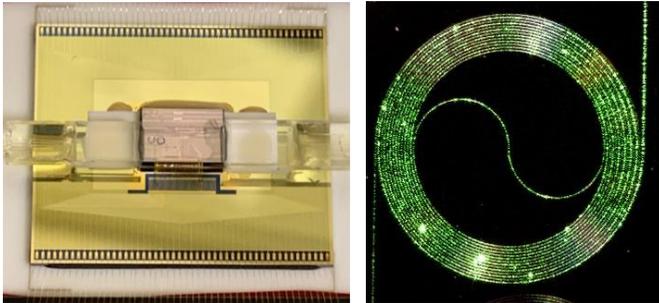




Call for Papers for the
SET-331 Research Specialists' Meeting (RSM)
on

Photonic Integrated Circuits

organized by the
Sensors and Electronics Technology (SET) Panel



to be held in

Dresden, DEU

21-22 October 2024

This Research Specialists' Meeting is
NATO UNCLASSIFIED
open to Australia, Japan, Sweden, and Switzerland

Latest Enrollment Date

NATO Nations 23 September 2024

Non-NATO Nations 23 September 2024

Enroll on-line at <http://www.sto.nato.int>

All presentations and discussions will be in English

No conference fee for presenters and participants

INTRODUCTION

General Information

A Research Specialist's' Meeting aims to promote the exchange of state-of-the-art knowledge on a scientific or applied topic that is important to enhancing the military capabilities of NATO. **Authors of accepted papers will meet international leaders and potential future collaborators in the field of photonic integrated circuits, while informing future NATO S&T investments by the defence community.**

Authors of selected papers will be provided with information in the Instructions for Authors document, which contains detailed instructions for the presentation, publication of papers, release forms, etc.

S&T Organization in NATO

Science & Technology (S&T) in the NATO context is defined as the selective and rigorous generation and application of state-of-the-art validated knowledge for defence and security purposes. S&T activities embrace scientific research, technology development, transition, application and field-testing, experimentation and a range of related scientific activities that include systems engineering, operational research and analysis, synthesis, integration and validation of knowledge derived through the scientific method.

The mission of the NATO STO is to help position the Nations' and NATO's S&T investments as a strategic enabler of the knowledge and technology advantage for the defence and security posture of NATO Nations and its partner Nations, by:

- Conducting and promoting S&T activities that augment and leverage the capabilities and programmes of the Alliance, of the NATO Nations and the partner Nations, in support of NATO's objectives;
- Contributing to NATO's ability to enable and influence security- and defence-related capability development and threat mitigation in NATO Nations and partner Nations, in accordance with NATO policies;
- Supporting decision-making in the NATO Nations and NATO.

The Sensors & Electronics Technology Panel

The Sensors and Electronics Technology (SET) Panel is one of the seven Panels under the STB. The mission of the SET Panel is to foster cooperative research, the exchange of information and the advancement of science and technology among the NATO Nations in the field of sensors and electronics for defence and security. The SET Panel addresses electronic technologies as well as active sensors as they pertain to Reconnaissance Surveillance and Target Acquisition (RSTA), Electronic Warfare (EW), communications and navigation, and the enhancement of sensor capabilities through multi-sensor integration and fusion.

SET-331/RSM INFORMATION

Background

The NATO Science and Technology Organization (STO) through the Optical Technologies Focus Group of SET has highlighted Photonic Integrated Circuits (PICs) as an area of growing interest. PIC technology, adapted from silicon microelectronics fabrication and packaging, is being investigated for next-generation electro-optic systems that require the modulation, multiplexing, filtering, propagation, and routing of optical signals. PIC technologies are being investigated for a variety of DoD applications including RF signal processing, high-speed data read-out from sensors, communication, inertial and physical sensing, chemical and biological sensing, and lidar. By leveraging semiconductor microelectronics processing, PICs provide not only low size, weight, and power but also new technical capabilities deriving from system phase stability and nanoscale optical confinement.

Objectives

The key objective is to provide SET with a comprehensive understanding of the current state-of-the-art in PIC technology. This means that the proposed RSM should consider the manufacturing and engineering issues which underpin their commercial viability. Important factors are thermal management, mechanical and material properties, device packaging and the integration of semiconductor, optical and photonic components. The role of silicon photonics is central to PIC development but there are also notable advances in the use of indium phosphide (InP), gallium arsenide (GaAs), lithium niobate (LiNbO₃), and silicon nitride (SiN), which increase the diversity and flexibility of functional devices. The RSM would advise SET of the latest technological achievements and highlight a wide range of applications for defence. It would also advise future NATO technology strategy and collaborative R&D by:

1. Providing insight to the current state-of-the-art in PIC technology, both in engineering and practical applications. Most PIC development is in support of civilian applications, especially in fibre-based data communications and vehicular lidar. Understanding how to leverage this development for military electro-optic systems is pivotal for this RSM.
2. Highlighting recent advances in materials and manufacturing techniques, including foundry fabrication, packaging, and system assembly. This also provides an overview of the manufacturing infrastructure across NATO member states, which can then be benchmarked against non-NATO development activity.
3. Identifying specific military uses where PIC technology is likely to have an immediate or short-term impact.

