

The IRTG 2150

The International Research Training Group (IRTG) is formed by scientists from JARA BRAIN, an initiative of the RWTH Aachen University and the Research Center Jülich, Germany, together with the University of Pennsylvania, U.S.A.

The IRTG is a structured PhD and MD educational program and investigates a clinically and societally highly relevant topic: the neurobiology of pathological aggression and impulsivity.

This will be achieved using experimental, animal, clinical and increasingly also data-driven approaches. Main goal will be the improvement, generalizability and validation of diagnostic, prognostic and therapeutic precision by combining experimental and data science approaches in the field of aggression and impulsivity.

The IRTG offers the possibility for US Penn students to join the IRTG as associated students.

Advantages:

- Possibility for research stay in Aachen or Jülich
- Additional supervision by one or two German supervisors
- Workshops (e.g., neuroanatomy workshop, open science workshop, etc.)
- Attendance of monthly external online talks of renowned neuroscientists
- International networking
- IRTG Spring school alternatively in Aachen and Philadelphia
- IRTG certificate

Research facilities and infrastructure

RWTH Aachen (University Hospital)

- Neuroimaging at 3 T Siemens Prisma MR research scanner
- plus simultaneous EEG and eye-tracking system
- HR+PET scanner
- TMS and Pathway pain stimulator
- MR-compatible high definition tDCS
- EEG/fMRI neurofeedback and hyperscanning
- fMRI during video games and virtual reality
- Olfactometer, NIRS, Pain Stimulator
- Psychiatric department with a broad option to study aggression and impulsivity in diverse patient groups at different ages (children, adolescents, and adults)
- Department of Neurology to study neurodegenerative diseases such as movement disorders and dementia
- Work spaces for analyzing MEG/EEG/PET/fMRI data
- Methodological expertise for MEG/EEG/PET/MR data analysis
- Expertise in computational neuroscience and imaging databases
- Experimental tasks assessing aggressiveness and impulsivity
- Patch-clamp recording and live-cell imaging analysis
- Tissue clearing techniques (CLARITY, etc.)
- Cell morphology and ultrastructure (electron microscopic) analysis
- Automated analysis of animal behavior

FZ Jülich

- The INM has broad expertise in brain imaging and houses a unique 9.4-T MR-PET hybrid scanner and a 3-T MR-PET hybrid system in addition to 3T and 7T scanners as well as an animal 9.4T and animal PET

For more detailed information, please refer to our website at



Habel, Ute, Prof. Dr. rer. soc. (uhabel@ukaachen.de): Psychiatry and Psychotherapy, aggression, impulsivity, psychiatric disorders, neuroimaging, hormones and behavior, sex differences

Neuner, Irene, Prof. Dr. med. (ineuner@ukaachen.de): Multimodal neuroimaging for identification of individual resilience factors, imaging genetics, Tourette syndrome

Mathiak, Klaus, Prof. Dr. med. Dr. rer. nat. (kmathiak@ukaachen.de): Psychiatry and Psychotherapy, functional imaging (MEG, fMRI) of cognition, audition, fMRI neurofeedback, fMRI during video games, virtual reality and Brain-Computer interfaces, schizophrenia, depression and personality disorders, aggression and impulsivity

Konrad, Kerstin, Prof. Dr. rer. nat. (kkonrad@ukaachen.de): Child Psychiatry and Psychotherapy, neural correlates of cognitive and emotional development, neuroimaging in psychiatric disorders of children, conduct disorders, autism spectrum disorders, disorders of attention

Eickhof, Simon Prof.Dr. (s.eickhoff@fz-juelich.de): FZ Juelich, Mapping brain structure, function and connectivity, Clinical translation and medical AI, neuroimaging meta-analyses

Shah, N. Jon, Prof. Dr. rer. nat. (n.j.shah@fzjuelich.de): FZ Juelich, BOLD MR physics, neurobiology (fMRI), development of MR techniques, development of hybrid MR/PET, ultra-high field fMRI/MRI

Spehr, Marc, Prof. Dr. rer. nat. (m.spehr@sensorik.rwth-aachen.de): Biology, neural processing of sensory information, mechanism of pheromone signaling, analysis of social and aggressive behavior, single neuron electrophysiology and functional imaging in vitro, in situ, and in vivo

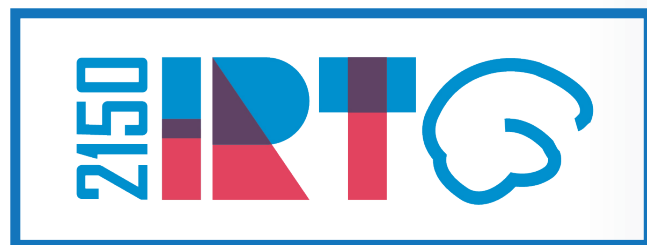
Merhof, Dorit, Prof. Dr.-Ing. (dorit.merhof@lfb.rwth-aachen.de): Imaging and computer vision, image analysis, visualization and exploration, feature extraction and classification, diffusion image analysis, multispectral image analysis, digital pathology and facial expression monitoring

Reetz, Kathrin, Prof. Dr. med. (kreetz@ukaachen.de): Neurology, translational brain medicine in psychiatry and neurology, multimodal neuroimaging and its correlations with genetic, clinical and neuropsychiatric parameters

Hanke, Michael, Prof. Dr. (m.hanke@fz-juelich.de): FZ Juelich, Neuroinformatics, brain response to complex natural stimulation, multivariate pattern analysis, functional imaging

Wagels, Lisa, Prof. Dr. (lwagels@ukaachen.de): Psychiatry and Psychotherapy, aggression, impulsivity, hyperscanning, neuroimaging, hormones and behavior

JARA BRAIN and UPenn



Information for
interested Upenn
IRTG students