



34th Newsletter of the ITN:

**“NExt Generation
of Tuneable LASers for optical
coherence tomography”**

(NETLAS)

led by University of Kent



APRIL 2023



Congratulations to NETLAS ESR

Philipp Tatar-Mathes for his great achievement!

"I am excited to have been considered for **a fantastic PhD Masterclass** at [ASML](#) in Eindhoven. Here, I recently had the opportunity to participate in a career event that left me feeling incredibly positive about my professional future. **This is thanks to NETLAS for funding me over the last three years and ORC in Tampere to provide me with a skillset that is otherwise hard to find.** The event provided a platform for me to connect with like-minded individuals and gain valuable insights from industry experts.

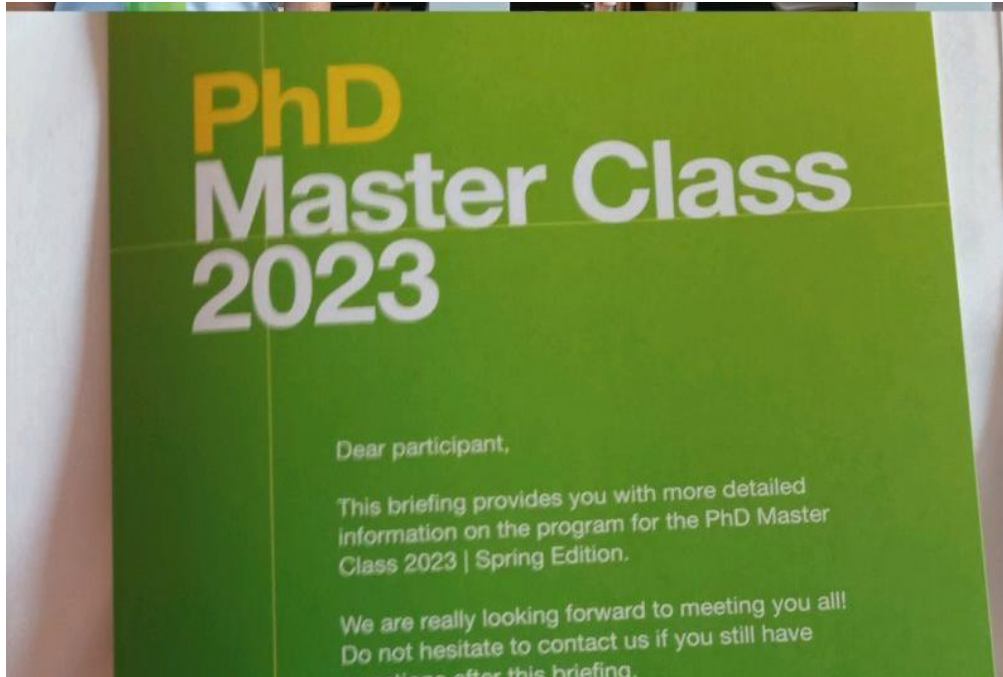
Throughout the event, **I was impressed by the level of engagement and the thought-provoking discussions that took place.** It was clear that the organizers had put in a lot of effort to ensure that attendees were able to get the most out of their experience.

As someone who is constantly striving to learn and grow in my career, I found the event to be both informative and inspiring. **I was able to gain new perspectives on industry trends and the challenges they come along with. We were also encouraged to explore new ideas and approaches.**

Overall, **I left the event feeling energized and excited about the opportunities that lie ahead.** I would highly recommend this event to anyone looking to connect with industry professionals and gain valuable insights into their chosen field.



Many thanks to [Marjan Flohr](#) and the rest of the organizing team for putting on such a great event!"



@ by [Philipp Tatar-Mathes](#) recruited by Tampere University



Congratulations to our NETLAS Associated Partners **David (Ted) Garway-Heath** and **Pearse Keane** for being nominated in the **Ophthalmologist Power List 2023**

Twelve Moorfields Eye Hospital and UCL Institute of Ophthalmology (IoO) staff were named on The Ophthalmologist Power List 2023, **a list of the top 100 most influential people in the world of ophthalmology**. This **year's theme was ten years of excellence and impact on ophthalmology**, with each nomination highlighting the most influential and inspirational people in the field across the past decade. Judging was against the impact each individual has made across five separate themes. Two Moorfields staff were named in the Power List's top ten, with a total of four in the top 20, recognising them for truly world-leading impact. With twelve names, **the Moorfields and UCL IoO partnership are the most represented institution in the world across the whole list**.

Congratulations to all the staff who feature on the Power List 2023, and to their teams at Moorfields and UCL IoO who have supported their achievements.

David (Ted) Garway-Heath



Pearse Keane

[Twelve Moorfields staff honoured in the Ophthalmologist Power List 2023 | Moorfields Eye Hospital NHS Foundation Trust](#)



AOG Journal Club

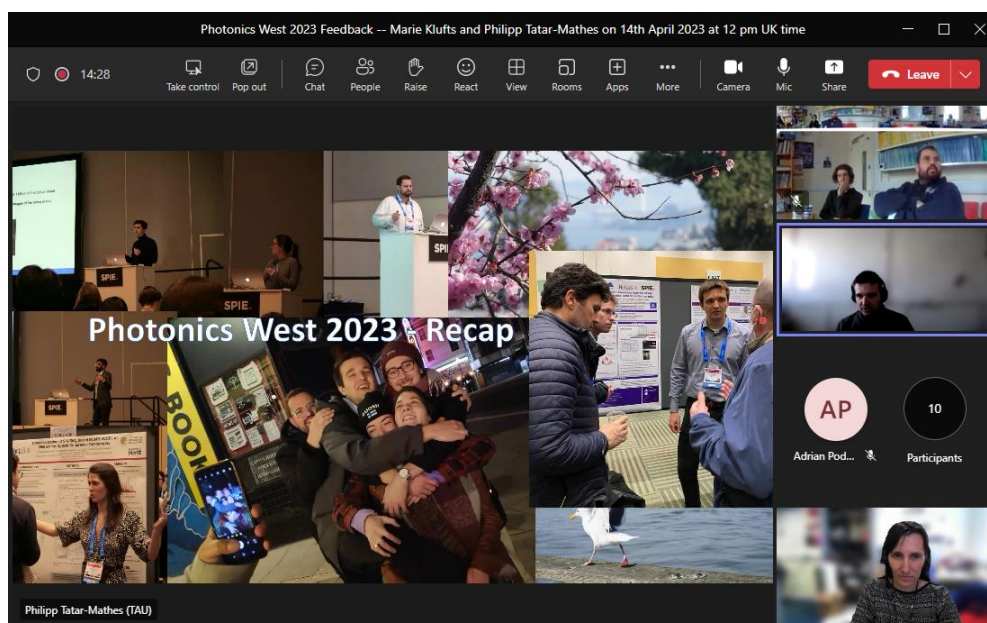
Feedback from the [Photonics West 2023 conference in San Francisco](#) (28 January - 2 February 2023)

Presentation by [NETLAS PhD Student Philipp Mates-Tatar](#)

Friday 14/04/2023 at 12 pm

Philipp presented in a hybrid event a paper from Photonics West 2023 he found very interesting to share with the AOG members entitled “*Epidermal-dermal segmentation and polarization feature analysis using advanced Jones matrix optical coherence tomography*”. A few slides from Philipp’s presentation are presented below.

[Epidermal-dermal segmentation and polarization feature analysis using advanced Jones matrix optical coherence tomography \(spiedigitallibrary.org\)](https://spiedigitallibrary.org)





PROCEEDINGS OF SPIE

Epidermal-dermal segmentation and polarization feature analysis using advanced Jones matrix optical coherence tomography

Sina Maloufi, Xin Zhou, Daniel C. Louie, Mitra Mirsalehi, Tim K. Lee, Shuo Yang

<https://doi.org/10.1117/12.2653006>

JONES MATRIX OCT

- Polarization delay unit (PDU) uses time multiplexing to separate input polarization states
- A path length delay is introduced in the PDU to illuminate sample with P and S states individually

Results from Proceeding

2.1 Image Acquisition

Samples were acquired by a custom-built Jones-matrix-based PS-OCT system, introduced in earlier work [4]. The sensitivity of the PS-OCT system is 92 dB with axial and lateral resolutions of $\sim 8.1 \mu\text{m}$ and $\sim 19.2 \mu\text{m}$, respectively. It contains a super source laser (Accur Technology Inc., MA), with a centre wavelength of 1060 nm, FWHM of 110 nm and a sweeping rate of 100 kHz. With a passive polarization delay unit, two orthogonal polarization states are produced to illuminate the sample. An AFS-9559 Aperture (AlkermTech Inc., Poulin, QC, Canada) is used to record the interference fringes from both \rightarrow and \leftarrow polarized signals. Using this system, co-registered high-sensitivity intensity, DOPI, phase retardation, and local birefringence images are acquired simultaneously from a single 3D volumetric scan. Each 3D volume was recorded within 10 seconds.

SEGMENTATION EXAMPLE

Slides from Philipp's presentation



AOG Journal Club

Feedback from the [Photonics West 2023](#) [conference in San Francisco](#) (28 January - 2 February 2023)

Presentation by [NETLAS PhD Student Marie Klufts](#)

Friday 14/04/2023 at 12 pm

Marie presented highlights from Photonics West 2023 from **five presentations** (links below) in an hybrid event. The event was very well received by the AOG members and other NETLAS PhD Students. Slides from Marie's presentation are presented below.

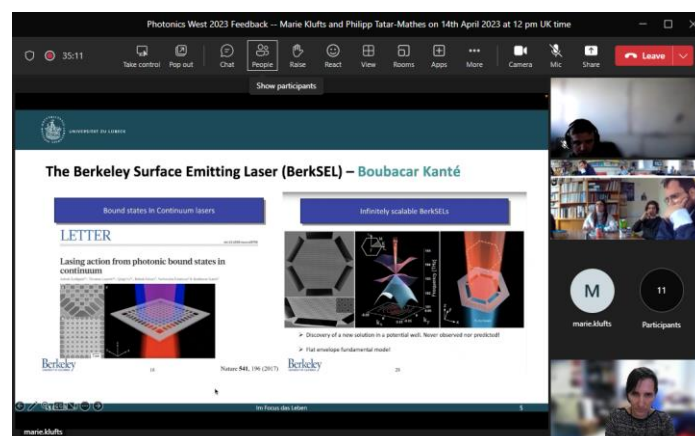
[The Berkeley Surface Emitting Laser \(BerkSEL\) \(spiedigitallibrary.org\)](#)

[Influence of eye movements on functional signals in optoretinography \(spiedigitallibrary.org\)](#)

[Structural metrics of the photoreceptor–pigment epithelium–choriocapillaris complex measured with 3.4 MHz adaptive optics–optical coherence tomography \(spiedigitallibrary.org\)](#)

[140° field-of-view contact handheld swept-source OCT for pediatric peripheral imaging \(spiedigitallibrary.org\)](#)

[Clinic-ready wide-field 500 kHz swept-source OCT angiography \(spiedigitallibrary.org\)](#)



Photonics West 2023 Feedback -- Marie Klufits and Philipp Tatar-Mathes on 14th April 2023 at 12 pm UK time

36:57

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Show participants

UNIVERSITÄT ZU LÜBBECK

Influence of eye movements on functional signals in optoretinography – Clara Pfäffle

