coupled and can operate continuously from 0.1 THz to 1 THz with a resolution of 2 MHz. We demonstrate two different applications with it: the determination of the material properties of a quartz wafer and the characterization of a terahertz distributed Bragg reflector (DBR).

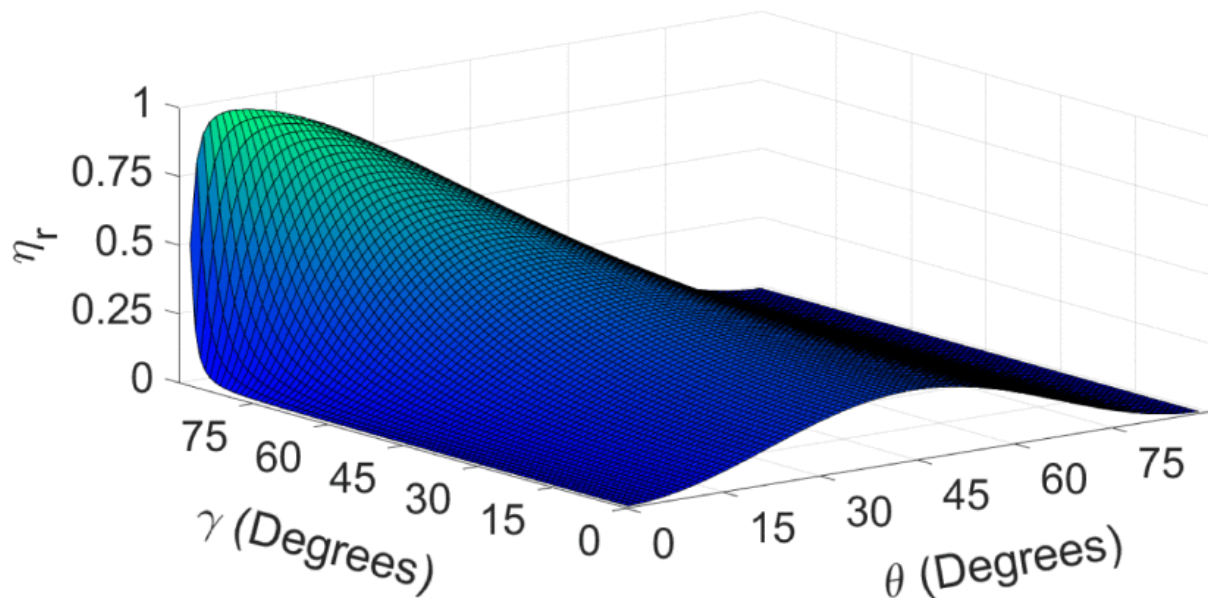


FIGURE 3.

Fraction of incident terahertz power effectively directed to the terahertz receivers as a function of γ and θ .



[Evaluating an automated machine learning model that predicts visual acuity outcomes in patients with neovascular age-related macular degeneration](#)

Abdallah Abbas, Ciara O'Byrne, Dun Jack Fu, Gabriella Moraes, Konstantinos Balaskas, Robbert Struyven, Sara Beqiri, Siegfried K. Wagner, Edward Korot & **Pearse A. Keane**

Graefes Arch Clin Exp Ophthalmol (2022)

DOI: <https://doi.org/10.1007/s00417-021-05544-y>

Purpose

Neovascular age-related macular degeneration (nAMD) is a major global cause of blindness. Whilst anti-vascular endothelial growth factor (anti-VEGF) treatment is effective, response varies considerably between individuals. Thus, patients face substantial uncertainty regarding their future ability to perform daily tasks. In this study, we evaluate the performance of an automated machine learning (AutoML) model which predicts visual acuity (VA) outcomes in patients receiving treatment for nAMD, in comparison to a manually coded model built using the same dataset. [Read more](#)

