Strengthening innovation via scientific and high-performance computing

Final Workshop of the project

ecosister Spoke 6
PNRR M4C2 1.5 «ECOSISTEMI TERRITORIALI D'INNOVAZIONE»

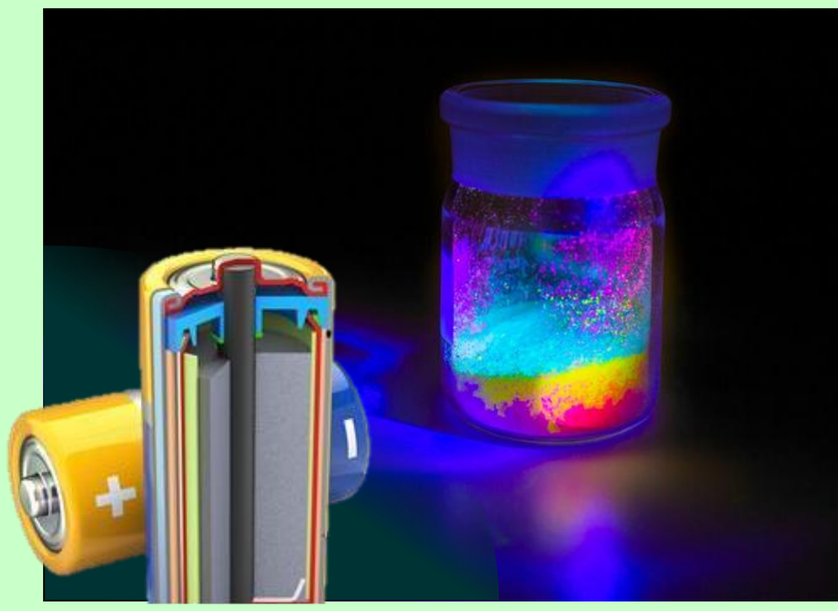
UNIMORE-Data Center, Via E. Gorrieri, 31, 41122 Modena - **30/10/2025**

From 9:00 to 9:15 Welcome address and introduction to the ECOSISTER Spoke 6 goals and activities

