

# 15<sup>th</sup> INTERNATIONAL CONFERENCE ON MID-INFRARED: OPTOELECTRONIC MATERIALS AND DEVICES (MIOMD)

## Conference Programme

**\* All live sessions are on British Summer Time (GMT+01:00) \***

**Wednesday 1<sup>st</sup> September 2021**

Topic	Time/ID	Speaker	Organisation	Title
<b>Conference Opening (Live)</b>	<b>OPENING</b>  14:00-14:15	<b>Stephen Sweeney</b>	<b>University of Surrey</b>	<b>Welcome Address</b>
<b>Plenary 1 (Live)</b>	<b>PL-1</b>  14:15-15:15	<b>Gunther Roelkens</b>	<b>IMEC, University of Gent</b>	<b>III-V/Si photonic integrated circuits and their applications in spectroscopy</b>
<b>Scientific Advisory Committee Meeting</b>	<b>SAC</b>  15:15-16:15			<b>Closed meeting for the MIOMD Scientific Advisory Committee</b>

<b>Session 1:</b>  <b>QCL and ICL Devices</b>  <b>(Pre-recorded Session)</b>	<b>I1-1</b>	<b>Roland Teissier</b>	<b>University of Montpellier, France</b>	<b>Long wavelength mid-IR QCLs: state of the art, physics and applications</b>
	O1-2	Igor Vurgaftman	Naval Research Laboratory	Toward Robust and Practical Interband Cascade Laser Frequency Combs
	O1-3	Yuzhe Lin	Institute of Semiconductors, Chinese Academy of Sciences	Development of InAs-based Interband Cascade Lasers
	O1-4	Jeremy Massengale	University of Oklahoma	Long wavelength interband cascade lasers with reduced thresholds
	O1-5	Pierre Didier	Telecom Paris - Institut polytechnique de Paris	Analysis and simulation of the relative intensity noise in a Fabry-Perot interband cascade laser highlights relaxation oscillations around GHz
	O1-6	Weicheng You	The Ohio State University	Comparison of BCl <sub>3</sub> /Ar and CH <sub>4</sub> /Ar Plasma Chemistries for Dry Etching of Interband Cascade Lasers

<b>Session 2: Photodetectors 1  (Pre-recorded Session)</b>	<b>I2-1</b>	<b>Francois Julien</b>	<b>University Paris- Saclay</b>	<b>Quantum cascade detectors based on wide band-gap semiconductor</b>
	O2-2	Georg Marschick	Technische Universität Wien	A novel quantum cascade detector (QCD) for low attenuation free-space telecommunication around 9 $\mu\text{m}$ wavelength
	O2-3	Dhafer Alshahrani	Cardiff University	Optical and Electrical Performance of a 5 $\mu\text{m}$ InAs/GaSb Type-II Superlattice Photodiode for NO <sub>x</sub> Gas Detection
	O2-4	Laura Hanks	Lancaster University	Development of Quasi-Planar In <sub>0.14</sub> Ga <sub>0.86</sub> As <sub>0.10</sub> Sb <sub>0.90</sub> pBn Devices for Spectroscopic Sensing
	O2-5	Rui Yang	University of Oklahoma	Fundamental Limit of Detectivity of Infrared Photodetectors

<b>Session 3:  Si Photonics and integration 1  (Pre-recorded Session)</b>	<b>I3-1</b>	<b>Milos Nedeljkovic</b>	<b>University of Southampton</b>	<b>Silicon photonic photodetectors, sensors, and spectrometers for the mid-infrared</b>
	O3-2	Chen Wei	University of Southampton	Mid-infrared SOI waveguide thermo- optic Fourier Transform spectrometer
	O3-3	Martino De Carlo	Photonics Research Group	Proposal of a semi-integrated QEPAS sensor
	O3-4	Yanli Qi	University of Southampton	Silicon waveguides integrated with switch for low noise mid-infrared sensor

