



# IEEE **INERTIAL**2025

The 12<sup>th</sup> IEEE International Symposium on Inertial Sensors & Systems  
Lindau, Lake Constance, Germany || May 4-7, 2025



## 12<sup>TH</sup> IEEE International Symposium on Inertial Sensors & Systems 2025

### SYMPOSIUM PROGRAM

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**2025.ieee-inertial.org**





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## WELCOME MESSAGE

Dear Colleagues and Friends,



A heartfelt welcome to the attendees of the **12th IEEE International Symposium on Inertial Sensors and Systems (IEEE INERTIAL 2025)**! We are delighted to host this year's conference in **Lindau, Germany**, a historic town nestled on the shores of **Lake Constance**, where Germany, Austria, and Switzerland converge. This unique location, at the feet of the majestic Alps, is also a destination of choice for millions of visitors every year that enjoy summer vacation on inland beaches, surrounded by breezy hills covered by apple trees and vineyards. Lindau, and its surrounding, offers an inspiring atmosphere for discussing, learning, and connecting around inertial sensors and systems.

This year's symposium continues the tradition that began in **2014 in Laguna Beach, California, USA**, as an informal and highly focused international gathering dedicated exclusively to **inertial sensors and their emerging applications**. IEEE INERTIAL is sponsored by the **IEEE Sensors Council** and overseen by the **Technical Committee of Inertial Sensors and Systems (TCISS)**. It remains the **premier IEEE event dedicated to inertial sensor technologies**, offering a forum where academia, industry, and government institutions come together to share groundbreaking research and discuss the latest challenges and opportunities in the field.

Inertial technology continues to play a critical role across numerous industries, with adoption accelerating due to advances in miniaturization, performance, and integration. The progress in development addresses the major industry trends that will reshape the inertial sensor and system landscape such as autonomy, GNSS-denied operation, user experience, health and many others. **This year's program will showcase cutting-edge developments**, including, but not only, the **latest advancements in accelerometers and gyroscopes**, the **progress of quantum sensors as they transition from the lab to real-world applications**, and the **technical challenges of deploying consumer-grade inertial sensors in space**. We will also explore topics such as the **siliconization of photonics** and its implications for next-generation inertial sensing. Through a rich selection of invited talks, technical presentations, and interactive discussions, we aim to highlight the most important trends shaping the future of our field.

IEEE INERTIAL 2025 continues our commitment to a **single-track format**, ensuring that all attendees can fully engage with every aspect of the program. **Our technical program spans four days**, including **tutorials, keynote presentations, oral and poster sessions, and industry exhibitions**. The contributions presented here will be compiled in the **technical digest**, providing in-depth insights into the latest research, with most papers available through **IEEE Xplore** following the conference.

Beyond the technical sessions, **we offer numerous opportunities for networking and social engagement**, allowing participants to connect with peers and experience the local culture and cuisine. The **Welcome Reception** provides a relaxed setting to meet fellow attendees the night before the core of the symposium starts, while the **Sponsor Appreciation Night** recognizes the invaluable contributions of our industry partners. The highlight of our social events will be the **Gala Dinner**, that will take place at the local brewery, where we will celebrate outstanding research by awarding the **Best Student Paper** and enjoying an evening with regional traditional delicacies.



As we gather for **IEEE INERTIAL 2025**, we extend our sincere appreciation to the **Oversight Committee, the Technical Program Committee, and the many expert reviewers** who contributed their time to review submissions, ensuring a high standard of quality. We are also deeply grateful to the **IEEE Sensors Council for their sponsorship**, as well as to our **patrons, exhibitors, and administrative team** for their efforts in making this event possible. Most importantly, we thank **you, our attendees**, for your participation and contributions, which continue to make IEEE INERTIAL the essential event for the inertial sensor community.

We hope you find **IEEE INERTIAL 2025** to be a rewarding, stimulating, and enjoyable experience. Take full advantage of the technical sessions, networking opportunities, and social events—and don't forget to take in the spectacular surroundings of **Lake Constance**.

**Welcome to IEEE INERTIAL 2025!**

Sincerely,

Grant Lodden  
General Co-Chair  
IEEE INERTIAL 2025

Joan Giner  
General Co-Chair  
IEEE INERTIAL 2025





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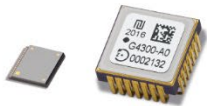
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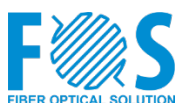


## PATRONS

### PLATINUM PATRONS



### GOLD PATRONS



### SILVER PATRONS



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BRONZE PATRON

LANYARD PATRON



COFFEE BREAK PATRON

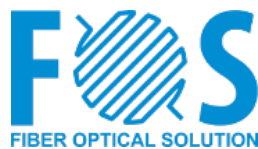
WELCOME RECEPTION PATRON

LUNCH PATRON



### CONFERENCE SPONSOR

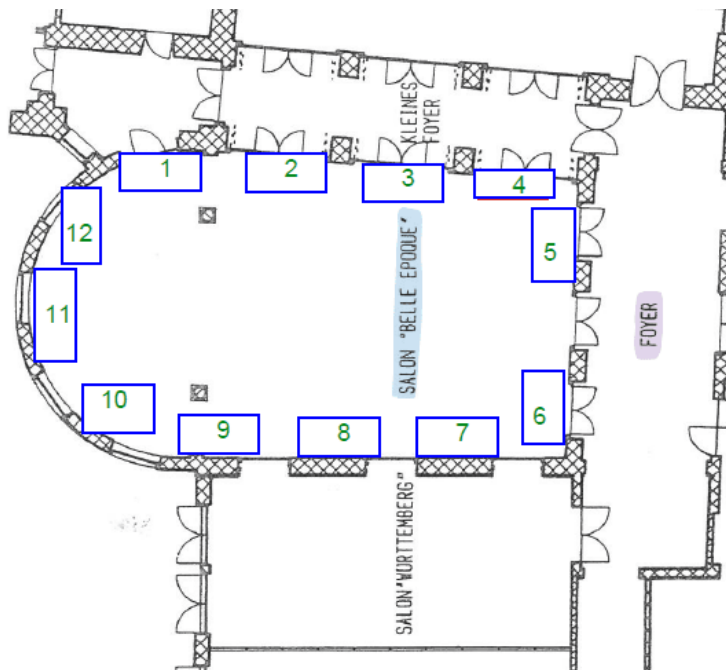






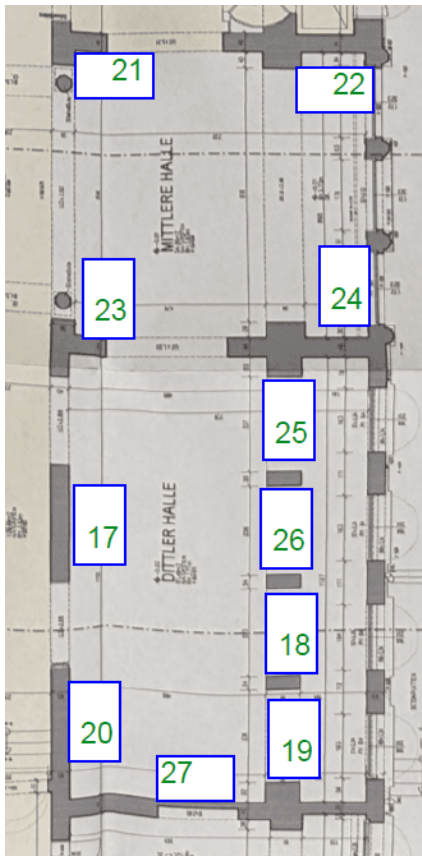
# EXHIBIT HALL LAYOUT

## Salon Belle Epoque



- 1-Inertial Labs
- 2-Bosch Sensortec GmbH
- 3-TRONICS
- 4-Seskion GmbH
- 5-FEYMAN
- 6-Hanwha Aerospace
- 7-Silicon Sensing
- 8-FIBERPRO, INC.
- 9-Acutronic
- 10-MostaTech
- 11-Ideal Aerosmith
- 12-ASYGN S.A.S.

