



Announcement of an ECRO sponsored

SUMMER SCHOOL on HUMAN OLFACTION

The SUMMER SCHOOL on HUMAN OLFACTION is going to take place this summer in Dresden, Germany. It will begin on Sunday evening, July 27th, and end on Saturday noon, August 2nd, of 2003.

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 100 Euro - except for participants from an industrial background where the fee is 500 Euro. This fee covers dormitory-style accomodation, breakfast, a barbecue, and an excursion to the surroundings of Dresden. Only a limited number of students/researchers participate. Participation at the conference dinner at [Schloss Eckberg](#) will cost an extra 25 Euro for students.

The address of the **dormitory** ("Gästehaus") is Schubertstrasse 42; it will be open from Sunday 27th of July, 12 a.m. Should you come later than 9 p.m., please contact [Thomas Hummel](#) for details. On the 27th 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 **1st of May 2003**. Please send an informal application including your CV to [Thomas Hummel](#).

Support: In addition to the generous support through [ECRO](#), the SUMMER SCHOOL will be supported by the [Sense of Smell Institute](#), [Procter & Gamble](#), and [Firmenich](#).

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.

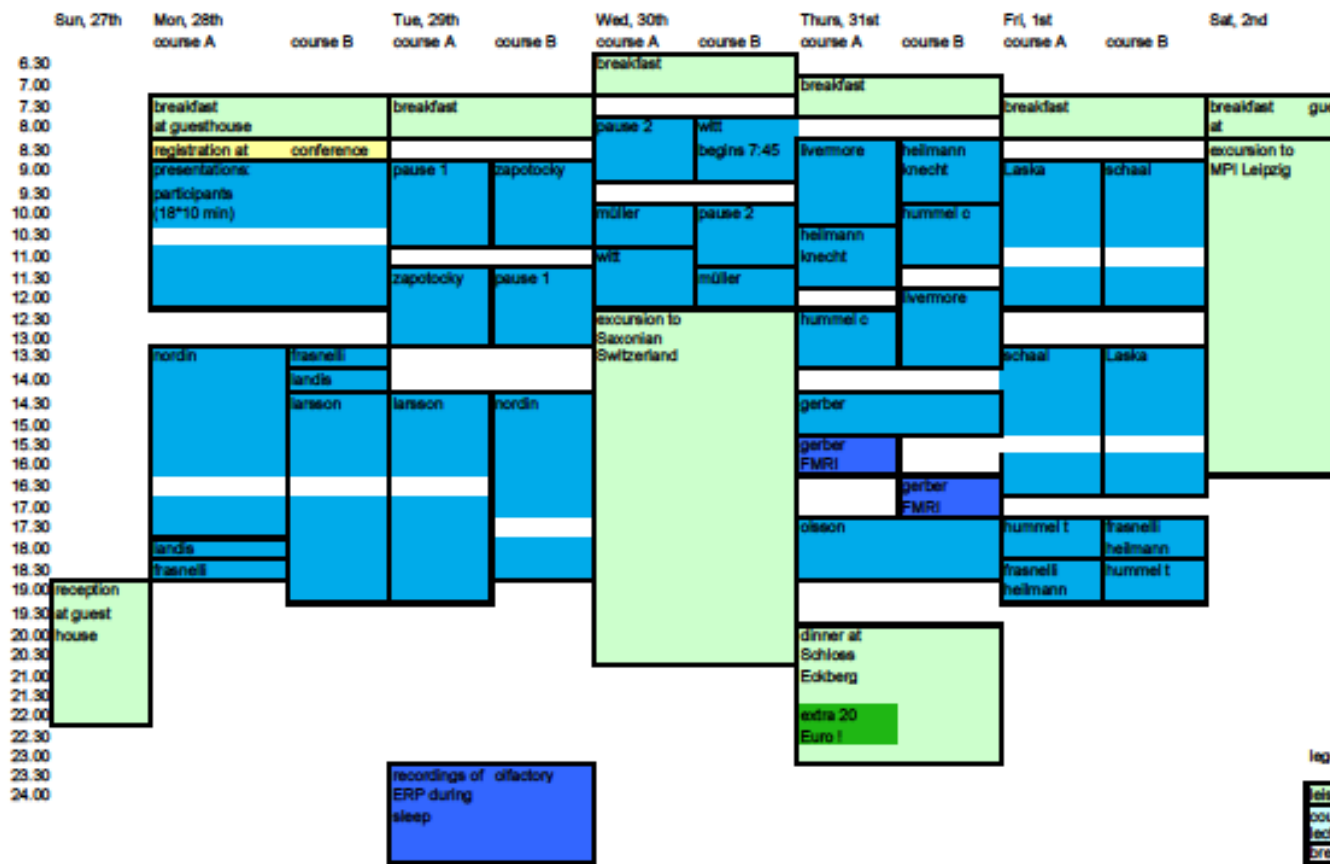
[Lecturers](#)

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

[Timetable](#)

[Participants](#)

[Contact](#)



The following **lecturers** will participate:

Andrew Livermore (Richmond, VA, USA) - [odor mixtures](#)

[Maria Larsson](#) (Stockholm, Sweden) - [cognition, odor memory](#)

[Matthias Laska](#) (Munich, Germany) - [chemosensory discrimination](#)