Influence of eye movements on functional signals in optoretinography

Clara Pfäffle¹, Sven Hübner², Hendrik Spahn³, Lito Puyg^{3,4}, Jonas Franke⁵, Gerson Hübner^{1,2,3,4}, & Dr. Christian Hübner^{1,2,3,4}

¹Institute of Biomedical Optics, ²Medical Laser Center Lübeck, ³Thorlabs, ⁴VU, ⁵Research Center Borstel (RCB), Member of the German Center for Lung Research (DGL)

30th of January 2023

Functional Imaging of the Retina

- Detecting functionality might prove a valuable tool
- Neurons might change their scattering properties after activation
- Neurons might change their size after activation
 - Eye currents
 - Oculars
- OCT can distinguish the different layers but resolution might be too small for detecting small changes
- Use of the phase to observe thickness changes

14.04.23 6

marie.klufits

Photonics West 2023 Feedback -- Marie Klufits and Philipp Tatar-Mathes on 14th April 2023 at 12 pm UK time

39:20

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UNIVERSITÄT ZU LÜBBECK

Influence of eye movements on functional signals in optoretinography – Clara Pfäffle

Standard Phase Evaluation

2D vector field visualization (vector)

- The phase is chaotic and dominated by bulk sample motion
- Phase difference to one initial frame
- Local averaging of complex data effectively averages the phase results
- Phase difference between two layers evaluates
- Gaussian filter

Motion extraction

- Use of OCT data and image registration to obtain motion data

The Extended Knox-Thompson Method

All possible phase differences – for all lateral positions

- For each point take all possible, temporal phase differences and select paths through those differences
- With a Gaussian filter over lateral data points
- Short paths are less susceptible

14.04.23 8

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Photonics West 2023 Feedback -- Marie Klufits and Philipp Tatar-Mathes on 14th April 2023 at 12 pm UK time

40:51

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Structural metrics of the photoreceptor–pigment epithelium–choriocapillaris complex measured with 3.4 MHz adaptive optics–optical coherence tomography – Daniel X. Hammer

STRUCTURAL METRICS OF THE PHOTORECEPTOR–PIGMENT EPITHELIUM–CHORIOCAPILLARIS COMPLEX MEASURED WITH 3.4 MHz ADAPTIVE OPTICS–OPTICAL COHERENCE TOMOGRAPHY

Daniel X. Hammer¹, Sanjiv Acharya², Raghuveer³, Osamah⁴

¹Center for Biomedical Research and Development, ²Department of Ophthalmology and Visual Sciences, ³Department of Ophthalmology and Visual Sciences, ⁴Department of Ophthalmology and Visual Sciences

KEY FEATURES

- Retinal domain-resolved swept source for OCT imaging
- λ_c : 800 nm, $\Delta\lambda$: 78 nm
- 3.4 MHz sweep rate
- 13.5 μ m
- AO system: λ_c : 800 nm
- High resolution (PSF) for SDOCT scanning
- 512x512 pixel lateral field size
- Up to 4.5° FOV wide-field AO imaging scans
- Out-of-focus optical design for maximum system aberration
- Super-resolution laser visual stimulus port
- Internal fixation to image up to 30° retinal region
- Pupillometry (and more)
- GPU-based OCT processing (live & scan display), WS, extending SDOCT registration

MOTIVATION

- AO-based biomarkers provide fine-scale (cellular-level), sensitive assessment of multiple retinal layers in normal and diseased eyes that surpass the

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Slides from Marie's presentation



Photonics West 2023 Feedback – Marie Klufits and Philipp Tatar-Mathes on 14th April 2023 at 12 pm UK time

42:59

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140° field-of-view contact handheld swept-source OCT for pediatric peripheral imaging – Shuibin Ni

Background

- Gold standard: Indirect ophthalmoscopy
- Desktop retinal imaging systems are impractical to image infants
- Most OCT/OCTA systems have narrow field of view, and cannot screen peripheral retina

14.04.23 14

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Photonics West 2023 Feedback – Marie Klufits and Philipp Tatar-Mathes on 14th April 2023 at 12 pm UK time

45:44

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Clinic-ready wide-field 500 kHz swept-source OCT angiography – Guangru Ben Liang

Too fast scanning → lost of contrast for fine capillaries

Instantaneous motion strength index

$$IMS = \frac{\Delta I(D_{t+1}, t)}{\Delta I(D_{t-1}, t)}$$

Mean projection of OCTA values

Direct motion from intrinsic information in OCTA

Ben Liang, et al
Biomedical Optics Express
2020, 28(16), 2306-2318

18

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Photonics West 2023 Feedback – Marie Klufits and Philipp Tatar-Mathes on 14th April 2023 at 12 pm UK time

54:31

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PowerPoint Fichier Edition Affichage Insérer Mise en forme Organisation Outils Diaporama Fenêtres Aide

Présentation automatique Transitions Animations Diaporama Révision Affichage Enregistrement Format Vidéo Lecture Outils de notes Commentaires Partager

Standard Phase Evaluation

- The phase is chaotic and dominated by both sample and motion
- Phase difference is not related to depth
- Real movement of sample time effectively averages the phase signal
- Phase difference between two layers evaluates the motion

The Extended Knox-Thompson Method

- For each point take all possible temporal offset differences and select paths through those differences
- With a Gaussian filter over lateral data points
- Short paths are less susceptible to temporal changes, such as the movement of the sample
- Long paths are less susceptible to motion, i.e., seconds
- Most effective weighted fit over multiple paths

Motion overview

- Overview of the extracted motion
- High resolution between measurements
- At least two major components
- 2D & 3D
- Correlation is only an indicator

14.04.23 14

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Slides from Marie's presentation



AOG Journal Club

Feedback from the [Photonics West 2023 conference in San Francisco](#) (28 January - 2 February 2023)

Presentation by [Muhammad Asim Bashir](#)

Friday 28/04/2023 at 12 pm

Asim presented in a hybrid event a paper from Photonics West 2023 he found very interesting to share with the AOG members entitled “*High-resolution OCT probe as the stylet cochlea implant for intraoperative imaging during cochlear implant surgery*” (link below). A few slides from Asim’s presentation are presented below.

[High-resolution OCT probe as the stylet of cochlea implant for intraoperative imaging during the cochlear implant surgery| Hou | Publications | Spie](#)

Photonics West 2023 Feedback by Sacha Grelet, Muhammad Asim Bashir and Alejandro Martinez Jimenez

14:03

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UNIVERSITÄT ZÜRICH Institut für Biomedizinische Optik

High-resolution OCT probe as the stylet cochlea implant for intraoperative imaging during cochlear implant surgery

Fang Hou, Guillermo J. Terney et al.
UR - <https://doi.org/10.1117/12.2651786>

Wellman Center for Photomedicine THE TEARNEY LAB

28.04.2023 2

Asim (Guest)

Adrian Podolea... 18 Participants



Photonics West 2023 Feedback by Sacha Grelet, Muhammad Asim Bashir and Alejandro Martinez Jimenez

15:47

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Institut für Biomedizinische Optik

Motivation

Sensorineural hearing loss (SNHL) – hearing loss caused by defects of inner ear

- By 2050 nearly 2.5 Billion people projected some degree of hearing loss
- Almost 700 million requires hearing rehabilitation
- About 2 to 3 per 1000 Childrens born with detectable level of hearing loss in one or both ears
- Disabling Hearing loss Rates:
 - 2% age 45-54
 - 8.5 % age 45-54
 - 25% age 45-54
 - 50% age > 75

28.04.2023

Asim (Guest)

Results:

Supportive Sheath

- Stainless steel
- 150 um outer diameter
- 85 um inner diameter (to fit 80 um fiber)
- 22 mm long

Imaging Probe

- Maximum 80 um outer diameter
- Rotary Junction based scanning
- 600 um working distance
- 500-100 um imaging range
- <5 um axial resolution (1060 nm, 140 nm bandwidth)

28.04.2023

Asim (Guest)

Photonics West 2023 Feedback by Sacha Grelet, Muhammad Asim Bashir and Alejandro Martinez Jimenez

21:39

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Institut für Biomedizinische Optik

Tearney Lab Solution – Replacing stylet with an OCT endoscope

Stylet Tube Wall of cochlear implant Optical probe head Single Mode Fiber (Stripped) 3D printed reflector

SMF Stepped Index MMF Graded Index MMF EDOF

28.04.2023

Asim (Guest)

Photonics West 2023 Feedback by Sacha Grelet, Muhammad Asim Bashir and Alejandro Martinez Jimenez

25:27

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Institut für Biomedizinische Optik

Some Memories

28.04.2023

Asim (Guest)

Slides from Asim's presentation



AOG Journal Club

Feedback from the [Photonics West 2023 conference in San Francisco](#) (28 January - 2 February 2023)

Presentation by [Sacha Grelet](#)

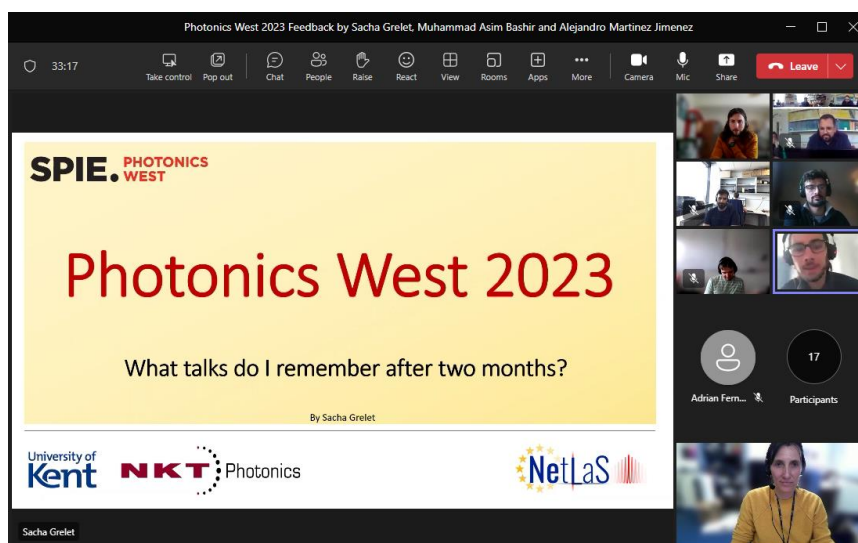
Friday 28/04/2023 at 12 pm

Sacha presented highlights from Photonics West 2023 from **three presentations** (links below) in an hybrid event. The event was very well received by the AOG members and other NETLAS PhD Students. Slides from Sacha's presentation are presented below.

[Optoelectronic system based on photonic integrated circuits to miniaturize spectral domain OCT](#) | [Agneter](#) | [Publications](#) | [Spie](#)

[Multi-molecular super resolution metabolic imaging in aging and diseases \(Conference Presentation\)](#) ([spiedigitallibrary.org](#))

[Compact ultra-fast pulse modulation device based on rotated chirped volume Bragg gratings](#) ([spiedigitallibrary.org](#))





Photronics West 2023 Feedback by Sacha Grelet, Muhammad Asim Bashir and Alejandro Martinez Jimenez

34:08

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Miniaturization of OCT

Optoelectronic system based on Photonic Integrated Circuits to miniaturize Spectral Domain OCT

A. Agneter, E. A. Rank, M. Vlašović, S. Nevlacsil, P. Cipriano, R. Santos, Q. Ngyuen, A. Maese Novo, D. Seyringer, M. Eggeling, M. Sagmeister, E. Bodenstorfer, L. Ginner, J. Kraft, G. Meinhardt, H. Zimmermann, R. Hainberger, P. Müllner, R. A. Leitgeb, W. Drexler

FFG COHESION PHOTONICS SPIE

Sacha Grelet

36:09

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Miniaturization of OCT

AWG splits the light into 512 wavelengths

OCT light coupled from fiber via edge-coupling

16 input ports with optimized in-coupling structures

512 integrated photodiodes with patent pending waveguide-to-photodiode coupling structure?

