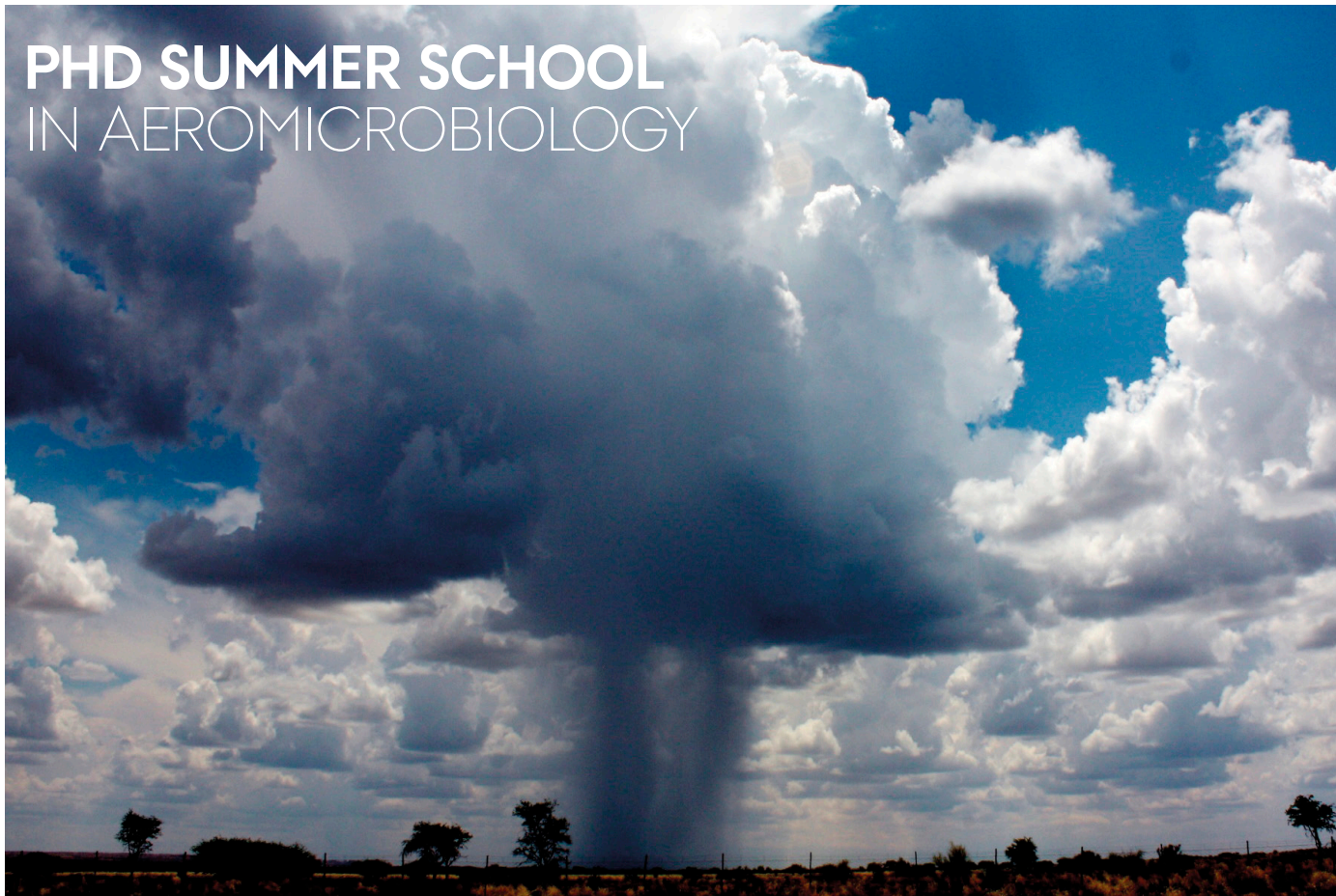


PHD SUMMER SCHOOL IN AEROMICROBIOLOGY



MICROBIOLOGICAL AND MOLECULAR METHODS FOR **STUDYING BACTERIA** IN **ATMOSPHERIC SAMPLES**

Aarhus University, Roskilde, Denmark, 12 – 19 August 2012
5 ECTS points

Background and aims

Aeromicrobiology is an exciting new field that has received much attention from the scientific community and security organizations recently. There is evidence that airborne bacteria could be active in cloud droplets and play a role in atmospheric chemistry. As some groups of airborne bacteria carry a gene for the ice nucleation protein, they may be involved in the formation of precipitation and affect the global weather. Naturally occurring airborne bacteria could also interfere with public warning systems against biological hazards. Hence there is a need to expand our knowledge on numbers and identity of airborne bacteria, their genetic make-up, as well as their ability to survive, grow and spread in the atmosphere. Some of this research requires novel or unconventional techniques, and a close collaboration between biologists, physicists and atmospheric modellers.

The aim of this PhD course is to provide the participants with a theoretical background and practical tools for:

- Sampling of microbes in the atmosphere
- Detection of virulence genes
- The atmosphere as a stressful bacterial environment that may act as a selective barrier to bacterial dispersal
- Mathematical modelling of areal spreading of microorganisms
- Bio-aerosol chambers: using methods of aerosolization and detection of airborne microbes
- Methods to assess the metabolic potential of airborne bacteria
- Bacterial ice nucleators and their influence on climate.

Assignments will include reading course materials before arrival, student presentations and a final report.

PRELIMINARY SCHEDULE

Day	Time	Preliminary topic
Sunday, August 12		Arrival
	18.00 – 22.00	Welcome and informal gathering
Monday, August 13		Sampling
	9.00 – 12.00	Sampling strategies for airborne bacteria
		The problem of low bacterial density: negative controls, decontamination procedures
