



NETLAS NEWSLETTER 3-2021

This newsletter marks another success in terms of recruitment of this year, we welcome the 12th ESR, Asim, to NETLAS!

PhD10: Asim Bashir

Host: University of Lübeck

Secondment: Optores GmbH and Research Center for Materials Characterization and Non-Destructive Testing, RECENDT GmbH



PhD Project: Super broadband FDML Lasers for Optical Coherence Tomography

To achieve a high-speed and high-resolution imaging, specialized light sources are highly demanded in Optical Coherence Tomography, which sweep across broad bandwidth and allow imaging for longer depths with high resolution. This project aims to develop a super broadband Fourier Domain Mode Locked (FDML) Laser for Optical Coherence Tomography.

Previous education:

Master in Optical Engineering, Sejong University, Seoul, South Korea (2019-2021)

Master Thesis: *Development of unidirectional and bidirectional broadband wavelength swept lasers for Optical Coherence Tomography*

Bachelor in Electrical Engineering with specialization in Electronics Engineering, Bahria University Islamabad, Pakistan (2013-2017).



16th May 2021 - International Day of Light

Applied Optics Group in Kent has marked one year since the “HUB on Light” was launched on the occasion for the Day of Light in 2020 (celebrating 60 years from the invention of the LASER). Please visit the website at:



L4L
Light4Life

<https://light4life.aogkent.uk>

Dr George Dobre has taken part in a podcast, alongside collaborators and friends of the Applied Optics Group, including NETLAS Partner NKT, exploring some of the ways that light is touching all our lives.

The podcast features:

Theresa Smith: <https://www.mooch.co/>

George Dobre: <https://research.kent.ac.uk/applied-optics/>

Patrick Bowen: <https://www.nktphotonics.com/>

Howard Griffin: <https://www.kent.ac.uk/architecture-planning>

and was produced by **Hannah Tony** from the School of Physical Sciences at the University of Kent. It was supported by George Dobre’s SPIE grant for outreach.

[Podcast to mark International Day of Light - Applied Optics Group \(kent.ac.uk\)](#)



NETLAS NETWORK EVENT

International Day of Light Conference

20th – 21st May, 2021

SPIE Tampere student chapter organized a special “***International Day of Light***” (IDL) conference. The conference was scheduled over two days 20th and 21st May 2021 and all NETLAS members were invited to attend. NETLAS Coordinator Prof. Adrian Podoleanu delivered a plenary talk on “Optical Coherence Tomography”. Eight NETLAS PhD students attended the conference. Four of them presented the results obtained so far. Print screens of the conference’ schedule with details about the talks and speakers are presented below.

Two NETLAS PhD students delivered oral presentations: Alejandro Martinez Jimenez - ‘*MHz tuning rate Erbium doped fibre based laser for swept source OCT*’ and Sacha Grelet - ‘*80 MHz swept source targeting the dip in water absorption at 1060 nm*’. The other two NETLAS PhD students had poster presentations: Marie Klufts - ‘*Towards an 800nm FDML laser*’ and Rene Riha - ‘*Akinetic swept source based on dispersion mode-locked tuning*’.

International day of light conference May 20-21, 2021

List of registered attendees (from NETLAS network)

University of Kent	Rene Riha
	Sacha Grelet
	Gopika Venugopal
	Alejandro Martinez Jimenez
University of Luebeck	Marie Klufts
	Muhammad Bashir
TU-Darmstadt	Mojdeh Vakili
Superlum	Andrey Anikeev

List of presenters (from NETLAS network)

- Oral presentation (Biophotonics session)
 - Alejandro Martinez Jimenez** - *MHz tuning rate Erbium doped fibre based laser for swept source OCT*
 - Sacha Grelet** - *80 MHz swept source targeting the dip in water absorption at 1060 nm*
- Poster presentation
 - Marie Klufts** - *Towards an 800nm FDML laser*
 - Rene Riha** - *Akinetic swept source based on dispersion mode-locked tuning*



IDL Conference Day 1 (May 20th, 2021)

09:00 – 09:30 **Opening ceremony**

Session 1: Semiconductor light sources

09:30 – 10:30 Plenary talk 1 - **Prof. Klaus Jöns** - *Quantum light sources*

10:30 – 11:00 Coffee break

11:00 – 11:15 **Hov My Phung** - Towards widely tunable membrane external-cavity surface-emitting lasers (MECSELs) around 1 μm emission wavelength