Integrated electronics (amplifiers, A/D converters, multiplexer)

512 individual output waveguides for 512 different wavelengths

2 cm

Sacha Grelet

37:02

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Miniaturization of OCT

Reference arm

Thorlabs SLD: $\lambda_c = 880 \text{ nm}$ Power: 25 mW

SLD

PC

FC

15/25%

Sample arm

Gx

Gy

SL

S

Sacha Grelet

Slides from Sacha's presentation



Photronics West 2023 Feedback by Sacha Grelet, Muhammad Asim Bashir and Alejandro Martinez Jimenez

43:32

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Unmute (Ctrl+Shift+M)

Multi-modal imaging

University of California San Diego

JACOBS SCHOOL OF ENGINEERING
Shu Chien-Gene Lay Department of Bioengineering

Multi-molecular Super Resolution Metabolic Imaging in Aging and Diseases

Lingyan Shi
Shu Chien-Gene Lay Department of Bioengineering
UC San Diego
Jan 28th, 2023

SPIE, PHOTONICS WEST 11

Sacha Grelet

Asim (Guest) 18 Participants

Photronics West 2023 Feedback by Sacha Grelet, Muhammad Asim Bashir and Alejandro Martinez Jimenez

39:22

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Unmute (Ctrl+Shift+M)

Miniaturization of OCT

UCF

Rotated chirped volume Bragg gratings for compact spectral analysis

Oussama Mhalla,¹ Murat Yessenov,^{1,*} Lam Mach,¹ Leonid Glebov,¹ Aymen F. Abouraddy,¹ and Ivan Divliansky^{1,†}

¹CREOL, The College of Optics & Photonics, University of Central Florida, Orlando, FL 32816, USA

(a) Prism (b) VBG (c) VBG (d) n-VBG (e) CBG (f) CBG (g) n-CBG

SPIE, PHOTONICS WEST 8

Sacha Grelet

Asim (Guest) 18 Participants

Photronics West 2023 Feedback by Sacha Grelet, Muhammad Asim Bashir and Alejandro Martinez Jimenez

45:26

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Unmute (Ctrl+Shift+M)

Multi-modal imaging

2PF NADH SHG Collagen

2PF Flavin SRS Protein

Human Kidney Merged

Fung et al. & Shi under preparation, 2023

SPIE, PHOTONICS WEST 14

Sacha Grelet

Asim (Guest) 18 Participants

Slides from Sacha's presentation



AOG Journal Club

Feedback from the [Photonics West 2023 conference in San Francisco](#) (28 January - 2 February 2023)

Presentation by [Alejandro Martinez Jimenez](#)

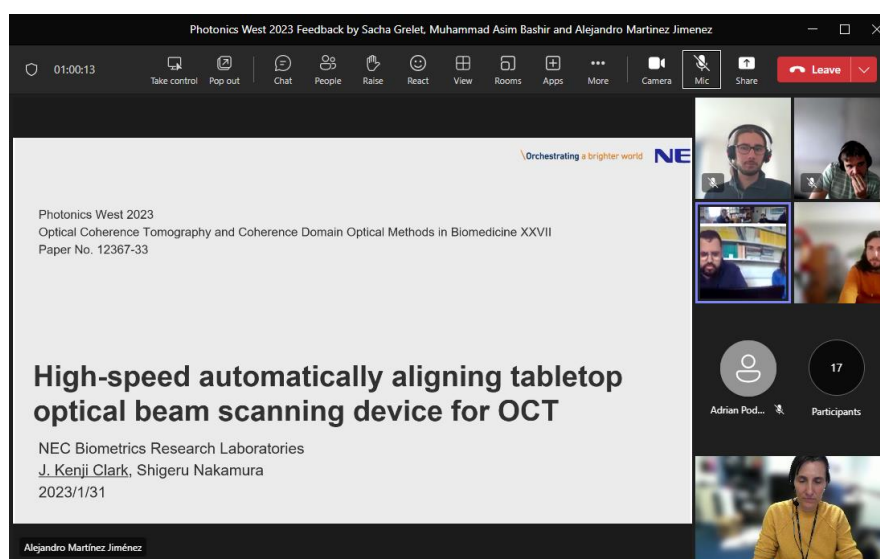
Friday 28/04/2023 at 12 pm

Alejandro presented highlights from Photonics West 2023 from **three presentations** (links below) in an hybrid event. The event was very well received by the AOG members and other NETLAS PhD Students. Slides from Alejandro's presentation are presented below.

[High-speed automatically aligning tabletop optical beam scanning device for OCT | \(2023\) | Clark | Publications | Spie](#)

[Photonic integrated circuit for OCT applications \(spiedigitallibrary.org\)](#)

[High speed 4D in-vivo OCT imaging of the human brain: creating high density datasets for machine learning toward identification of malign tissue in real time | \(2023\) | Draxinger | Publications | Spie](#)





Photonic West 2023 Feedback by Sacha Grelet, Muhammad Asim Bashir and Alejandro Martinez Jimenez

01:01:02

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Large Area Scanning Techniques

Motorized Stage/Arm Aided Acquisition

Ma, X., et al., SPIE BIOS 2022, 2022.

Goh, M., et al., SPIE BIOS 2022, 2022.

Manually Aligned Handheld Scanners

Lu, C. D., et al., Biomed. Opt. Exp., 5(1), 2014.

Automatic Alignment with Robotic Arms

Draclos, M., et al., Nat. Biomed. Eng., 5, 2021.

Gap in Current Technology: Current devices require skilled professionals to operate, have long acquisition times, long alignment times, or large sizes. A compact device that can detect multiple regions of interest and sequentially align and acquire OCT data at high speed remains to be seen.

Alejandro Martínez Jiménez

Photonic West 2023 Feedback by Sacha Grelet, Muhammad Asim Bashir and Alejandro Martinez Jimenez

01:04:50

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Synchronous Scanning

- High-speed stage aligns OCT scan lens and scan is acquired **while stage moves towards the next finger**
- Complementary raster scan** compensates for stage movement during scan
- Undistorted** epidermal and dermal fingerprints are obtained

- Stage Movement Speed: 8 cm/s
- OCT Acquisition Time: 500 ms
- Inter-finger Alignment Time: ~50 ms
- Total Scan Time: 2.3 s (300ms deadtime) ← <2.2 s shown recently

Alejandro Martínez Jiménez

Photonic West 2023 Feedback by Sacha Grelet, Muhammad Asim Bashir and Alejandro Martinez Jimenez

01:07:57

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Photonic Integrated Circuit for OCT application

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VU UNIVERSITY AMSTERDAM

RAPID PHOTONICS

Alejandro Martínez Jiménez

Slides from Alejandro's presentation



Photronics West 2023 Feedback by Sacha Grelet, Muhammad Asim Bashir and Alejandro Martinez Jimenez

01:09:18

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Show conversation

OCT on a silicon chip
Miniaturized spectrometer

Arrayed waveguides
 Free propagation regions
 Input waveguide
 Output waveguides

Resolution ~ Depth range
 Bandwidth ~ Depth resolution

Adrian Pod... 16 Participants

Alejandro Martínez Jiménez

Photronics West 2023 Feedback by Sacha Grelet, Muhammad Asim Bashir and Alejandro Martinez Jimenez

01:14:34

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High speed 4D in-vivo OCT imaging of the human brain:
Creating high density datasets for machine learning
toward identification of malign tissue in real time

Wolfgang Draxinger^{1,5}

Nicolas Detrez², Paul Strenge^{1,2}, Patrick Kuppert³,
 Veit Danieky², Dirk Theisen-Kunde², Wolfgang Wieser⁵,
 Claudia Attha³, Matteo Mario Bonsanto³, Sonja Spahr-Hess³,
 Christian Hagel⁴, Ralf Brinkmann^{1,2}, Robert Huber^{1,2,3}

¹ Institut für Biomedizinische Optik (IBMO), Universität zu Lübeck
² Medizinisches Laser-Zentrum Lübeck (MLL), Lübeck
³ Universitäts-Klinikum Schleswig Holstein (UKSH), Lübeck
⁴ Universitätsklinikum Eppendorf, Hamburg
⁵ Optisches GmbH, München [Disclosure: Financial Interest](#)

Photronics West / BIOS 2023 2023-01-30

Adrian Pod... 16 Participants

Alejandro Martínez Jiménez

Photronics West 2023 Feedback by Sacha Grelet, Muhammad Asim Bashir and Alejandro Martinez Jimenez

01:19:42

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Live 4D MHz-OCT Imaging

Adrian Pod... 16 Participants

Alejandro Martínez Jiménez

Slides from Alejandro's presentation



Many thanks to all NETLAS ESRs
Marie Klufts, Alejandro Martínez
Jiménez, Rene Riha, Irene Lamoso,
Asim Bashir, Esteban Proano, Sacha
Grelet and Philipp Tatar-Mathes for
sharing with their colleagues and
AOG members interesting
presentations they witnessed at
the Photonics West Conference,
San Francisco,
28 January - 2 February 2023!





AOG Seminar

12th April 2023, 2 pm Ingram Building, LT

By [Assistant Prof. Sam Van der Jeught](#)



[Sam Van der Jeught](#) was born in Antwerp, Belgium, in 1987. He graduated as master in Physics in 2010 from the University of Antwerp, where he researched new ways of accelerating the digital signal processing algorithms **involved in optical coherence tomography in a joint collaboration between the Laboratory of Biomedical Physics (BIMEF) and the University of Kent, UK.** As a Marie Curie fellow, **he was able to work at the Applied Optics Group (AOG) at the University of Kent for a period of ten months.** He received his degree of PhD in Science: Physics in 2015 at the University of Antwerp for the dissertation entitled “*Optical techniques for real-time morphology measurement of the tympanic membrane*”. He is currently researching new optical methods for measuring human eardrum shape in real-time and in-vivo as a tenure-track assistant professor at the University of Antwerp within the Faculty of Applied Sciences (InViLab).

Title of Sam’s presentation: *Optical techniques for real-time morphology measurement of the human eardrum*

Abstract: The eardrum is the first component in the complicated mechanical system of the middle ear. To fully understand the functioning of the human hearing organ, and to optimize ossicular prostheses and middle ear implants, highly realistic computer models of the middle ear system are being developed. As input for such models, accurate geometric data of the eardrum are needed. In addition, the ear transports sound energy whilst dealing with large quasi-static pressure variations. Therefore, models need to be validated in this low-frequency high-pressure regime, especially since these large displacements form a particular problem in middle ear prosthesis design. Much research on in-vitro samples has already been performed in this area, but a technique to measure full-field deformation of the human eardrum has been missing. In this talk, we present several non-contact optical measurement techniques to measure real-time three-dimensional eardrum deformation.



Photos from Sam's presentation will follow below.



