Inter-institutional projects for postdoctoral positions within the Heidelberg Mannheim Health and Life Science Alliance

Project Proposal

Proposing parties (two or more):

Name and affiliation of PI:	Name and affiliation of PI:	Name and affiliation of PI:
Prof. Bernd Lenz, M.D.	**Prof. Beate Ditzen, Ph.D.**	**Prof. Thomas Fuchs, M.D., Ph.D.**
University Full Professor, Addiction Research	University Full Professor, Medical Psychology and Psychotherapy	University Full Professor, Philosophy and Psychiatry
Deputy Head, Department of Addictive Behavior and Addiction Medicine	Director, Institute of Medical Psychology	Clinic for General Psychiatry
Central Institute of Mental Health (CIMH) Mannheim	**Heidelberg University**	**Heidelberg University Hospital**
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Webpage: RG Integrative Neuroscience of Addictive Behaviors	Webpage: www.medpsych.uni-hd.de	Webpage: www.thomas-fuchs.uni-hd.de

By submitting your proposal, you agree to the open sharing of the project idea, group description and contact information (e.g. through mailings and on the Alliance Webpage). Project and group descriptions should contain only non-confidential information.

Project Title:

Social Interaction, Social Connection, and Sense of Coherence in Real Life and Virtual Reality: Embodied Cognitions, Neuroendocrine Mechanisms, and Implications for Mental Health

Project outline (1/2 page abstract):

The digital transformation has created new technologies and stimulates novel approaches in mental health research. Social interaction, social connection, and sense of coherence exert short- and long-term effects on mental health, and these vary by age and sex.

We are interested in the perception of social interaction, social connection, sense of coherence, and underlying neuroendocrine mechanisms in real life in comparison to the digital world. Therefore, we aim at conducting experimental studies in virtual reality environments generated by head-mounted displays or wall-sized projection displays and real-life investigations using augmented reality applications and ecological momentary assessment (EMA) tools (e.g., various app-based and wearable technologies). We intend to focus on the mind-body interplay. The effects of embodiment techniques targeting body perception and representation on social interaction, social connection, and sense of coherence will be tested. Moreover, special attention will be given to sex- and age-related variations (e.g., changes over the menstrual cycle, adolescence vs. adulthood vs. senium). The project will provide novel insight in perception of social interaction in virtual reality relative to real life. This will contribute to the further development of virtual reality technologies.

To reach these goals, we will foster the already existing collaboration between the CIMH, the Institute of Medical Psychology of Heidelberg University, and the Department of General Psychiatry at Heidelberg University Hospital. We will combine innovative and novel techniques available at these three locations, thereby generating a unique and added value to the Heidelberg Mannheim Health and Life Science Alliance. The CIMH offers different virtual reality technologies provided by the Virtual Reality Core Facility including eye-tracking technology, psychophysiology, functional near-infrared spectroscopy, and augmented reality. The Institute of Medical Psychology at Heidelberg University is specialized on the biopsychology of social interaction and the neuroendocrine factors involved and maintains a fully equipped laboratory to measure steroid hormones and neuropeptides. The Phenomenological Psychopathology Research Section at Heidelberg University has long-standing expertise in collaborative projects on embodied cognition and intercorporeality, using tools of phenomenology as well as video-based movement analysis to investigate processes of inter-bodily interaction.

Prof. Bernd Lenz – General Research Group description (max. 250 words):

Bernd Lenz heads the Research Group Integrative Neuroscience of Addictive Behaviors. The group investigates the role of bio-psycho-social mechanisms, neurodevelopmental factors over the lifespan, and clinical aspects in the pathogenesis of addictive disorders and mental health-related behaviors. One of the main focuses is on humoral factors including neuropeptides, sex hormones, and neurosteroids. We are also interested in neural correlates. The results are used to develop novel preventive and therapeutic strategies. We follow a strong translational approach and wish to implement these strategies into daily use. We employ various research

methods including virtual reality technologies, neuroimaging techniques, pharmaco-challenge experiments, deep longitudinal behavioral and clinical real-life phenotyping, and saliva as well as blood biomarkers. We have established virtual reality environments with high levels of immersion and presence. The research group conducts in-depth mechanistic studies, large-scale longitudinal cohort studies, and clinical trials with a strong translational emphasis.