## Hotel Halle



- 17-Fiber Optical Solution
- 18-Northrop Grumman (LITEF)
- 19-Polytec GmbH
- 20-Lyncée Tec
- 21-indie (EXALOS)
- 22-THALES
- 23-Exail SAS
- 24-Safran Electronics & Defense
- 25-Silicon Microgravity (SMG)
- 26-i-ROM GmbH
- 27-SmarAct Metrology



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**Sunday, May 4<sup>th</sup> | 09:00 - 10:45**

## **From Precision to Insight: The Synergy of Inertial Sensors and Advanced Algorithms**

**Room:** Salon Baden

**Instructor:** Jussi Collin, *Nordic Inertial Oy, Finland*

**Abstract:** Modern inertial sensor technology, combined with significantly increased computational power and memory availability, creates remarkable opportunities for improving system performance in position and orientation estimation. This tutorial explores the powerful synergy achieved by integrating advanced inertial sensors with state-of-the-art filtering techniques tailored to realistic conditions. Due to inherent noise in inertial measurements and cumulative error growth in traditional mechanizations, sophisticated

stochastic filtering algorithms and careful consideration of application-specific constraints are essential. In the examples, inertial sensor raw data is propagated to tailored mechanizations and advanced filtering and estimation methods, leading to unprecedented accuracy.

Participants will gain practical insights into overcoming traditional limitations of inertial sensing through mathematical frameworks, ultimately achieving transformative performance improvements. The tutorial will also provide a brief historical overview of inertial sensor applications, highlighting key advancements and milestones.

Real-world case studies illustrate how substantial enhancements in system capabilities are directly driven by effectively combining advanced algorithms and cutting-edge inertial sensor technology. This integration provides significant customer-focused benefits across various industries, including autonomous navigation, robotics, defence, and consumer technology.



**Sunday, May 4<sup>th</sup> | 11:15 - 13:00**

## **MEMS Accelerometer Technology Review: Progress towards Navigation-grade**

**Room:** Salon Baden

**Instructor:** John Reinke, *Honeywell, USA*

**Abstract:** Micro-electromechanical systems (MEMS) accelerometers are widely employed in consumer and tactical applications, but their use in navigation-grade applications, notably commercial air travel, remains limited by device performance. MEMS accelerometers have yet to supplant the current gold standard for navigation-grade accelerometer technology, Honeywell's quartz accelerometer (QA) product line generally known as the Q-Flex. However, the inertial sensor community has made great strides forward over the last 15

years and is likely on the brink of overcoming the final hurdles. To help one understand recent progress and the remaining gaps in device performance, this tutorial will review navigation-grade accelerometer requirements, emphasize and elaborate upon some often-overlooked performance aspects, and review technology advances made by the community that are approaching Q-Flex capabilities.

This admittedly Honeywell-centric view of accelerometer technology will not be limited to Honeywell products and development. Care will be taken to present an objective view of the accelerometer competitive landscape. Notable work by competitors, such as Thales and Safran-Colibrys, will be discussed. Focus is placed on technologies with clear published performance results over temperature, vibration, and device life, which, when combined, often represent the limits of performance in a realistic environment.

Several accelerometer requirements will be noted as critical and yet often unreported by less mature accelerometer development endeavors. In particular, misalignment repeatability and vibration rectification error will be reviewed since consideration of these effects is necessary for a complete view of accelerometer performance.



**Sunday, May 4<sup>th</sup> | 14:30 - 16:15**

## **Quantum Technologies for Classical Navigators**

**Room:** Salon Baden

**Instructor:** Tim Freegarde, *University of Southampton, UK*

**Abstract:** The quantum mechanical realm offers a new range of mechanisms and devices for inertial sensing and timekeeping, with applications to positioning, navigation, timekeeping and geodesy – as well as new means of imaging, computing and communicating securely.

The development of these Quantum Technologies relies upon a combination of classical engineering and quantum science. By drawing upon analogies with techniques familiar from classical technologies, from the chronometric determination of longitude to finding the optimum route for circumnavigation by airship, this tutorial will describe some of the principal quantum methods for inertial sensing, timekeeping and magnetometry, and the key phenomena that underpin them.

## KEYNOTES



**Monday, May 5<sup>th</sup> | 09:00 - 09:45**

### **Quantum sensors and their application**

**Room:** Salon Baden/Württemberg

**Speaker:** Joerg Wrachtrup, *University of Stuttgart, Germany*

**Abstract:** Quantum technology is evolving into a new paradigm for information processing, communication, and sensing. For example, quantum sensors promise unparalleled sensitivity and resolution. But how do these key advantages translate into practical superiority?

In my talk, I will explain the underlying physical principles of quantum sensors and reveal the origins of their performance. I will also present several examples where quantum sensors demonstrate superior capabilities and discuss specific design considerations for their practical implementation. Applications such as sensitive magnetic field detection and precision measurements of gravitational fields will be highlighted.

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**Tuesday, May 6<sup>th</sup> | 08:30 - 9:15**

### **Ingenuity Mars Helicopter: Navigating the Martian Skies**

**Room:** Salon Baden/Württemberg

**Speaker:** Håvard F. Grip, *Jet Propulsion Laboratory, California Institute of Technology, USA*

**Abstract:** The Ingenuity Mars Helicopter was the first aircraft to operate from the surface of another planet, exploring the Jezero Crater on Mars over the course of nearly three years from 2021-2024. In this talk I will discuss how Ingenuity came to be and the many challenges of developing an aircraft unlike any other from scratch, with a particular focus on navigation and related sensing. Ingenuity's mission on Mars was to consist of up to 5 demonstration flights over benign, pre-scouted terrain, but was unexpectedly extended after the first few flights. I will discuss how the Ingenuity operations team was able to turn Ingenuity into a long-range explorer without

advance preparation, focusing in particular on navigation challenges.

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**Wednesday, May 7<sup>th</sup> | 08:30 - 09:15**

### **Fabricating the Future: My Journey in Silicon Photonics**

**Room:** Salon Baden/Württemberg

**Speaker:** Avi Feshali, *Independent, USA*

**Abstract:** Since the 1990 Silicon photonics was suggested to be a good option to replace traditional discrete optic by moving to integrated photonics. The 'selling point' was that the use of CMOS manufacturing and existing infrastructure can be shared and reused by photonics industry. In my talk, I will go over the evolution of the silicon photonics industry through my experience working on various projects of the past 2 decades.