Photos from Sam's presentation @by Dr Ramona Cernat (top photos) & Prof. Adrian Podoleanu (last photo)

[Visit \(and talk\) by Dr Sam Van der Jeught - Applied Optics Group - Research at Kent](#)



PUBLICATIONS

Surgical polarimetric endoscopy for the detection of laryngeal cancer

Ji Qi, **Taranjit Tatla**, Eranga Nissanka-Jayasuriya, Alan Yilun Yuan, Danail Stoyanov & Daniel S. Elson

Nat. Biomed. Eng (2023).

<https://doi.org/10.1038/s41551-023-01018-0>

The standard-of-care for the detection of laryngeal pathologies involves distinguishing suspicious lesions from surrounding healthy tissue via contrasts in colour and texture captured by white-light endoscopy. However, the technique is insufficiently sensitive and thus leads to unsatisfactory rates of false negatives. **Here we show that laryngeal lesions can be better detected in real time by taking advantage of differences in the light-polarization properties of cancer and healthy tissues.** By measuring differences in polarized-light retardance and depolarization, the technique, which we named ‘surgical polarimetric endoscopy’ (SPE), generates about one-order-of-magnitude greater contrast than white-light endoscopy, and hence allows for the better discrimination of cancerous lesions, as we show with patients diagnosed with squamous cell carcinoma. **Polarimetric imaging of excised and stained slices of laryngeal tissue indicated that changes in the retardance of polarized light can be largely attributed to architectural features of the tissue.** We also assessed SPE to aid routine transoral laser surgery for the removal of a cancerous lesion, indicating that SPE can complement white-light endoscopy for the detection of laryngeal cancer. [Read More](#)

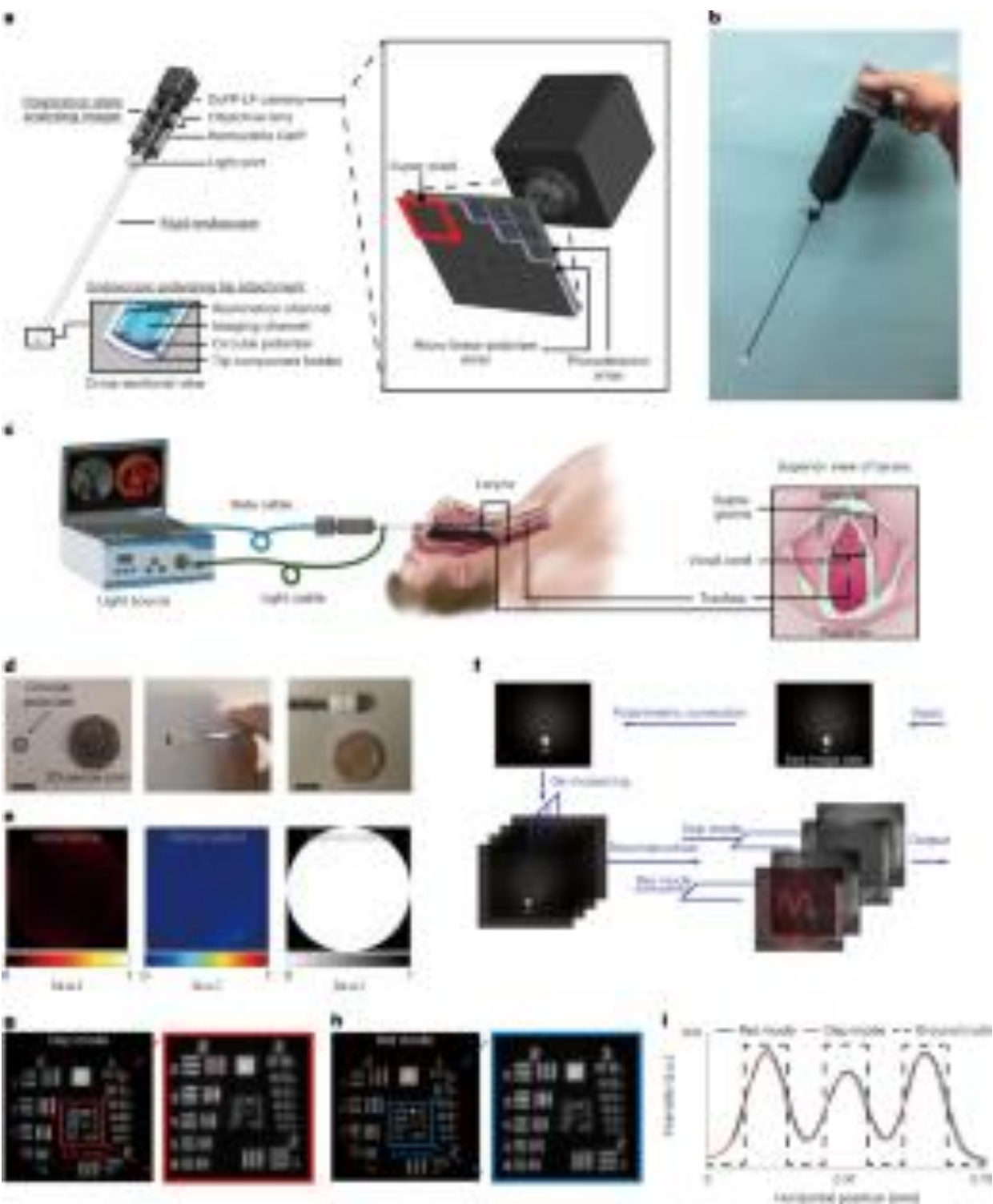


Fig1 The SPE system

Bragg Gratings in ZEONEX Microstructured Polymer Optical Fiber With 266 nm Nd:YAG Laser

L. Pereira *et al.* Ole Bang *et al.*

[IEEE Sensors Journal](#) PP(99), March 2023

DOI: [10.1109/JSEN.2023.3259546](https://doi.org/10.1109/JSEN.2023.3259546)

We present the first fiber Bragg gratings inscription in ZEONEX-480R microstructured polymer optical fiber by employing the fourth harmonic (266 nm) of a Nd:YAG laser system. The gratings were produced in the L-band region by the phase mask method, in 270 μm diameter polymer optical fiber samples connectorized with ferrule connectors. The results of 3 produced gratings are reported, showing good stability over 99 days. The sensing response to strain, temperature and humidity was analyzed and confirmed the good stability and performance of the inscribed gratings in this polymer fiber. These results are promising from the point of view that gratings can be produced in ZEONEX-480R microstructured polymer optical fiber with the 266 nm wavelength, which is an alternative and viable cost-effective solution. [Read More](#)

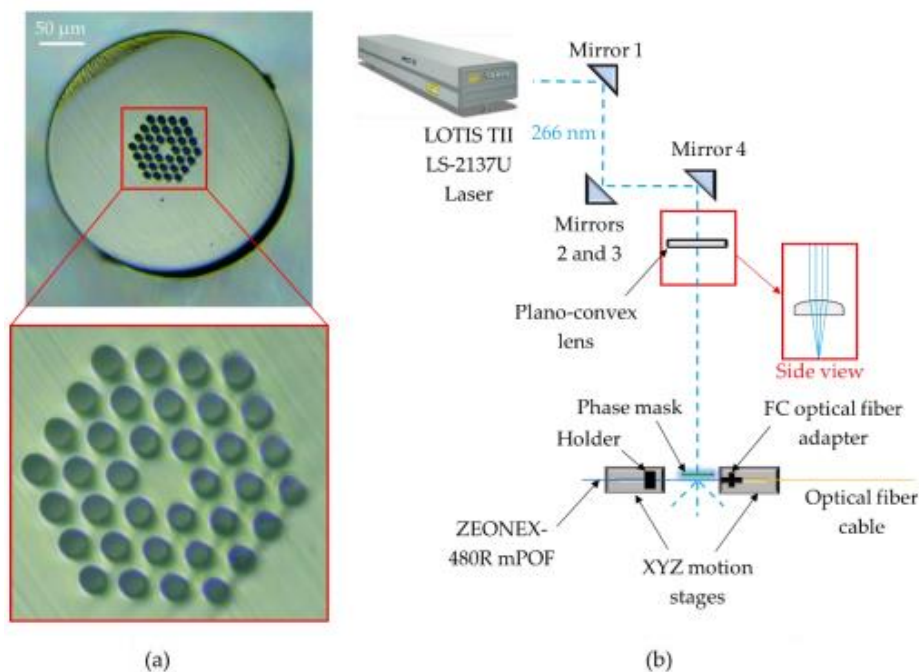


Fig. 1. (a) Cross-section of the ZEONEX-480R mPOF, detailing the 3-rings hexagonal hole structure, (b) POFBG inscription setup (view from above)

Mid-IR Supercontinuum Noise Reduction Using a Short Piece of Normal Dispersion Fiber - A General Mechanism

Hansen, Rasmus & Smith, Callum & Moltke, Asbjørn & Petersen, Christian & Raghuraman, Sidharthan & Yoo, Seongwoo & Bang, Ole

[Laser & Photonics Review](#), April 2023

DOI:[10.1002/lpor.202200776](https://doi.org/10.1002/lpor.202200776), License [CC BY-NC-ND 4.0](#)

Mid-infrared (IR) supercontinuum (SC) lasers are important in applications such as pollution detection, stand-off detection, and non-destructive testing. The performance in many applications is limited by the noise level of the supercontinuum laser. High noise typically results in low sensitivities or a need for long integration times. In this paper, a simple technique to reduce the noise of high noise soliton-based SC sources is introduced by adding a short piece of normal dispersion fiber to force the spectrally distributed solitons to spectrally broaden through self-phase modulation and thereby overlap to average out the noise. [Read More](#)

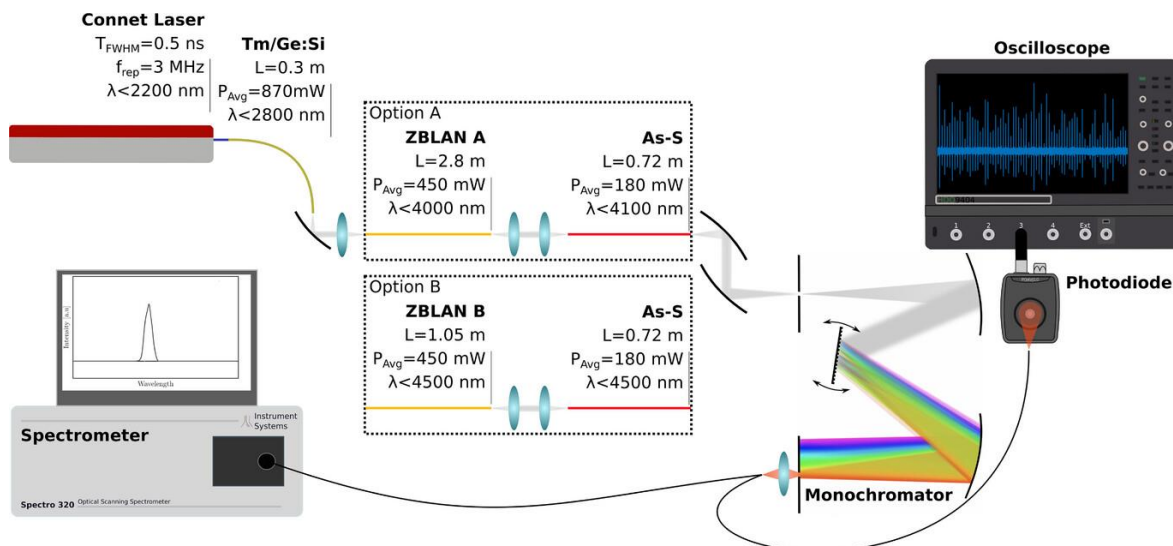


Figure 2: The experimental setup. The supercontinuum cascade is initiated by a pulsed Connet Laser module, and a Tm/Ge doped silica fiber. The remaining cascade either consists of ZBLAN fiber A or ZBLAN fiber B, followed by the As-S fiber. A Czerny–Turner type monochromator spectrally filters the light, that is subsequently measured by a photodiode, to measure the noise or a spectrometer to measure the center wavelength and spectral width at each setting on the monochromator.



