



27th ETH Nanoparticles Conference

10.-14. June 2024, ETH Zürich, Switzerland



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27th ETH Nanoparticles Conference

The Nanoparticle Conference in 2024 (NPC-24) is organized as an on-site conference at the ETH Zürich. It serves as an interdisciplinary platform for expert discussions on all aspects of nanoparticles, freshly emitted from various sources, transformed in ambient air, distributed on local and global scale, on technical mitigation aspects, particle legislation, and impact of particles on health, environment, and climate. The conference brings together representatives from research, industry, and government.

Aerosols-24: Joint Conference on Nanoparticles and on Workplace and Indoor Aerosols

The COVID pandemic and the measures implemented to abate the release and transport of virus-containing aerosols have proven the importance of indoor exposure. We can announce that the NPC-24 will be organized together with the Workplace and Indoor Aerosols Conference (Aerosols-24). Accordingly, a focus of the joined conference will be on indoor particles and aerosols at workplaces. This part is co-organized together with the Aerosols Conference team and time is reserved on June 13 and 14, 2024.

NPC-24 Health Session

The session will provide new experimental and epidemiological results about health consequences of combustion emissions and nanoparticle exposure.

Program Overview

All indicated times are in CEST (GMT +2). *Convert CEST into any time zone.*

CEST	Mon, June 10, 2024	Tue, June 11, 2024	Wed, June 12, 2024	Thu, June 13, 2024	Fri, June 14, 2024	CEST
09.00h		Opening Ceremony Keynote lecture Session 1: Aircraft, marine and other non-road sources 1	Session 5: Biomass-, biofuel- and synfuel combustion	Session 9: Instrumentation (Nanoparticle metrology and chemical characterization)	Session 13: Workplace und Indoor Aerosols	09.00h
10.30h		Coffee break	Coffee break	Coffee break	Coffee break	10.30h
11.00h		Session 2: Aircraft, marine and other non-road sources 2	Session 6: Toxicology	Session 10: Ambient air & soot particles, secondary pollutants	Session 14: Nanoparticle formation and transformation Trojan Horse Award and Poster Award Ceremony	11.00h
12.30h		Lunch break	Lunch break	Lunch break	Lunch break	12.30h
13.30h		Session 3: Emission Control 1	Session 7 Poster Session 1	Session 11 Poster Session 2	Session 15: Occupational Exposure and prevention	13.30h
15.00h		Coffee break	Coffee break	Coffee break	Coffee break	15.00h
15.30h		Session 4: Emission Control 2 and periodical technical inspection	Session 8: Brake and tyre wear, non-combustion emissions	Session 12: Health Effects	Session 16: Chemical composition, transport, and exposure	15.30h
17.00h		Apéro			Closing remarks End of the conference	17.00h
18.00h						18.00h
19.00h	Welcome Party ETH Dozentenfoyer		Conference Dinner ETH Restaurant			19.00h