11:15 – 11:30 **Abhiroop Chellu** - Highly uniform GaSb quantum dots emitting in telecom S-band

11:30 - 11:45 **Ibrahim Issah** - Quantum entanglement of emitters coupled with rolled-up epsilon-near-zero waveguide

11:45 – 12:00 **Nouman Zia** - Tunable integrated GaSb semiconductor lasers in 2 - 3 μm wavelength

12:00 – 12:15 **Rabia Zafar Ali** - Vertical cavity surface emitting lasers (VCSEL) fabrication processing

12:15 – 13:30 Lunch break

Session 2: Biophotonics

13:30 – 14:30 Plenary talk 2 – **Prof. Adrian Podoleanu** - *Optical coherence tomography*

14:30 – 14:45 **Alejandro Martinez Jimenez**- MHz tuning rate Erbium doped fibre based laser for swept source OCT

14:45 – 15:00 **Sacha Grelet** – 80 MHz swept source targeting the dip in water absorption at 1060 nm

15:00 - 16:00 Coffee break/Poster session (3 poster presenters)

Industrial session

16:00 – 17:00 **Seppo Orsila** -*The photonics entrepreneurship path of Modulight*



IDL Conference Day 2 (May 21st, 2021)

Session 3: Plasmonics and Metamaterials

09:30 – 10:30	Plenary talk 3 – Prof. Päivi Torma
10:30 – 10:45	Dipa Ghindani - Spontaneous emission rate enhancement in metal-insulator-metal cavities and their mechanisms
10:45 – 11:00	Jussi Kelavuori - Thermal control of plasmonic surface lattice resonances
11:00 – 11:15	Mohsin Habib - Wavefront control via out-of-plane metasurfaces on self-rolled-up tubes
11:15 – 11:30	Timo Stolt - Second-harmonic generation from multiply-resonant aluminum metasurfaces supporting surface lattice resonances
11:30 – 11:45	Daria Briukhanova - Low loss three-dimensional fishnet structures via strained induced self-assembled rolled-up technology
11:45 – 15:00	Lunch break

Session 4: Nonlinear and ultrafast optics

15:00 – 15:15	Lauri Salmela - Predicting supercontinuum generation dynamics using a neural network
15:15 – 15:30	Shambhatee Annurakshita - THG microscopy of vertically-aligned semiconductor nanowires using cylindrical vector beams
15:30 – 15:45	Caroline Amiot - Extreme polarization dependent infrared supercontinuum generation in uncladded silicon nitride waveguide
15:45 – 16:00	Ekaterina Krutova - Mid-infrared supercontinuum generation in a graded-index multimode tellurite fiber
16:00 – 16:30	Awards ceremony
16:30 – 17:30	Plenary talk 4 – Prof. Robert Boyd - <i>How light behaves when the refractive index vanishes</i>



NETLAS SEMINAR

Ivan Zorin from the Associated NETLAS Partner, Research Center for Materials Characterization and Non-Destructive Testing (RECENDT GmbH) will deliver a talk on RECENDT activities in the field of (MIR)OCT! on Friday 18th June, 12 pm UK time, use link: <https://teams.microsoft.com/l/meetup-join/19%3ab4b026919ff64a11991dba5e2cde51fd%40thread.tacv2/1623074462231?context=%7b%22Tid%22%3a%2251a9fa56-3f32-449a-a721-3e3f49aa5e9a%22%2c%22Oid%22%3a%22bfd5e884-e491-4f62-919e-19ea419bb4c0%22%7d>

Innovating for the Future at Kent University

How to shrink your microscope

by Dr Mike Hughes

(part of the British Science Week Public Engagement Lecture series)





