

CO₂ Reduction for Transportation Systems Conference

@ Museo Nazionale dell'Automobile - Torino

Wednesday - June 12, 2024 (morning)			
8.30		Registration	
Opening Welcome Address & Plenary Keynotes @Auditorium Chairperson: Federico Millo, Politecnico di Torino			
09.00-09.20	<ul style="list-style-type: none"> • Murly Iyer - SAE International • Gianmarco Giorda - ANFIA 		
09.20-09.45	• Electro Mobility is the Future, but...! Marc Sens - IAV GmbH		
09.45-10.10	• Sustainable Powertrains for People's Mobility André Casal Kulzer - IFS, University of Stuttgart		
10.10-10.20	• Q&A Session		
Break @Exhibition Area			
Parallel Sessions			
	AUDITORIUM	SALA 150	SALA VETRATA
	Hydrogen for Sustainable Mobility: H2ICE&H2FC – part 1 Chairperson: A. Kulzer, IFS University of Stuttgart	Hybridization & Electrification – part 1 Chairpersons: D. Misul, L. Rolando, Politecnico di Torino	Aero & Thermal Management– part 1 Chairpersons: M. Biglia, DENSO, M. Casella, CRF
11.00-11.20	Advanced H2 ICE development aiming for full compatibility with classical engines while ensuring zero-impact tailpipe emissions T. Koerfer , T. Durand, H. Busch - FEV Group GmbH Paper # 2024-37-0006	How far can you drive on a full charge? A practical exploration of Battery Electric Vehicles range and environmental impact based on real-world data A. Tansini , G. Fontaras - JRC	Optimization of a Sliding Rotary Vane Pump for Heavy Duty Internal Combustion Engine cooling F. Fatigati, M. Di Bartolomeo , R. Cipollone - Università degli Studi dell'Aquila ; F. Pallante, G. Lo Biundo - O.M.P. Officine Mazzocco Pagnoni Paper # 2024-37-0030
11.20-11.40	Performance, Efficiency and NOx Emissions in A Sport Car H2 ICE F. Gullino, M. Medda - Ferrari Spa	Development of composite battery housing components: cost reduction and performance improvements for large volume BEVs L. Mazarella , T. Delpero, D. Caprioli, M. Hauenstein, F. Pezzani, U. Cotic, Autoneum Management AG	Evaluation of a Combined Cooling/HVAC System for Electric Heavy Quadricycles under Different Conditions D. Chiappini, S. Lombardi, L. Tribioli - Università degli Studi Niccolò Cusano
11.40-12.00	The Potential of Hydrogen High Pressure Direct Injection Toward Future Emissions Compliance: Optimizing Engine-Out NOx and Thermal Efficiency R. Willems , X. Seykens, C. Bekdemir, E. Doosje, P. Van Gompel - TNO Paper # 2024-37-0005	A methodology to develop and validate a 75-kWh battery pack model with its cooling system under a real driving cycle R. Sok , K. Kishida, T. Otake, K. Nandagopal, J. Kusaka - Waseda University ; N. Mizushima - Advanced Industrial Science and Technology (AIST) ; T. Noyori - AVL Japan Paper # 2024-37-0012	Validation of Boiling Model via correlation with Coolant Deposits M. Bovo , Aurobay
12.00-12.20	Development of a Direct Injection Hydrogen Engine for off-road applications through numerical and experimental investigations F. Mallamo - FEV Italia ; B. Jagodzinski- FEV Europe ; N. Scinicariello, W. Lodi, K. Engines; F. Millo, A. Piano, A. Scalambro - Politecnico di Torino	Comparison of Lithium-Ion Battery Chemistries in the Hybridization of Ultralight Aircraft T. Donateo , L. Spada Chiodo - Università del Salento Paper # 2024-37-0017	A New Design Rule of Engine Coolant Pump in ICES Focused to Energy Consumption Reduction M. Di Bartolomeo , D. Di Battista, R. Cipollone - Università degli Studi dell'Aquila ; F. Fremondi, U. Camagni - Metelli Paper # 2024-37-0015
12.20-12.40	Direct Injection Hydrogen Combustion System for Mid-Duty Diesel Engines Retrofit D. Gessaroli , A. Vassallo, F. Concetto Pesce, F. Accurso - Dumarey Automotive Italia ; R. Golisano, N. Sacco - Dumarey Propulsion Solutions	Hyva's Decarbonization Drive: Innovations in Component Electrification for Sustainable Heavy Machinery Solutions G. M. Fulgeri , - Hyva Group	Development and Validation of a Thermal Model for Passenger Car Cabin Temperature and Mobile Air-Conditioning Cooling Loads Susana Gil-Sayas , G. Fontaras, G. Di Pierro - JRC ; D. Curro' - Piksel ; A. Broatch, - Universitat Politècnica de Valencia
Lunch @Exhibition Area			