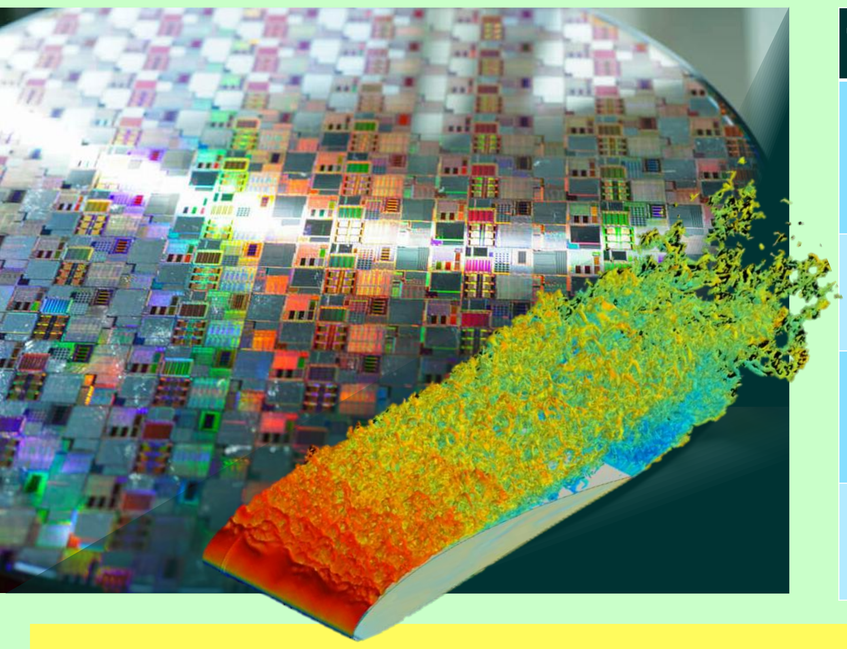
Speaker: Roberto De Renzi *Uni-Parma*

Scientific computing and HPC for innovation: ECOSISTER Spoke 6

Time	Topic	Speaker	Title
9:15-9:45	**Session Chair: Alice Ruini Keynote: Industrial / Academic Expert**	**Luca Larcher *Applied Materials***	**Accelerating Material-to-Device Technology Co-Optimization Leveraging Simulation & AI**
9:45-10:00	WP1: High-Throughput	Alfonso Pedone *Uni-MoRe*	Exploring Sodium-based Solid Electrolytes through Machine-Learning accelerated Molecular Dynamics Simulations
10:00-10:15	WP1: Green pilots	Cristina Sissa *Uni-Parma*	Theoretical strategies for efficient OLED materials
10:15-10:30	WP1: Response functions Spectroscopies	Pietro Bonfà *Uni-MoRe*	Boosting Muon Spin Spectroscopy with High-throughput Computing

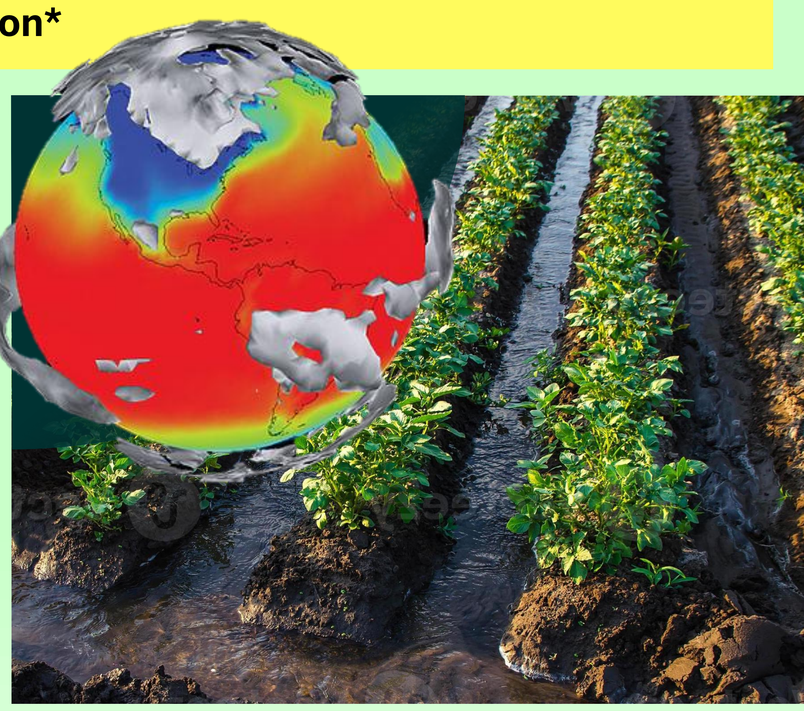


From 10:30 to 11:30 **BREAK and poster session***



Time	Topic	Speaker	Title
11:30-12:00	**Session Chair: Luca Selmi Keynote: Industrial / Academic Expert**	**Paolo Toniutti *Infineon Technologies Villach***	**Computational requirements in the development of electronic components**
12:00-12:15	WP2: Advanced electronic and photonic components	Alessandro Ruggieri *Uni-MoRe*	Uprising thermal and reliability issues in advanced 3D nanoelectronics
12:15-12:30	WP2: Neuromorphic computing	Tommaso Zanotti *Uni-MoRe*	HPC-Enabled Design of non von Neumann Circuits for Ultra-Low Power Computing
12:30-12:45	WP2: Fluid dynamics and turbulence	Roberto Corsini *Uni-MoRe*	Direct numerical simulation of the separated flow around a wing section