Topics to be covered

PIC Applications:

- Microwave photonics
- Multi/Hyperspectral imaging
- Lidar for imaging/mobile platforms/remote sensing
- Spectroscopy on-chip for gas, chemical, or biological sensing
- Communications (for data, sensors, AI, high-performance computing, or quantum information)
- Biosensing and healthcare diagnostics and monitoring
- Free-space and laser communication
- Positioning, navigation, and timing (PNT)
- High-powered lasers and directed energy
- Augmented reality and virtual reality (AR+VR)
- Optical neuromorphic computing and AI

PIC Technologies:

- Silicon photonics
- Mid-IR silicon photonics and integrated MIR materials
- Visible Integrated photonics, including SiN, AlN, and AlO
- Quantum integrated photonics
- Glass-based PICs and planar lightwave circuits
- Monolithic or heterogeneous electronic-photonics integration and co-packaging
- Heterogeneous materials integration (III-Vs, nonlinear materials, electro-optic materials, etc)
- Integrated light sources
- Frequency combs
- Reconfigurable and programmable photonics
- Nonmechanical beam-steering and optical phased arrays (OPAs)

Program Committee Members

Todd Stievater (USA), NRL (Co-Chair)
Graham Reed (GBR), U. Southampton (Co-Chair)
James R. Adelman (USA), Navy NIWC Pacific
Cheryl Sorace-Agaskar (USA), MIT-LL
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Stefan Preble (USA), RIT
Marcel Rattunde (DEU), IAF
Peter J. Smith (USA), Army DEVCOM C5ISR
Torbjørn Skauli (NOR), FFI

Local Host Coordinator

Mr. Sven Kupfer (DEU)

Bundeswehr

SvenKupfer@bundeswehr.org

Submission deadlines

- US Abstracts submission: **29 APRIL 2024**
- Abstracts submission: **13 MAY 2024**
- Acceptance notification: **10 JUNE 2024**
- US Paper submission: **19 AUGUST 2024**
- Final paper submission: **2 SEPTEMBER 2024**

PRELIMINARY INFORMATION TO AUTHORS

All authors who wish to present at the RSM should send an abstract as described below. The authors selected by the Programme Committee will receive the Instruction for Authors package from the SET panel office, which contains detailed instructions for the presentation, publication of papers, release forms, etc. Please note that the authors of papers selected for presentation will not be financially supported by this organization. Authors are responsible for their own hotel and travel expenses. Each speaker will customarily have 15 minutes for presentation and 5 minutes for discussions.

Abstracts

All abstracts must be submitted by the deadline stated in the Preliminary Schedule. Non-US Authors must send the abstract by e-mail as PDF to both SET-331 RSM Co-Chairs:

Todd Stievater: todd.h.stievater.civ@us.navy.mil

Graham Reed: g.reed@soton.ac.uk

And SET panel Executive Assistant: alicia.maharaj@cso.nato.int

The Abstracts (length: 200-500 words) should contain the following information:

- SET-331 Research Specialists' Meeting (RSM) on Photonic Integrated Circuits
- Title of abstract/paper
- Topic
- Name of author/co-author(s), company/affiliation, complete mailing addresses, telephone, and e-mail addresses
- Content - scope of the contribution, relevance to the meeting, rationale, conclusions

Special notice for US authors and non-US citizens affiliated with US organizations

Abstracts of papers from the US must be sent only to the following POC:

Phone: +1 571 372-6538/9 Fax: +1 571 372-6471

Email: osd.pentagon.ousd-atl.mbx.usnatcor@mail.mil

To ensure documents are received on time, it is best to send related documents electronically.

All US Authors must include the following statement in a cover letter:

- The work described in this abstract is cleared for presentation to NATO audiences
- The abstract is technically correct
- If work is sponsored by a government agency, identify the organization and attest that the organization is aware of submission
- The abstract is NATO Unclassified; and
- The abstract does not violate any proprietary rights.

US Authors are encouraged to contact the US POC as early as possible. Delays in meeting POC deadlines will impact the timely submission of your Abstract. Also note:

- Only complete packages (abstract plus all items listed above) will be accepted by the US POC.
- After review and approval, the US POC will forward all US abstracts with the Details of Authors Form to the SET Panel Assistant. All US abstracts must be received directly from the US POC. US abstracts will not be accepted directly from Authors

Enrollment

Enrollment will be announced at a later date and can be done online only at

<https://events.sto.nato.int>

Note: if you enrolled in other RTO-STO activities in the past, please use the same e-mail address as previously. If your e-mail address has changed, please inform the CSO contact before enrolling.

Enrollment Deadline: 23 SEPTEMBER 2024

If you are unable to enroll via the internet, please contact the SET PANEL Executive Assistant: SET@cso.nato.int



NATO Collaboration Support Office (CSO), SET Panel Office

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