



ECRO sponsored 2005

SUMMER SCHOOL on HUMAN OLFACTION

July 31st, to August 5th, of 2005, in Dresden, Germany.

[Evaluation, and addresses of participants](http://www.tu-dresden.de/medkhno/riechen_schmecken/summerschool_05_plus.htm) can
be found at
http://www.tu-dresden.de/medkhno/riechen_schmecken/summerschool_05_plus.htm

Please see below for structure of the school including announcement, abstracts, timetable etc.

We gratefully acknowledge the generous support through the [Komitee Forschung Naturmedizin e.V.](#), [Bionorica](#), [Lichtwer Pharma](#), and [Givaudan](#).

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SUMMER SCHOOL on HUMAN OLFACTION

The 2005 SUMMER SCHOOL on HUMAN OLFACTION 2005 is going to take place in Dresden, Germany. It will begin on Sunday evening, July 31st, and end on Saturday noon, August 6th, of 2005.

The School is organised in collaboration with the European [COST Action 921](#) ("Food Matrices: Structural Organisation from Nano to Macro Scale and Impact on Flavour Release and Perception")

Location: It will be organised through the [Smell & Taste Clinic](#) of the [Department of Otorhinolaryngology](#) of the University of Dresden Medical School, Fetscherstrasse 74, 01307 Dresden, Germany, phone +49-351-458-4189. The meeting will be held in the vicinities (the lecture hall - "Hörsaal") of the [Herzzentrum Dresden](#), Fetscherstrasse 76, 01307 Dresden, Germany, phone +49-351-450-0.

Fee for participation is 200 Euro - except for participants from an industrial background where the fee is 750 Euro. This fee covers dormitory-style accomodation, breakfast, conference dinner at [Schloss Eckberg](#), a barbecue, and an excursion to the surroundings of Dresden. **Only a limited number of students/researchers will participate.**

The address of the **dormitory** ("Gästehaus") is Schubertstrasse 42; it will be open from Sunday 31st of July, 12 a.m. Should you come later than 9 p.m., please contact [Thomas Hummel](#) for details. On the 31st of July from 7 p.m. on there will be a registration plus food and drinks at the "Gästehaus". [How to get there?](#)

Deadline for registration is the **15th of May 2005**. Please send an informal application including your CV plus bibliography to [Thomas Hummel](#).

Support: In addition to the generous support through [ECRO](#), the SUMMER SCHOOL will be supported by the [Komitee Forschung Naturmedizin e.V.](#), [Bionorica](#), [Lichtwer Pharma](#), and [Givaudan](#).

Aim: The school is meant to provide participants with up-to-date knowledge on various aspects of the human chemical senses not only through seminar-style lectures but there will also be a focus on practical demonstrations and experiments to be carried out by the participants.

Lecturers

Abstracts of [lectures](#) / [demonstrations](#)

[Timetable](#)

[Previous participants](#)

[Contact](#)

The following **lecturers** will participate (this list is still subject to changes):

Andrew Livermore (Richmond, VA, USA) - [odor mixtures](#)
[Maria Larsson](#) (Stockholm, Sweden) - [cognition, odor memory](#)
[Matthias Laska](#) (Munich, Germany) - [chemosensory discrimination](#)
[Steven Nordin](#) (Umea, Sweden) - [olfactory psychophysics](#)
[Bettina Pause](#) (Kiel, Germany) - [pheromones](#)
[Benoist Schaal](#) (Dijon, France) - [chemosensory development](#)
[Mats Olsson](#) (Uppsala, Sweden) - [from odor perception to cognition](#)
[Silvain Lacroix](#) (Geneva, Switzerland) - [neurogenic inflammation of the nasal mucosa and olfaction impairment](#)

lecturers from Dresden will include:

[Johannes Gerber](#) - [functional MR imaging of olfactory induced activation](#)
[Cornelia Hummel](#) - [source imaging from MEG and EEG data](#)
[Thomas Hummel](#) - [evoked potential olfactometry, recordings from the mucosa](#)
[Antje Müller](#) - [olfaction in Parkinsonian syndromes](#)
[Martin Witt](#) - [morphology of human olfaction](#)
[Martin Zapotocky](#) - [Biophysics of olfactory adaptation](#)

In addition to the demonstrations/experiments given by/performed together with each of the lecturers, among others there will be practical demonstrations of [endoscopy of the nasal cavity](#), [rhinomanometry](#), [blood flow](#), [acoustic rhinometry](#), and clinical aspects of olfactory dysfunction (diagnosis, treatment).