<b>Session 4:  Mid-IR Spectroscopy  (Pre-recorded Session)</b>	<b>I4-1</b>	<b>Stefan Hugger</b>	<b>Fraunhofer Institute for Applied Solid State Physics</b>	<b>MOEMS external cavity QCLs for spectroscopic sensing</b>
	O4-2	Melissa Najem	Institut of Electronic and Systems, University of Montpellier, France.	Multimodal infrared vibrational spectroscopy from 1.1 to 6.5 microns using MIM Aluminum Bowties
	O4-3	Diba Ayache	University of Montpellier	Infrared spectroscopy for exhaled breath diagnosis
	O4-4	Pierre Fehlen	NS3E-ISL, l'Université de Strasbourg & IES, Université de Montpellier	Surface-enhanced infrared spectroscopy for selective and sensitive detection of organophosphorus compounds
	<b>I4-5</b>	<b>Jana Jagerska</b>	<b>University of Tromso</b>	<b>Nanophotonic waveguides with high field confinement in air for on-chip trace gas sensing</b>

## Thursday 2nd September 2021

Topic	Time/ID	Speaker	Organisation	Title
<b>Plenary 2 (Live)</b>	<b>PL-2</b>  14:00-15:00	<b>Carlo Sirtori</b>	<b>ENS &amp; University Paris Diderot</b>	<b>Metamaterial enhanced THz devices</b>
<b>Plenary 3 (Live)</b>	<b>PL-3</b>  15:00-16:00	<b>Alex Gaeta</b>	<b>University of Columbia</b>	<b>Chip-based comb spectroscopy</b>

<b>Session 5:</b> <b>Epitaxy and Novel Materials</b>  <b>(Pre-recorded Session)</b>	<b>I5-1</b>	<b>Amy Liu</b>	<b>IQE, Inc.</b>	<b>Progress in MBE Production Technology for GaSb-based IR Photodetector Structures</b>
	O5-2	Marko Milosavljevi c	Arizona State University	Optical properties of InAsSbBi and GaInAsSbBi grown on GaSb substrates
	O5-3	Nicholas Bailey	University of Sheffield	Bi surfactant for tailoring InAs(Bi) quantum dots
	O5-4	Shi-Jane Tsai	Graduate Institute of Electronics Engineering, National Taiwan University	Infrared GaAsBi Grown on GaAs by Molecular Beam Epitaxy
	O5-5	Stephen Schaefer	Arizona State University	Temperature and excitation dependent photoluminescence measurements of nonradiative lifetime in InAs(SbBi)
	<b>I5-6</b>	<b>David Lackner</b>	<b>Fraunhofer ISE, Freiburg</b>	<b>Bridging the Gap: Developing Engineered Substrates Spanning Lattice Constants between GaAs and InP</b>

<b>Session 6:</b> <b>Emitters, LEDs and Materials</b>  <b>(Pre-recorded Session)</b>	<b>I6-1</b>	<b>Hiromi Fujita</b>	<b>Asahi Kasei Microdevices Corporation</b>	<b>Development of highly mismatched AlInSb/GaAs mid-infrared LEDs/PDs and its application to gas sensing</b>
	O6-2	Abdullah Altayar	Lancaster University	Mid-infrared InAsSb/AlInAs multi-quantum well light emitting diodes on GaAs and Silicon
	O6-3	Matthew Suttinger	Air Force Research Laboratory	Notched Angled Cavity Waveguides for Mid-Infrared Semiconductor Lasers
	O6-4	Christopher Broderick	Tyndall National Institute, Ireland	Theory of emerging III-V heterostructures for mid-infrared emitters