Wednesday - June 12, 2024 (afternoon)

Parallel Sessions

	AUDITORIUM	SALA 150	SALA VETRATA
	Alternative Fuels and E-Fuels – part 1 Chairpersons: B. M. Vaglieco, CNR - STEMS, A. Garcia, Universitat Politecnica de Valencia	Hybridization & Electrification – part2 Chairpersons: V. Ravello, CRF, R. Sok, Waseda University	Aero & Rolling Resistance Reduction and Lightweighting Designs – part 1 Chairpersons: F. Wittmeier, FKFS, G. Mastinu, Politecnico di Milano, F. Leali, Università di Modena e Reggio Emilia
14.00-14.20	Exploring methanol and naphtha as alternative fuels for a hybrid-ICE battery-driven light-duty vehicle E. Iñiguez, J. Marco-Gimeno, J. Monsalve-Serrano, A. Garcia - <i>Universitat Politecnica de Valencia</i> Paper # 2024-37-0021	Optimization of the Power Split Ratio for a Fuel Cells-Battery Hybrid Electric Supercar M. Diana, A. D'Adamo, L. Martocchia - <i>Universita di Modena e Reggio Emilia</i>	The new Porsche Taycan: Advanced Aero Wheel Strategy F. Cogotti,- Porsche AG
14.20-14.40	Environmental Sustainability of low/free - carbon fuels for SI engines: methanol, methane and hydrogen F. Catapano, S. Di Iorio, A. Magno, P. Sementa, B. M. Vaglieco - <i>CNR - STEMS</i>	Definition of a rule-based energy management controller for the simulation of a plug-in hybrid vehicle using power and on-board measured data S. Doulgeris, G. Tsakonas, A. Dimaratos, D. Kontses, Z. Samaras - Aristotle University of Thessaloniki Paper # 2024-37-0016	Towards the Design-driven Carbon Footprint reduction of Composite Aerospace and Automotive components: An overview E. Dalpadulo, M. Russo, F. Gherardini, F. Leali - <i>Universita di Modena e Reggio Emilia</i> Paper # 2024-37-0032
14.40-15.00	Experimental Study of Lignin Fuels for CI Engines M. Terauchi - University of Copenhagen; T. Simonsen, S. Mortensen, J. Schramm, A. Ivarsson - <i>Technical University of Denmark</i> Paper # 2024-37-0022	Development of a Soft-Actor Critic Reinforcement Learning Algorithm for the Energy Management of a Hybrid Electric Vehicle L. Rolando, N. Campanelli, L. Tresca, L. Pulvirenti, F. Millo - <i>Politecnico di Torino</i> Paper # 2024-37-0011	Lightweight construction enabled by measurement of forces and moments at the wheels G. Mastinu, M. Gobbi, F. Ballo - Politecnico di Milano
15.00-15.20	Influence of Intake Charge Temperature and EGR Rate on the Combustion and Emission Characteristics of Ammonia/Diesel Dual-Fuel Engine M. Hoseinpour - <i>Ferdowsi University of Mashhad;</i> R. Karami - <i>Central Queensland University;</i> M. Mahdi Salahi, A. Mahmoudzadeh Andwari - <i>University of Oulu;</i> A. Gharehghani - <i>Iran University of Science & Technology;</i> A. Garcia - <i>Universitat Politecnica de Valencia</i> Paper # 2024-37-0025	Potentials of non linear MPC strategy for the optimal control of a parallel P4 hybrid electric vehicle: towards improved fuel consumption and emissions over different driving missions L. Teodosio, V. De Bellis – Università di Napoli Federico II	Aerodynamics' Influence on Performance in Human-Powered Vehicles for Sustainable Transportation A. Di Gesù, C. Gastaldi, C. Delprete - Politecnico di Torino Paper # 2024-37-0028
15.20-15.40		Decentralized Control for CACC Systems Accounting for Uncertainties A. Seifoddini, A. Azad, A. Musa, D. Misul,- Politecnico di Torino Paper # 2024-37-0010	Improving aerodynamic efficiency of EV trailers using advanced CFD optimization methods P. Geremia - ENGYS