Contact:

[Thomas Hummel, M.D.](#)

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<http://www.tu-dresden.de/medkhno/hummel.htm>

Abstracts

[Maria Larsson](#), Ph.D.

Cognition, odor memory

The talk and demonstration will include theoretical and methodological aspects in the assessment of life-span changes in chemosensory functioning. One important issue concerns cross-sectional vs longitudinal assessment, advantages and disadvantages with the respective method (e.g., practice effects, costs, environmental confounders). Also, various aspects of olfactory cognitive processing will be highlighted. In particular, the relationship between various forms of odor memory and how they relate to the different memory systems will be addressed (e.g., the most simple forms of olfactory learning, conditioning as contrasted with the most complex form - episodic odor recognition). The theoretical part will be combined with a practical demonstration of behavioral assessment of episodic and semantic odor memory and how these two forms of memory are related.

[Matthias Laska](#), Ph.D.

Discrimination of odors? or: why does it smell different ?

Humans are capable of discriminating between an enormous number of odors. The question of how the olfactory system achieves this amazing ability is one of the central topics in olfactory research and is of both theoretical and practical interest. This lecture aims at giving an overview with regard to the present knowledge about the neural basis of odor discrimination, odor structure-activity relationships, the psychophysical methods used to measure discrimination performance, and comparative data on discriminability of structurally related odorants. Experiments performed by the participants shall illustrate the advantages and disadvantages of different methods and their influence on the outcome of odor discrimination tasks.

[Bettina Pause](#), Ph.D.

Conception and evaluation of pheromone studies in humans

Several chemicals are commercially available, which are promised to show pheromonal effects in humans. However, in this seminar, it will be questioned whether human pheromones exist at all. Therefore, studies in humans will be critically evaluated in terms of methodological considerations. In detail, a brief overview on the pheromone concept will be given and possible chemical messengers will be discussed. Additionally, it will be a major topic of the seminar to choose the appropriate kind of human response for the study in question. In general, one could measure pheromone effects on a perceptual (subliminal or supraliminal) or on a behavioural (subjective, physiological or motor response) level. Hereby, recent advances in EEG methodology will be focused. The main aim of the seminar is to guide the students in designing their own pheromone study.

Andrew Livermore, Ph.D.

Odor mixtures

This section will explore the topic of odor mixture interactions within the olfactory system and also between the olfactory and trigeminal systems. Despite inflated estimates in the literature, our ability to discriminate and identify the components of chemosensory mixtures is very limited to a very small number of the most 'salient' stimuli. The topic of interest then is what makes a particular component salient. Recent and not so recent research on intensity, memory and learning, sensory interactions, and adaptation will be reviewed with practical demonstrations used to reinforce important concepts.

[Steven Nordin](#), Ph.D.

Olfactory Psychophysics

1. Psychophysics refers to the relation between psychological function (e.g., sensation, perception, cognition) and the physical or chemical properties of the stimulus (e.g., intensity, structure) that underlies the psychological function under study. Olfactory psychophysics is commonly applied in both clinical and research settings that involve humans. In a lecture we will discuss the psychophysical methodological domains of detection, intensity discrimination, and scaling. The lecture will be followed by a demonstration in which the participants will get hands-on experience with the assessment of olfactory detection and intensity scaling by means of the methods of constant stimuli and magnitude estimation.

[Benoist Schaal](#), Ph.D.

