

**IPIN2024**

**HONG KONG**

**香港**

14th INTERNATIONAL  
CONFERENCE ON

INDOOR POSITIONING & INDOOR NAVIGATION



**Proceedings of the Work-in-Progress Papers at the  
14th International Conference on Indoor  
Positioning and Indoor Navigation**

**IPIN-WiP 2024**

**October 14-17, 2024, Hong Kong**

<https://ipin-conference.org/2024/>

**Organized by**

**Department of Aeronautical and Aviation Engineering**

**The Hong Kong Polytechnic University**

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# **14th International Conference on Indoor Positioning and Indoor Navigation**

## **Preface**

The 14th International Conference on Indoor Positioning and Indoor Navigation (IPIN 2024) was held in Hong Kong, on October 14-17, 2024. This proceeding contains the Regular Papers presented at IPIN 2024.

First held in Zurich, Switzerland in 2010, IPIN is a unique event dedicated to indoor positioning, its applications and development. The last ten years have seen enormous technical progress in this field, yet, in contrast with outdoors well-established GNSS solutions, no technology still exists cheap and accurate enough for the general market. The potential applications of indoor localisation are all-encompassing, from home to wide public areas, from IoT and personal devices to surveillance and crowd behaviour applications, from casual use to mission-critical systems.

The conference received 130 regular papers and 38 work-in-progress papers with authors from universities, research institutes and renowned companies in 20 different countries. Each paper was reviewed by at least two members of the Technical Program Committee of the Conference. 78 out of 130 Regular Papers were accepted and submitted to the IEEE Xplore Digital Library, while 34 were accepted as Work-in-Progress papers and submitted to CEUR Workshop Proceedings. Regular Papers were presented as oral presentations, and Work-in-Progress papers were presented in a dedicated poster session.

IPIN 2024 hosted 2 tutorials, 4 Keynotes, 16 Parallel Sessions, including Machine Learning Aided Radiolocation, Acoustic and Ultrasound systems, Visual and Optical System, Inertial Measurement Units, Radio Signal Processing, UWB and Wi-Fi, etc. There were 204 registered on-site attendees at this onsite conference.

The conference also hosted the 11th International Indoor Positioning and Navigation Competition from September 25 to October 4 for offsite participants and from October 10 to 13 for onsite participants. The competition included four tracks, such

as smartphone positioning, foot-mounted IMU positioning, and smartphone-on-vehicle positioning, attracting 15 teams from around the world. The global synchronous online competition mode, first adopted in 2022, was used again, showcasing the highest level of the current international indoor positioning and navigation field. Additionally, one onsite competition track was held at the PolyU campus in Hong Kong.

IPIN 2024 awarded 6 best papers, 1 best poster, and 6 competition track winners. Best paper awardees are given the opportunity to send a technically extended version to the IEEE Journal of Indoor and Seamless Positioning and Navigation (J-ISPIN). The journal is currently the only international academic journal focusing on the field of indoor navigation and positioning.

Thanks to all members of the IPIN 2024 Technical Program Committee for their effort in the review process that was fundamental for maintaining the high scientific level of the conference. Thanks to all members of Organizing Committee for their hard work in making the meeting go on smoothly. Thanks to all the researchers who supported this event by submitting their work and actively participating in it. Thanks to all participants for their efforts to make IPIN 2024 a success.

October 2024  
Li-Ta Hsu, Christopher Mutschler  
Conference Co-Chairs

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# 14th International Conference on Indoor Positioning and Indoor Navigation

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Antonino Crivello  
Michele Girolami

ISTI-CNR (IT)  
ISTI-CNR (IT)  
ISTI-CNR (IT)

### Track 3: Smartphone (offsite-online)

Joaquín Torres-Sospedra  
Antonio Ramón Jiménez Ruiz  
Antoni Pérez Navarro

Universitat de València  
The Centre for Automation and Robotics  
Universitat Oberta de Catalunya

### Track 4: Foot-mounted IMU (offsite-online)

Miguel Ortiz  
Ni Zhu

The University Gustave Eiffel  
The University Gustave Eiffel

### Track 6: Smartphone on vehicle (offsite with onsite survey)

Wenchao Zhang  
Xinchun Ji

Aerospace Information Research  
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