From 12:45 to 14:15 **LUNCH and poster session***



Time	Topic	Speaker	Title
14:15-14:45	**Session Chair: Renato Vacondio Keynote: Industrial / Academic Expert**	**Günter Blöschl *TU Wien and University of Bologna***	**Flood Hazard Mapping**
14:45-15:00	WP3: Climate models	Valeria Todaro *Uni-Parma*	Statistical downscaling of climate model data for climate change impact assessments in the Emilia-Romagna region
15:00-15:15	WP3: Terrain analysis and surface flow propagation modeling	Riccardo Gasperoni *Uni-MoRe*	Lidar-Based Modeling of Riparian Tree Impacts on River Flow and Conveyance
15:15-15:30	WP3: Agriculture	Vittorio Bernuzzi and Leonardo Rossi *Uni-Parma*	AI-driven Aerial Vision for Sustainable Agriculture

From 15:30 to 16:30 **Interactive panel on: Strengthening innovation via scientific and high-performance computing: state of play and what is next**
Representatives from Institutions, RTOs (Cineca, Infn), experts, stakeholders, researchers.

* Poster session next page →

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Poster exhibition Spoke 6

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0.1	**ECOSISTER SPOKE 6 and its cascaded initiatives: WPs, Topics, People, and Competences**	
0.2	**ECOSISTER SPOKE 6 - WP1 - Advanced materials**	
0.3	**ECOSISTER SPOKE 6 - WP2 - Electronic, photonic and mechanical components for energy and sustainability**	
0.4	**ECOSISTER SPOKE 6 - WP3 - Cross-disciplinary methods, Water flow, Agriculture, and Climate**	
0.5	**Supporting Sustainable Scientific Simulations and Industrial Applications through HPC – CINECA activities in ECOSISTER Spoke 6** F. Affinito, A. Acocella, A. Emerson, T. Gorni, L. Bellentani, L. Querciagrossa, M. Ippolito, E. Pascolo	*Cineca, Casalecchio di Reno (BO)*
0.6	**Infrastructure management and user support** Alessandro Pascolini, Claudio Grandi, Carmelo Pellegrino	*INFN*
	WP1 Research activities	
1.1.1	**Pressure And Magnetic Field Control Of The Topological Phase In Antiferromagnetic Bilayers** Narsimha Rao Elaprolu, and Marco Gibertini	*Università degli Studi di Modena e Reggio Emilia*
1.2.1	**Molecular modeling studies on the effect of polymer-electrolyte interactions in the Li-ion batteries** Michele A. Salvador, Rita Maji, Elena Degoli, Alice Ruini, and Rita Magri	*Università degli Studi di Modena e Reggio Emilia*
1.2.2	**Photoinduced charge separation in single-component squaraine thin films: the key role of electrostatic disorder** Davide Giavazzi, Anna Painelli	*Università di Parma*
1.2.3	**Silicon based materials for energy storage applications** Omar Lopez Estrada, Rita Maji, Alice Ruini, Rita Magri, Michele Salvador, Ivan Marri, Elena Degoli	*Università degli Studi di Modena e Reggio Emilia*
1.2.4	**Carrier Multiplication in Si Nanocrystals: an ab initio Study** Manaswita Kar, Marco Govoni and Ivan Marri	*Università degli Studi di Modena e Reggio Emilia*
1.3.1	**First principles characterization of opto-electronic properties and defect engineering of emerging materials for next-generation electronics and optics** Luca Bursi, Tommaso Gorni, Angela Acocella, Fabio Affinito, Alice Ruini	*Università degli Studi di Modena e Reggio Emilia*
1.3.2	**Defect complexes and charge compensation in Ta-doped anatase TiO2 transparent conductor** Luca Bursi, Alessandra Catellani, Piero Mazzolini, Cristina Mancarella, Andrea Li Bassi, Andrea Baraldi, Arrigo Calzolari	*Università degli Studi di Modena e Reggio Emilia*