Chemosensory development: Assessing olfaction in preverbal humans

The study of perception has generated contrasted models of development where nativist and constructivist views oppose. Olfaction is no exception, but this talk will present data that reconcile both conflicting parties in showing that the odour environment strongly influences olfactory development from very early on, long before birth. Data will be presented on the structural development and functional onset of olfaction, on the developmental course of olfactory sensitivity and discriminative power, and on learning and memory processes. The performance of the sense of smell will be described in the context of issues of communication and adaptation, emphasising evolved and learned perceptual predispositions. Experimental paradigms to investigate odour perception and cognition will be described in early human development with special emphasis on the numerous issues that remain to be resolved. Finally, the value of using animal models will be highlighted to test hypotheses that are raised in the human, or conversely to import new questions to the understanding of our own species.

[Martin Witt](#), M.D.

Morphology of Human Olfaction

Part 1. Histology of olfactory epithelium

You will be given a short introduction of common (immuno)histological techniques and a guide how to read a histological specimen. Subsequently you will be able to examine some slides showing mouse and human olfactory and vomeronasal epithelium.

Part 2. Gross Anatomy of the Human Nasal Cavity and the Human Brain

This is intended as an introduction into olfaction-related structures in the anatomical

dissection room.

[Martin Zapotocky](#) , Ph.D.

Biophysics of olfactory adaptation

The lecture will review the known physiological mechanisms of adaptation of the olfactory response. Emphasis will be placed on the level of the olfactory epithelium and the olfactory bulb. The dynamics of adaptation in olfactory sensory neurons will be described in detail. Analogies and differences between adaptation mechanisms in olfaction and in color vision will be discussed

[Mats Olsson](#) , Ph.D.

From odor perception to cognition

The talk will describe odor perception and cognition, and how the former lead to the latter. An example here concern odor memory. Several papers have argued that odor memory exhibits "unique" characteristics in relation to what is generally seen when memory is investigated using visual stimuli. Odor memory characteristics will be related to how odors are perceived and encoded. A central question for this talk will concern what human odor perception is really about. A demonstration will focus on the difference between high-semantic judgments such as identification and more categorical judgments such as edibility judgments.

[Silvain Lacroix](#) , M.D., Ph.D.

Neurogenic inflammation of the nasal mucosa and olfaction impairment

The nose is an air conditioner and is involved in the protection of the lower airways against inhalation of exogenous particles and airborne irritants. The nasal mucosa is therefore densely innervated by sensory nerves containing several neuropeptides. In the airways, activation of sensory C and A δ fibres leads to the release of multiple neuropeptides. In addition to their involvement in vasodilatation and nasal airway obstruction, plasma protein exudation and mucus secretion, sensory neuropeptides also participate in inflammatory cell recruitment. This neurogenic inflammation contributes to the intensity of nasal blockage and subsequent olfaction disorders, rhinorrhea, and headaches, the most common symptoms in chronic rhinosinusitis. The concentration of pro-inflammatory sensory neuropeptides is increased in the nasal mucosa of patients suffering from chronic rhinosinusitis. In contrast, the activity of the enzymes involved in the degradation of these sensory neuropeptides is markedly reduced. These observations should contribute to a better understanding of the pathophysiological mechanisms of one of the most frequent chronic inflammatory diseases.

This presentation will be held in conjunction with the demonstration by [Basile Landis \(see below\)](#)

Abstracts of additional demonstrations

Practical demonstrations of endoscopy of the nasal cavity; assessment of nasal airflow and stimulus activated changes of nasal blood flow

[Basile Landis](#), M.D.

When contemplating olfactory problems and questions, one has to bear in mind that not only cells are busy picking up olfactory cues using molecules dispersed in our environment, but that a whole organ is designed to that task besides helping with respiration: the nose.

When the problem of olfactory loss is encountered, a thorough examination of the nose is necessary. During this demonstration, the nose will receive a closer look using rigid and flexible endoscopy technique. Special attention will be paid to the appearance of the vomeronasal duct, as well as to the nasoplatine duct. Major reasons of olfactory loss due to alterations of nasal conditions will be demonstrated. Attendants will have the chance to practise endoscopy to have a look at cavity that hosts the sensory system they deal with during this Summer School. This course will also provide an introduction of the current nasal function measurement techniques. The methods presented will be: anterior rhinomanometry, acoustic rhinometry, and Laser Doppler Flowmetry. The techniques will be discussed and a practical demonstration will be given.