## INVITED SPEAKERS



**Tuesday, May 6<sup>th</sup> | 09:45 - 10:15**

### **Continuous Physiological Monitoring Using Mechano-acoustic Sensing for Chronic Disease Management**

**Room:** Salon Baden/Württemberg

**Speaker:** Tzeno Galchev, *Analog Devices Inc., USA*

**Abstract:** Advances in inertial sensor technology with respect to power consumption, noise, and bandwidth are opening the door to a multitude of use cases for monitoring sounds from the heart, lungs, and digestive tract which contain a wealth of physiological and pathological information. Measurements are demonstrated using both contact/seismocardiography (SCG) and non-contact/ballistocardiography (BCG) with clinical-grade accuracy. Markers such as heart rate (HR) and respiration rate (RR) are captured and compared with gold standards like electrocardiography (ECG) and photoplethysmography (PPG). Additionally, SCG sensing offers a

wealth of information about the heart function not captured by ECG. Integrated together, these technologies offer the ability to unobtrusively and continuously monitor patients outside of a clinical setting to improve disease management and outcomes.

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**Tuesday, May 6<sup>th</sup> | 14:15 - 14:45**

### **Quantum Inertial Sensors for Gravimetry and Inertial Navigation in the Field**

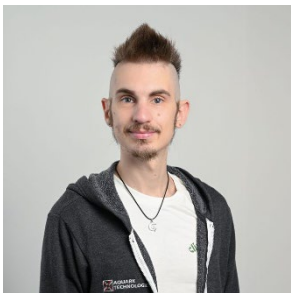
**Room:** Salon Baden/Württemberg

**Speaker:** Matthew Cashen, *Vector Atomic, USA*

**Abstract:** Quantum inertial sensors based on atom interferometry have the potential to provide new capabilities in inertial navigation, guidance systems, geodesy, and geophysical exploration. Vector Atomic has developed mGal-class gravity sensors for strapdown operation in marine environments and  $\mu$ Gal-class sensors for static operation in terrestrial environments. The prototype gravimeters have been fielded and tested under operational conditions on relevant platforms and test sites. In addition to the gravimeter efforts, Vector Atomic and Honeywell have partnered to develop, integrate, and test a quantum IMU. A prototype quantum gyroscope payload

has been delivered for flight testing. In this presentation we will report testing results for a quantum gravimeter at-sea for 36 days, with > 99% uptime through mild to heavy ship dynamics. Measurement results confirm that our gravimeter is more accurate than the publicly available gravity maps, with performance surpassing 1 mGal gravimeter precision and accuracy for the duration of the test. We will also present field test results of a  $\mu$ Gal-class terrestrial gravimeter that is man-portable and consumed < 70W of power during steady state operation. This device provides both gravimeter and gradiometer real-time outputs and competes with state-of-the-art conventional gravity sensors. Finally, we will present progress on a quantum IMU designed for operation on airborne and space platforms.

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**Tuesday, May 6<sup>th</sup> | 17:40 - 18:10**

### **What even is quantum anyway?**

**Room:** Salon Baden/Württemberg

**Speaker:** Max Carey, *Aquark Technologies, UK*

**Abstract:** The quantum revolution is coming... so starts the perpetual spiel you will hear from most of us working on quantum technologies. But what is this quantum stuff anyway, and – perhaps more importantly – what is it not? Why do quantum devices hold so much promise, why is it so hard to deliver on this promise, and where will these devices take us once we do? In a light-hearted talk over evening drinks, we will play a game of “is it quantum?” designed to lift the shroud of mystery that can surround quantum mechanics through direct analogies to familiar concepts. We will then explore the quantum future, highlighting some of the innovations Aquark

Technologies are working on to bring it to fruition. We will discuss why this future is so exciting, and the roles we can all play in it!

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**Wednesday, May 7<sup>th</sup> | 14:00 - 14:30**

### **HALOVS: Highly Accelerated Learning of Vibratory Systems**

**Room:** Salon Baden/Württemberg

**Speaker:** Sunil Bhawe, *DARPA, USA*

**Abstract:** The Highly Accelerated Learning of Vibratory Systems (HALOVS) portfolio is a fundamental science portfolio launched by DARPA's Defense Sciences Office to develop, model, prototype, and demonstrate technologies to overcome the existing performance limitations of vibratory sensors (e.g., inertial sensors such as accelerometers or gyroscopes in your smartphone) for improved positioning and navigation. The HALOVS programs will investigate and demonstrate new technology platforms that exploit the latest breakthroughs and insights in 3D micromachining, assembly, and fabrication processes using novel materials and chemistries to

determine their dynamic performance limits while increasing lifetime. The goal is to provide precision navigation via a handheld device in GPS-denied environments.





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## PROGRAM-AT-A-GLANCE

### Sunday, May 4, 2025

9.00-10.45	Tutorial 1 (Jussi Collin)	Salon Baden
10.45-11.15	Coffee Break	Lakeside Terrace
11.15-13.00	Tutorial 2 (John Reinke)	Salon Baden
13.00-14.30	Lunch Break	Restaurant "Seeblick"
14.30-16.15	Tutorial 3 (Tim Freegarde)	Salon Baden
18.00-20.00	Ideal Aerosmith Welcome Reception	Lakeside Terrace

### Monday, May 5, 2025

8.30-9.00	Welcome, opening	
9.00-9.45	Keynote 1 (Joerg Wrachtrup)	Salon Baden/Württemberg
9.45-10.15	Exhibitors Lightning Round 1	
10.15-10.45	Coffee Break & Exhibits	Hotel Halle/Salon Belle Epoque
10.45-12.05	Session 1: Calibration and compensation of MEMS inertial sensors	Salon Baden/Württemberg
12.05-12.35	Posters 1 Lightning Round	
12.35-14.05	Lunch Break	Restaurant "Seeblick"
14.05-14.35	Exhibitors Lightning Round 2	Salon Baden/Württemberg
14.35-15.55	Session 2: MEMS accelerometers and gravimeters	
15.55-16.25	Coffee Break, Exhibits, & Poster Session 1	
16.25-17.30	Poster Session 1	Hotel Halle/Salon Belle Epoque
17.30-18.30	Industry appreciation event and open posters	

## PROGRAM-AT-A-GLANCE

Tuesday, May 6, 2025

8.30-9.15	Keynote 2 (Harvard Grip)	
9.15-9.45	Posters 2 Lightning Round	Salon Baden/Württemberg
9.45-10.35	Session 3: Applications of inertial sensors (with invited Tzeno Galchev)	
10.35-11.05	Advanced Devices & Instrumentation Coffee Break & Exhibits	Hotel Halle/Salon Belle Epoque
11.05-11.25	Announcement from Sensors Council	Salon Baden/Württemberg
11.25-13.05	Session 4: IMUs, INSs and components for inertial navigation	
13.05-14.15	IAI Lunch Break	Restaurant "Seeblick"
14.15-16.05	Session 5: Progress on portable atomic/quantum sensors (with invited Matt Cashen)	Salon Baden/Württemberg
16.05-16.35	Coffee Break, Exhibits, & Poster Session 2	Hotel Halle/Salon Belle Epoque
16.35-17.40	Posters Session 2	
17.40-18.10	Evening Invited Talk (Max Carey)	Salon Baden/Württemberg
19.00-21.00	Conference Banquet and Awards Ceremony	Max & Moritz Brewery