References (max. 3):

- Lenz, B., Röther, M., Bouna-Pyrrou, P., Mühle, C., Tektas, O.Y., & Kornhuber, J. (2019) The androgen model of suicide completion. *Progress in Neurobiology, 172,* 84-103.
- Lenz, B., Weinland, C., Bach, P., Kiefer, F., Grinevich, V., Zoicas, I., Kornhuber, J., & Mühle, C. (2021) Oxytocin blood concentrations in alcohol use disorder: A cross-sectional, longitudinal, and sex-separated study. *European Neuropsychopharmacology, 51,* 55-67.
- Mazza, M., Kammler-Sücker, K., Leménager, T., Kiefer, F., & Lenz, B. (2021) Virtual reality: a powerful technology to provide novel insight into treatment mechanisms of addiction. *Translational Psychiatry, 11,* 617.

Prof. Beate Ditzen – General Research Group description (max. 250 words):

Research at Heidelberg University's Institute of Medical Psychology headed by Beate Ditzen is focused on the effects of social interaction on health parameters and – vice versa – on the influence of individual health on close social relationship functioning. Within this focus, one central aspect is the role of neural circuitry and peripheral dynamics involving stress-sensitive endogenous neurosteroids and neuromodulators such as reproductive hormones, cortisol, and oxytocin. Our group investigates these factors using real time instructed social interaction in the laboratory, fMRI investigations and fMRI neurofeedback paradigms, as well as psycho-biological ecological momentary assessments (EMA) in everyday life, thereby interpreting the within and between subjects' dynamics in neuroendocrine modulators of socially-mediated cognition and emotion.

References (max. 3):

- Ditzen, B., Schaer, M., Bodenmann, G., Gabriel, B., Ehlert, U., & Heinrichs, M. (2009) Intranasal oxytocin increases positive communication and reduces cortisol levels during couple conflict. *Biological Psychiatry, 65(9),* 728-731.
- Ditzen, B., & Heinrichs, M. (2014) Psychobiology of social support: the social dimension of stress buffering. *Restorative Neurology and Neuroscience, 32(1),* 149-162.
- Stoffel, M., Neubauer, A. B., & Ditzen, B. (2021) How to assess and interpret everyday life salivary cortisol measures: A tutorial on practical and statistical considerations. *Psycho-neuroendocrinology, 133,* 105391.

Prof. Thomas Fuchs – General Research Group description (max. 250 words):

The research section "Phenomenological Psychopathology" investigates the basic structures of subjective experience and their deviations in mental illness using theoretical and empirical methodology. The focus is on the analysis of schizophrenic and depressive disorders of embo-diment, social interaction and intersubjectivity, ego and intentionality disorders, as well as the distinctions between reality, delusion, and virtuality. The Section has led several European collaborative projects on these topics, including "Disorders and Coherence of the Embodied

Self" (DISCOS) and "Towards an Embodied Science of Intersubjectivity" (TESIS). The conception of schizophrenia as a "disembodiment" developed in the course of this research led, among other things, to the implementation of body-oriented therapeutic procedures for the treatment of schizophrenic self-disorders. Moreover, fundamental analyses of the mind-brain-body connection from the perspective of "Embodied and Enactive Cognition" have resulted in a series of high-level publications, among them "Ecology of the Brain" (Oxford University Press 2018).

References (max. 3):

- Fuchs, T., & De Jaegher, H. (2009) Enactive intersubjectivity: participatory sense-making and mutual incorporation. *Phenomenology and the Cognitive Sciences, 8,* 465-486.
- Fuchs, T. (2014) The virtual other. Empathy in the age of virtuality. *Journal of Consciousness Studies, 21,* 152-173.
- Fuchs, T. (2017) Intercorporeality and interaffectivity. In: C. Meyer, J. Streeck & S. Jordan (Eds.) *Intercorporeality: Emerging Socialities in Interaction*, pp. 3-24. Oxford University Press.

