UNIKLINIK RWTH AACHEN

Scientific Center of
Neuropathic Pain Aachen

Program
SCN^{AACHEN}

Inaugural Symposium of the Scientific Center of Neuropathic Pain Aachen

TUESDAY: TALKS

2nd September 2025, from 08:30 to 17:45
Roermonderstr. 110
52072 Aachen

WEDNESDAY: LAB TOURS

3rd September 2025, from 09:00 to 11:15

Uniklinik RWTH Aachen
Pauwelsstr. 30
52074 Aachen

OR

SCN^{AACHEN}
Roermonderstr. 110
52072 Aachen

Program

TUESDAY: TALKS
2nd September 2025

08:30 - 08:45 › **Opening remarks**
Angelika Lampert, Ralf Hausmann

BASIC SCIENCE
Chair: Jenny Tigerholm

08:45 - 09:00 › PatchSeq to classify sensory neurons functionally
Jannis Körner
Neurophysiology

09:00 - 09:15 › painOMICS - deciphering pain mechanisms with single cell resolution
Natja Haag
Functional Genomics

09:15 - 09:30 › Stem cell research of genetic pain syndromes with ion channel variants
Angelika Lampert
Neurophysiology

09:30 - 09:45 › Drug-screening in pain-relevant 1.7/1.8 Nav variants by APC
Ralf Hausmann
Clinical Pharmacology

09:45 - 10:00 › Micro-Pain: Mechanisms of microbedependent pain perception
Joel Selkrig
Medical Microbiology

10:00 - 10:15 › Peripheral nerve fiber recordings
Stanislav Koulchitsky
Neurophysiology

10:15 - 11:00 › **Coffee break // Poster session**

PLENARY LECTURE I
Chair: Robin Bekrater-Bodmann

11:00 - 11:45 › Intersections of pain and reward: modulation of perception, behavior and the role of uncertainty
Susanne Becker
Düsseldorf University

PSYCHOLOGY
Chair: Ralf Hausmann

11:45 - 12:00 › Body in pain: Multisensory illusions as a window into embodied pain processing
Robin Bekrater-Bodmann
Psychobiology of chronic pain

12:00 - 12:15 › Amygdala and Hippocampus Hyperactivity in Small Fiber Neuropathy: Evidence for Affective Central Sensitization from Multimodal fMRI
Pia Klabunn
Neuropsychology

12:15 - 12:30 › Pain in Palliative care
Dr. Iris Appelmann
Klinik für Palliativmedizin

12:30 - 13:45 › **Lunch break // Poster session**

PLENARY LECTURE II
Chair: Angelika Lampert

13:45 - 14:30 › Pain Proteomics for mechanistic insights across species: from microbiota to humans
Manuela Schmidt
Wien University

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CLINICAL
Chair: Robin Bekrater-Bodmann

14:30 - 14:45 › Life without pain: Lessons from genetics
Ingo Kurth
Center for Human Genetics and Genomic Medicine

14:45 - 15:00 › The manifold patterns of pain – genotype-phenotype correlations
Maike Dohrn
Neurology

15:00 - 15:15 › QST in children with pain and their predictive value
Martin Häusler
Neuropediatrics

15:15 - 16:00 › **Coffee break // Poster session**

COMPUTATIONAL
Chair: Angelika Lampert

16:00 - 16:15 › A nociceptor excitability test for identifying alterations of the Nav1.7 channel in humans
Jenny Tigerholm
Computational subcellular Neurobiology

16:15 - 16:30 › Computational modeling of voltagegated sodium channels
Marie Mehlfeldt
Computational Biomedicine and Neurophysiology

16:30 - 16:45 › Registration from the peripheral nerve fibers in vivo
Viviana Rincón Montes
FZ Jülich