Wednesday, May 7, 2025

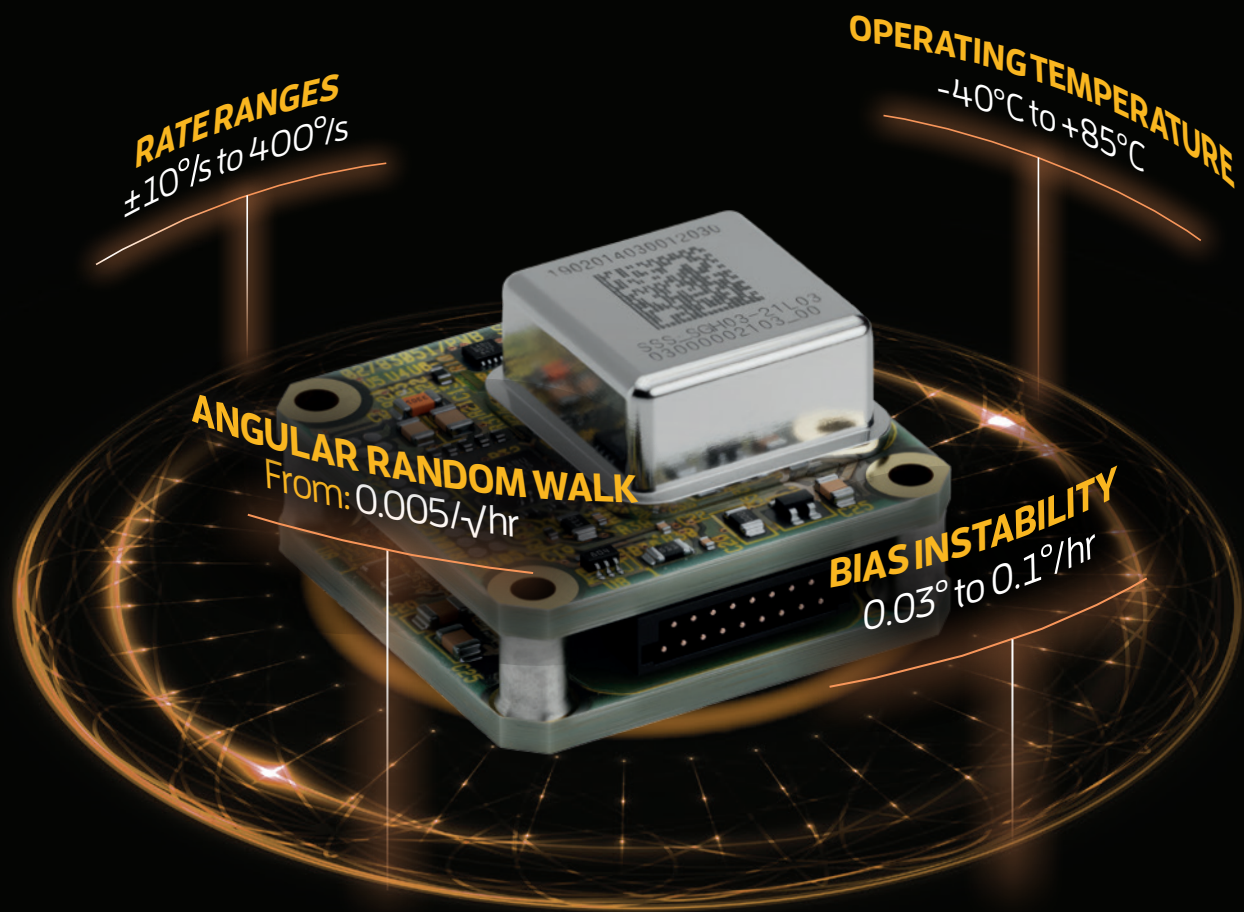
8.30-9.15	Keynote 3 (Avi Feshali)	Salon Baden/Württemberg
9.15-10.30	Late News Session	
10.30-11.00	Coffee Break & Exhibits	Hotel Halle/Salon Belle Epoque
11.00-11.15	Inertial 2026 Announcement	Salon Baden/Württemberg
11.15-12.55	Session 6: MEMS gyroscopes for navigation applications	
12.55-14.00	Lunch Break	Restaurant "Seeblick"
14.00-15.10	Session 7: Learning and correction in inertial sensors (with invited Sunil Bhawe)	Salon Baden/Württemberg
15.10-15.30	Closing Session: Conference adjourns	



Join us at  
**TABLE 7**

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## TECHNICAL PROGRAM: MAY 4, 2025

*\*All times appear in Central European Summer Time (CEST) UTC+2)*

8:00 – 9:00

**Registration**

**Room:** Foyer

9:00 – 10:45

**Tutorial: From Precision to Insight: The Synergy of Inertial Sensors and Advanced Algorithms**

Jussi Collin, Nordic Inertial Oy, Finland

**Room:** Salon Baden

**Session Chair:** Erdinc Tatar, *Bilkent University, Turkey*

10:45 – 11:15

**Coffee Break**

**Room:** Lakeside Terrace

11:15 – 13:00

**MEMS Accelerometer Technology Review: Progress towards Navigation-grade**

John Reinke, Honeywell, USA

**Room:** Salon Baden

**Session Chair:** Erdinc Tatar, *Bilkent University, Turkey*

13:00 – 14:30

**Lunch Break**

**Room:** Restaurant "Seeblick"

14:30 – 16:15

**Tutorial: Quantum Technologies for Classical Navigators**

Tim Freegarde, University of Southampton, UK

**Room:** Salon Baden

**Session Chair:** Erdinc Tatar, *Bilkent University, Turkey*

18:00 – 20:00

**Ideal Aerosmith Welcome Reception**

**Room:** Lakeside Terrace

*\*Open to everyone*

# TECHNICAL PROGRAM: MAY 5, 2025

*\*All times appear in Central European Summer Time (CEST) UTC+2*

7:30 – 8:30

**Registration**

**Room:** Foyer

8:30 – 9:00

**Opening Remarks**

**Room:** Salon Baden/Württemberg

9:00 – 9:45

**Keynote: Quantum sensors and their application**

Joerg Wrachtrup, University of Stuttgart, Germany

**Room:** Salon Baden/Württemberg

**Session Chair:** Andrei M. Shkel, *University of California, Irvine, USA, IEEE TCSS Chair*

9:45 – 10:15

**Exhibitors Lightning Round 1**

**Room:** Salon Baden/Württemberg

10:15 – 10:45

**Coffee Break & Exhibits**

**Room:** Hotel Halle/Salon Belle Epoque

10:45 – 12:05

**Calibration & Compensation of MEMS Inertial Sensors**

**Room:** Salon Baden/Württemberg

**Session Chairs:** Caroline Coutier, *CEA Leti* & Marius Gheorghe, *Ideal Aerosmith*

10:45

**3019: One-Port Quality Factor Measurement of High-Q MEMS Gyroscope Utilizing Negative Impedance Converter**

Yang Zhao, Guoming Xia, Meijia Xu, Jinyang Huang, Qin Shi, Anping Qiu

*Nanjing University of Science and Technology, China*

11:05

**3006: Study of the Quadrature Error Correction on the GYTRIX Quartz Crystal Axisymmetric MEMS Gyro**

Maxime Duquesnoy, Amandine Andrieux-Ledier, Raphaël Lévy, Jérémy Bonhomme, Lucas Hudeley, Pierre Lavenus, Jean Guérard, Olivier Le Traon

