2024 IEEE Gaming, Entertainment and Media Conference (GEM)

The General Conference Chair, Prof. Fabrizio Lamberti, and the Technical Program Committee Chairs, Dr. Filippo Gabriele Prattico̔ and Prof. Bill Kapralos are delighted to welcome you to the 2024 IEEE Gaming, Entertainment and Media Conference (GEM), a premier international conference that focuses on the latest research in these domains. The conference is financially sponsored by IEEE Consumer Technology Society (CTSoc) and held at Politecnico di Torino in Turin (Torino), Italy, from June 5th to June 7th, 2024. IEEE GEM 2024 aims to explore the field at the intersection of consumer technologies, gaming, entertainment, and media by bringing together leading researchers, academics, and industry professionals. This edition of GEM aims to offer participants the possibility to share and discover cutting-edge research, ideas, and experiences on the future of gaming, entertainment and media in various application domains. Interactive and smart applications, storytelling, artificial intelligence, immersion in virtual and augmented reality, emerging art & design techniques to healthcare, cultural heritage, education, are just a few examples of domains represented at IEEE GEM 2024.

The conference committee has been working hard to organize an outstanding technical program that includes keynotes, technical papers, posters, demos, workshops, tutorials, special sessions and Industry Forum papers. IEEE GEM 2024 received 165 submissions. Each submission has been screened by at least two domain experts. After rigorous peer review, 126 papers have been accepted (35 of them after an additional shepherding phase that followed peer review), 85 as "full" papers, 41 as "short" papers. Acceptance rates before shepherding were 58% for the former category, 73% for the latter category.

Accepted papers were arranged in the following technical sessions that are scheduled in the three days of the conference program:

- Multimedia & Audio/Video Signal Processing;
- Frameworks & Innovative Methodologies;
- Virtual Humans & Digital Twins;
- Game Studies, Sociology & Psychology of Play(ers);
- Human-Machine Interaction & Haptics;
- Machine Learning & AI in Games;
- DeepFakes & Privacy of Media;
- Game Design, Game Development & UX;
- Inspiration, Ethical Aspects, Research Insight & Trends;

- Serious Games for Education and Industry Applications;
- Cultural Heritage & Engagement;
- Serious & Applied Games for Health and Wellness.

In addition to traditional oral presentations and posters, the authors of 12 accepted papers have been selected to showcase their work through an interactive demo along with the 4 selected only-demo contributions.

The conference features also 2 workshops and 4 tutorials:

- Workshop 1: "Wave your way - Deploy personalized gesture recognition using ToF sensors with MATLAB and STM32Cube.AI Dev Cloud", organized by Shixin Zhuang (*The MathWorks, USA*), Danilo Pietro Pau and Martin Joel Mouk Elele (*STMicroelectronics, Italy*), Giuseppe Ridino (*TheMathWorks Italy, Italy*).
- Workshop 2: "Virtual production with Unreal Engine", organized by Nicola di Meo (*UNSPACE, Italy*) and Daniele Barone (*Education Advisor for Unreal Engine, Italy*).
- Tutorial 1: "The power of shapes - How to create simple and sharp blockout to support game design during early stages of development", organized by Davide Cavuoto (*Ubisoft, Italy*).
- Tutorial 2: "Blender BIM for virtual worlds and digital twins", organized by Filippo Zorgno (*Blender Italia aps and BoffaPetrone&Partners of Gruppo Building, Italy*) and Piercarlo Stori (*Italy*).
- Tutorial 3: "MoodMentor - Virtual reality UI/UX design considerations for neurodivergent users", organized by Austin J Stanbury (*Augmented Info Systems, USA*) and Ines Said (*University of Florida, USA*)
- Tutorial 4: "Semantic communication for multimedia applications", organized by Anil Fernando and Yasith Ganearachchi (*University of Strathclyde, United Kingdom*).

IEEE GEM 2024 program includes 4 special sessions:

- Games for health (featuring 7 of the accepted papers) organized by Giacinto Barresi (*Istituto Italiano di Tecnologia, Italy*), Jessica Podda (*Fondazione Italiana Sclerosi Multipla, Italy*) and Massimiliano Pau (*Università degli Studi di Cagliari, Italy*).
- Next-gen networked XR(NGNXR): Advancing multiplayer and co-locative gaming experiences (featuring 6 of the accepted papers) organized by Xi Guo (*Birmingham City University, United Kingdom*), Ning Wang (*University of Surrey, United Kingdom*), Zhen Gao (*Beijing Institute of Technology, China*), Liucheng Guo (*Tangi0 LTD, United Kingdom*), De Mi (*Birmingham City*

University, United Kingdom) and Carlo Harvey (*Birmingham City University, United Kingdom*).