An Overview of Anterior Segment OCT

By Sharon Keh, OD, Irene Frantzis, OD and Yana Seviaryn, OD

A recent article by Keh et al., published in [Review of Optometry](#), gives a device-independent overview of anterior segment OCT and how it can serve as a valuable, adjunctive tool in the diagnosis and monitoring anterior segment abnormalities. It discusses the virtues and shortcomings of its clinical applications in angle assessment, corneal disease, and contact lens fitting, in addition to highlighting why this technology has earned its rightful place in the optometric practice. [Read More](#)

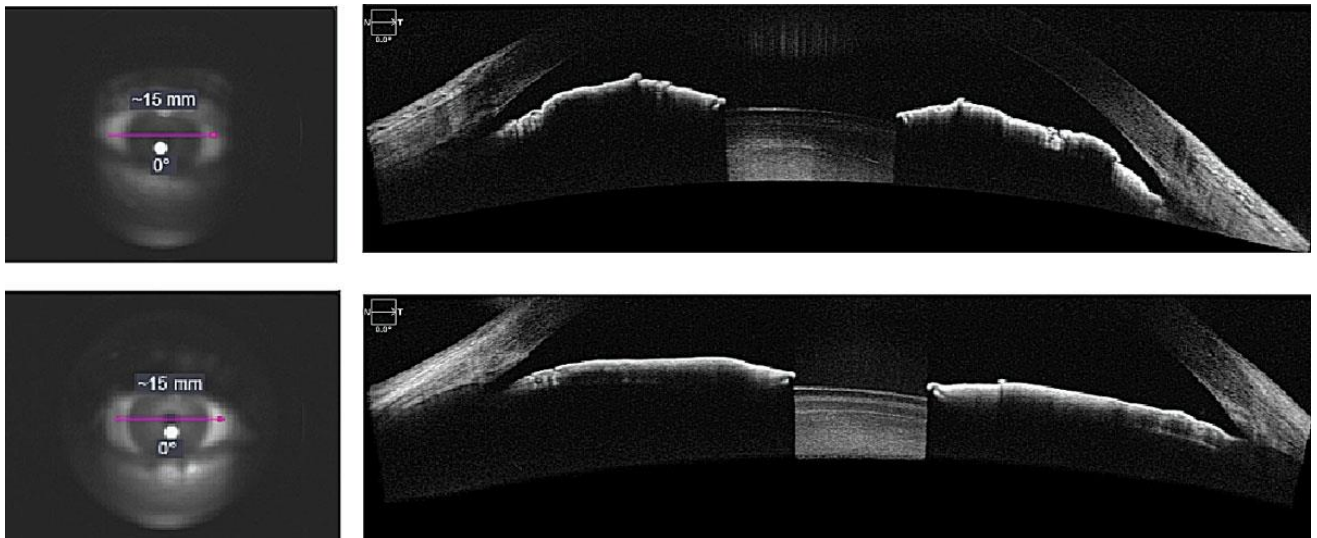


Fig. 1. AS-OCT evaluation of narrow angle (top) and open angle (bottom) using anterior segment angle-to-angle scans.

[An Overview of Anterior Segment OCT \(reviewofoptometry.com\)](#)

Fluid compartments influence elastography of the aging mouse brain

Gary R Ge, **Jannick P Rolland** Wei Song, Maiken Nedergaard, Kevin J Parker

Phys Med Biol, 2023

[doi: 10.1088/1361-6560/acc922](https://doi.org/10.1088/1361-6560/acc922)

Elastography of the brain has the potential to reveal subtle but clinically important changes in the structure and composition as a function of age, disease, and injury.
 Approach: In order to quantify the specific effects of aging on mouse brain elastography, and to determine the key factors influencing observed changes, we applied optical coherence tomography reverberant shear wave elastography at 2000 Hz to a group of wild-type healthy mice ranging from young to old age.
 Main Results: We found a strong trend towards increasing stiffness with age, with an approximately 30% increase in shear wave speed from 2 months to 30 months within this sampled group. Furthermore, this appears to be strongly correlated with decreasing measures of whole brain fluid content, so older brains have less water and are stiffer. Rheological models are applied, and the strong effect is captured by specific assignment of changes to the glymphatic compartment of the brain fluid structures along with a correlated change in the parenchymal stiffness.
 Significance: Short-term and longer-term changes in elastography measures may provide a sensitive biomarker of progressive and fine-scale changes in the glymphatic fluid channels and parenchymal components of the brain.

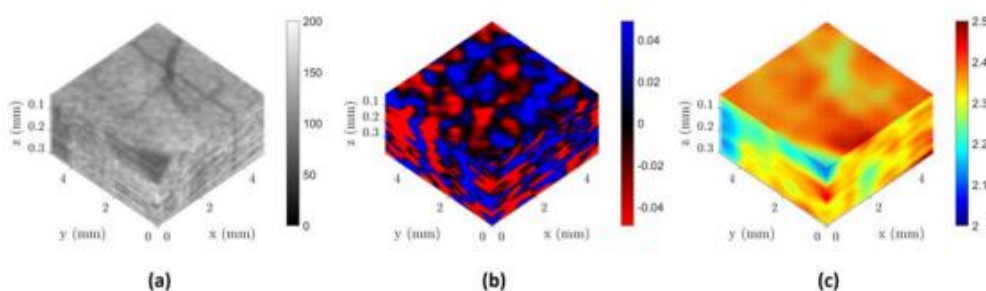


Figure 1. An example of elastography in the mouse brain using 2000 Hz reverberant shear waves. (a) 3D data set from the OCT scan of the anterior cortical brain (top) with a resolved blood vessel under the intact dura mater. (b) Instantaneous displacement patterns within the reverberant shear wave field, with red and blue colors indicating the direction positive or negative of the displacements. (c) Estimated SWSs within the 3D volume with some spatial variation corresponding to proximity to the blood vessel. Colorbar units are arbitrary grayscale in (a), arbitrary phase displacement in (b), and in m s^{-1} in (c).

Reliability of Retinal Layer Annotation with a Novel, High-Resolution Optical Coherence Tomography Device: A Comparative Study

Leon von der Emde, Marlene Saßmannshausen, Olivier Morelle, Geena Rennen, Frank G. Holz, Maximilian W. M. Wintergerst, and Thomas Ach

Optical coherence tomography (OCT) enables in vivo diagnostics of individual retinal layers in the living human eye. However, **improved imaging resolution could aid diagnosis and monitoring of retinal diseases and identify potential new imaging biomarkers**. The investigational high-resolution OCT platform (High-Res OCT; 853 nm central wavelength, 3 μm axial-resolution) has an improved axial resolution by shifting the central wavelength and increasing the light source bandwidth compared to a conventional OCT device (880 nm central wavelength, 7 μm axial-resolution). **To assess the possible benefit of a higher resolution, we compared the retest reliability of retinal layer annotation from conventional and High-Res OCT, evaluated the use of High-Res OCT in patients with age-related macular degeneration (AMD), and assessed differences of both devices on subjective image quality.**

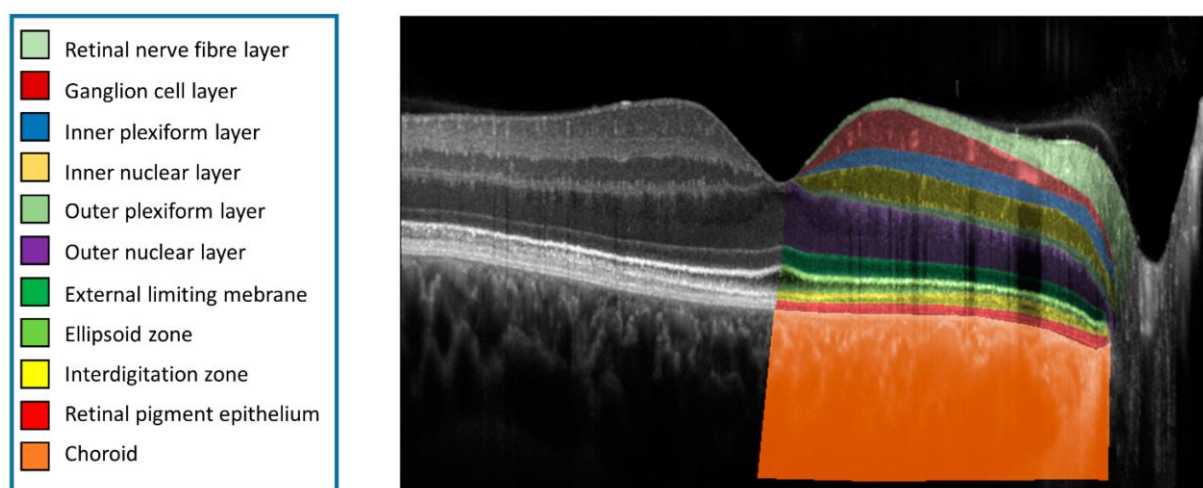


Figure 1: OCT Layer Annotation. Eleven different layers (from retina and choroid), annotated and color-coded on a central B-scan from a High-Res OCT image. The right eye of a 28-year-old male control participant (best corrected visual acuity of 1.0)

Read More on [Bioengineering](#) | [Free Full-Text](#) | [Reliability of Retinal Layer Annotation with a Novel, High-Resolution Optical Coherence Tomography Device: A Comparative Study \(mdpi.com\)](#)



Development of polarization-sensitive optical coherence tomography imaging platform and metrics to quantify electrostimulation-induced peripheral nerve injury *in vivo* in a small animal model

Guillermo L. Monroy, *et al.*

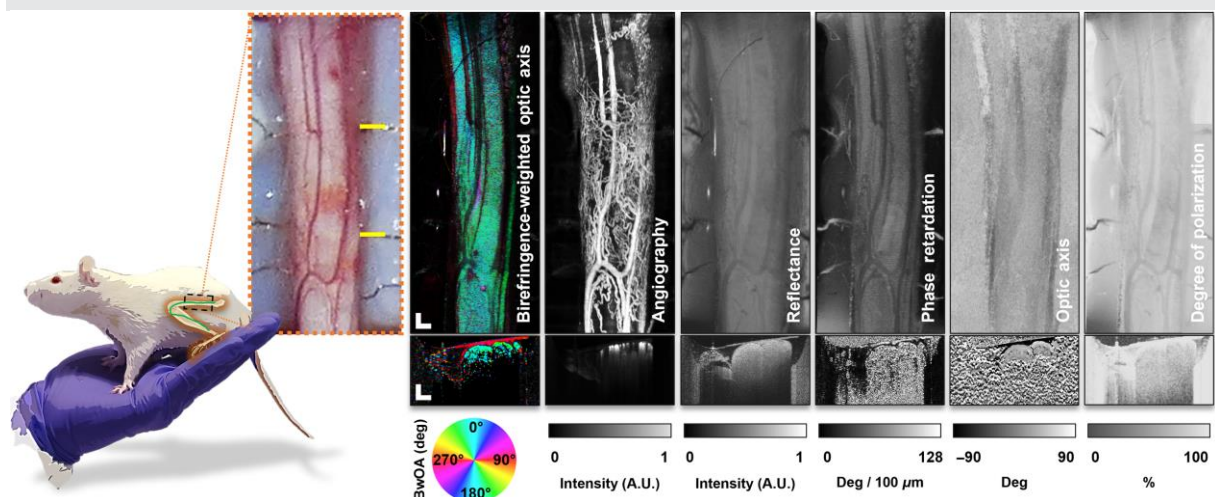
Neurophotonics, Vol. 10, Issue 2, 025004 (April 2023).