	I6-5	John Prineas	University of Iowa	Advances in Materials and Structures for High Efficiency Mid-Infrared Light Emitting Diodes
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<b>Session 7: Photodetectors 2 (Pre-recorded Session)</b>	I7-1	Yi Zhou	Shanghai Institute of Technical Physics, CAS	Interband cascade infrared photodetectors and light emitting diodes at high temperatures based on InAs substrate
	O7-2	Dominic Kwan	Cardiff University	Type-II InAs/GaSb superlattices on GaAs for 10 $\mu$ m infrared detection
	O7-3	David Ting	NASA Jet Propulsion Laboratory, California Institute of Technology	Very long wavelength InAs/InAsSb type-II superlattice barrier infrared detectors and focal plane arrays
	O7-4	Andreas Bader	University of Würzburg	Growth of Interband Cascade Detectors for Light Detection in the Mid Infrared Spectral Band
	O7-5	Andrew Bainbridge	Lancaster University	Design and Analysis of InAs-based Resonant Cavity Enhanced Photodiodes

<b>Session 8: Si Photonics and Integration 2</b>	I8-1	Mikhail Belkin	Walter Schottky Institute	Mid-infrared photonic integration on InP
	O8-2	Oluwatobi Olorunsola	University of Arkansas	Comparative study of SiGeSn/GeSn quantum wells towards high-performance all-group-IV optoelectronics
	O8-3	Tyler McCarthy	Arizona State University - MBE Optoelectronics	Optimal Design of Momentum (k)-Space Charge Separation IR Photodetectors Using SiGeSn Alloys
	O8-4	Callum Stirling	University of Southampton	Mid-infrared SOI waveguides with broadband single-mode propagation
	I8-5	Jacopo Frigerio	Politecnico di Milano	Heavily doped Ge-on-Si: a promising material platform for mid-infrared plasmonics

<b>Poster Session (Pre-recorded Session)</b>	P1-1	Dominic Duffy	University of Surrey	Radiative Characteristics of Low Threshold Current Type-II Ga(InAs)/Ga(AsSb) "W"-Lasers on GaAs
	P1-2	WeiJiang Li	Key Laboratory of Semiconductor Materials Science, Institute of Semiconductors, Chinese Academy of Sciences	Single-mode GaAs/AlGaAs quantum cascade lasers emitting at 4.9 THz
	P1-3	Rinki Aggarwal	Amity University Noida	High efficiency PbS/Si NW heterojunction photodetectors using chemical bath deposition
	P1-4	Ran Yin	Institute of Semiconductors, Chinese Academy of Sciences	The temperature influence of anti-reflection coating on QCL facet
	P1-5	Matthew Sharpe	University of Surrey	Rutherford Backscattering Spectrometry of Bi Containing III-V Semiconductors
	P1-6	Masahiro Okujima	Ehime University	Molecular Beam Epitaxy of GaNAsBi Nanowires emitting around 1300 nm
	P1-7	Aneirin Ellis	University of Surrey	Temperature and High Hydrostatic Pressure Investigations of Epitaxially Grown 2.3- $\mu$ m GaSb lasers on Si
	P1-8	Teng Fei	Institute of Semiconductors	Room-temperature lasing of quantum cascade lasers grown by metal-organic chemical vapor deposition
	P1-9	Aidas Baltusis	University of Surrey	Rapid minority charge carrier lifetime imaging of semiconductor materials and devices using compressed sensing
	P1-10	Dominic Duffy	University of Surrey	Optical Spectroscopy of NIR III/V-Bi Alloys and Heterostructures
	P1-11	Aleksey Andreev	Tyndall National Institute, Ireland	Non-radiative Auger Recombination in GeSn Quantum Wells: Unusual Band-gap Dependence
	P1-12	Peter Carrington	Lancaster University	Mid-Infrared Gallium Antimonide Photonic Devices Grown on Silicon