Presentation can be found on the following link:

https://www.youtube.com/watch?v=Mjh_Mz5dl-w

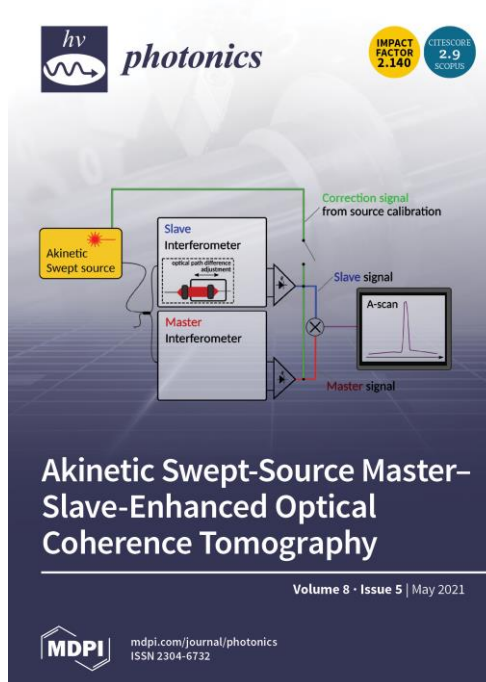
AOG research on the cover of Photonics Journal

Akinetic Swept-Source Master-Slave-Enhanced Optical Coherence Tomography

Manuel J. Marques, Ramona Cernat, Jason Ensher, Adrian Bradu and Adrian Podoleanu

Photonics 2021, 8(5), 141; <https://doi.org/10.3390/photonics8050141>

The screenshot displays the Photonics journal website interface. At the top, there is a navigation bar with links for '25th Anniversary', 'Journals', 'Information', 'Author Services', 'Initiatives', and 'About'. A search bar is also present. Below the navigation bar, the page title reads 'Journals / Photonics / Volume 8 / Issue 5'. The main content area features a large red oval highlighting the 'Cover Story' section. This section includes the title 'Photonics, Volume 8, Issue 5 (May 2021) – 30 articles' and a thumbnail image of the journal cover. The cover story text describes the 'Akinetic Swept-Source Master-Slave-Enhanced Optical Coherence Tomography' technique. To the left of the main content, there is a 'Journal Menu' with various links. On the right side, there are badges for 'IMPACT FACTOR 2.140' and 'CITESCORE 2.9 SCOPUS'. At the bottom, there are options to 'Order results' and 'Show export options'.



Open Access Article

Akinetic Swept-Source Master-Slave-Enhanced Optical Coherence Tomography

by Manuel J. Marques ^{1,*}, Ramona Cernat ¹, Jason Ensher ², Adrian Bradu ¹ and Adrian Podoleanu ¹

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(This article belongs to the Special Issue Optical Fiber Interferometric Sensors: New Production Methodologies and Novel Applications)

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Abstract

This paper presents a different approach for processing the signal from interferometers driven by swept sources that exhibit non-linear tuning during stable time intervals. Such sources are, for example, those commercialised by Insight, which are electrically tunable and akinetic. These Insight sources use a calibration procedure to skip frequencies already included in a spectral sweep, i.e., a process of “clearing the spectrum”. For the first time, the suitability of the Master-Slave (MS) procedure is evaluated as an alternative to the conventional calibration procedure for such sources. Here, the MS process is applied to the intact, raw interferogram spectrum delivered by an optical coherence tomography (OCT) system. Two modalities are investigated to implement the MS processing, based on (i) digital generation of the Master signals using the OCT interferometer and (ii) down-conversion using a second interferometer driven by the same swept source. The latter allows near-coherence-limited operation at a large axial range (>80 μm), without the need for a high sampling rate digitiser card to cope with the large frequency spectrum generated, which can exceed several GHz. In both cases, the depth information is recovered with some limitations as described in the text. [View Full-Text](#)

Keywords: optical coherence tomography; low-coherence interferometry; large-scale imaging

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.



Coming Soon! Minimizing and Understanding Vibrations in the Lab

In this webinar, Joel White will discuss environmental and mechanical sources of vibration that are encountered in a lab setting and how to select suitable vibration isolation solutions for your experiment.



Presented by Joel White,
Tables Support Engineer,
Thorlabs Ltd.

Click to Register!



Various Vibration Sources Exist in a Lab Setting



Coming Soon! Laser Scanning Techniques and Applications

In this fourth instalment of our *How to Build a Microscope* series, Henry Haeberle will discuss the fundamentals of multiphoton and confocal implementations of laser scanning microscopy.



Presented by Henry Haeberle,
Applications Specialist,
Thorlabs Imaging Systems

Click to Register!



Our Bergamo II Microscope Configured for Random Access Scanning



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