<https://doi.org/10.1117/1.NPh.10.2.025004>

AIM: We aim to demonstrate an imaging and stimulation platform that can elucidate the biological mechanisms and impacts of neurostimulation in the PNS and apply it to the sciatic nerve to extract imaging metrics indicating electrical overstimulation.

Conclusions

The poststimulation changes observed in our study are manifestations of nerve injury and repair, specifically degeneration and angiogenesis. Optical imaging metrics quantify these processes and may help evaluate the safety and efficacy of neuromodulation devices.



Platform output: processed PSOCT data, animal #2: SC, D7. Representative data from a rat sciatic nerve as observed in this study of the six data channels captured. *En face* representations and cross-sectional scans for each channel are shown. BWOA, birefringence-weighted optic axis.

Scale bar: 500 μm



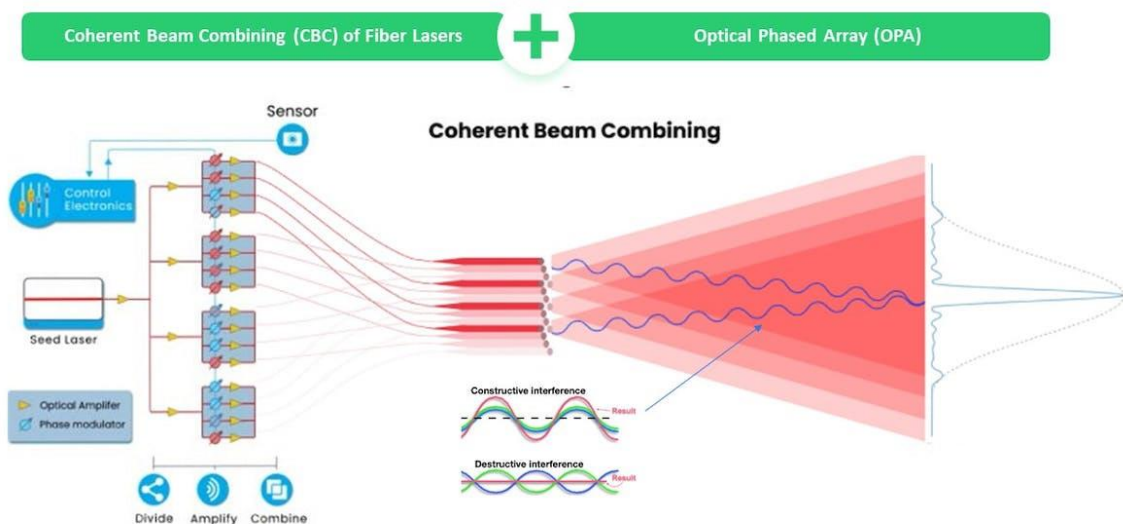
Galvo scanners and dynamic beam lasers

Combining galvo scanners and dynamic beam lasers provides advancements in laser welding needed to increase feed rates for e-mobility welding applications.

In today's world of manufacturing, speed is a key factor in producing new products. This is where galvo scanners come into play, providing a common method for laser welding and metal additive manufacturing. These scanners allow the laser beam to move in high feed rates and complex geometries, providing manufacturers with greater flexibility and control over their manufacturing processes. **Galvo scanners are widely used in various areas of manufacturing, including the automotive industry.**

To ensure high-quality output, **galvo scanners are often combined with sensors to monitor weld quality.** This provides manufacturers with the ability to quickly identify and correct any issues in the manufacturing process, reduce waste, and increase productivity.

However, **galvo scanners require the mechanical movement of lenses to maintain the correct focus position and complex optics to maintain the inclination angle.** This complexity can make it difficult for manufacturers to use the technology to its full potential.



Read More on [Galvo scanners and dynamic beam lasers | Laser Focus World](#)



Directional Connectivity-based Segmentation of Medical Images

Z. Yang and S. Farsiu,

Computer Vision and Pattern Recognition Conference, *CVPR*, 2023.

Anatomical consistency in biomarker segmentation is crucial for many medical image analysis tasks. A promising paradigm for achieving anatomically consistent segmentation via deep networks is incorporating pixel connectivity, a basic concept in digital topology, to model inter-pixel relationships. However, previous works on connectivity modeling have ignored the rich channel-wise directional information in the latent space. In this work, we demonstrate that effective disentanglement of directional sub-space from the shared latent space can significantly enhance the feature representation in the connectivitybased network. To this end, **we propose a directional connectivity modeling scheme for segmentation that decouples, tracks, and utilizes the directional information across the network.** **Experiments on various public medical image segmentation benchmarks show the effectiveness of our model** as compared to the state-of-the-art methods.

Code is available at <https://github.com/Zyun-Y/DconnNet>

[Read More](#)

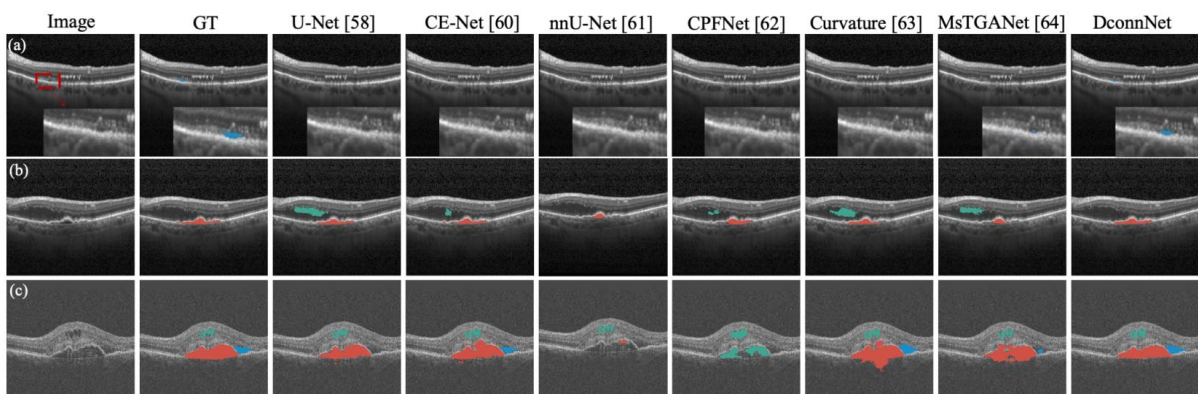


Figure 7. Visual comparison between the proposed DconnNet and other state-of-the-art methods on Retouch dataset. Different colors of masks represent different biomarker classes. Green: IRF; blue: SRF; red: PED.

Blind deconvolution of second harmonic microscopy images of the living human eye

Rosa M. Martínez-Ojeda, Laurent M. Mugnier, Pablo Artal, and Juan M. Bueno

Biomedical Optics Express, Vol. 14, [Issue 5](#), pp. 2117-2128, (2023)

•<https://doi.org/10.1364/BOE.486989>

Second harmonic generation (SHG) imaging microscopy of thick biological tissues is affected by the presence of aberrations and scattering within the sample. Moreover, additional problems, such as uncontrolled movements, appear when imaging *in-vivo*. Deconvolution methods can be used to overcome these limitations under some conditions. In particular, we present here a technique based on a marginal blind deconvolution approach for improving SHG images obtained *in vivo* in the human eye (cornea and sclera). Different image quality metrics are used to quantify the attained improvement. Collagen fibers in both cornea and sclera are better visualized and their spatial distributions accurately assessed. This might be a useful tool to better discriminate between healthy and pathological tissues, especially those where changes in collagen distribution occur.

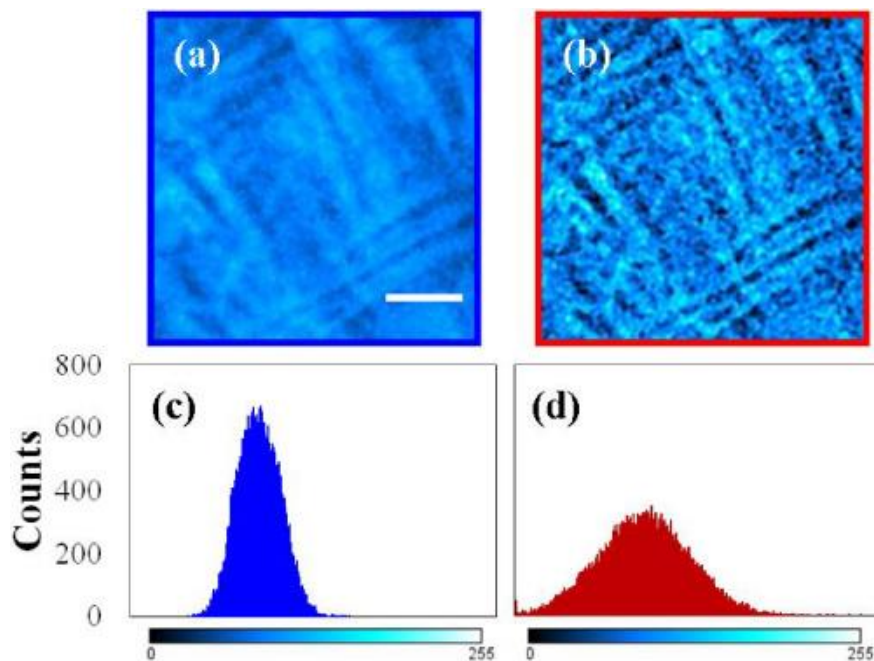


Fig. 4. Original (a) and deconvolved (b) SHG images of an ex vivo human cornea. The corresponding intensity histograms (c, d) are also shown. Scale bar: 50 μm .



Overview of the best photonics books: 2023 update

If you are looking for information about photonics, you have many resources at your disposal. You have tweets, articles, blog posts, brochures, flyers, whitepapers, videos, and of course books.

From among the resources listed above books remain the primary source as “first principles” knowledge of photonics. Photonics is a progressive discipline that is evolving fast. This evolution rests on a solid bedrock of knowledge contained in books.