Break @Exhibition Area

Wednesday - June 12, 2024 (afternoon)

Parallel Sessions

	New Powertrain Developments - part 1 Chairperson: M. Sens, IAV	Hybridization & Electrification – part 3 Chairpersons: V. Ravello, CRF, R. Sok, Waseda University	Alternative Fuels and E-Fuels – part 2 Chairperson: A. Garcia, Universitat Politecnica de Valencia
16.10-16.30	The PHOENICE Project: an Innovative Lean-Burn High Efficiency Spark Ignition Engine Concept F. Millo, L. Rolando, G. Castellano , A. Bottega - Politecnico di Torino ; F. Bocchieri, R. Loiodice, V. Di Napoli, G. Cappelli - FEV Italia ; T. Tahtouh - IFPEN Energies Nouvelles	Numerical Assessment of Fuel Consumption and Tailpipe Emissions for Electrified Long Haul Heavy-Duty Commercial Vehicles A. Zanelli , L. Cambriglia, P. Corrado, E. Servetto - GammaTech Engineering S.r.l.	Sustainable Fuels for Long-Haul Truck Engines: a 1D-CFD Analysis A. Volza, A. Pisapia , S. Caprioli, C. Rinaldini, E. Mattarelli - Universita di Modena e Reggio Emilia Paper # 2024-37-0027
16.30-16.50	Lubricating Oil Effects on the Performance of an Automotive Turbocharger Turbine in Pulsating Flow: An Experimental Investigation S. Marelli, V. Usai , C. Cordalunga - Università degli Studi di Genova	Potential of Serial Hybrid Powertrain Concepts towards decarbonizing the Off-Highway Machinery J. Weber , J. Schatorje, Y. Frekers, O. Herrmann, R. Gries - DENSO AUTOMOTIVE Deutschland GmbH Paper # 2024-37-0018	Effects of Renewable Fuels on The Performance and Emissions of a Small Displacement Diesel Engine for Urban Mobility O. Chiavola , F. Palmieri, E. Recco - Universtità di Roma TRE ; J. Matijošius, Vilnius Gediminas Technical University Paper # 2024-37-0019
16.50-17.10	CFD modeling of advanced combustion modes for free-piston linear generators T. Lucchini , N. Morandi - Politecnico di Milano ; C. Beatrice - STEMS - CNR	Fuel Cell Fault Simulation and Detection for On Board Diagnostics using Real-Time Digital Twins. H. Rajendra Pandit, P. Dimitrakopoulos , M. Shenoy, C. Althenhofen - Gamma Technologies LLC Paper # 2024-37-0014	Evaluation of an optimal engine configuration for a SI Engine Fueled with Ethanol for Stationary Applications D. Perrone , L. Falbo, B. Falbo, T. Castiglione - Università della Calabria Paper # 2024-37-0024
Plenary Keynote @Auditorium Chairperson: Zissis Samaras, Aristotle University of Thessaloniki			
17.15-17.45	<ul style="list-style-type: none"> Stellantis Dare Forward Plan, Daniele Chiari - Stellantis 		
17.45	Final Remarks		

Social Program
h 20.00 - Congress networking Cocktail & Guided Tour of the Heritage Hub, via Plava 80 - Torino

(transfer included - meeting point at 19.30 at Museo Nazionale dell'Automobile)

Thursday - June 13, 2024 (morning)

08.00	Registration
Plenary Keynote @Auditorium Chairpersons: Marc Sens - IAV, André Kulzer - IFS University of Stuttgart	
08.35-09.00	• Life Cycle Analysis: A Level Playing Field for Road Transport Environmental Regulations, Zisis Samaras - Aristotle University of Thessaloniki
09.00-09.25	• Resources Challenges to Green Mobility and Related R&I, Christof Schernus - FEV Europe GmbH
09.25-9.50	• Future Powertrain Solutions, Maurizia Bagnato - Robert Bosch GmbH Branch Italy
9.50-10.00	• Q&A Session