1.3.3	**First-principles study of bound excitons in monolayer SnS_2** Vinicius Alves Bastos, Fulvio Paleari, Eleonora Luppi, Marco Gibertini, and Alice Ruini	*Università degli Studi di Modena e Reggio Emilia*
1.3.4	**Non-adiabatic Molecular Dynamics Applied to Muons: Computation of Stopping Power** Adrian Gomez Pueyo[1], Alberto Castro[2], Roberto De Renzi[1], Pietro Bonfà[3]	*[1]Università di Parma, [2]Universidad de Zaragoza, Spain, [3]Università degli Studi di Modena e Reggio Emilia*
	WP2 Research activities	
2.1.1	**Neural Strategies for Upper Limb Movements: Motor Unit Control during Dynamic Contractions at Increasing Speeds** Mattia Orlandi[1], Pierangelo M. Rapa[1,2], Farah Baracat[3,4], Luca Benini[1,4], Elisa Donati[3,4], Simone Benatti[2]	*[1]Università di Bologna, [2]Università degli Studi di Modena e Reggio Emilia, [3]University of Zurich, [4]ETH, Zurich*
2.1.2	**Application and highly efficient coupling of hollow-core fibers for wideband communication and sensing** Lorenzo Rosa, Federico Melli, Luca Vincetti	*Università degli Studi di Modena e Reggio Emilia*
2.1.3	**HPC-driven thermal design of GaN-based, highly-efficient converters for next generation photovoltaics** Payam R. Kalvani, Pierpaolo Palestri, Luca Selmi **CASCADED CALL**	*Università di Parma*
2.2.1	**Turbulence around a wing section in separated flow conditions** Roberto Corsini, Andrea Cimarelli, Enrico Stalio	*Università degli Studi di Modena e Reggio Emilia*
2.2.2	**Direct numerical simulation of wind-waves** Marco Crialesi Esposito, Andrea Cimarelli, Enrico Stalio	*Università degli Studi di Modena e Reggio Emilia*
2.2.3	**RANS representation of a low-Reynolds number blade section at high angles of attack** Luca Pagliarini[1], Roberto Corsini[2], Enrico Stalio[2], Fabio Bozzoli[1], Sara Rainieri[1]	*[1]Università di Parma, [2]Università degli Studi di Modena e Reggio Emilia*
	WP3 Research activities	
3.0.1	**Boundary-drift driven diffusion and uphill phenomena** Francesco Casini, Cristian Giardinà, Jacopo Nicolini, Luca Selmi, Cecilia Vernia	*Università degli Studi di Modena e Reggio Emilia*
3.1.1	**Forecasting biodiversity loss in agricultural ecosystems** Michele Bellingeri[1], Davide Cassi[1], Davide Martinetti[2], David Bohan[2], Daniele Bevacqua[2]	*[1]Università di Parma, [2]INRAE, Avignon, France*
3.2.1	**Artificial intelligence for water flow prediction from synthetic data** Pietro Musoni , Alessandro Dal Palù	*Università di Parma*
3.2.2	**Monte Carlo Evaluation of Levee Reliability Under Hydraulic Loading and Mammal Bioerosion** Rachit Soni, Giovanni Moretti, Marco Redolfi, Stefano Orlandini	*Università degli Studi di Modena e Reggio Emilia*
3.2.3	**Robust Statistical Processing of Long-Time Data Series to Estimate Soil Water Content** Mirko Anello[1], Fabrizio Laurini[1], Marco Riani[1], Roberto Valentino[1], Marco Bittelli[2], Massimiliano Bordoni[2], Claudia Meisina[3]	*[1]Università di Parma, [2]Università di Bologna, [3]Università di Pavia*
3.2.4	**3D SPH simulations of Bridges during flood conditions** Aaron English, Susanna Dazzi, Renato Vacondio	*Università di Parma*
3.2.5	**Investigating the migration of immiscible contaminants fluid flows in homogeneous and heterogeneous aquifers with high-resolution numerical simulations** Michele Pasquali, Alessandra Feo, Fulvio Celico	*Università di Parma*

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