*Office National d'Études et de Recherches Aéronautiques ONERA, France*

11:25

**3060: Estimating Temperature-Dependent Glass Substrate CTE via Frequency Measurements in a MEMS Gyroscope**

Mehran Hosseini-Pishrobat, Erdinc Tatar

*Bilkent University, Turkey*

11:45

**3063: Real-Time Parameter Estimation for Adaptive Control of High-Q Micromachined Accelerometers**

Charles Duruaku{2}, Zayed Ahmed{2}, Erfan Ghaderi{2}, Abdul Qader Ahsan Qureshi{1}, Behraad Bahreyni{2}

*{1}CMC Microsystems, Canada; {2}Simon Fraser University, Canada*

12:05 – 12:35

**Posters 1 Lightning Round**

**Room:** Salon Baden/Württemberg

**Session Chairs:** Brian Grantham, *University of Alabama in Huntsville* & Roman Forke, *Fraunhofer Institute for Electronic Nano Systems ENAS*

12:35 – 14:05

**Lunch Break**

**Room:** Restaurant "Seeblick"



## TECHNICAL PROGRAM: MAY 5, 2025

14:05 – 14:35

### Exhibitors Lightning Round 2

Room: Salon Baden/Württemberg

14:35 – 15:55

### MEMS Accelerometers & Gravimeters

Room: Salon Baden/Württemberg

Session Chairs: Tobias Hiller, *Bosch Sensortec* & Toshiyuki Tsuchiya, *Kyoto University*

14:35

#### 3036: MEMS Vibrating Beam Gravimeter for Inertial Navigation Applications

Matthew Reed{1}, Francis Neill{1}, Colin Baker{2}

{1}Silicon Microgravity, United Kingdom; {2}Silicon Microgravity Limited, United Kingdom

14:55

#### 3052: State-Space Control of Force-Feedback MEMS Accelerometers with 115-dB Dynamic Range

Alessandro Ticozzi{2}, Matteo Gianollo{1}, Marco Bestetti{1}, Marco Gadola{1}, Giacomo Langfelder{2}

{1}Civitanavi Systems, Italy; {2}Politecnico di Milano, Italy

15:15

#### 3040: World's Smallest Accelerometer

Johannes Classen{1}, Lars Tebje{1}, Jens Goldeck{1}, Marcel Pristl{1}, Juliane Weissbecker{1}, Hanna Götz{1}, Moritz Bühler{1}, Dusan Radović{1}, Xuan-Quang Du{1}, Amin Jemili{1}, Falk Roewer{1}, Jürgen Ruf{1}, Andreas Prümm{1}, Tim Kanzler{1}, Martin Rambach{2}, Jens Frey{2}, Arnd Kälberer{2}, Jens Sonntag{2}, Suhith Hemanth{2}, Jörg Bräuer{2}, Frank Reuss{2}, Timm Höhr{2}, Tobias Gaber{2}, Cornelius Thienel{2}, Emre Erkan{2}, Christoph Kröner{2}, Martin Lapis{2}

{1}Bosch Sensortec GmbH, Germany; {2}Robert Bosch GmbH, Germany

15:35

#### 3103: Frequency Noise Optimization by Operating a Vibrating Beam Accelerometer in the non-Linear Regime

Theo Miani, Guillermo Sobreviela, Lokesh Gurung, Colin Baker, Aswhin Seshia

Silicon Microgravity Limited, United Kingdom

15:55 – 16:25

### Coffee Break, Exhibits, & Poster Session 1

Room: Hotel Halle/Salon Belle Epoque

15:55 – 17:30

### Poster Session 1

Room: Hotel Halle/Salon Belle Epoque

Session Chairs: Brian Grantham, *University of Alabama in Huntsville* & Roman Forke, *Fraunhofer Institute for Electronic Nano Systems ENAS*

#### 3010: Design and Test of High-Performance Navigation Grade MEMS Resonant Accelerometers

Yukun Ma, Haonan Li, Rong Zhang, Fengtian Han

Tsinghua University, China

#### 3011: Feature-Driven Rapid Prototyping of Test-Sequences for Sensor Characterization in the Laboratory

Ferdinand Auerswald{1}, Dmytro Pukhkaiev{2}, Uwe Aßmann{2}

{1}Bosch Sensortec GmbH, Germany; {2}Technische Universität Dresden, Germany

#### 3017: Analysis and Compensation of Phase Error for the Butterfly Gyroscope

Zhanqiang Hou, Gao Liu, Mi Zeng, Xi Chen, Dingbang Xiao, Xuezhong Wu

National University of Defense Technology, China

#### 3021: A Closed-Loop MEMS Resonant Accelerometer with Force Rebalance Control

Bowen Wang{1}, Zhenxiang Qi{1}, Bingchen Zhu{1}, Zhaoyang Zhai{1}, Wuhao Yang{2}, Xudong Zou{1}

{1}Aerospace Information Research Institute, CAS / University of Chinese Academy of Sciences, China; {2}Aerospace Information Research Institute, Chinese Academy of Sciences, China

## TECHNICAL PROGRAM: MAY 5, 2025

### **3023: Research on the Electrical-Coupling Induced Effects in Cobweb-Like Disk Resonant Sigma-Delta Gyroscope**

Shihao Du{1}, Tianqi Guo{2}, Jianlin Chen{2}, Fang Chen{1}

{1}Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, China; {2}Shanghai University, China

### **3025: Analyzing Resonance-Induced Rate Offsets Over Temperature in MEMS Gyroscopes Due to Die Fixation**

Francisco Ambia, Steffen Zunft, Manuel Glueck, Saskia Dzubiella, Renate Schuell, Marcel Stoecker, Simone Schreijaege

Robert Bosch GmbH, Germany

### **3034: Analysis and Measurement of Moisture Ingress Effects on Small Volume and Sub-Ambient Pressure Capacitive MEMS Accelerometers**

Christopher Bishop, Tiffany Reagan, Raymond Fuentes, Ryan Shaffer, Jason Brown, Thomas Friedmann, Brian Homeijer

Sandia National Laboratories, United States

### **3035: On the Feasibility of the BDRIE-HS\* Technology for a MEMS Gyroscope**

Roman Forke{1}, Alexey Shaporin{1}, Susann Hahn{3}, Sebastian Weidlich{3}, Matthias Küchler{1}, Dirk Wünsch{1}, Daniel Bühlz{1}, Karla Hiller{2}

{1}Fraunhofer Institute for Electronic Nano Systems ENAS, Germany; {2}Fraunhofer Institute for Electronic Nano Systems ENAS / Chemnitz University of Technology, Germany; {3}Technische Universität Chemnitz, Germany

### **3037: Effect of Shock Duration on Si-to-Si Stiction**

Shih-Wei Lee, Chao-Shiun Wang

Sensortek Technology Cooperation, Taiwan

### **3041: Estimation and Compensation of G-Sensitivity in Low-Cost MEMS Inertial Sensors**

Jing Liu, Jürgen Gut

Bosch Sensortec GmbH, Germany

### **3042: Closed-Loop Atomic Interferometric Inertial Sensor for Dynamic Measurement**

Weichen Jia, Peiqiang Yan, Ascar Shen, Yanying Feng

Tsinghua University, China

### **3055: A Multi-Bit Electromechanical Sigma-Delta Accelerometer with Complementary Pulse Width Modulated Force Feedback**