Keep reading the following article to find out the best books to read:

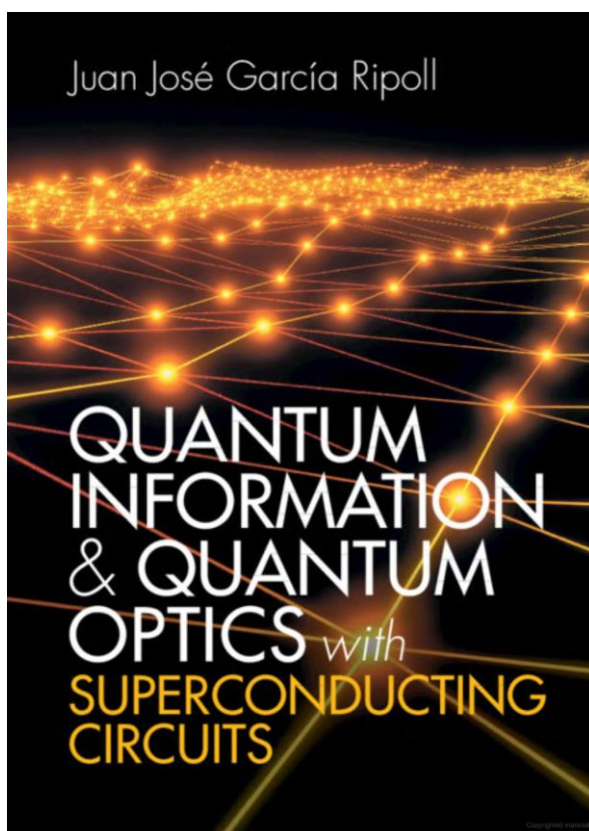
- Books on lasers: Principles of lasers, Ultrafast lasers
- Optics books: Principles of optics, Imaging optics
- Silicon photonics books, Silicon photonics design, Handbook of silicon photonics
- Biophotonics books: Handbook of biophotonics
- Fiber optic communication books: Nonlinear fiber optics
- Nanophotonics books: Introduction to nanophotonics
- Computational Photonics: Computational photonics: an introduction with Matlab

[Overview of the best photonics books: 2023 update - Photonics report](#)



Quantum Information and Quantum Optics with Superconducting Circuits New Edition

by Juan José García Ripoll



This book provides a comprehensive and self-contained introduction to the world of superconducting quantum circuits, and how they are used in current quantum technology. Beginning with a description of their basic superconducting properties, the author then explores their use in quantum systems, showing how they can emulate individual photons and atoms, and ultimately behave as qubits within highly connected quantum systems. Particular attention is paid to **cutting-edge applications of these superconducting circuits in quantum computing and quantum simulation.** Written for graduate students and junior researchers, **this accessible text includes numerous homework problems and worked examples.**

[Quantum information and quantum optics superconducting circuits |](#)
[Quantum physics, quantum information and quantum computation |](#)
[Cambridge University Press](#)

Order from [Amazon](#)



Student Theses -Optical Coherence Tomography News

Machine Learning Approaches for Automated Glaucoma Detection using Clinical Data and Optical Coherence Tomography Images



By **Nahida Akter**

University of New South Wales

Aims of this thesis: The research first focuses on optimising glaucoma diagnostic features by combining structural, functional, demographic, risk factor, and optical coherence tomography (OCT) features. The significant features were evaluated using statistical analysis and trained in ML algorithms to observe the detection performance. Three crucial structural ONH OCT features: cross-sectional 2D radial B-scan, 3D vascular angiography and temporal-superior-nasal-inferior-temporal (TSNIT) B-scan, were analysed and trained in explainable deep learning (DL) models for automated glaucoma prediction. The explanation behind the decision making of DL models were successfully demonstrated using the feature visualisation. The structural features or distinguished affected regions of TSNIT OCT scans were precisely localised for glaucoma patients. This is consistent with the concept of explainable DL, which refers to the idea of making the decision-making processes of DL models transparent and interpretable to humans. However, artifacts and speckle noise often result in misinterpretation of the TSNIT OCT scans. This research also developed an automated DL model to remove the artifacts and noise from the OCT scans, facilitating error-free retinal layers segmentation, accurate tissue thickness estimation and image interpretation.

Persistent link to this record

<http://hdl.handle.net/1959.4/101104>



OPTICS & PHOTONICS NEWS



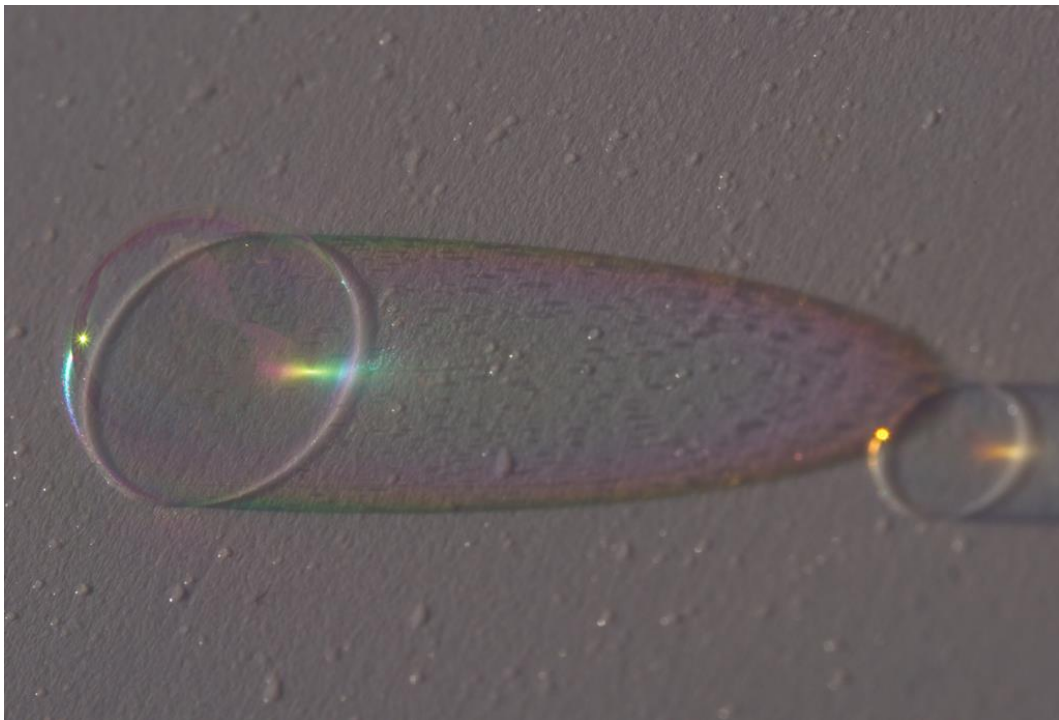
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Image of the Week

Striking images of optics and photonics, contributed by OPN readers



Soap Bubble Spectrum

A soap bubble resting on a flat white surface, illuminated by sunlight (elevation about 14 degrees). A teacup cusp caustic is caused, with light contributions from differently inclined parts of the bubble, resulting in different colors along the caustic.

—Markus Selmke, Deutsches Patent- und Markenamt, Jena, Germany



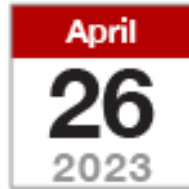
Webinars

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 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](#).



Thorlabs' Strategy for Sustainable Work Force Development

The photonics manufacturing industry requires a highly skilled workforce to design, manufacture, and assemble the precise instruments and equipment necessary for advanced research and development in the medical, telecommunications, and defense industries. Join Thorlabs' Business Development Manager, Navid Entezarian, as he outlines the approach Thorlabs is taking to solve the trained workforce shortage.



Presented by Navid Entezarian,

Business Development Manager, Thorlabs

Navid Entezarian began his career at Thorlabs in 2013 as a production engineer, and has worked his way through the optics department to his current role as Business Development Manager. In this role, he focuses on growing the optics and mechanics unit here at Thorlabs. Navid graduated from New Jersey Institute of Technology with a degree in Physics and has since then been involved in the photonics industry to become a seasoned specialist in the optics field.

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on Our [Careers Page](#)



Fiber laser technology for commercial quantum applications

NKT Photonics has for many years been the leading provider of narrow linewidth fiber lasers and also the sole commercial producer of photonic crystal amplification fiber. These are the key ingredients that allow NKT Photonics to match the ambitious development roadmaps of the world's foremost quantum computing efforts.

They are motivated by making a difference in the world through fiber and laser technology, and we have been active in the quantum optics community for many years. In recent years, we have developed high-power frequency conversion for the emerging cold atom quantum sensing community which didn't have any commercial options at these levels.

[Watch the following video to learn more about fiber lasers for commercial quantum applications](#)
[\(video was shot at Photonics West 2023\)](#)

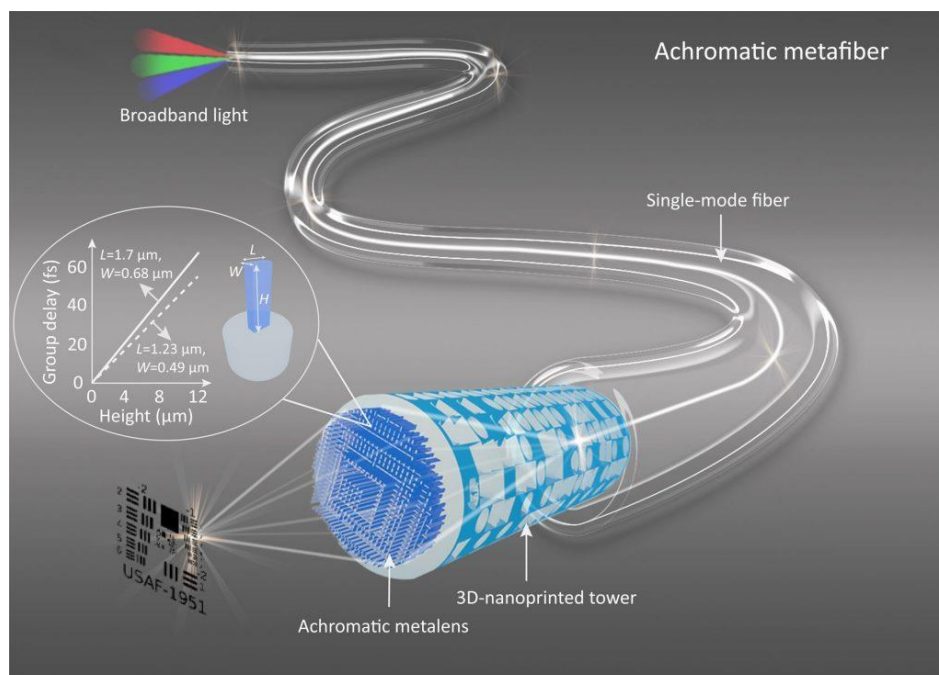
<https://vimeo.com/809667470>



Dispersion engineering with meta-optics

Meta-optics is an emerging technology that provides for dispersion-free optical engineering

The [Ren Group](#) - a research team at the School of Physics and Astronomy, Monash University - has developed a broadband achromatic metafiber and used a [SuperK FIANIUM](#) supercontinuum white light laser to characterize it. NKT Photonics SuperK lasers are ideal for the characterization of advanced optical components, metamaterials, plasmonics, etc., due to their high brightness, high spatial resolution, and flat and broad spectrum. Get the summary in their [case story](#) or the full story in the [article](#) in Nature Communications.



Principle of an achromatic metafiber used for achromatic focusing and imaging



CONFERENCES



**Markus Pessa Summer School "New Frontiers in Optical Technologies", August 7-11, Tampere, Finland, in conjunction with the
NETLAS International Conference**

The International Summer School New Frontiers in Optical Technologies was established in 2001. The 11th edition organized this year marks a name change to “**Markus Pessa International Summer School New Frontiers in Optical Technologies**” – a tribute to the memory of the late [Prof. Markus Pessa](#), the founder of the Optoelectronics Research Centre in Tampere and the pioneer of optoelectronics and semiconductor laser technology in Finland.

Tutorial type of lectures covering laser technologies, imaging (including bio-imaging technology), quantum technology, photonic integration, transferable skills and Student Mentoring Activities.

