

## **Dennis Kätzel, D.Phil(OXON), Dipl.-Humanbiol., Mag. Artium**

### **Occupational Career**

Since 2022	Full Professor of Neurophysiology (W3), <b>Ulm University</b>
2015 – 2022	Assistant Professor of Neurophysiology (W1), <b>Ulm University</b>
2012 – 2015	Sir Henry Wellcome Postdoctoral Fellow, <b>UCL, Oxford, MIT</b>
2011 – 2012	Research Associate, Institute of Neurology, <b>UCL</b>
2011 – 2014	Academic Visitor, Centre for Neural Circuits & Behaviour, <b>Oxford</b>

### **Education**

2011	<i>D.Phil</i> : Physiology, Anatomy and Genetics, <b>Oxford</b>
2007	<i>Magister Artium</i> : Philosophy (Maj.), Psychology (Min.), Sociology (Min.), <b>Marburg</b>
2007	<i>Diplom</i> : Human Biology, <b>Marburg</b>

### **Scholarships & Grants**

**Active:** Boehringer-Ingelheim – Ulm University BioCenter (BIU2)

**Past:** Boehringer Ingelheim; Boehringer-Ingelheim – Ulm University BioCenter (BIU); Deutsche Forschungsgemeinschaft (DFG); Federal Ministry of Science and Art Baden-Württemberg (Juniorprofessorenprogramm); Else-Kröner/GSO Förderinitiative für medizinische Spitzenforscher aus dem Ausland; NARSAD Young Investigator Award (BBR); John Fell Fund (Oxford University Press), Roche, Wellcome Trust

**Pre-doctoral fellowships:** Boehringer Ingelheim Fonds, Christopher Welch Scholarship Fund, Studienstiftung des deutschen Volkes

### **Current teaching: Human Medicine, Dental Medicine, Molecular Medicine**

**Main neurophysiology lectures:** autonomous nervous system, consciousness & attention, function of neocortical areas, language, memory and emotion, methods for measuring neural activity, motor system, motivation, nociception, sleep, visual system

**Advanced lectures:** optogenetics, neural oscillations, circuit neuroscience & drug discovery

**Seminars:** motor systems, reward system, skeletal muscle, heart physiology, autonomic nervous system, vision and hearing, biological psychiatry

**Practicals:** visual system

### **Research**

**Interests:** translational psychiatry, schizophrenia, ADHD, drug target discovery, organization & function of neuronal circuits, inhibition, inter-regional neural communication, working memory

**Methods:** optogenetics, chemogenetics, viral vectors, LFP, multi-electrode recordings, miniscope imaging, patch-clamp, mouse models of psychiatric diseases, behavioural testing & pharmacology, machine-learning

## Invited reviewer

**Grant reviews:** Alexander-von-Humboldt Foundation, Austrian Science Fund (FWF), Behavioural Brain Research, Deutsche Forschungsgemeinschaft (DFG), ETH Zurich Grants, Rosetrees Trust, French National Research Agency (ANR), Medical Research Council UK, National Science Centre Poland, Neurological Foundation of New Zealand, Studienstiftung des deutschen Volkes

**Publication reviews:** Advances in Pharmacology, Behavioural Brain Research, Biological Psychiatry, Br J Pharmacology, Brain, Brain Communications, Brain Research Bulletin, Brain Structure and Function, Cerebral Cortex, Epilepsia, European Neuropsychopharmacology, Frontiers in Behavioural Neuroscience, Frontiers in Cellular Neuroscience, Frontiers in Molecular Neuroscience, Frontiers in Neuroscience, Internat. J of Neuropsychopharmacology (IJNP), Nature Communications, Neuropsych Disease & Treatment, Neuropsychopharmacology, Neuroscientist, Neurotherapeutics, npj Schizophrenia, Schizophrenia Bulletin, Schizophrenia Research, Translational Psychiatry

**Editorial Board Member:** Scientific Reports

**Guest Editor:** Frontiers in Psychiatry *Reviews in Psychiatry 2022: Schizophrenia*, Scientific Reports *Hallucinations and Delusions Collection*

## Publications: Journals / Pre-prints (\* corresponding author)

Kapanaiah SKT, [Kätzel D\\*](#): *Open-MAC: A low-cost open-source motorized commutator for electro- and opto-physiological recordings in freely moving rodents.* **HardwareX**, 2023.

Bühner L M, Kapanaiah SKT, [Kätzel D\\*](#): *Chronic N-acetylcysteine treatment improves anhedonia and cognition in a mouse model of the schizophrenia prodrome.* **Front Behav Neurosci**, 2022

Kilonzo K, Strahnen D, Prex V, Gems J, van der Veen B, Murthy BKB, Kapanaiah SKT, Schulz S, Sprengel R, Bannerman DM, [Kätzel D\\*](#): *GluA1-containing AMPA receptors of distinct hippocampal subfields mediate salience processing, memory and impulse control.* **Translational Psychiatry**, 2022.

Akam T\*, Lustig A, Rowland JM, Kapanaiah SKT, Esteve-Agraz J, Panniello M, Marquez C, Kohl MM, [Kätzel D](#), Costa RM, Walton ME: *Open-source, Python-based, hardware and software for controlling behavioural neuroscience experiments,* **eLife**, 2022.

Kapanaiah STK\*, van der Veen B, Strahnen D, Akam T, [Kätzel D\\*](#): *A low-cost open-source 5-choice operant box system optimized for electrophysiology and optophysiology in mice,* **Scientific Reports**, 2021.

van der Veen B, Kapanaiah STK, Kilonzo K, Steele-Perkins P, Jendryka MM, Schulz S, Tasic B, Yao Z, Zeng H, Akam T, Nicholson JR, Liss B, Nissen W, Pekcec A, [Kätzel D\\*](#): *Control of impulsivity by G<sub>i</sub>-protein signalling in layer-5 pyramidal neurons of the anterior cingulate cortex,* **Communications Biology**, 2021.