Xingyin Xiong{2}, Zongwei Li{2}, Zeyu Wang{1}, Xiaoyuan Yu{1}, Shengru Zhou{2}, Kedu Han{2}, Changchun Yang{2}

{1}Institute of Geology and Geophysics, CAS, University of Chinese Academy of Sciences, China; {2}Institute of Geology and Geophysics, Chinese Academy of Sciences, China

### **3004: Performance Improvement of an Inertial Navigation System Based on FOG and SA Using a Two-Step Indirect Calibration Method**

Haesung Yu, Inseop Lee, Juhyun Oh, Chang-Ky Sung, Taegyoo Lee, Cheonjoong Kim

Agency for Defense Development, Korea

### **3079: Low-Cost Polymeric Energy Harvester As Vibration Intensity Sensor**

Mark Kantor{1}, Nicola Molinazzi{1}, Tsvi Shmilovich{1}, Slava Krylov{2}

{1}EZMEMS, Israel; {2}Tel Aviv University, Israel

### **3075: Single Proof Mass Resonant MEMS Accelerometer with Parallel Motion Linkage Amplifier**

Alexandra Zobova, Maxim Drizovsky, Omer Halevy, Neta Melech, Shmuel Livne, Slava Krylov

Tel Aviv University, Israel

### **3084: A Z-Axis MEMS Accelerometer with Input-Insensitive Constant Stiffness**

Leinuo Dong, Zhipeng Ma, Mingkang Li, Yiming Jin, Tao Zhou, Xinyu Qian, Yihan Wu, Zhonghe Jin

Zhejiang University, China

17:30 – 18:30

Industry appreciation event and open posters

Room: Hotel Halle/Salon Belle Epoque

## TECHNICAL PROGRAM: MAY 6, 2025

7:30 – 8:30

**Registration**

**Room:** Foyer

8:30 – 9:15

**Keynote: Ingenuity Mars Helicopter: Navigating the Martian Skies**

Håvard F. Grip, *Jet Propulsion Laboratory, California Institute of Technology*

**Room:** Salon Baden/Württemberg

**Session Chair:** Joan Giner, *Bosch Sensortec, Germany*

9:15 – 9:45

**Posters 2 Lightning Round**

**Room:** Salon Baden/Württemberg

**Session Chairs:** Ohad Zohar, *RFE PTE LTD, Singapore* & Joerg Wagner, *University of Stuttgart, Germany*

9:45 – 10:35

**Applications of Inertial Sensors**

**Room:** Salon Baden/Württemberg

**Session Chairs:** Anssi Blomqvist, *Murata* & Ryuta Araki, *Sumitomo Precision*

9:45

**3108: Continuous Physiological Monitoring Using Mechano-Acoustic Sensing for Chronic Disease Management (INVITED)**

Tzeno Galchev

*Analog Devices Inc.*

10:15

**3105: Lightweight Wearable Headband with Flexible-Hybrid Electronics for Head-Kinematic Monitoring and Mild Traumatic Brain Injury Risk Detection**

Jeneel Pravin Kachhadiya{3}, Jaden Romero{2}, Shuting Kou{2}, Yang Wan{1}, Haneesh Kesari{1}, Ron Szalkowski{2}, Joseph Andrews{3}

{1}Brown University, United States; {2}Team Wendy, United States; {3}University of Wisconsin-Madison, United States

10:35 – 11:05

**Coffee Break & Exhibits**

**Room:** Hotel Halle/Salon Belle Epoque

11:05 – 11:25

**Announcement from Sensors Council**

**Room:** Salon Baden/Württemberg

11:25 – 13:05

**IMUs, INSS & Components for Inertial Navigation**

**Room:** Salon Baden/Württemberg

**Session Chairs:** Cristiano Marra, *iNGage* & Aleksandra Efimovskaya, *Microsoft*

11:25

**3100: Mechanical-Thermal Noise Limited Near-Navigation Grade MEMS IMU**

Igor Prikhodko, Carey Merritt, Arthur Savchenko, Sathish Shanmuga Sundaram, Sam Zhang

*Analog Devices, United States*

11:45

**3028: An Ultra-Low Noise MEMS IMU Array Based on Analytical Interference Mitigation for Highly Accurate Inertial Navigation**

Tsutomu Sawada, Toru Amano, Masato Kimishima, Akihiro Sonoura, Kazuo Hongo, Kosei Yamashita, Hiroyuki Kamata

*Sony Corporation, Japan*



## TECHNICAL PROGRAM: MAY 6, 2025

12:05

**3080: Synergistic Design of Resonant Elements and Force Multipliers to Boost the Sensitivity in Resonant Sensing Applications**

Erfan Ghaderi, Emad Esmaeili, Mikhail A. Kanygin, Behraad Bahreyni

*Simon Fraser University, Canada*

12:25

**3076: Mode-Split MEMS Gyroscopes Under Bending Stress: Detection Mode Coupling and the Relation to Cross-Axis Sensitivity**

Wolfram Mayer{2}, Burkhard Kuhlmann{1}, Andrea Guerrieri{1}, Tobias Hiller{4}, Andre Zimmermann{3}

*{1}Bosch Sensortec GmbH, Germany; {2}Bosch Sensortec GmbH / Universität Stuttgart, Germany; {3}Hahn-Schickard Gesellschaft für Angewandte Forschung e.V. /*

*Universität Stuttgart, Germany; {4}Robert Bosch GmbH, Germany*

12:45

**3077: Enhancing the Performance of Sintered Fused Silica Cylindrical Shell Resonators Through Wet Etching**

Yahya Atwa, Hamza Shakeel

*Queen's University of Belfast, United Kingdom*

13:05 – 14:15

**IAI Lunch Break**

**Room:** Restaurant "Seeblick"

14:15 – 16:05

**Progress on Portable Atomic/Quantum Sensors**

**Room:** Salon Baden/Württemberg

**Session Chairs:** Patrick Everitt, Q-CTRL & Mike Larsen, Northrop Grumman, USA

14:15

**3107: Quantum Inertial Sensors for Gravimetry and Inertial Navigation in the Field (INVITED)**

Matthew Cashen

*Vector Atomic, United States*

14:45

**3030: Strapdown Quantum Inertial Sensing at Arbitrary Orientations and Rotation Rates**

Vincent Menoret{3}, Cyrille Des Cognets{2}, Quentin D'Armagnac de Castanet{3}, Vincent Jarlaud{3}, Bruno Desruelle{1}, Philippe Bouyer{4}, Baptiste Battelier{2}

*{1}Exail, France; {2}Laboratoire Photonique, Numérique et Nanosciences, France; {3}Laboratoire Photonique, Numérique et Nanosciences / Exail, France; {4}University of*

*Amsterdam, Netherlands*

15:05

**3049: Assessment of IMU Quality Requirements in Integrated Quantum Inertial Navigation Systems**

Benjamin Tennstedt, Steffen Schön

*Leibniz Universität Hannover, Germany*

15:25

**3072: Self-Bonding Piezoelectric Micromirrors for Integrated Atomic Beam Devices**

Jiacheng Wang, Ce Pei, Chandra Raman, Farrokh Ayazi

*Georgia Institution of Technology, United States*

15:45

**3059: Software Ruggedized Atom Interferometry for Strapdown Mobile Quantum Inertial Sensing**

Patrick Everitt, P. S. Light, K. Thomas, D. H. White, H. Orton, K. Gill, C. D. Macrae, A. Rischka, R. Symon, K. C. Stitely, D. Harcombe, J. C. Saywell, D. Adams, S. S. Szigeti, R. P.