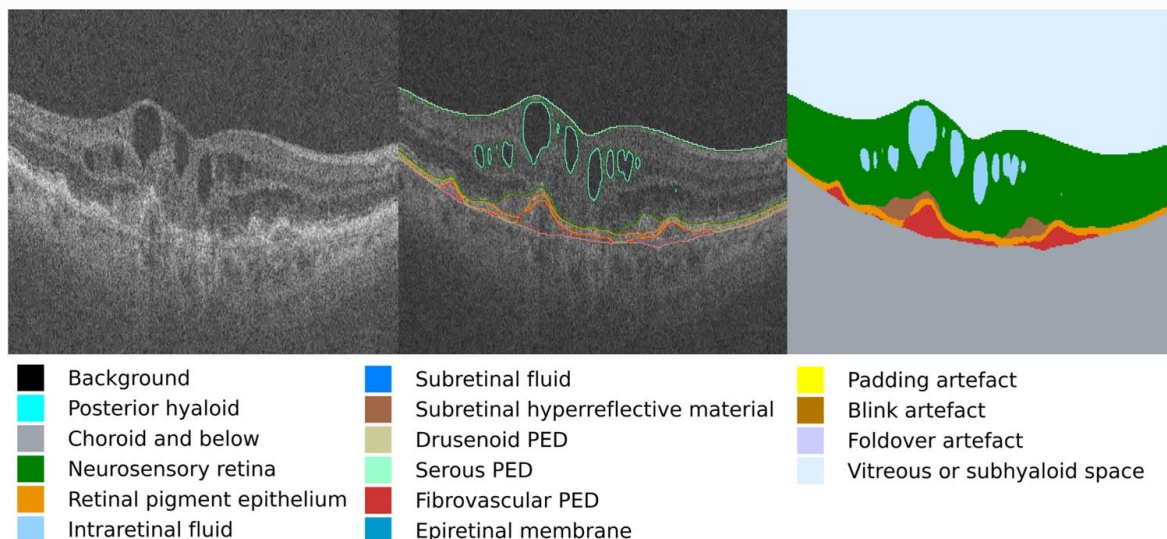


Fig.2 Segmentation of retinal compartments using deep learning algorithm.

Exemplar OCT scan and segmentation map for a patient with neovascular age-related macular degeneration. The colour key shows the features quantified by the segmentation algorithm. Volumes outputted were scaled from voxels ($2.60 \times 11.72 \times 47.24 \mu\text{m}\mu\text{m}$ cuboids) to cubic millimetres before their use as input features in this study. PED = pigment epithelium detachment

Cathodoluminescence mapping of electron concentration in MBE-grown GaAs:Te nanowires

Capucine Tong, Thomas Bidau, Eero Koivusalo, Marcelo Rizzo Piton, **Mircea Guina**, Helder Vinicius Avanço Galeti, Yara Galvão Gobato, Andrea Cattoni, Teemu Hakkarainen and Stéphane Collin

Nanotechnology, Volume 33, Number 18
<https://doi.org/10.1088/1361-6528/ac4d58>

Abstract

Cathodoluminescence mapping is used as a contactless method to probe the electron concentration gradient of Te-doped GaAs nanowires. The room temperature and low temperature (10 K) cathodoluminescence analysis method previously developed for GaAs:Si is first validated on five GaAs:Te thin film samples, before extending it to the two GaAs:Te NW samples. We evidence an electron concentration gradient ranging from below $1 \times 10^{18} \text{ cm}^{-3}$ to $3.3 \times 10^{18} \text{ cm}^{-3}$ along the axis of a GaAs:Te nanowire grown at 640 °C, and a homogeneous electron concentration of around $6\text{--}8 \times 10^{17} \text{ cm}^{-3}$ along the axis of a GaAs:Te nanowire grown at 620 °C. The differences in the electron concentration levels and gradients between the two nanowires is attributed to different Te incorporation efficiencies by vapor–solid and vapor–liquid–solid processes.