Kilonzo K, van der Veen B, Teutsch J, Schulz S, Kapanaiah SKT, Liss B, [Kätzel D\\*](#): *Delayed-matching-to-position working memory in mice relies on NMDA-receptors in prefrontal pyramidal cells.* **Scientific Reports**, 2021.

Strahnen D, Kapanaiah STK, Bygrave A, Liss B, Sprengel R, Bannerman DM, Akam T, Grewe BF, Johnson EL, [Kätzel D\\*](#): *Highly task-specific and distributed neural connectivity in working memory revealed by single-trial decoding in mice and humans,* **bioRxiv**, 2021. (pre-print)

Strahnen D\*, Kapanaiah STK, Bygrave A, [Kätzel D\\*](#): *Lack of redundancy between electrophysiological measures of long-range neuronal communication.* **BMC Biology**, 2021.

[Kätzel D\\*](#), Wolff AR, Bygrave AM, Bannerman DM: *Hippocampal hyperactivity as a druggable circuit-level origin of aberrant salience in schizophrenia.* **Front Pharmacology**, 2020.

Bygrave AM, Kilonzo K, Kullmann DM, Bannerman DM, [Kätzel D\\*](#): *Can NMDA-receptor hypofunction in schizophrenia be localized to an individual cell-type?* **Front Psychiatry**, 2019.

Teutsch J, [Kätzel D\\*](#): *Operant Assessment of DMTP spatial working memory in mice.* **Front Behav Neurosci**, 2019.

Bygrave AM, Jahans-Price T, Wolff AR, Sprengel R, Kullmann DM, Bannerman DM\*, [Kätzel D\\*](#): *Hippocampal-prefrontal coherence mediates working memory and selective attention at distinct frequency bands and provides a causal link between schizophrenia and its risk gene GRIA1.* **Translational Psychiatry**, 2019.

- Jendryka M, Palchadhuri M, Ursu D, van der Veen B, Liss B, [Kätzel D](#), Nissen W, Pekcec A\*: *Pharmacokinetic and pharmacodynamic actions of clozapine-N-oxide, clozapine, and compound 21 in DREADD-based chemogenetics in mice*. **Scientific Reports**, 2019.
- Bygrave AM, Masiulis S, Kullmann DM\*, Bannerman DM\*, [Kätzel D\\*](#): *Gene-environment interaction in a conditional NMDAR-knockout model of schizophrenia*. **Front Behav Neurosci**, 2018.
- Grimm CM, Aksamaz S, Schulz S, Teutsch J, Sicinski P, Liss B and [Kätzel D\\*](#): *Schizophrenia-related cognitive dysfunction in the Cyclin-D2 knockout mouse model of ventral hippocampal hyperactivity*. **Translational Psychiatry**, 2018.
- Wolff AR, Bygrave AM, Sanderson DJ, Boyden ES, Bannerman DM\*, Kullmann DM\*, [Kätzel D\\*](#): *Optogenetic induction of the schizophrenia-related endophenotype of ventral hippocampal hyperactivity causes rodent correlates of positive and cognitive symptoms*. **Scientific Reports**, 2018.
- Bruyckere E, Simon R, Nestel S, Heimrich B, [Kätzel D](#), Egorov AV, Liu P, Jenkins NA, Copeland NG, Schwegler H, Draguhn A, Britsch S\*: *Stability and function of hippocampal mossy fiber synapses depends on Bcl11b/Ctip2*. **Front Mol Neurosci**, 2018.
- Bygrave AM, Masiulis S, Nicholson E, Berkemann M, Barkus C, Sprengel R, Harrison P, Kullmann DM\*, Bannerman DM\*, [Kätzel D\\*](#): *Knockout of NMDA-receptors from parvalbumin interneurons sensitizes to schizophrenia-related deficits induced by MK-801*. **Translational Psychiatry**, 2016.
- Anastasiades PG, Marques-Smith A, Lyngholm D, Lickiss T, Raffiq S, [Kätzel D](#), Miesenböck G, Butt SJ\*: *GABAergic interneurons form transient, layer-specific circuits in early postnatal neocortex*. **Nature Communications**, 2016.
- [Kätzel D](#), Nicholson E, Schorge S, Walker M, Kullmann D\*: *Chemical-genetic silencing of focal neocortical seizures*. **Nature Communications**, 2014.
- [Kätzel D](#) & Miesenböck G\*: *Experience-dependent rewiring of specific inhibitory connections in adult neocortex*. **PLoS Biology**, 2014.
- [Kätzel D](#), Zemelman BV, Buetfering C, Wölfel M, Miesenböck G\*: *The columnar and laminar organization of inhibitory connections to neocortical excitatory cells*. **Nature Neuroscience**, 2011.

## Publications: Books and Book Chapters

- Liss B, [Kätzel D](#): *Kleinhirn*, in Brandes R, Lang F, Schmidt RF: **Physiologie des Menschen: mit Pathophysiologie**, Springer-Verlag, 2019.
- Kohl MM, [Kätzel D](#): *Optogenetic mapping of neuronal connections and their plasticity*, in Appasani K (ed.): **Optogenetics: from neuronal function to mapping and disease biology**, Cambridge University Press, 2017.
- [Kätzel D](#), Kullmann D: *Optogenetic and chemogenetic tools for drug discovery in schizophrenia*, in Lipina T, Roder J (eds.): **Drug discovery for schizophrenia**, RSC Publishing, 2015
- [Kätzel D](#): *Gen und Gestalt – Der Genbegriff der Entwicklungsbiologie*. LIT-Verlag, 2011.