Anderson, N. P. Robins, M. R. Hush, M. J. Biercuk

*Q-CTRL, Australia*

16:05 – 16:35

**Coffee Break, Exhibits, & Poster Session 2**

**Room:** Hotel Halle/Salon Belle Epoque

16:05 – 17:40

## Posters Session 2

Room: Hotel Halle/Salon Belle Epoque

Session Chairs: Ohad Zohar, RFE PTE LTD, Singapore & Joerg Wagner, University of Stuttgart, Germany

### 3029: Improving the Vibration Rectification of MEMS Resonant Accelerometer Using Digital Oscillator

Bingchen Zhu{1}, Zheng Wang{2}, Zhaoyang Zhai{1}, Xudong Zou{1}

{1}Aerospace Information Research Institute, CAS / University of Chinese Academy of Sciences, China; {2}Qilu Aerospace Information Research Institute, Chinese Academy of Sciences, China

### 3038: Improved Cross-Wafer Variability in MEMS Resonators: The Advantage of Tapered Flexures

Brian Grantham{2}, Ryan Knight{1}, Shane Weasner{1}, Jennifer English{2}

{1}U.S. Army Combat Capabilities Development Command Army Research Laboratory, United States; {2}University of Alabama in Huntsville, United States

### 3043: High Precision Capillary Printing for PNT Vibrating MEMS

Jérémy Bonhomme{2}, Raphaël Lévy{2}, Achille Guitton{1}, Marc Pascual{1}, Maxime Duquesnoy{2}, Lucas Hudeley{2}, Amandine Andrieux-Ledier{2}, Pierre Lavenus{2}, Jean Guérard{2}, Olivier Le Traon{2}

{1}Humink, France; {2}Office National d'Études et de Recherches Aérospatiales ONERA, France

### 3044: Early Measurements of Silicon Axisymmetric MEMS Gyro

Lucas Hudeley{4}, Raphaël Lévy{4}, Marc Faucher{3}, Benjamin Walter{5}, Maxime Duquesnoy{4}, Jérémy Bonhomme{4}, Alain Bosseboeuf{1}, Jerome Juillard{2}, Olivier Le Traon{4}

{1}Centre de Nanosciences et de Nanotechnologies / CNRS-Université Paris-Saclay, France; {2}GEEPS Laboratory, CentraleSupélec, France; {3}IEMN, Université de Lille, France; {4}Office National d'Études et de Recherches Aérospatiales ONERA, France; {5}Vmicro, France

### 3048: Calibration of a 3D MEMS Gyroscope Using Shallow Neural Networks Under Laboratory Conditions

Benedikt Schulz, Mohamed Bochkati, Ian Mambea Solomon, Elsie Watere Kiema, Thomas Pany

Universität der Bundeswehr München, Germany

### 3053: A Wide-Range, High Stability Navigation-Grade MEMS Frequency-Modulated Accelerometer

Jing Zhang{2}, Zhengyu He{2}, Xinglian Shang{1}, Zhi Li{2}, Rui Feng{1}, Zhenjun Wang{2}, Yan Su{2}

{1}East China Institute of Photo-Electron IC, China; {2}Nanjing University of Science and Technology, China

### 3054: Gravity Measurement with a Quantum Inertial Sensor for Mobile Applications

Cyrille Des Cognets{1}, Guillaume Lenogue{1}, Quentin D'Armagnac de Castanet{2}, Vincent Jarlaud{2}, Vincent Menoret{2}, Baptiste Battelier{1}

{1}Laboratoire Photonique, Numérique et Nanosciences, France; {2}Laboratoire Photonique, Numérique et Nanosciences / Exail, France

### 3058: (100) Silicon Ring Gyroscope with Rectangle Spring Aiming at Frequency and Thermoelastic Q-Factor Matching

Ayumu Takahashi, Masaki Shimofuri, Amit Banerjee, Jun Hirotsu, Toshiyuki Tsuchiya

Kyoto University, Japan

### 3068: Design, Fabrication and Characterization of a High-Quality Factor Fused Silica Toroidal Ring Gyroscope

Davide Pavesi{2}, Lois Meira Lopez{3}, Eudald Sengeniz{3}, Valentina Zega{2}, Andrei Shkel{1}

{1}Microsystems Laboratory, University of California Irvine, United States; {2}Politecnico di Milano, Italy; {3}University of California Irvine, United States

### 3073: Thermal Effects on Modified Beam Structures with Enhanced Sensitivity for Resonant Sensing Applications

Erfan Ghaderi{2}, Abdul Qader Ahsan Qureshi{1}, Mohammadreza Hajipour{2}, Behraad Bahreyni{2}

{1}CMC Microsystems, Canada; {2}Simon Fraser University, Canada

### 3081: Euler Error Analysis According to Sensor Error Factors for Accelerometer- and Magnetometer-Based Arbitrary Stationary Alignment

Chang June Lee, Jung Keun Lee

Hankyong National University, Korea

### 3083: Which Is More Robust to Gyroscope Bias? A Comparative Analysis of Rule-Based and Machine Learning-Based Attitude Estimation

Ji Hoon Park, Chang June Lee, Jung Keun Lee

Hankyong National University, Korea

## TECHNICAL PROGRAM: MAY 6, 2025

### 3094: Initial Demonstration of a Closed-Loop Two-Axis MEMS Accelerometer with Quasi-Zero Effective Stiffness

Mingkang Li, Zhipeng Ma, Leinuo Dong, Yiming Jin, Tao Zhou, Xinyu Qian, Yihan Wu, Zhonghe Jin

*Zhejiang University, China*

### 3099: Advanced Inertial Measurement Unit (IMU) Hypersonic Flight Test Results

Simon Berman{1}, Michael Chavez{1}, Youngmin Choi{1}, Phil Clark{1}, Farzin Dinyarian{1}, Jorge Gutierrez{1}, Aaron Hofmann{1}, Lawrence Linick{1}, Daniel Rampacek{1}, Cole Umemura{1}, Alexander Trusov{1}, Brian Irelan{2}, Stephen Pethel{2}, Scott David{2}, Patrick Renfro{3}

*{1}Northrop Grumman Corporation, United States; {2}NTA, Inc., United States; {3}U.S. Army Combat Capabilities Development Command Aviation & Missile Center, United States*

### 3097: Optimized Structure Design for High Quality Factor Based on MEMS Quadruple Mass Gyroscope

Jianjun Ma, Bin Zhou, Qi Wei, Rong Zhang

*Tsinghua University, China*

### 3050: An Accelerometer Using an On-Chip Cold Atom Interferometer

Soizic Hello{2}, Alexandre Mersch{3}, Benjamin Wirschafter{3}, Frédéric Segueineau{2}, Christoph Westbrook{1}, Matthieu Dupont-Nivet{3}

*{1}Laboratoire Charles Fabry, Institut d'Optique Graduate School, CNRS-Université Paris-Saclay, France; {2}Thales AVS France SAS, France; {3}Thales Research & Technology, France*

### 3015: Scale Factor Nonlinearity Suppression in Micromachined Resonant Accelerometers by Using an Improved Proportion F-Squared Method