- GameTech impact: Consumer engagement and citizen science with emerging technologies (featuring 5 of the accepted papers) organized by Celestine Iwendi (*University of Bolton, United Kingdom*), Vandana Sharma (*CHRIST University, Delhi NCR Campus, India*), Pradeep Hewage (*University of Bolton, United Kingdom*) and Paul Hollins (*University of Bolton, United Kingdom*).
- Beyond boundaries: Exploring advanced image processing and AI's impact on data and life sciences (featuring 6 of the accepted papers) organized by Thi Thi Zin (*University of Miyazaki, Japan*) and Hiromitsu Hama (*Osaka City University, Japan*).

Three Industry Forum panels have also been arranged:

- "World of gaming between academia & industry" envisages the contribution of Marco Mazzaglia (*Politecnico di Torino, Italy*); Davide Cavuoto (*Ubisoft, Italy*); Matteo Lana (*Tiny Bull Studios, Italy*); Nicola di Meo (*UNSPACE, Italy*); Davide La Sala (*Meta Reality Labs*). In the panel, the industry experts discuss the state of collaboration between the University and the Game Industry.
- "AI applied to game development" envisages the contribution of Kai Erenli (*University of Applied Sciences - FH DES BFI Vienna & Arx Anima, Austria*); Johanna Pirker (*LMU & Graz University of Technology, Austria*); Ross Smith (*Microsoft Corporation, USA*); Martin Filipp (*PGDA, Austria*); Gabriella Chihan Stanley (*VRISCH & XRVienna, Women in immersive Technologies Europe, Austria*); Axel Dietrich (*VRISCH, Austria*). In the panel, the industry experts provide their vision about the dynamic intersection between AI technologies and sustainable development practices within the gaming industry.
- "Technology and performing arts: A human-based approach" envisages the contribution of Paolo Arlenghi (*Compagnia Pindarica, Italy*). In the panel, the industry expert discusses how technology can be leveraged to improve a live experience in the field of performing arts, by sharing his experience at :-Pindarica, a multimedia theatre company based in Turin, Italy.

This year, the conference welcomes 3 distinguished keynote speakers.

- Prof. Leonardo Chiariglione (*Moving Picture, Audio, and Data Coding by Artificial Intelligence (MPAI), Italy*) presents the latest updates regarding two MPAI projects in the talk titled "AI-processed data for manifold applications".
- Prof. Mariano Luis Alcañiz Raya (*Laboratory of Immersive Neurotechnologies (LabLENI), Human-Centered Technology Institute (Human-Tech), Universitat*

Politècnica de València (UPV), Spain) provides example of Virtual Humans applications for the assessment of human cognition in the talk entitled "Virtual agents: A new interface to characterize human cognition?".

- Prof. Marcelo Knörich Zuffo (*Escola Politécnica da Universidade de São Paulo, Brazil*) in the talk entitled "Engaging Minds, Enhancing Reality: Leveraging Artificial Intelligence in Immersive Serious Games for Learning, Discovery and Training Critical Procedures" shares the experiences of his research team in creating immersive serious games for applications in power grid maintenance, prehistoric archaeology, mathematics education, interactive museums, and environmental conservation.

To provide more face-to-face networking opportunities, the conference organizers have arranged two social activities: a private visit to the Royal Palace and a gala dinner at the Villa Sassi historic building.

We would like to express our sincere gratitude to the numerous volunteers who worked hard for the conference. In particular, we want to thank the Publications Chairs, Dr. Hannes Mareen and Prof. Jose-Maria Flores-Arias as well as all those who served in the Organizing Committee, the members of the Technical Program Committee and the Reviewers. It is your great dedication and trust that made IEEE GEM 2024 possible.

We would like to acknowledge the support of IEEE and IEEE Consumer Technology Society, in particular of Prof. Wen-Chung Kao (President), Prof. Nobuo Funabiki (VP Conferences), Prof. Yu-Cheng Fan (Treasurer), Dr. Christian Groß (Regional Director), Ms. Charlotte Kobert (Administrator) and the 15 Technical Committees.

We also want to express our sincere thanks to all the Authors for their outstanding submissions without which this conference would not have occurred.

The smooth operation of the conference was made possible with the great support of student volunteers and local staff. We are grateful for their efforts.

Finally, we are grateful to all those who attended and participated in the conference. We hope that you found IEEE GEM 2024 to be engaging, insightful, informative, and fun and you will consider joining again to make also the next edition another successful and memorable event.

GENERAL CONFERENCE CHAIR

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