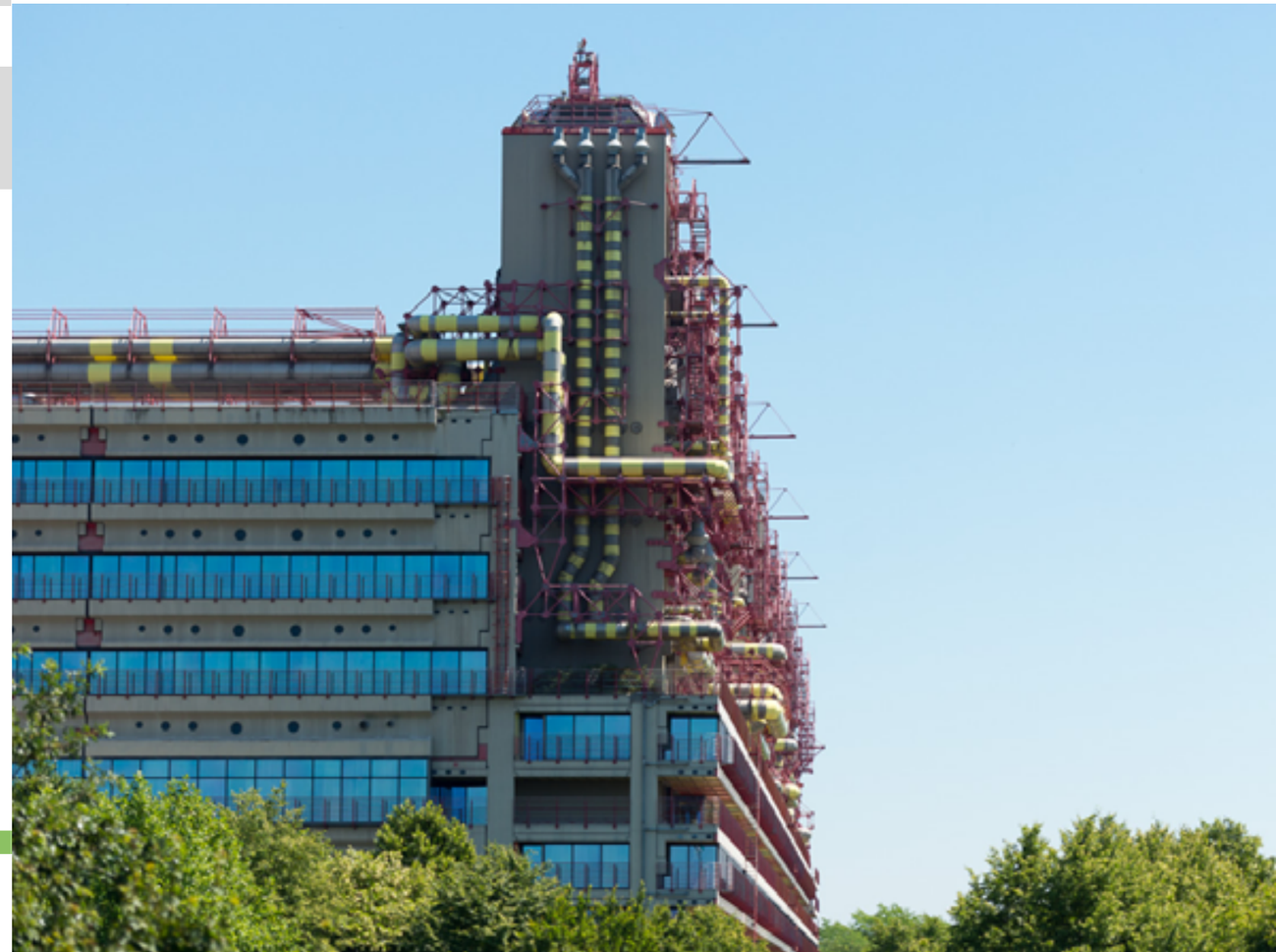
16:45 - 17:00 › Understanding Nav1.7 structure, dynamic, and druggability with molecular simulations
Giulia Rosetti
Digital Neuropharmacology

Program

17:00 - 17:15 › Computational Modeling and Machine Learning for Digital Twins of pain patients
Andreas Schuppert, Jonas Kupschuss
Computational Biomedicine

17:30 › **Closing remarks**
Angelika Lampert, Ralf Hausmann

WEDNESDAY: LAB VISITS
3rd September 2025, from 09:00 to 11:00



BODY IN PAIN

Dr. Annette Löffler, Prof. Dr. Robin Bekrater-Bodmann
WG Psychobiology of chronic pain, Department of Psychiatry, Psychotherapy and Psychosomatics, Uniklinik RWTH Aachen

SCN Aachen, Roermonder Straße 110, Room 5

In our Body-in-pain lab, we combine different forms of painful stimulation with psychometric, behavioral, and peripheral physiological methods in an experimental context.

During the lab tour, we will demonstrate the possibilities of thermal pain stimulation techniques. We will also provide insights into currently ongoing experiments that combine different body illusions with pain stimulation to better understand the connection between body and pain perception. As a tour participant, you will have the opportunity to explore the thermal grill illusion, conditioned pain modulation, and the effects of experimentally manipulated body perception on pain perception — if you wish, you may even experience it yourself.