Yukun Ma, Haonan Li, Rong Zhang, Fengtian Han

*Tsinghua University, China*

17:40 – 18:10

#### What even is quantum anyway? (INVITED)

Max Carey, *Aquark Technologies, UK*

**Room:** Salon Baden/Württemberg

**Session Chair:** Giacomo Langfelder, *Politecnico di Milano, Italy*

19:00 – 21:30

#### Conference Banquet and Awards Ceremony

**Location:** Max & Moritz Brewery

*Buses will transport you to and from the hotel. The first bus leaves at 6:30 pm, the next 3 leave at 6:45 pm and 6:50 pm. To come back to the hotel, the first bus leaves at 9:00 pm, and the rest leave at 9:30 pm. Please wear your name badges for entry.*



## TECHNICAL PROGRAM: MAY 7, 2025

7:30 – 8:30

**Registration**

**Room:** Foyer

8:30 – 9:15

**Keynote: Fabricating the Future: My Journey in Silicon Photonics**

Avi Feshali, *Independent, USA*

**Room:** Salon Baden/Württemberg

**Session Chair:** Erdinc Tatar, *Bilkent University, Turkey*

9:15 – 10:30

**Late News**

**Room:** Salon Baden/Württemberg

**Session Chairs:** Patrick Fedeli, *ST Microelectronics* & Behraad Bahreini, *Simon Fraser University*

9:15

**3089: Offset Temperature Stability Control for Frequency-Modulated PiezoMEMS Gyroscope**

Antti Ontronen<sup>{1}</sup>, Masahiro Ishii<sup>{2}</sup>, Chika Sakamoto<sup>{2}</sup>, Seiji Umezawa<sup>{2}</sup>, Yasuhiro Aida<sup>{2}</sup>

<sup>{1}</sup>Murata Electronics Oy, Finland; <sup>{2}</sup>Murata Manufacturing Co., Ltd., Japan

9:30

**3101: Digital Manufacturing of Fused Quartz Resonant MEMS with Enhanced Surface Quality**

Danmeng Wang, Daryosh Vatanparvar, Andrei Shkel

*Microsystems Laboratory, University of California Irvine, United States*

9:45

**3078: Feasibility of Constructing a High Performance Virtual IMU Using Low-Cost IMUs**

John Liu

*Jet Propulsion Laboratory, United States*

10:00

**3093: Stochastic Modeling of Interferometric Optical Gyroscopes for High-End Applications: Experimental Validation**

Teresa Natale<sup>{2}</sup>, Lorenzo Attivissimo<sup>{1}</sup>, Salvatore Di Girolamo<sup>{1}</sup>, Mario Lucchesini<sup>{1}</sup>, Fabrizio Berton<sup>{1}</sup>, Pietro Peliti<sup>{1}</sup>, Pedro Bossi Núñez<sup>{2}</sup>, Ludovico Dindelli<sup>{2}</sup>, Vittorio M. N. Passaro<sup>{2}</sup>, Francesco Dell'Olio<sup>{2}</sup>

<sup>{1}</sup>Northrop Grumman Italia, Italy; <sup>{2}</sup>Politecnico di Bari, Italy

10:15

**3091: Electrostatic Calibration of MEMS Accelerometers**

Ardalan Armin, Toby Alexander, Chris Fell

*Collins Aerospace, United Kingdom*

10:30 – 11:00

**Coffee Break & Exhibits**

**Room:** Hotel Halle/Salon Belle Epoque

11:00 – 11:15

**INERTIAL 2026 Announcement**

**Room:** Salon Baden/Württemberg

11:15 – 12:55

**MEMS Gyroscopes for Navigation Applications**

**Room:** Salon Baden/Württemberg

**Session Chairs:** Julien Auger, *Safran* & Xudong Zou, *UCAS, China*

## TECHNICAL PROGRAM: MAY 7, 2025

11:15

**3071: Tuning Fork Vibratory MEMS Gyroscope with Optical Drive and Sense Modes Detection**

Eldad Yichie{1}, Ido Peleg{1}, Ronen Maimon{1}, Naftaly Krakover{1}, Danny Kassie{1}, Tamar Tepper-Faran{1}, Slava Krylov{2}  
{1}Rafael Advanced Defense Systems Ltd., Israel; {2}Tel Aviv University, Israel

11:35

**3062: Whole-Angle Gyroscopes on Mass-Production Process: Dual Foucault Pendulum vs Disk Resonant Gyroscope**

Davide Pavesi{3}, Carolina Viola{2}, Claudia Comi{3}, Alberto Corigliano{3}, Pietro Peliti{1}, Fabrizio Berton{1}, Luca Falorni{4}, Gabriele Gattere{4}, Riccardo Nistri{3}, Stefano Zoia{1}, Paolo Frigerio{3}, Giacomo Langfelder{3}, Valentina Zega{3}  
{1}Northrop Grumman Italia, Italy; {2}Northrop Grumman Italia / Politecnico di Milano, Italy; {3}Politecnico di Milano, Italy; {4}STMicroelectronics, Italy

11:55

**3018: Robust Double Mass MEMS Gyroscope with Large Drive Amplitude for North-Finding**

Yang Zhao, Qin Shi, Guoming Xia, Meijia Xu, Jinyang Huang, Anping Qiu  
Nanjing University of Science and Technology, China

12:15

**3067: Near Nav-Grade Safran MEMS Gyro Improves SWaP with New ASIC and Ceramic Packaging**

Jean-Daniel Emerard{1}, Julien Auger{1}, Frederic Fretouly{1}, Baptiste Soyer{1}, Jean-Sebastien Macé{1}, Philippe Ullah{1}, Thierry Baurèche{1}, Rob Compton{2}, Alexandre Lenoble{1}  
{1}Safran Electronics & Defense, France; {2}Safran Federal Systems, United States

12:35

**3102: Real-Time Detection and Dynamic Compensation of Mismatch in Rate-Integrating MEMS Gyroscopes Using Virtual Rotation**

Takashiro Tsukamoto{1}, Fumito Miyazaki{2}, Taichi Uchiumi{1}, Yasuchi Tomizawa{2}, Shuji Tanaka{1}  
{1}Tohoku University, Japan; {2}Toshiba Corporation, Japan

12:55 – 14:00

**Lunch Break**

**Room:** Salon Baden/Württemberg

14:00 – 15:10

**Learning & Correction in Inertial Sensors**

**Room:** Salon Baden/Württemberg

**Session Chairs:** Andrea Buffoli, INGAGE SAS & Lia Li, Zero point motion

14:00

**3109: HALOVS: Highly Accelerated Learning of Vibratory Systems (INVITED)**

Sunil Bhawe  
Defense Advanced Research Projects Agency, United States

14:30

**3065: Olfactory Inertial Odometry: Sensor Calibration and Drift Compensation**

Kordel France, Ovidiu Daescu, Anirban Paul, Shalini Prasad  
University of Texas at Dallas, United States

14:50

**3032: Measuring Angular Rate and Substrate Stress from the Same Sensing Piezoresistors: A Path Towards Compensating Drift Induced by Package Deformation?**

Gabriele Laita{2}, Francesco Tubaro{2}, Andrea Buffoli{1}, Philippe Robert{1}, Giacomo Langfelder{2}  
{1}CEA-Leti, France; {2}Politecnico di Milano, Italy

15:10 – 15:30

**Closing Session: Conference adjourns**

**Room:** Salon Baden/Württemberg