Break @Exhibition Area

Parallel Sessions

	AUDITORIUM	SALA 150	SALA VETRATA
	Alternative Fuels and E-Fuels – part 3 Chairperson: A. Garcia, Universitat Politècnica de Valencia	New Powertrain Developments – part 2 Chairperson: A. Onorati, Politecnico di Milano	Hydrogen for Sustainable Mobility: H2ICE&H2FC – part 2 Chairperson: A. Vassallo, Dumarey Automotive Italia
10.30-10.50	Development of a Hybrid-Electric Medium-HD Demonstrator Vehicle with a Pent-Roof SI Natural Gas Engine J. Wallace , R. Mitchell, S. Rao, K. Jones, D. Kramer, Y. Wang, P. Chambon, S. Sjøvall, D. Ryan Williams - Southwest Research Institute Paper # 2024-37-0026	The Key Factors of Innovative Diesel Combustion Systems for Achieving Future Emissions and High Efficiency G. Belgiojorno, V. Ottria , F. Pesce, A. Vassallo - Dumarey Automotive Italia ; G. Di Blasio, R. Ianniello, M. Pipicelli, C. Beatrice - STEMS - CNR	ANN-Based Modelling of Hydrogen Internal Combustion Engine for Model-in-the-Loop Applications and Development of a Dedicated Torque-Based Control Strategy P. P. Brancalonei , E. Corti, D. Moro, V. Ravaglioli - Università di Bologna
10.50-11.10	NG Engines Technologies to Enable Road Transport Decarbonization S. Golini , S. Giordana - FTP Industrial , X. Gautrot - IFP Energies Nouvelles	Numerical assessment of a hydrogen HPDI combustion system G. Quattrone , A. Piano, F. Millo - Politecnico di Torino	1D Modeling of a High-Performance Engine Fueled with H2 And Equipped with A Low NOx Aftertreatment Device G. Montenegro, A. Marinoni , A. Della Torre, G. D'Errico, A. Onorati - Politecnico di Milano ; T. Cerri - Sursum-Mi Paper # 2024-37-0009
11.10-11.30	Effects of chemical and physical properties of drop-in fuels on combustion and emissions of heavy duty diesel engines Y. Hatano, Hsiang-An Cheng , R. Sok, J. Kusaka - Waseda University	Experimental Assessment of Additive-Manufactured Ducted Fuel Injection Combustion System for Medium-Duty Diesel Engine Achieving Ultra-Low Emissions G. Belgiojorno , V. Ottria, M. Alletto, F. Pesce, L. Buzzi, A. Vassallo - Dumarey Automotive Italia	Exhaust After-Treatment Modeling Challenges for H2 Combustion Engines M. Zafeiridis , P. Alexiadou, V. Martyuk - Gamma Technologies LLC ; G. Koltsakis - Aristotle University of Thessaloniki
11.30-11.50	Potentials to Reduce Emissions in Heavy-duty Diesel Engines by Using Alternative Fuels and Advanced Combustion Modes K. Cung , G. Buffaloe, Y. Auzzi, D. Christopher Bitsis, I. Khalek - Southwest Research Institute	Towards carbon-free ICEs: premixed ammonia ignited with an active pre-chamber and the recuperated split-cycle concept L. Sforza , G. Gianetti, T. Lucchini, G. D'Errico - Politecnico di Milano	Model-Based Algorithm for Water Management Diagnosis and Control for PEMFC Systems for Motive Applications M. Sicilia , D. Cervone, P. Polverino, C. Pianese - Università degli Studi di Salerno Paper # 2024-37-0004
11.50-12.10	Experimental Assessment of Drop-In Hydrotreated Vegetable Oil (HVO) in a Medium-Duty B7 diesel Engine for Low-Emissions Marine Applications C. Cosseddu , T. Spedicato, D. Pennazio, A. Vassallo - Dumarey Automotive Italia ; C. Fittavolini - Eni Paper # 2024-37-0023	Numerical investigation of the combustion process on prechamber systems for high-speed large bore gas engines M. Zanatta , A. Piano, A. Scalambro, F. Millo - Politecnico di Torino ; F. Accurso, F. Pesce, M. Luci - Dumarey Automotive Italia	Fuel Cell Hybrid Electric Vehicles: the role of detailed modeling in optimal design during prototype development L. Bartolucci, E. Cennamo , S. Cordiner, V. Mulone - Università degli Studi di Roma Tor Vergata