Link to website:
https://www.ukaachen.de/kliniken-institute/klinik-fuer-psychiatrie-psychotherapie-und-psychosomatik/forschung/psychobiologie-chronischer-schmerzen/

QR-code to website:

Labtours Roermonder Straße

ELECTRICAL STIMULATION PARADIGMS TO PREFERENTIALLY ACTIVATE DIFFERENT SUBCLASSES FIBERS IN HUMANS

Jun.-Prof. Jenny Tigerholm, Anna Maxion
Computational simulation of subcellular neurobiological processes

SCN Aachen, Roermonder Straße 110, Room 7

In the Transcutaneous Electrical Stimulation lab, we investigate how electrical stimulation can be used to probe the excitability of peripheral nerves in humans.

In the Lab tour we will demonstrate in a human experiment how different electrodes and pulse shapes can selectively activate subclasses of peripheral fibers, thereby altering the perception of the electrical stimulus. Parallel to the experimental demonstration, we simulate the same experiment and illustrate how computational modeling can help us understand the experimental results. This will be a hands-on session where you'll have the opportunity to participate in the experiment and experience various electrical stimulation sensations, including tapping, stinging, burning, and sometimes itching.

For more information about the work conducted in our lab see link below:
https://www.ukaachen.de/kliniken-institute/joint-research-center-for-computational-biomedicine/lehre/computational-simulation-of-subcellular-neurobiological-processes/

QR-code to website:

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STEM CELLS, SODIUM CHANNELS AND PAIN

Prof. Dr. Ralf Hausmann, Dr. Ramona Hohnen, Dr. Pascal Röderer,
Prof. Dr. Angelika Lampert
Institute for Neurophysiology, Uniklinik RWTH Aachen
Institute for Clinical Pharmacology, Uniklinik RWTH Aachen

Labs of AG Lampert, Uniklinik RWTH Aachen main building, Pauwelsstr. 30
Level 6, hallway D, Room 26 (library physiology), near elevator D4.

The Institute of Neurophysiology works with induced pluripotent stem cells (iPSCs) from pain patients which we use to generate those sensory neurons necessary to detect potentially painful stimuli. The Institute of Clinical Pharmacology and the Institute of Neurophysiology investigate the voltage-gated sodium channel as it plays a major role in pain perception.

In the lab tour we will show you how we grow those stem cells, genetically manipulate them using CRISPER/cas9 and how we differentiate them into sensory neurons. We will demonstrate how we do the readout of the function of the neurons (multi-electrode arrays, manual and automated patch clamp, immuno stainings). We will also show you how we assess the sodium channel's biophysics and do structure-function investigations using mutagenesis and computer modeling.

Links to websites:
https://www.ukaachen.de/kliniken-institute/institut-fuer-neurophysiologie/institut/

https://www.ukaachen.de/kliniken-institute/institut-fuer-klinische-pharmakologie/forschung/biophysikalische-pharmakologie-von-ionenkanaelen/

QR-codes to websites:

Labtours Uniklinik RWTH Aachen

HANDS-ON DEMONSTRATION OF CLINICAL ASSESSMENTS

Dr. Maike Dohrn, Noortje van den Braak
Department of Neurology

Uniklinik RWTH Aachen main building, Pauwelsstr. 30, Level 3, Hallway 2,
Room 2 (elevator: B2)

In this lab tour, we provide insights into the patient journey:
- What are the typical questions we ask a pain patient?
- What are the physical exams, and what types of additional tests do we perform?

.

We will demonstrate how to assess and classify pain efficiently and in a patient-centred way. You will have the opportunity to see and test our devices for nerve conduction studies and nerve ultrasound, and we will demonstrate how to measure sensory thresholds. Depending on your interests, this tour will include hands-on elements.
In 45 minutes, you will learn about the diagnostic steps that pain patients undergo in our clinical routine, while also gaining an understanding of how closely clinical work and research are intertwined.

