

*Proceedings*

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**Third Asia International Conference  
on Modelling and Simulation**

**AMS 2009  
Asia Modelling Symposium 2009**

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# Welcome Message from the Chairs

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We are very pleased to welcome our colleagues from Asia and other parts of the world to the Third Asia International Conference on Modelling and Simulation, the Asia Modelling Symposium 2009, held in two locations in Indonesia for the first time: in Bandung on 25 and 26 May and Bali on 29 May. The conference Program Committee has organized an exciting and balanced program comprising presentations from distinguished experts in the field, and important and wide-ranging contributions on state-of-the-art research that provides new insights into the latest innovations in the modelling and simulation of intelligent systems. The third such event in this region, it follows in the foot steps of the second held in Kuala Lumpur in May 2008, and the first held jointly with the 11th Thai Annual National Symposium for Computational Science and Engineering, ANSCSE-11, in March 2007 at the Prince of Songkla University campus in Phuket. We are hopeful that its outstanding technical content contributed by leading researchers in the field from Asia and worldwide will ensure its continued success. No plans have yet been finalized for the location of next year's event, but it would be appropriate to choose another interesting location in another neighboring country.

The main themes addressed by this conference are:

- Intelligent Systems
- Hybrid Intelligent Systems and Hybrid Soft Computing
- Methodologies, Tools and Operations Research
- Bio-informatics and Bio-Medical Simulation
- Discrete Event and Real Time Systems
- Image, Speech and Signal Processing
- Industry, Business and Management
- Human Factors, Social & Economic Sciences
- Engineering: Civil, Mechanical, Chemical, Industrial, Manufacturing and Control
- Energy, Power Generation and Distribution
- Transport, Logistics, Harbour, Shipping and Marine Simulation
- Virtual Reality, Visualization and Computer Games
- Parallel and Distributed Architectures and Systems
- Internet Modelling, Semantic Web and Ontologies
- Performance Engineering of Computer & Communication Systems
- Circuits, Sensors and Devices

AMS 2009 is technically sponsored by UK Simulation Society, Asia Modelling and Simulation Society (AMSS), European Simulation council (EUROSIM), IEEE Computer Society (UK and RI), European Conference for Modelling and Simulation (ECMS), Parahyangan Catholic university (UNPAR), Bandung, Indonesia, University of Technology, Malaysia (UTM), Norway University of Science and Technology, and Nottingham Trent University, UK. AMS2009 proved to be very popular and received submissions from over 40 countries. The conference program committee had a very challenging task of choosing high quality submissions. Each paper was peer reviewed by several independent referees of the program committee and, based on the recommendation of the reviewers, 135 papers were finally accepted. The papers offer stimulating insights into emerging modelling and simulation techniques for intelligent and hybrid intelligent systems or employing intelligent methodologies. We express our sincere thanks to the plenary speakers, authors, track chairs, Program Committee members, and additional reviewers who have made this conference a success. Finally, we hope that you will find the conference to be a valuable resource in your professional, research, and educational activities whether you are a student, academic, researcher, or a practicing professional. Enjoy!

**David Al-Dabass, Robertus Triweko, Sani Susanto, Ajith Abraham**  
*General and Program Chairs*

# Conference Organization

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Siti Mariyam Shamsuddin

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Teruaki Ito  
Omar Yaakob  
Galina Merkuryeva  
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Alessandra Orsoni

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Farshad Moradi  
Russell Cheng  
Mohd Ngadiman

## **Bioinformatics and Biomedical Simulation**

Norlaili Safri  
Jasmy Yunus

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Manaf hashim  
Ooi Chia Yee