Plenary Keynote @Auditorium

Chairperson: Antonio Garcia, Universitat Politècnica de Valencia

12.15-12.45	Could Ducted Fuel Injection with Low-Lifecycle-CO2 Fuels Be An Easier Path to Sustainability? Charles Mueller, Sandia National Laboratories
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Lunch @Exhibition Area

Thursday - June 13, 2024 (afternoon)

Parallel Sessions

	AUDITORIUM	SALA 150	SALA VETRATA
	Hydrogen for Sustainable Mobility: H2ICE&H2FC – part 3 Chairperson: J. Kusaka, Waseda University	Aero & Thermal Management – part 2 Chairpersons: M. Biglia, DENSO, M. Casella, CRF	From Well to Wheels to Life Cycle Assessment – part 1 Chairpersons: M. Lattore, Stellantis, M. Pierini, Università di Firenze
14.00-14.20	Assessing Heavy Duty Vehicle CO2 Emissions for Qualification as a Zero Emissions Vehicle D. K. Mumford , G. Williams, N. Leclercq - <i>Westport Fuel Systems</i> Paper # 2024-37-0007	PFAS-free Thermal Management System with R290 C. Massano - DENSO Thermal Systems	A Methodological Approach to Circular Design Strategies Based on Life Cycle Assessment for a Velomobile Production E. Brusa, A. Di Gesù , C. Delprete, C. Gastaldi - Politecnico di Torino ; C. A. Dattilo, M. Delogu - <i>Università degli Studi di Firenze</i>
14.20-14.40	Development of a multi-zone 1D-CFD predictive combustion model for a diesel-H2 dual-fuel medium-speed engine G. Stanzione, A. Piano, F. Millo, Politecnico di Torino ; G. Vichi, N. Fiorini - Yanmar R&D Europe ; Na. Fogla, K. Roggendorf - <i>Gamma Technologies LLC</i>	R290 HP-Module for Electric Vehicles A. Pogorelov , T. Reimers - <i>Rheinmetall - Division Power Systems</i> Paper # 2024-37-0031	Life cycle assessment of different powertrain alternatives for a clean urban bus in adverse weather conditions B. Peiretti Paradisi , F. Millo, L. Rolando, A. Piano, L. Pulvirenti, A. Vinogradov - <i>Politecnico di Torino</i>
14.40-15.00	Advanced pressure management platform for hydrogen propulsion systems for next generation transportation D. Micelli - Landi Renzo	Comparison of Performance and Efficiency of different Refrigerants at high load Conditions and their Impact on CO2eq Emissions C. Macri , Á. De León, F. Flohr - <i>Daikin Chemical Europe GmbH</i> Paper # 2024-37-0029	Life cycle greenhouse gas emissions of a novel Hydrogen-powered Engine A. Accardo, E. Spessa, T. Costantino - <i>Politecnico di Torino</i> ; M. Pensato, G. Malagrìno - Dumarey Automotive Italia
15.00-15.20	A New Generation of Hydrogen-Fueled Hybrid Propulsion Systems for The Decarbonization of Urban Public Transport F. Millo , B. Peiretti Paradisi - <i>Politecnico di Torino</i> , R. Cipollone - <i>Università degli Studi dell'Aquila</i> ; E. Corti - <i>University of Bologna</i> ; M. Battistoni - <i>Università degli Studi di Perugia</i> ; I. Arsie - <i>Università di Napoli "Parthenope"</i>	Numerical Assessment of the Potential of CO2 as a Refrigerant for Electrified Powertrain Thermal Management System F. Millo, L. Rolando, A. Jaisawal - Politecnico di Torino ; M. Rostagno, M. Casella - <i>Centro Ricerche Fiat</i>	Rotation for a better tomorrow - SKF's journey towards decarbonization L. Sguotti , A. Leprotti, A. Ferrero, M. D'Aleo, M. Berglund - <i>SKF Industrie</i> Paper # 2024-37-0033

Break @Exhibition Area

Thursday - June 13, 2024 (afternoon)