Links to websites:
https://www.ukaachen.de/kliniken-institute/klinik-fuer-neurologie/forschung-1/forschungsschwerpunkte/forschungsgruppen/hereditaere-neuropathien-neuropathische-schmerzsyndrome-und-motoneuronerkrankungen/

https://www.scn-aachen.rwth-aachen.de/cms/SCN-Aachen/Wissenschaftliche-Teilprojekte/~mprcz/Teilprojekt-Z/

QR-codes to websites:

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HIGH-THROUGHPUT GUT MICROBIOME ISOLATION,CULTIVATION AND PHENOTYPING

Dr. Joel Selkrig
Institute for Medical Microbiology

Uniklinik RWTH Aachen main building, Pauwelsstr. 30, Elevator D4, 5th Floor, Entrance to 'Medizinische Mikrobiologie' Institute

We will showcase our state-of-the-art gut bacterial isolation, cultivation and phenotyping platform used to screen natural isolate collections and large scale gene deletion libraries.

We will demonstrate how we move from random bacterial colonies on an agar plate, to a format amenable to high-throughput phenotypic screening, allowing us to elucidate mechanisms underlying bacterial phenotypes.

For those interested, we will take a 5-minute walk to the Drosophila labs (Prof. Gaia Tavosanis, Developmental Biology) where we are establishing a platform to screen for microbiota-dependent effects on Drosophila larvae nociception. Insights will be gained into the current projects and collaborations in which we're exploring the ways that commensal gut microbiota influence pain.

Link to website:
https://www.ukaachen.de/kliniken-institute/institut-fuer-medizinische-mikrobiologie/forschung/ag-selkrig/our-research/

QR-code to website:

Labtours Uniklinik RWTH Aachen

MULTISENSORY STIMULATION OF CHRONIC PAIN PATIENTS INTHE MRI

PD Dr. Thilo Kellermann and Pia Klabunn
WG Habel, Section of Neuropsychology, Department of Psychiatry, Psychotherapy and Psychosomatics, Uniklinik RWTH Aachen

Uniklinik RWTH Aachen main building, Pauwelsstr. 30, Level 3, Corridor 11, Room 07, near Elevator A5

In one of the currently ongoing projects in the WG Habel, we investigate how multisensory stimuli, combining temperature, olfactory, and visual cues, can reveal brain mechanisms associated with multisensory hypersensitivity in chronic pain..

By integrating magnetic resonance imaging with multisensory stimulation, we map central alterations in the diagnostically overlapping conditions of fibromyalgia syndrome and small fiber neuropathy.

During the interactive lab tour, you will be able to observe a measurement at our 3-Tesla MRI scanner. We will provide insights into the principles of MRI and EEG-based brain imaging and analysis. Participants will also have the opportunity to experience the thermal and olfactory stimulation paradigms that we currently employ in this project on multisensory processing in chronic pain patients.

Link to website:
https://www.ukaachen.de/kliniken-institute/klinik-fuer-psychiatrie-psychotherapie-und-psychosomatik/team/alle-personen-h-r/habel-ute/forschung/

QR-code to website:

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SODIUM CHANNEL RECORDING AND PHARMACOLOGY USING AUTOMATED PATCH CLAMP: HANDS-ON DEMONSTRATION OF THE PATCHLINER

Dr. Artem Kondratskyi, Dr. Lars Buschmann
Nanion Technologies

Labs of Neurophysiology, Uniklinik RWTH Aachen main building, Pauwelsstr. 30, level 6, hallway D, room 26 (library physiology), near elevator D4

The Patchliner is a fully automated patch clamp system that helps you measure the biophysical properties of ion channels, including voltage-gated and ligand-gated channels. In this demo, we'll show how the Patchliner is used to record NaV channels. You can record from multiple cells at once, increasing throughput without compromising data quality.

You'll also see how to analyze NaV activation and inactivation, test compound effects, and automatically analyze concentration-response curves for known NaV blockers. This demo is a great chance to see how the Patchliner can speed up your research.

Link to website:
https://www.nanion.de/products/patchliner/

QR-code to website:

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HANDS-ON DEMONSTRATION OF THE QPATCH® COMPACT

Jason Villagomez
Sophion

Labs of Neurophysiology, Uniklinik RWTH Aachen main building, Pauwelsstr. 30, Level 6, hallway D, room 26 (library physiology), near elevator D4

In this labtour you will be shown how to use the QPatch® Compact to generate medium throughput (1 to 8 simultaneous and/or independent patch clamp recordings).

Link to website:
https://sophion.com/products/qpatch-compact/

QR-code to website:

SOPHION BIOSCIENCE

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Sponsors

The Organizers would like to acknowledge
the sponsors of the inaugural symposium of the
Scientific Center for Neuropathic Pain Aachen
SCN^{AACHEN} 2025 for their generous financial support.