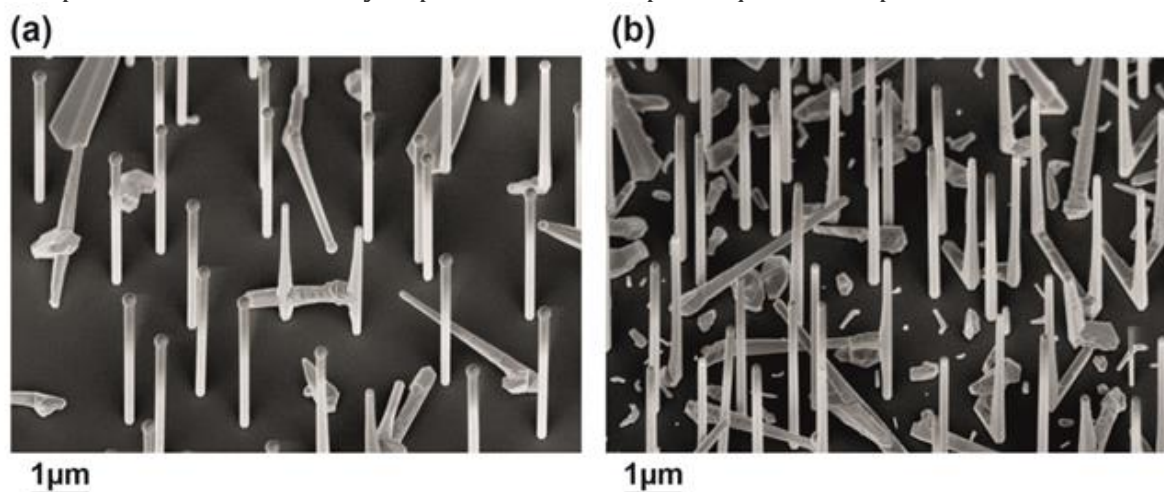


Figure A1. Tilted view (30°) SEM pictures of (a) Te-NW1 and (b) Te-NW2.



BOOK of interest for NETLAS PhD Students

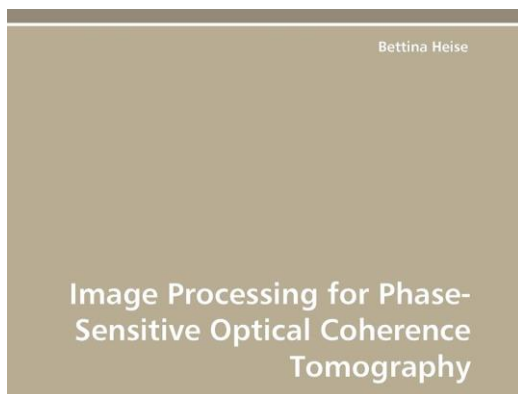
Image Processing for Phase-Sensitive Optical Coherence Tomography: Applications in Differential Phase Contrast-OCT and Polarization-Sensitive OCT Imaging



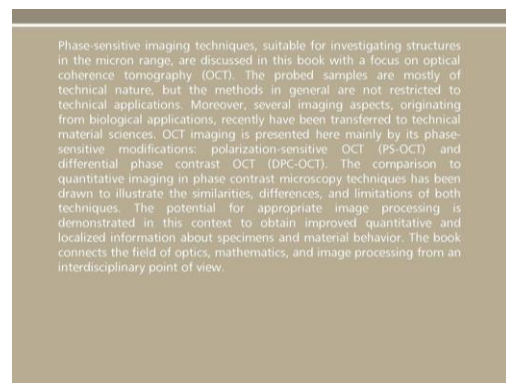
Dr. Bettina Heise,

- 1) Research Center for Non-Destructive Testing, [RECENDT GmbH](#), Austria- NETLAS Associated Partner
- 2) Johannes Kepler University, Linz

Phase-sensitive imaging techniques, suitable for investigating structures in the micron range, are discussed in this book with a focus on optical coherence tomography (OCT). The probed samples are mostly of technical nature, but the methods in general are not restricted to technical applications. Moreover, several imaging aspects, originating from biological applications, recently have been transferred to technical material sciences. OCT imaging is presented here mainly by its phase-sensitive modifications: polarization-sensitive OCT (PS-OCT) and differential phase contrast OCT (DPC-OCT). [Read More & how to order the book.](#)



Applications in Differential Phase Contrast-OCT and Polarization-Sensitive OCT Imaging



Bettina Heise
Bettina Heise is a Senior Research Scientist at the Christian Doppler Laboratory for Microscopic and Spectroscopic Material Characterization, Johannes Kepler University Linz, Austria. Her research interests include signal and image processing, data mining, and optical measurement techniques.



978-3-8381-2058-4

[Bettina Heise on the Value of Interdisciplinary Research](#)



THE TOP CITED ARTICLES IN BIOMEDICAL OPTICS EXPRESS

Biomedical Optics Express has delivered must-read research results to the biomedical optics community since its first issue published in August 2010. In recognition of the Journal's 10th Anniversary, we have curated 100 top-cited research articles from ten important topic categories. Consideration was given to average citations per year, in addition to total citations, so that more recent articles are also included. *Biomedical Optics Express* has published a number of highly valued Review papers, yet this list highlights research articles only.

Biomedical Optics Express publishes technological advances involving hardware and software across the breadth of its content scope and we made efforts to ensure both aspects are well-represented in this listing.