Parallel Sessions

	AUDITORIUM	SALA 150	SALA VETRATA
	Legislation Framework, Future Scenarios, and Infrastructure Development for Transport Decarbonization – part 1 Chairpersons: C. Schernus, FEV, B. Dalla Chiara, Politecnico di Torino	Hydrogen for Sustainable Mobility: H2ICE&H2FC – part 4 Chairperson: G. Ferrara, Università di Firenze	Aftertreatment Systems – part 1 Chairperson: Z. Samaras, Aristotle University of Thessaloniki
15.50-16.10	The evolution of conventional vehicles' efficiency for meeting carbon neutrality ambition D. Komnos , J. Nur, A. Tansini - <i>European Commission Joint Research</i> ; M. Alexandros Ktistakis - <i>Aristotle University of Thessaloniki</i> ; J-Suarez, J. Krause, G. Fontaras - <i>European Commission Joint Research</i> Paper # 2024-37-0034	Spectroscopy of Flame Kernel Inception During Ultra-Lean Operation of An Optically Accessible Spark Ignition Engine Fueled with Hydrogen S. S. Merola , A. Irimescu, B. M. Vaglieco - <i>CNR - STEMS</i>	Development of Innovative Burners for Advanced Management of Engine Aftertreatment Systems A. Bianco , <i>GammaTech Engineering</i> ; S. Pizza, M. Brignone, F. Napoli, G. Galati, <i>Marelli Green Technology Systems</i>
16.10-16.30	The role of Renewable and Alternative fuels in decarbonization of transport to 2030-2050 D. Chiamonti - <i>Politecnico di Torino</i>	Analysis and Visualization of Hydrogen Combustion in a Spark Ignition Optical Access Engine M. Avana , F. Ricci, J. Zembli, C. N. Grimaldi, M. Battistoni - <i>Università degli Studi di Perugia</i> ; S. Papi - <i>FEDERAL-MOGUL ITALY</i>	Effect of Dithering on post-catalyst exhaust gas composition and on short time regeneration of deactivated PdO/Al ₂ O ₃ catalysts under real engine conditions S. Tomin , U. Wagner, T. Koch - <i>KIT Karlsruhe Institute Of Technology</i> Paper # 2024-37-0002
16.30-16.50	Modelling charging infrastructure in V2G scenario E. Innocenti , L. Berzi, A. Kociu, M. Delogu, <i>Università degli Studi di Firenze</i>	Guided Port Injection of Hydrogen as An Approach for Reducing Cylinder-To-Cylinder Deviations in Spark-Ignited H ₂ Engines – A Numerical Investigation P. E. Jung , M. Guenther, N. Walter - <i>RPTU University of Kaiserslautern-Landau</i> Paper # 2024-37-0008	Acceleration of Fast-SCR Reactions by Eliminating “The Ammonia Blocking Effect D. Morita, Y. Kotani, Q. Zu, F. Yoshida , R. Sok, J. Kusaka - <i>Waseda University</i> Paper # 2024-37-0001
16.50-17.10		Experimental and Numerical Investigation of Abnormal Combustion Phenomena in a High-Performance Hydrogen Fueled DISI Engine operated in stoichiometric Conditions L. Rolando, S. Roggio , A. Piano, F. Millo - <i>Politecnico di Torino</i> ; F. Gullino, F. Mortellaro, R. Tonelli, M. Medda - <i>Ferrari</i>	Experimental and Simulation Study of Zero Flow Impact on Hybrid Vehicle Emissions V. Emmanouil , C. Kotoulas - <i>Gamma Technologies LLC</i> ; G. Koltsakis - <i>Aristotle University Thessaloniki</i> Paper # 2024-37-0036
Plenary Keynote @Auditorium Chairpersons: Carloandrea Malvicino - Stellantis, Federico Millo - Politecnico di Torino			
17.10-17.30	<ul style="list-style-type: none"> EU decarbonisation and industrial policy agenda and challenges ahead, Maria Linkova-Nijs - <i>ACEA</i> 		
17.30-18.00	<ul style="list-style-type: none"> What now? Kelly Senecal - <i>Convergent Science</i> 		
18.00	Closing Remarks @Auditorium		

Friday, June 14 - Morning

Technical visits

Dana Graziano (transfer included – meeting point at Politecnico di Torino)

Denso Thermal Systems (transfer included - meeting point at Politecnico di Torino)

Dumarey & Politecnico Labs (meeting point at Politecnico di Torino)