<https://npc24.scg.ch>

Program Tue, June 11, 2024

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- 09.00 Welcome, Introduction and Conference Opening
Norbert Heeb, Empa and Chair of NPC 2024
Jan-Helge Zimmermann, ETH Zürich, Industry Relations
Dr. Jeannine Pilloud, ETH Zurich
«Partnerships for Innovation»
- 09.10 Keynote Lecture
Dr. Martin Gysel-Beer, Paul Scherrer Institut, PSI
«Anthropogenic aerosol emissions at the nexus between air quality, climate and geoengineering»
- 09.40 **Session 1: Aircraft, marine and other non-road sources Part A**
Chair: Norbert Heeb, Empa
Theo Rindlisbacher, Swiss Civil Aviation Authority, FOCA
«Aircraft particle emissions in cruise»
Benjamin Brem, Paul Scherrer Institute, PSI
«The ubiquitous nature of lubrication oil in aero gas turbine exhausts»
- 10.30 Coffee Break
- 11.00 **Session 2: Aircraft, marine and other non-road sources Part B**
Chair: Theo Rindlisbacher, Swiss Civil Aviation Authority, FOCA
Michal Vojtíšek, Technical University of Liberec
«Mobile test rig for field measurement of small jet engine particle emissions»
Marius Rohkamp, University of the Bundeswehr Munich
«Gaseous and Non-Volatile Particulate Matter Turboshaft-Engine Emissions using 30%, 50% and 100% HEFA Sustainable Aviation Fuel»
Fergus Lidstone-Lane, University of Manchester
«Experimental Investigation of Charge on Aircraft Gas Turbine Combustion Engine nvPM»
Anni Hartikainen, University of Eastern Finland
«Effects of photochemical aging on the chemical and optical properties of exhaust emissions from a small-scale jet engine burner»
Thorsten Streibel, University of Rostock
«Influence of photochemical aging on physical-chemical properties of ultrafine particulate matter from the exhaust emissions of a ship diesel engine»
- 12.30 Lunch Break
- 13.30 **Session 3: Emission Control Part A**
Chair: Danilo Engelmann, BFH, Biel
David Kittelson, University of Minnesota
«Changes in particle emissions and measurement during the past 30 years»
Barbara Apicella, STEMS-CNR
«Physical and chemical characterization of the particles emitted by a DI SI engine with low- and zero-carbon fuels»
Nic Surawski, University of Technology Sydney
«Real driving solid particle number emissions from a hydraulic hybrid heavy commercial vehicle and diesel sports utilities vehicles in Australia»
Ioannis Raptis, AUTH
«Evaluation of a miniaturized exhaust emission measuring system for L category Vehicles measurements in real world driving conditions»
Sebastian Schurl, Technische Universität Graz
«Assessment of pollutant emissions including ultrafine particles down to 10nm of high-performance motorcycles – lab and real-world evaluation using advanced PEMS technology»
- 15.00 Coffee Break
- 15.30 **Session 4: Emission Control Part B and periodical technical inspection (PTI)**
Chair: Jan Czerwinski, BFH, Biel
Chiara Guido, CNR-STEMS
«Strategies for particle emission control from gas fuelled heavy-duty engines: potentiality of filter technology»
Danilo Engelmann, BFH Biel
«Innovative Gasoline Particulate Filters: A Comprehensive Analysis of Intrinsic High Filtration Rates and Operational Performance»
Jacek Pielecha, Poznan University of Technology
«Particle number emissions from a hydrogen-fueled Turbulent Jet Ignition engine with a passive prechamber»
Lauretta Rubino, VERT Association
«The Dirty Tail of Vehicle Fleets and how to Detect and Clean the High Emitters - the Fastest Route to Clean Urban Air at Low Cost»
Erkka Saukko, Pegasor
«Integrated PN measurement system performance and VPR requirements»
- 17.00 Aperitif sponsored by exhibitors and End of Day 1