**Friday 3rd September 2021**

Topic	Time/ID	Speaker	Organisation	Title
<b>Session 9:</b>  <b>Si Photonics and integration 3</b>  <b>(Pre-recorded Session)</b>	<b>I9-1</b>	<b>Mircea Guina</b>	<b>Tampere University</b>	<b>Broadband light sources at 2-3 <math>\mu\text{m}</math> region based on GaSb/SOI hybrid integration</b>
	O9-2	Lauren Reid	University of Southampton	PIN-ch me!: A Ge-on-SOI photodiode with response up to 3.8 $\mu\text{m}$
	O9-3	Colin Mitchell	University of Southampton	Development of Hybrid Integration of Quantum Cascade Lasers with Germanium Waveguides for Mid-IR
	O9-4	Michele Paparella	University of Montpellier - Polytechnic University of Bari	Analysis of the optical coupling between monolithically integrated GaSb laser diodes and SiNx waveguides
	O9-5	Wei Cao	University of Southampton	MIR Silicon Modulators in the 2 $\mu\text{m}$ wavelength band

<b>Session 10:</b> <b>Communications and sensing</b>  <b>(Pre-recorded Session)</b>	<b>I10-1</b>	<b>Natalie Wheeler</b>	<b>University of Southampton</b>	<b>Hollow core optical fibres for mid-infrared beam delivery and applications</b>
	O10-2	Olivier Spitz	Télécom Paris	Application of chaos synchronization in injected mid-infrared quantum cascade lasers for private free-space communication
	O10-3	Wioletta Trzpił	IES, Univ. Montpellier, CNRS, F-34000 Montpellier, France	Silicon micro-electromechanical resonator for enhanced photoacoustic gas detection
	O10-4	Florian Pilat	Institute of Solid State Electronics, TU Wien	Spectrally-Resolved Measurement of the Linewidth Enhancement Factor
	O10-5	Jordan Fordyce	Université de Montpellier	Single mode interband cascade lasers for petrochemical process monitoring

<b>Session 11:</b> <b>Plasmonics and nanomaterials</b>  <b>(Pre-recorded Session)</b>	<b>I11-1</b>	<b>Sergey Morozov</b>	<b>IPM RAS</b>	<b>Mid-IR Stimulated Emission in HgCdTe QW Heterostructures with Dielectric and "Phonon" Waveguides</b>
	O11-2	Dao Thang	Silicon Austria Labs GmbH	Resonant Metasurface Absorbers for Infrared Spectroscopic Sensing
	O11-3	Mauro David	Institute of Solid State Electronics, TU Wien	LWIR dielectric-loaded surface-plasmon-polariton waveguide for optical sensing
	O11-4	Loren Patricia	University of Montpellier	Perfect Absorbers based on high doped III-V semiconductor for the next generation of

				plasmonic platforms in the Mid-IR
	I11-5	Hon Ki Tsang	The Chinese University of Hong Kong	Hybrid Integration of 2D materials for Photonic Devices

<b>Session 12: Terahertz</b>  <b>(Pre-recorded Session)</b>	I12-1	Jaime Gomez Rivas	Eindhoven University of Technology	<b>Broadband THz Near-Field Microscopy of Resonant Metasurfaces</b>
	O12-2	Nathalie Lander Gower	Bar Ilan University	The Effect of Doping in Split-Well Direct-Phonon THz Quantum-Cascade Laser Structures
	O12-3	Fernando Gonzalez-Posada Flores	University of Montpellier - Institute for Electronics and Systems	Semiconductor plasmonic microstructures for THz absorption modulation
	O12-4	Giacomo Scalari	ETH Zürich	High Temperature THz Quantum cascade laser frequency combs
	O12-5	Julien Guise	Institut d'Electronique et des Systèmes	THz Modulator Based On Optically-Tuned Metasurfaces
	I12-6	Giacomo Scalari	ETH Zürich	<b>THz ultrastrong coupling with Landau polaritons: Non-local effects and single meta-atom spectroscopy</b>

<b>Plenary 4 (Live)</b>	PL-4  14:00-15:00	Ted Masselink	Humboldt University Berlin	Power and brightness scaling of quantum-cascade lasers using reduced cascade number with tapered broad-area emitters
<b>Closing Session (Live)</b>	CLOSE  15:00-15:30	Stephen Sweeney  Goran Mashanovich  Peter Carrington	University of Surrey  Southampton University  Lancaster University	Closing Session  Prize Announcements