Evoked potential olfactometry, recordings from the mucosa

[Johannes Frasnelli](#) , M.D.

During this summerschool an introduction to olfactometry will be given. This will consist of both, a more theoretical introduction to this area of research, and a hands-on, practical approach. During the practical demonstrations it will be shown how electrodes for recordings of electro-olfactograms are prepared, flows are adjusted, temperatures measured, humidity is controlled, and odor concentrations are assessed.

Olfaction in Parkinsonian syndromes

[Antje Müller](#) , M.D.

Olfactory function is differentially impaired in distinct Parkinsonian syndromes. The clinical data presented in this talk suggest that psychophysical olfactory testing provides an important clue in the diagnosis of idiopathic Parkinson's disease (IPD). These findings seem to be of particular significance as IPD has a clinical misdiagnosis rate of approximately 20%. Preserved or mildly impaired olfactory function is more likely to be related to atypical parkinsonism such as multiple system atrophy, progressive supranuclear palsy or corticobasal degeneration. Patients with IPD exhibit a specific decrease of olfactory function which appears to take place during very early stages of the disease.

Functional MR imaging of olfactory induced activation

[Johannes Gerber](#), M.D.

Starting from known neuroanatomic correlates of olfaction, functional imaging methods will be introduced. The most widely used functional imaging method being MRI, we will concentrate on this modality. We will look at all steps of a fMRI-study, beginning with the methodological background, passing by the study-design, to finally interpret the results of the complex data analysis procedures. Besides the great advantage of good anatomical resolution, fMRI has a rather poor temporal resolution.

Possible remedies for this problem will be discussed. In a second, more practical part, we will visit a MR-scanner to better understand the specific demands of this environment and to perform one or two simple fMRI-experiments.

Source imaging from MEG and EEG data

[Cornelia Hummel](#), M.D.

Magnetoencephalography (MEG) means the recording of magnetic activity of the brain. This neurophysiological technique can be used, for example, to localize generators of event related responses. The presentation will focus on basic principles; advantages and limitations will be pointed out, and applications illustrated.

How to get to the dormitory?

from the Airport:

From the Airport, please take the train S2 (every 30 min) to the train station Bahnhof-Neustadt. Then take the tram no. 6, direction Niedersedlitz, to the station Königsheimplatz. Cross the street and walk along the street Schubertstrasse till you come to intersection with Goethestrasse. The guesthouse address is Schubertstrasse 42; it is at the corner Schubertstrasse / Goethestrasse.

by train:

From the main train station please take the tram no. 10 from Hauptbahnhof Nord, direction Striesen, to the station Fetscherplatz. Then take the tram no. 12, direction Striesen, to the station Königsheimplatz. Cross the street and walk along the street Schubertstrasse till you come to intersection with Goethestrasse. The guesthouse address is Schubertstrasse 42; it is at the corner Schubertstrasse / Goethestrasse.

From the train station Bahnhof Neustadt take tram no. 6, direction Niedersedlitz, to the station Königsheimplatz. Cross the street and walk along the street Schubertstrasse till you come to intersection with Goethestrasse. The guesthouse address is Schubertstrasse 42; it is at the corner Schubertstrasse / Goethestrasse.

by car:

From the Highway A4 and A13: Take the highway exit Dresden-Hellerau (No. 81a) and follow the signs along Hansa Strasse to the centre of Dresden „Zentrum“ until the point when you pass the train station, „Dresden-Neustadt“. At the first traffic light after the train station, turn left, (you may only turn left here) and drive straight on following

the signs to the „Staatskanzlei“. Passing the Staatskanzlei on your right, follow the sign „Zentrum“ and cross the Albert-Bridge. At the second traffic light after the bridge turn left and follow the sign „Johannstadt“ into Gerokstrasse which will later become Blasewitzer Strasse. When you reach the third traffic light turn left into Fetscherstrasse. Almost at the end of the street turn right at the intersection with Schubertstrasse. The guesthouse address is Schubertstrasse 42; it is at the corner Schubertstrasse / Goethestrasse.

The following people participated in our previous Summerschool in 2003

If you have questions about the Summerschool, please do not hesitate to ask the people listed below

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