Program Wed, June 12, 2024

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- 09.00 **Session 5: Biomass-, biofuel- and synfuel combustion**
Chair: Heinz Burtscher, FHNW/ISE
Alexandre Albinet, INERIS
«Primary and secondary emissions of pellets, logwood, and oil residential heating appliances: emissions factors, secondary particle formation and particle effective density»
Axel Friedrich, Consultant
«UFP and Black Carbon emissions from Real World Wood Stoves without and with Electrostatic Precipitators»
Gunter Hagen, University of Bayreuth - Zentrum für Energietechnik (ZET)
«On the emissions of wood-log fueled fireplaces: correlation of continuous gas sensor data with particle spectra analysis»
Anssi Järvinen, VTT
«Emissions of an agricultural tractor with experimental e-diesel and commercial diesels»
Stijn van Rijn, University of Groningen
«The effect of hydrogen addition on the aerosol properties of combustion generated nanoparticles from premixed ethylene flames»
- 10.30 Coffee Break
- 11.00 **Session 6: Toxicology**
Chair: Barbara Rothen-Rutishauser, University of Fribourg
Johan Øvrevik, Norwegian Institute of Public Health
«Revisiting the Trojan Horse Effect – On the role of lipophilic chemicals in the toxicity of fine and ultrafine combustion particles and implications for regulatory needs»
Johannes Becker, Comprehensive Molecular Analytics, HelmholtzMunich
«Traffic-related non-exhaust emission UFPs toxicological potentials»
Bozhena Tsyupa, Brembo SpA
«On-site ALI versus Submerged Culture: Toxicological and Chemical Characterization of Brake Wear Nanoparticles»
Tana Zavadna, Institute of Experimental Medicine of the Czech Academy of Sciences
«Genotoxicity of Organic Extracts of Particulate Emissions from Conventional Gasoline and Alternative Fuels»
Lidia Morawska, Queensland University of Technology
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- 12.30 Lunch Break
- 13.30 **Poster Session 1**
- 15.00 Coffee Break
- 15.30 **Session 8: Brake and tyre wear, non-combustion emissions**
Chair: Lauretta Rubino, VERT Association
Stefan Hausberger, TU Graz
«Trends in exhaust and non-exhaust particle emissions in road transport»
Agnese Magno, STEMS-CNR
«Comprehensive investigation on the effect of different brake profiles and temperature on the brake wear particle emissions»
Hiroyuki Hagino, JARI
«Implications of Nanoparticle Emissions from Passenger Car Brakes based on the WLTP Brake Cycle»
Antonino La Rocca, University of Nottingham
«Morphology, elemental composition, and nanostructure of brake particle emissions»
Carsten Neukirchen, University of the Bundeswehr Munich
«Physical and chemical characterization of emissions from a EURO 7 brake dyno»
- 19.00 Conference Dinner, Polyterasse

Program Thu, June 13, 2024

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- 09.00 **Session 9: Instrumentation (Nanoparticle metrology and chemical characterization)**
Chair: Konstantina Vasilatou, METAS
Alejandro Keller, FHNW
«Enhancing total carbon quantification using fast-thermograms»
Martin Tanner, TOFWERK
«Quantitative Measurement of Dynamic Changes of Trace Element Content in Ambient Aerosol by MICAP-TOFMS»
Patrick Weber, Forschungszentrum Jülich
«A new kind of substance for the rapid activation and heterogenous growth of nanoparticles in particle counters»
QiZhi Xu, PSI
«Accurate retrieval of pure black carbon aerosol properties including light absorption from polarization-resolved in situ measurements of light scattering»
Dimitrios Zarvalis, CERTH
«Assessing particulate matter emissions from conventional cigarettes and heated tobacco products»
- 10.30 Coffee Break
- 11.00 **Session 10: Ambient air & soot particles, secondary pollutants**
Chair: Claudia Mohr, PSI / ETH Zurich
Fangqun Yu, State University of New York at Albany
«Nanoparticle and contrail ice formation in next generation aviation fuels and engines»
Yvette Gramlich, LAC, Paul Scherrer Institute, Switzerland
«Impact of biomass burning on Arctic aerosol composition»
Joel Corbin, National Research Council Canada
«Measurement and impacts of the mass fraction of volatile coatings on soot»
Jean-Jacques Sauvain, Unisanté, DSTE
«Towards continuous measurement of the oxidative potential of the air»
- 12.30 Lunch Break
- 13.30 **Poster Session 2**
- 15.00 Coffee Break
- 15.30 **Session 12: Health Effects**
Chair: Loretta Müller, Inselspital Bern
Pascale Haddad Thielke, Heinrich-Heine-University Düsseldorf
«Systematic review on health effects of long-term exposure to UFP»
Katherine Ogurtsova, HHU
«Association of ultrafine particle exposure with lung and neuro-cognitive functions in elementary school children in the Berlin-Brandenburg Air Study (BEAR)»
Marshall Lloyd, McGill University
«Airborne Nanoparticle Concentrations are Associated with Brain Cancer Incidence in Canada's Two Largest Cities»
Georgios Tsakonas, LAT, Aristotle University of Thessaloniki
«Physical and cell toxicity properties of Euro 6d diesel vehicle particle emissions with and without DPF regeneration»
- 17.00 End of Day 3

