

Program Schedule

Day 1

08:15 - 09:00 Hrs: Registration
09:00 - 10:30 Hrs: Opening of the School, Introduction
Atmospheric Aerosol
10:30 - 11:00 Hrs: Tea break
11:00 - 12:30 Hrs: Definitions, Mechanical Properties
12:30 - 13:30 Hrs: Lunch
13:30 - 15:00 Hrs: Diameter Definitions, Size
Distributions, Particle Charging
15:00 - 15:30 Hrs: Tea break
15:30 - 17:00 Hrs: Questions & Discussion

Day 2

09:00 - 10:30 Hrs: Condensation Particle Counter,
Impactor
10:30 - 11:00 Hrs: Tea break
11:00 - 12:30 Hrs: Electrical Mobility, Differential Mobility
Analyzer
12:30 - 13:30 Hrs: Lunch
13:30 - 15:00 Hrs: Mobility Particle Size Spectrometer,
Aerodynamic Particle Size Spectrometer
15:00 - 15:30 Hrs: Tea break
15:30 - 17:00 Hrs: Questions & Discussion

Day 3

09:00 - 10:30 Hrs: Filter, Sampling & Conditioning
10:30 - 11:00 Hrs: Tea break
11:00 - 12:30 Hrs: Integrating Nephelometer, Absorption
Photometer
12:30 - 13:30 Hrs: Lunch
13:30 - 15:00 Hrs: Preparation for the Examination
15:00 - 15:30 Hrs: Tea break

Day 4

09:00 - 10:30 Hrs: Examination
10:30 - 11:00 Hrs: Tea break
11:00 - 12:30 Hrs: Teacher: Correction
12:30 - 13:30 Hrs: Lunch
13:30 - 15:00 Hrs: Teacher: Correction, Handout
Certificates & Closing of the School
15:00 - 15:30 Hrs: Tea break

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ACTRIS



CACS



Winter School 2025 on Atmospheric Aerosol Physics, Measurements and Sampling Techniques

6th - 9th January

ICSR Building, IIT Madras, Chennai 600 036, India

Introduction

Accurate aerosol measurements are crucial for understanding climate impacts, particularly in data-scarce regions like India, where they affect global radiation and precipitation patterns.

- Aerosols influence Earth's radiation budget by absorbing / scattering sunlight (direct effect) and impacting cloud properties, lifetime, and precipitation as CCN (indirect effect).
- They pose health risks, contributing to respiratory and cardiovascular diseases.
- Designed for doctoral students, the program covers advanced techniques and instrument development to enhance research capabilities.
- Participants gain in-depth insights into aerosol properties, sampling, and in-situ measurement techniques, emphasizing their impact on climate and human health.

Convenors

Dr. Krishna Malakar,
Dept of Humanities and Social Sciences, IIT Madras

Dr. Anubhab Roy,
Dept of Applied Mechanics, IIT Madras

Dr. Sachin S Gunthe,
Dept of Civil Engineering, IIT Madras

Sponsors



ACTRIS: Exploring the Atmosphere



The Aerosol, Clouds, and Trace Gases Research Infrastructure (ACTRIS) is a pan-European initiative providing high-quality data on short-lived atmospheric constituents and their variability in natural and controlled environments. ACTRIS ensures open access to long-term atmospheric data via a single platform and offers world-class research facilities for academia and industry. By fostering cutting-edge science and international collaboration, ACTRIS supports advancements in understanding atmospheric processes and their impacts.

Further details of ACTRIS can be found in <https://www.actris.eu/>

CACS (Center for Atmospheric and Climate Sciences)

At CACS, we unite science to gain deeper environmental insights through interdisciplinary research. Our work focuses on understanding chemical processes within the atmosphere and biosphere, with key investigations into climate, ocean, and atmospheric systems. By integrating laboratory experiments, fieldwork, and advanced models, we explore critical interactions that sustain life and influence climate. Our research also delves into the effects of pollution on human health, climate change, and ecosystems, providing valuable insights into environmental sustainability.

Further details can be found in <https://cacs.iitm.ac.in/>

IIT Madras: A hub of Excellence and Inclusivity

IIT Madras fosters quality learning with world-class facilities, embracing inclusivity and diversity. The institution encourages innovation, entrepreneurship, and problem-solving for real-world challenges, contributing to societal growth and a self-reliant nation. Committed to global impact, IIT Madras strives for groundbreaking innovations to improve the world.

Prof. Alfred Wiedensohler Program Mentor

Prof. Alfred Wiedensohler is currently the Director of the ACTRIS Central Facility for Aerosol In-Situ Measurements (CAIS-ECAC). ACTRIS is a pan-European Research Infrastructure. He is also the Head of the World Calibration Centre for Aerosol Physics under the World Meteorological Organization's Global Atmosphere Watch Program (GAW).

He received the doctoral degree in Electrical Engineering at the University Duisburg Essen, Germany 1989 working on the charging of aerosol particles. From 1989 to 1993 he worked at the Technical University Lund in Sweden. In 1994 he joined the Leibniz Institute for Tropospheric Research in Leipzig Germany. Until 2020 he was Department Head for Aerosol & Cloud Microphysics. Since then, he is only engaged for the ACTRIS central facility CAIS-ECAC and GAW.

His expertise is experimental studies of physical and optical aerosol in-situ measurements and the development of advanced aerosol instrumentation. Currently, he is author or co-author of about 485 peer-reviewed publications (H-index of 91), focusing on the physical characterization, process studies, and climatology of atmospheric aerosols, as well as the development of advanced scientific instrumentation.



Topics

- Relevance of the Atmospheric Aerosols
- Mechanical Properties of Aerosols
- Definition of Particle Size
- Aerosol Charging
- Electrical Mobility of Aerosol Particles
- Condensation Particle Counters
- Inlets, Sampling and Drying Designs
- Differential Mobility Analyzer
- Mobility Particle Size Spectrometer
- Aerodynamic Particle Size Spectrometer
- Integrating Nephelometer
- Absorption Photometer

In addition some interactive tutorials and demonstration of the instruments will be conducted.