	13.00 – 17.00	Hands-on: Sampling, upconcentration of samples, direct plating, DNA extraction, Biolog plates
Tuesday, August 14		Airborne pathogens
	9.00 – 12.00	Pathogenic bacteria in air, an example of <i>Bacillus sp.</i>
		Application of mathematical models for spreading of microorganisms
	13.00 – 17.00	Hands-on: Detection of virulence genes
Wednesday, August 15		The atmosphere as a selective barrier for dispersal
	9.00 – 12.00	The atmosphere as an extreme bacterial habitat
		Atmospheric depositions on the Greenlandic ice cap surface
	13.00 – 17.00	Hands-on: Effect of selected stress factors on bacterial survival
Thursday, August 16		Laboratory work at atmosphere-like conditions
	9.00 – 12.00	Bio-aerosol chamber construction, bacterial aerosolization and detection methods
		A new instrument for instantaneous measurement of airborne microorganisms
	13.00 – 17.00	Hands-on: Detection and enumeration of airborne microorganisms
Friday, August 17		Ice nucleation in the atmosphere
	9.00 – 12.00	Bacteria as potential ice nuclei in the atmosphere
		Biological aerosols – a new component of weather prediction models
	13.00 – 17.00	Hands-on: Ice nucleation assays
Saturday, August 18		Bacterial activity in the atmosphere
	9.00 – 12.00	Clouds as bacterial habitat
		Effects of airborne bacteria on atmospheric chemistry
	13.00 – 17.00	Students' presentations
Sunday, August 19		Departure
		No course work scheduled
		Note: ISME14 begins at 16.00

From the course venue, the venue of ISME14 is reachable by public transportation within 1-2 hours.

Organization

The summer school will be organized by Ulrich Gosewinkel and Tina Šantl Temkiv. The summer school will be held at the Department of Environmental Science, AU, Roskilde, from August 12th to August 19th, 2012. Roskilde is close to Copenhagen, where ISME14 starts on August 19th.

Registration

Course fee, incl. accomodation and 2/3 of all meals: 3700 DKK (ca. 500 €)

To apply for the course: <http://envs.au.dk/summerschoolregistration/>

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Application deadline: June 17th, 2012