Program Fri, June 14, 2024

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- 09.00 **Session 13: Workplace and Indoor Aerosols**
Chair: Imad El-Haddad, PSI
Ludmila Maskova, Institute of Chemical Process Fundamentals of the CAS
«Personal exposure to particulate matter during grinding of dental nanocomposite»
Freja Rydahl Rasmussen, Danish Technological Institute
«Enhancing Air Quality: Investigating Filter Lifespan and Byproducts in Air Purification Solutions»
Dae Hoon Park, Korea Institute of Machinery & Materials
«Development of an Antiviral Electrostatic Precipitator to Prevent Airborne Transmission within Indoor Air Environments by Dry-aerosol Antiviral Coating Method»
Alfred Lawrence, Isabella Thoburn College
«Critical Assessment and Source apportionment of Particulate bound-PAHs in Indoor Air of South Asian precinct »
Judita Švaikauskaitė, Kaunas University of Technology
«Impact of Energy Retrofitting on Indoor Particulate Matter Levels in Finnish and Lithuanian Multifamily Dwellings»
- 10.30 Coffee Break
- 11.00 **Session 14: Nanoparticle formation and transformation**
Chair: Oliver Bischof, TSI
Lubna Dada, Paul Scherrer Institute
«Sources of ultrafine particles at a typical rural site in Switzerland»
Matti Rissanen, Tampere University & University of Helsinki
«Rapid formation of aerosol precursors from o/m/p-Xylene and their contribution to secondary organic aerosol formation»
Vinicius Berger, Catalytic Instruments
«Evaluation of Monodisperse Silver Particle Sintering Using a Tandem DMA Setup»
- 12.00 **Poster Award Ceremony**
Trojan Horse Award Ceremony
Chair: Oliver Bischof
- 12.30 Lunch Break
- 13.30 **Session 15: Occupational exposure and prevention**
Chair: Claudia Mohr, PSI / ETH Zurich
Dusan Licina, EPFL
«Influence of ventilation and room air movement on formation and growth of 1-20 nm particles via ozone-human chemistry»
Anssi Arffman, Dekati Ltd.
«Real-time measurement of total and solid particle fraction in underground mining environment with DC based sensors (MPEC+)»
Christina Isaxon, Lund University
«Airborne PM generated from handling of crushed carbon nanotube-enhanced concrete»
Keld Alstrup Jensen, NRCWE
«Workplace exposure to airborne particles in the plastics recycling and manufacturing industry»
Suranie Horn, North-West University, South Africa
«Occupational exposure risks of hazardous biological agents in an animal testing facility»
- 15.00 Coffee Break
- 15.30 **Session 16: Chemical composition, transport, and exposure**
Chair: Loretta Müller, Inselspital Bern
Award Ceremony Talks
Imad El-Haddad, PSI
«Towards implementing particle chemical composition in health impact assessments»
Michael Riediker, SCOEH: Swiss Centre for Occupational and Environmental Health
«Aerosols, a tool for assessing airborne transmissions of hazardous substances and agents»
- 17.00 Closing remarks by Loretta Müller, Inselspital Bern and end of conference

Poster Session 1, Wed, June 12, 2024

Session 1: Aircraft, marine and other non-road sources

- 1A **Seokho Moon**, Konkuk University
«Study on Virtual PM Sensor of Construction Machinery by utilizing Machine-Learning Algorithm»
- 1B **Alexander Rabl**, TU Munich - LTF
«Particulate emissions of a turboshaft engine running on HEFA-SPK and its Jet A-1 blends»
- 1C **Dalho Shin**, Konkuk University
«Real-world PM Emission Patterns according to Load Factor of off-road Construction Machinery»