Biomedical Optical Devices

Microscopy

Modelling and Image Processing

Multimodal and Other Imaging Techniques

Near Infrared Spectroscopy and Imaging

Optical Coherence Tomography

Optical Diagnostics

Optical Therapies

Other Optical Technologies

Photoacoustic Imaging and Spectroscopy



Computational Optical Sensing and Imaging 2021

New Feature Issue in *Applied Optics* and *Optics Express*

Applied Optics (AO) and *Optics Express* (OpEx) recently published a Feature Issue on **Computational Optical Sensing and Imaging**, in conjunction with the 2021 Imaging and Applied Optics Congress, which took place virtually 19-23 July 2021.

The articles in this Feature Issue cover a broad scope of computational imaging topics, such as microscopy, 3D imaging, phase retrieval, non-line-of-sight imaging, imaging through scattering media, ghost imaging, compressed sensing, and applications with new types of sensors.

The [Feature Issue Introduction](#) and a complete listing of the papers are provided below. Access to the subscription-based articles published in AO will be free for 30 days. OpEx is an Open-Access journal, and all articles in that journal are always free to access.

**[View All
Papers](#)**



March 2022 Issue

[Optical Fiber: Through the Looking Glass](#)

[Browse all Issues](#)

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. Their live webinars have concluded for 2021. Check back for next year's schedule and browse content from prior ones on the Recorded Webinars tab.



Up Next! [Optical Coherence Tomography for Biofilm Research](#)

Dr. Robert Nerenberg from the University of Notre Dame will detail how optical coherence tomography (OCT) has become an emerging tool for biofilm research, providing many new opportunities for biofilm imaging. Examples will include time-lapse imaging of biofilm growth, spatial mapping of biofilm cell density, and mapping biofilm development in porous plastic supports, among others.



Presented by Dr. Robert Nerenberg, University of Notre Dame

Click to Register!



GAN611C1

[Ganymede™ Series](#)
Spectral Domain OCT Imaging System



[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](#).



Danish photonic quantum computer

Over the next four years, a new innovation consortium will create a photonic quantum computer. The consortium will develop a new technology platform based on a different technology than the best current quantum processors – and has the potential to beat them.



Peek into the optical system, the foundation for the photonic quantum computer. Photo: Jonas Schou Neergaard-Nielsen

Today, even the largest supercomputers have problems handling the calculations and large amounts of data it takes to solve complex problems, such as advanced logistics and the development of medicine. Quantum computers may be the solution. However, today's quantum computers only give us a glimpse of what they are capable of and they are nowhere near reaching their full potential. [Read More](#)



Business continuity statement.

Superlum is open for business.

At this time of uncertainty in Europe, Superlum Diodes Ltd wishes to reassure all our stakeholders that Business in Superlum Diodes Ltd will continue as normal. Our strategic Business contingency plan was designed for the times we now find ourselves in. Times when our supply chain could be interrupted. All our stakeholders, but specifically our customers can be rest assured that we have robust multiple supply chains in place for critical components ensuring in so far as is humanly possible that we can fulfill our obligations, regardless of current events in Eastern Europe.

SLD light sources for Industrial OCT and Spectroscopy

Medical optical coherence tomography	Industrial OCT and Spectroscopy	Optical sensing	Optical metrology	Optical illumination and microscopy	Gain Modules/SOAs for tunable lasers at 650-1100 nm
--------------------------------------	---------------------------------	-----------------	-------------------	-------------------------------------	---

SLD light sources for medical optical coherence tomography

Superlum offers a wide variety of [SLD modules](#) and ready-to-use [light sources](#) for many different medical OCT systems, with focus on ophthalmic OCT at 780-1060 nm. There are many models available, optimized for different combination of output power and spectrum width. They allow customers to select optimal light source performance for required sensitivity, resolution, acquisition rate and other important parameters of a medical OCT system.

Featured products:

[SLD-371](#) are butterfly packaged SLD modules at 840 nm which were successively used in a pioneering demonstrations of SD OCT in a human eye by a leading and well-known Research Centres worldwide. These SLDs are our best sellers for commercial ophthalmic OCT systems with the resolution of 10 microns and below. They provide an excellent reliability, stability and price-to-performance value. Ultrahigh resolution down to a few microns is possible by our [Broadlighter SLD sources](#) which are available in benchtop versions for academic labs and OEM versions for easy integration into imaging systems.



[SUPERLUM SLD-37](#)



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 and to Adrian Podoleanu: ap11@kent.ac.uk