[Steven Nordin](#) (Umea, Sweden) - [chemosensory psychophysics](#)

[Bettina Pause](#) (Kiel, Germany) - [pheromones](#)

[Benoist Schaal](#) (Dijon, France) - [chemosensory development](#)
[Mats Olsson](#) (Uppsala, Sweden) - [from odor perception to cognition](#)

lecturers from Dresden will include:

[Johannes Gerber](#) - [functional MR imaging of olfactory induced activation](#)
[Stefan Heilmann](#) - [retronasal olfaction](#)
[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](#) - [molecular bioinformatics of olfaction](#)

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.](#), or [Stefan Heilmann, M.D.](#)
Smell and Taste Clinic, Department of Otorhinolaryngology
University of Dresden Medical School
Fetscherstr. 74 , 01307 Dresden, Germany
phone +49-351-458-4189 or -3197
fax +49-351-458-4326
<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 conscious) 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

Time needed: 4 hours (about 1 hour of theory and 3 hours of practical work for the students -- data collection)

Practical work: During these 3 hours we will collect data to be analyzed at a later stage. With presentations of the odor and noise stimuli, one person (student) in each of the two groups will (1) make ratings where we combine the method of constant stimuli (absolute detection) and magnitude estimation (intensity), and (2) judge which one in pairs of odor stimuli that is strongest, with the method of constant stimuli (discrimination).

Examination: With the data collected each student will (after the summer school week) analyze it and:

From part 1:

1. Determine the psychophysical function for odor intensity, both before and after calibration for individual scaling behavior (with master scaling)
2. Determine the psychometric function for odor detection, both before and after calibration for individual response bias -- and from that determine the detection threshold for various detection proportions
3. Compare the extrapolated threshold (from the magnitude estimation data) with the effective threshold (from the detection data)

From part two:

1. Determine the psychometric function for odor intensity discrimination
2. Determine the difference threshold, the point of subjective equality, and the weber fraction.
3. In a short paper the students will integrate these results with the theoretical issues given in the course literature.

[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 adaption, 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.

Molecular bioinformatics of olfaction

During the past three years, the essentially complete odorant-receptor (OR) repertoires have been characterized on the sequence level in human and in mouse; in addition, such information is gradually becoming available in several primate species. Comparative genomic techniques have been used to systematically classify ORs, identify particularly well-conserved OR families and subfamilies, infer the rates of OR pseudogenization in primates, and study the patterns of OR polymorphisms in human populations. These advances will be summarized in the lecture part. In the tutorial part, methods useful for extracting relevant information from current public databases will be demonstrated.

[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.

Abstracts of additional demonstrations

Practical demonstrations of endoscopy of the nasal cavity

[Stefan Heilmann](#), M.D. and [Michael Knecht](#), 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.

Evoked potential olfactometry, recordings from the mucosa

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

During this summerschool an introduction to olfactometry will be given. This will consist of both, a more theoretical introduction to this are of research, and, in collaboration with Johannes Frasnelli, M.D., 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. Apart from this, in collaboration with [Matthias Laska](#), during one of the nights it is planned to do recordings of olfactory ERP in sleeping subjects.

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.

Assessment of nasal airflow and stimulus activated changes of nasal blood flow

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

This course will 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.

Retronasal olfaction

[Stefan Heilmann](#), M.D.

Though in everyday life we are using our retronasal olfactory abilities much more often than orthonasal smell, retronasal olfaction has received less attention in the past. This is probably due to the difficulties in the manipulation of stimuli for the retronasal route of olfaction.

The aim of this session is (i) to present recent data on retronasal olfaction, showing that ortho- and retronasal olfaction share the same sensory organ, yet show some differences in perception and processing of stimuli. Attendants will (ii) be acquainted with means for the study of retronasal olfaction. These techniques will include

psychophysical methods and the delivery of retronasal olfactory stimuli using air-dilution olfactometry.

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.

[Timetable](#) (please click to download Excel sheet)

Participants

Boyle, Julie	julie.boyle@mcgill.ca	Canada
Behan, Paul	john.p.behan@questintl.com	U.K.
Broman, Daniel	daniel.broman@psy.umu.se	Sweden
Butinas, Llinas	linas.buntinas@uchsc.edu	USA
Chu, Simon	S.Chu@liverpool.ac.uk	UK
Colley, Beverly	colley@neuro.fsu.edu	USA
Ferdenzi, Camille	ferdenzi@cesg.cnrs.fr	France
Frasnelli, Johannes	frasnelli@yahoo.com	Italy
Frey, Sabine	freysabine@web.de	Germany
Heuberger, Eva	eva.heuberger@univie.ac.at	Austria
Jönsson, Frederik	fredrik.jonsson@psyk.uu.se	Sweden
Landis, Basile	bnlandis@hotmail.com	Switzerland
Lundstrom, Johan	johan.lundstrom@psyk.uu.se	Sweden

Shah, Mussadiqh	musshah@yahoo.co.uk	UK
Pouliot, Sandra	spouliot@ego.psych.mcgill.ca	Canada
Rombaux, Philippe	Philippe.Rombaux@orlo.ucl.ac.be	Belgium
Sacher, Petra	cocille@web.de	Germany
Sergeant, Mark	mark.sergeant@ntu.ac.uk	UK
Willander, Johan	marlar@psychology.su.se	Sweden

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.

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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.