Session 3: Emission control

- 3A **Christian Ferrarese**, European Commission JRC
«Raman Spectroscopy and Principal Component Analysis on fine and ultrafine particles emitted from modern vehicles.»
- 3B **Katariina Kylämäki**, Tampere University
«Secondary Aerosol Emissions from Diesel and Natural Gas Vehicles»
- 3C **Ireneusz Pielecha**, Poznan University of Technology
«Particulate number emissions during dynamic operating states of a hydrogen-fueled Turbulent Jet Ignition engine»
- 3D **Lauretta Rubino**, VERT Association
«VERT GPF-Retrofit Program for Cleaner Urban Mobility within the HORIZON Europe AeroSofld project»
- 3E **Mojtaba Bezaatpour**, Tampere University
«In search of an optimal combustion strategy for mitigating secondary organic aerosol in combustion engines»
- 3F **Wojciech Honkisz**, BOSMAL
«Road to Lab Light-Duty vehicle campaign in terms of Particle Number emission over custom RDE test cycle»
- 3G **Samuel Ugglas**, Scania & Department of Chemical Engineering, KTH Royal Institute of Technology, Stockholm, Sweden
«Distribution of particulate matter to extend heavy-duty diesel particulate filter service life»
- 3H **Eric Thébault**, MANN+HUMMEL
«Integrating a particulate filter system in the frontend: A step towards achieving emission-neutral vehicles»
- 3I **Anssi Järvinen**, VTT
«Emissions of passenger cars with different engine and aftertreatment technologies»

Session 4: Emission control and periodical technical inspection (PTI)

- 4A **Yamada Hiroyuki**, Tokyo Denki University
«PN measurement at PTI in Japan»
- 4B **Lars Hillemann**, Topas GmbH
«Reference aerosols for PTI-PN counters»

Session 5: Biomass-, biofuel- and synfuel combustion

- 5A **Freja Rydahl Rasmussen**, Danish Technological Institute
«Cost-efficient sensor solution for reducing emissions from woodstoves through user guidance»
- 5B **Jiun-Horng Tsai**, Department of Environmental Engineering, National Cheng Kung University, Taiwan, ROC
«Air Toxics Emissions from Cogeneration Boilers by Applying Multiple Fuels in Taiwan»

Session 8: Brake and tyre wear, non-combustion emissions

- 8A **Martin Lehmann**, MANN+HUMMEL
«Reducing Brake Dust Particle Emissions »
- 8B **Katie Kedwell**, MANN + HUMMEL
«Particle characterization for the development of a brake wear particle collection system»
- 8C **Gunhee Lee**, Korea Institute of Machinery and Materials
«Particle characterization for the development of a brake wear particle collection system»
- 8D **SangHee Woo**, Korea Institute of Machinery and Materials
«Development of Dust Collector to Mitigate the BWPs (Brake Wear Particles) Using the Dispersion Characteristics of Particles»

Session 10: Ambient air & soot particles, secondary pollutants

- 10A **Anssi Arffman**, Dekati Ltd.
«Characterization and application of a new oxidation flow reactor (DOFR) to study passenger car emissions»
- 10B **Cyprien Jourdain**, University of Cambridge, Department of Engineering
«Atmospheric black carbon radiative forcing driven by coating morphology»
- 10C **Ulku Alver Sahin**, Istanbul University-Cerrahpaşa
«Particle Numbers at the traffic site in Istanbul in the autumn»