**All NETLAS ESRs are expected to present orally.
Registration is now open, more information can be found at:**

[Markus Pessa Summer School | Tampere Universities \(tuni.fi\)](https://tuni.fi/markus-pessa-summer-school)



SEMINAR Careers after the MSCA fellowship

Alternative careers beyond academia & industry

Apr 28, 2023 12:00 PM in UK

Speakers:

Dr Anouk Lafortune, Policy Officer at MSCA Unit, European Commission

Dr Joana Moscoso, Social business innovator/Entrepreneur at Native Scientists and Chaperone -

Dr Ruben Riosa, Associate Medical Communications Manager at Excerpta Medica and Chair of the MCAA Communications working group

Dr Kyriakos Tzafestas, Director at PharmaVentures

[MCAA Webinar: Careers after the MSCA fellowship - alternative careers beyond academia & industry | Marie Skłodowska-Curie Actions \(europa.eu\)](#)



VCSEL Day 2023, Politecnico di Torino,

September 22, 2023: SAVE the DATE

Dear VCSELers,

after a two-year break, the VCSEL Day is back. **It will be a one-day informal session**, to be held in the [Maxwell room](#) of the Department of Electronics and Telecommunications (DET), at the Politecnico campus, Corso Duca degli Abruzzi 24, Torino, Italy. The event will take place on the **last day of the International Conference on Numerical Simulation of Optoelectronic Devices [NUSOD](#)** (Torino, Lingotto Campus, September 18—22).

Deadline for registration: June 30. An application link will be provided via email.

Deadline for submitting contributions: August 31. A template will be provided via email to the registered participants.



Please use this email address vcselday2023@polito.it for all correspondence



Questions to ask at interviews part 1: Ask yourself first

Many students and young professionals hesitate to ask questions at their interviews as they believe interviews are one-way. However, **asking your own questions is a powerful tool**. It's just as important for you to understand and feel comfortable with the position and work environment you are applying to work in as it is for the supervisor to get to know you as a candidate.

As you consider whether a job is right for you, first identify the aspects that are most important to you based on professional advancement, long-term goals, community, location and more. **Make a list with your very specific values categorized and ranked by your priorities**. This will help you prioritize your needs and select which questions to ask in an interview. Please consider that different cultures and institutions will have different standards.

Below, we have put together a list of questions to ask yourself before your interview to determine if a job is right for *you*.

Questions to ask yourself before accepting a PhD or Postdoc position:

1. *What do I want to achieve by taking this position?*
2. *Do I know what the project is about, and do I understand what is expected from me to be successful?*
3. *Would I enjoy working in this environment, and do I share similar ethics and goals as the rest of the group?*
4. *Do I understand the funding situation for my position in terms of salary, purchase of equipment and travel opportunities?*
5. *Am I aware of the challenges I may encounter to successfully write and defend a Ph.D. thesis?*
6. *What type of support and guidance will my advisors be able to give, both in technical areas and for career advancement?*
7. *What should I look for to successfully become an independent researcher/secure a tenure track position?*

Read More at [Questions to ask at interviews part 1: Ask yourself first | Blog | Optica](#)

Posted by Optica Ambassadors [Alessandra Carmichael-Martins](#) (Class of 2022), [Linhui \(Lynn\) Yu](#) (Class of 2021) and [Richard Zeltner](#) (Class of 2022) |



Job by University of [Antwerp](#)

Biomedical Imaging Researcher

A PhD researcher with an interest in optical measurement techniques (laser and imaging based) is required in the framework of an interdisciplinary research project on Plasma Oncology with research groups [UAntwerpen - CORE](#), [Plasmant](#), BIMEF and [InViLab.UAntwerp](#).

You will work actively on the preparation and defense of a PhD thesis in the field of in-situ characterization of the mechanical properties of skin tissue. You will use camera-based measurement techniques (e.g. hyperspectral imaging) and laser-based methods (e.g. laser Doppler vibrometry) to identify the material properties of healthy and cancerous skin tissue during plasma treatment. The research will be performed at the Industrial Vision Lab ([InViLab](#)) and Biomedical Physics ([BIMEF](#)) research groups in collaboration with researchers of the Plasma Lab for Applications in Sustainability and Medicine ([PLASMANT](#)) and Center for Oncological Research ([CORE](#)). A short description of the project on which you will work, can be found [here](#).

You will publish scientific articles related to the research project and you will present your work at conferences as well as to a broader audience (through social media).

You will carry out a limited number of teaching and research support tasks for the InViLab and BIMEF research groups.

For more information or to apply, please go to the [UAntwerp vacancy website](#)



Parkinson's Centre, Canterbury, UK

Parkinson's Centre is a community-based treatment and research centre located in Canterbury - a global ambition with a family feel. They offer a range of non-drug therapies for Parkinson's disease, all under one roof and host educational courses and placement schemes to train the next generation of clinicians and researchers in this integrated care model.



Parkinson's Centre - University of Kent

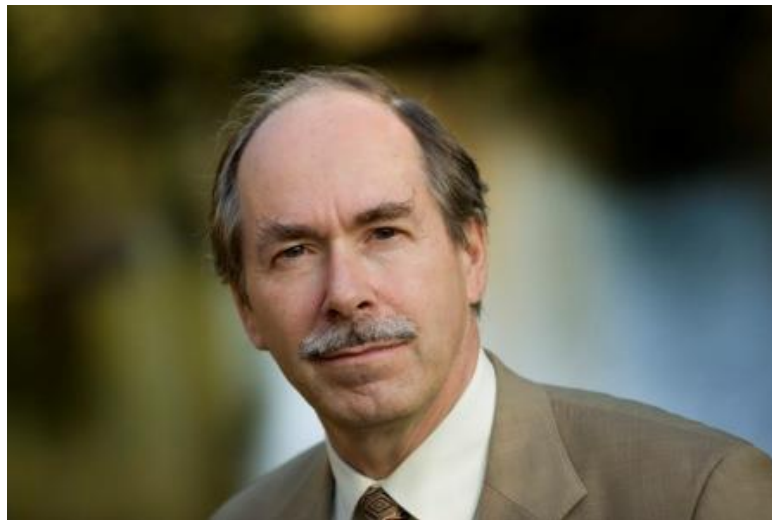
Find out more about the Centre



Did you know?

Nobel laureate [Gerardus 't Hooft](#) built a marvellous webpage called

[“How to become a GOOD Theoretical Physicist” \(goodtheorist.science\)](#)



If you follow his advice, you may achieve great things in physics!

Good luck!

Professor Gerardus 't Hooft, University of Utrecht, Utrecht, the Netherlands, and **Professor Emeritus Martinus J. G. Veltman**, University of Michigan, USA, resident in Bilthoven, the Netherlands, were awarded in 1999 the Nobel Prize for having placed particle physics theory on a firmer mathematical foundation. **They have in particular shown how the theory may be used for precise calculations of physical quantities.** Experiments at accelerator laboratories in Europe and the USA have confirmed many of the calculated results.



[New project to tackle farming food-waste launches](#)

The University and [Produced in Kent](#) are together launching a gleaning project that will see students work with farms to tackle food waste and reduce the environmental impact of surplus food, which currently accounts for [6-7% of greenhouse gas emissions](#) every year in the UK.

The project will support farms in the Kent Downs Area of Outstanding Natural Beauty (AONB) redistributing produce to businesses, charities and community groups in the Canterbury area, using the FoodLoop app – an app developed by Produced in Kent, which connects those who have surplus food with those who need it. Statistics on volumes of surplus gleaned from Kent fields and redistributed to those who need it, will be collected through FoodLoop and shared publicly.

The project will be supported by established local gleaning groups *Deal with It* and *Hythe Environmental Community Group*, who will train the students in the art of gleaning. The food redistribution infrastructure developed through the project can be replicated in other areas of the county.

Dr Philip Pothen, Director of Engagement at Kent, said: ‘The University’s Right to Food initiative brings all areas of the University’s work to bear on tackling the challenges of securing fair and sustainable access to food. This project demonstrates that volunteering has an important role to play in bringing communities together, building links with farms and food suppliers and redistributing food to where it is needed and wanted most. We’re delighted to be working with Produced in Kent and other partners on this important initiative.’

Read More at [New project to tackle farming food-waste launches - News Centre - University of Kent](#)



Did you know?

April is recognized as National Stress Awareness Month to bring attention to the negative impact of stress. Managing stress is an essential component of a healthy lifestyle. Knowing how to manage stress can improve mental and physical well-being as well as minimize exacerbation of health-related issues.

As we head towards the end of Stress Awareness Month, **University of Kent mental health Support wanted to highlight how to have conversations at work around the subject of mental health.** If you are experiencing a mental health problem, it can sometimes be difficult to initiate a conversation about mental health needs with your manager, and vice versa if you're a manager concerned about a colleague. At Kent University, you should have at least one appraisal discussion yearly and this is also a good opportunity to talk about wellbeing and mental health needs.

If you're looking for some advice, Nuffield Health have some great tips on [how to talk with a team member that you have concerns for as a manager](#). The basic advice is to set the right tone, keep it simple, listen and show interest. They also have advice on [how to raise the subject of support for your mental health with your manager](#). They have also created a [useful video](#) that encapsulates the advice for both parties.

If you contact the [Employee Assistance Programme](#), you can talk to a member of their team about how to start that initial conversation with someone, or, if you are a manager, you can speak to someone about how you feel about supporting someone with mental health needs. We also have a [network of Mental Health Allies](#) who are trained to have discussions about mental health. There's also an easily accessible development courses that can help in this area. For example, ['How to hold a Wellbeing Conversation'](#) and ['Emotional Intelligence'](#).

[Let's Talk About Mental Health at Work \(sharepoint.com\)](#)

Did you know?

[Monastic brewer makes instant beer powder | GlobalSpec](#)

By [Marie Donlon](#)

An instant beer powder has reportedly been developed by a German monastic brewery in what is being called a world's first.

The German monastery based-brewery [Klosterbrauerei Neuzelle](#) has developed a zero-alcohol, high dextrin beer that is initially brewed like traditional beers but then further processed and transformed into a powder that will dissolve when added to water.



Source: Klosterbrauerei Neuzelle

According to its developers, the process for creating this beer is shorter than traditional beer-making processes and uses less energy and fewer natural resources.

Further, the beer is lighter to transport in powder form, shipping at just 10% the weight of liquid beer.

The powdered beer is currently being trialed in smaller markets through mid-2023 and the brewers are now attempting to develop an alcohol-based version of the powdered beer.

To contact the author of this article, email mdonlon@globalspec.com



Happy Birthday to Johann Carl Friedrich Gauss

German mathematician, astronomer, and physicist

Born on 30 April 1777 – Died on 23 February 1855



Gauss wrote pivotal works in diverse scientific fields such as differential geometry, algebra, analysis, modular arithmetic, statistics, geophysics, geodesy, optics, planetary astronomy, electromagnetism and number theory, to which he remained devoted until his death.

He published over 150 works and made such important contributions as the fundamental theorem of algebra (in his doctoral dissertation), the least squares method, Gauss-Jordan elimination (for solving [matrix](#) equations), and the bell curve, or Gaussian error curve (see [normal distribution](#)). Gauss made important contributions to physics and astronomy and pioneered the application of mathematics to gravitation, electricity, and magnetism. He also developed the fields of potential theory and real analysis.

With [Archimedes](#) and [Newton](#), **he is one of the greatest mathematicians of all time.**

[Carl Friedrich Gauss | Biography, Discoveries, & Facts | Britannica](#)



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