Collaboration between the research groups

The three research groups have recently started a collaboration to investigate how social interaction and its underlying mechanisms differ between real life and virtual reality and how this knowledge may be used to strengthen mental health. They plan to prepare a joint application for funding of a research project. The research groups are involved in research consortia such as the Collaborative Research Centre Transregio 265 *Losing and Regaining Control over Drug Intake* (https://sfb-trr265.charite.de/en) and the Collaborative Research Centre 1158 *Chronic Pain* (https://www.sfb1158.de/) which are funded by the German Research Foundation.

Boost your career in a growing network of renowned partners and be part of an environment of scientific excellence

Inter-Institutional Postdoctoral Positions

What we are looking for

The **Innovation Campus Heidelberg Mannheim Health & Life Sciences** is looking for outstanding junior scientists for bridging projects between two or more of the Innovation Campus institutions. Suitable candidates may choose from a wide variety of 138 innovative, inter-institutional projects specifically proposed by Project Leaders of the Innovation Campus for this new initiative. Currently, a particular focus is on **priority areas of cancer research, cardiovascular research, neuropsychiatric diseases, genomics, synthetic immunology, molecular engineering and medical technologies.** Alternatively, applicants are also welcome to define their own research project with at least two PIs at two different institutions of the Innovation Campus. Candidates for the postdoctoral positions should have a PhD, MD or MD/PhD in a relevant area of research.

What we offer

- **Excellent scientific environment** and world-class research institutions in the life sciences
- **Access to high-end technologies and state of the art labs at the campus environment** of the Heidelberg University in Baden-Württemberg, Germany one of the largest biomedical research hubs in Europe
- Through the unique expertise across the institutions, we offer you the exclusive opportunity to **gain insight into transfer of knowledge and development of new applications**
- Accepted fellows will be provided **a two-year contract at one of the Innovation Campus institutions**
- Continuous guidance and support from experienced PIs from the Innovation Campus institutions
- This completely new inter-institutional program enables you to **excel in interdisciplinary research**
- Successful applicants are welcome to take up the post as soon as possible

Application Process

- Please register for access to the proposed Innovation Campus projects on our website
- Applicants need to apply solely via the application form on our website
- Applications should include (in a single PDF):
    - your CV
    - a publication list, and PhD/MD certificate
    - Template A: the project(s) you are interested in (see above) (up to 3 choices are possible) and a cover letter outlining your scientific interests
    - Or Template B: your own project idea, a support letter signed by the hosting PIs, and a cover letter outlining your scientific interests (see Guide for Applicants for details).
- Deadline for your applications is **April 22 2022, 9 pm CET**.
- Please submit your application as one single pdf via the contact form on our website.
- For further information please check out our **Guide for Applicants** at https://www.health-life-sciences.de

The Heidelberg Mannheim Health and Life Science Alliance stands for equal opportunities and diversity. Qualified female candidates are especially invited to apply. Disabled persons will be given preference if they are equally qualified.

For further questions contact postdoc-alliance@uni-heidelberg.de

We look forward to your application!

About the Innovation Campus of the Heidelberg Mannheim Health and Life Science Alliance

The Innovation Campus Heidelberg Mannheim Health & Life Sciences thrives to promote research and innovation through synergy – by bridging world-leading life science and biomedical research institutions and by bringing together a highly diverse range of disciplines and a cluster of top researchers. Heidelberg University with its faculties of Medicine, Biosciences, and Engineering, the University Hospital Heidelberg (UKHD) and the University Hospital Mannheim (UMM), the German Cancer Research Center (DKFZ), the European Molecular Biology Laboratory (EMBL), the Max-Planck-Institute for Medical Research (MPIMR), and the Central Institute for Mental Health (ZI Mannheim) have the common goal to develop the Rhine-Neckar region into a world-leading innovation cluster by supporting cutting-edge research and promoting transfer of knowledge into new diagnostics and therapeutics. The participating research institutions are located at the heart of a highly dynamic urban economic and industrial area embedded in a beautiful region with high quality of life.