Poster Session 2, Thu, June 13, 2024

Session 6: Toxicology

- 6A **Barbara Apicella**, STEMS-CNR
«Effect of UFP produced by anthropogenic combustion on human lung macrophages and motor neurons: role in pulmonary inflammation and neurodegeneration»
- 6B **Kevin Kilchhofer**, PSI
«Reactive Oxygen Species Build-up in Photochemically Aged Iron- and Copper-doped Secondary Organic Aerosol Proxy»
- 6C **Li-Hao Young**, China Medical University, Taiwan
«Direct observation of the internal and external morphology of size-segregated single particles and their interactions with alveolar epithelial cells»
- 6D **Alexandre Albinet**, INERIS
«Unveiling potent toxic chemicals associated to primary or aged (secondary) wood combustion particles: a bio-analytical approach»
- 6E **Gowsinth Gunasingam**, Adolphe Merkle Institute
«Assessing the direct and indirect effects of diesel exhaust particles on human intestine tissue»
- 6F **Georgios Tsakonas**, LAT, Aristotle University of Thessaloniki
«Nanoparticle profiling: a comprehensive assessment of physical, chemical, and toxicological characteristics at Thessaloniki airport»

Session 9: Instrumentation (Nanoparticle metrology and chemical characterization)

- 9A **Anna Ciajolo**, Consiglio Nazionale delle Ricerche
«Soot Nanostructure Investigation»
- 9B **Joel Corbin**, National Research Council Canada
«Modelling laser-induced incandescence of soot and tarballs in the SP2»
- 9C **Salvatore Laganá**, The University of Nottingham
«Assessing the benefits of novel nanoporous silicon nitride membranes to capture and analyse particulate emitted from spark ignited hydrogen internal combustion engine.»
- 9D **Andreas Nowak**, PTB-Braunschweig
«Development of a primary standard for particle number concentration»
- 9E **Andrea Pacino**, University of Nottingham
«Exploring the morphological and structural attributes of carbon nanoparticles used as soot replica in combustion studies: A comprehensive 2D/3D analysis»
- 9F **Ioannis Raptis**, AUTH
«portable optoacoustic Black Carbon Sensor for Exhaust Emissions Measurement»
- 9G **Cyprien Jourdain**, University of Cambridge, Department of Engineering
«Measurement of nanoparticles true volume and density in the aerosol phase»

Session 12: Health effects

- 12A **Penelope Baltzopoulou**, CERTH
«Health effect assessment of hybrid gasoline vehicle emissions by in-vitro cell exposure experiments in air-liquid interface»
- 12B **Antoaneta Patru**, National Technical University for Science and Technology
«On the effects of combustion generated nanoparticles on human health: Overview of the current body of understanding»
- 12C **Ruiwen He**, University of Fribourg
«An online measurement approach to monitor diesel exhaust particles in lung cells during exposure»
- 12D **Michal Vojtíšek**, Czech Technical University in Prague
«Portable air-liquid interface exposure chamber for field emissions toxicity assays»

Session 13: Indoor particles

- 13A **Jeong Hoon Byeon**, Yeungnam University
«Size-Classified Bioaerosol Detection from Recombination of Technically Proven Components»
- 13B **Kaare Press-Kristensen**, Healthy Indoor Environment
«Indoor particle pollution from cooking in Denmark»
- 13C **Saptarshi Ghosh**, Indian Institute of Technology Bombay
«Fabrication of O₂-TiO₂/CuO heterojunction photocatalyst as a nanocorals for the photocatalytic inactivation of bioaerosols»
- 13D **Luca Stabile**, Università degli studi di Cassino e del Lazio Meridionale
«Design of an innovative personal air cleaner to prevent airborne disease transmission in transport microenvironments»
- 13E **Farheen Zehra**, Isabella Thoburn College, Lucknow India (presented by Alfred Lawrence)
«Indoor TVOCs, RSPM and Fine Particulate matter: Health impact on young women of a rapidly growing urban city of Northern India»
- 13F **Shen Yang**, EPFL
«Nanocluster aerosol generation from squalene-ozone reaction»

Session 14: Nanoparticle formation and transformation

14A **Alireza Charmforoushan**, Tampere University

«Eco-friendly synthesis of Hydroxyapatite nanoparticles by Liquid Flame Spray»

Session 15: Occupational Exposure and prevention

15A **Keld Alstrup Jensen**, NRCWE

«Airborne particulate matter and diesel engine exhaust on infrastructure construction sites in the Copenhagen metropolitan area»

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