



## Understanding adaptation of brain circuits in development and learning

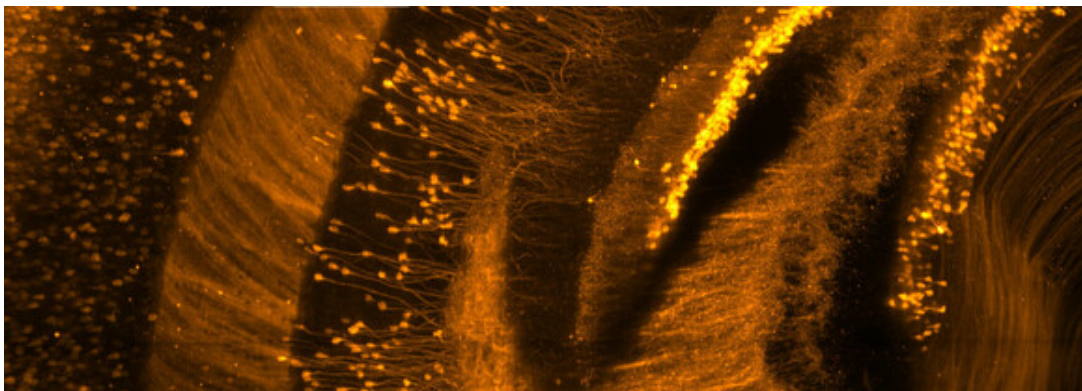
Dear Reader,

Have you ever wondered how brain circuits adapt during development and learning to enable behavioral change? Have you ever thought about possible causal links between learning deficits or developmental delay and impaired mechanisms of brain circuit adaptation? The URPP AdaBD aims to tackle these questions and to translate new insights to the clinic. We successfully started 2021 and are now pleased to present our first newsletter.

During the first two years, we successfully started several [research projects](#) and built up the structures. We established four [Platforms and Platform Seeds](#) that support URPP researchers in mesoscale light-sheet microscopy, high-dimensional data analysis, induced pluripotent stem cell (iPSC)-based models for neuroscience, and in identifying subtypes of developmental deficits as well as in recruiting study participants.

We organize several [events](#) for URPP members such as online seminars, symposia, lab visits and a retreat. Moreover, we participate in several outreach events to make our research visible and understandable to the public. So far, we have presented our URPP within the public series [Wissen-schaf\(f\)t Wissen](#) (see a report on the event on [UZH News](#)). Further, the URPP AdaBD contributes to the Scientifica events and is co-organizing the [Brainfair 2023](#).

We are looking forward to many years of exciting research and to regularly presenting new insights and events in our newsletter. Stay tuned!



The mesoSPIM gallery - mesospim.org: Mouse brain cleared using passive CLARITY: Hippocampus

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## Research projects

Within the last two years we started several collaborative research projects following three main paths. A list of all our projects can be found on our website. More and more detailed descriptions will be posted for each project in the near future.

## PATH 1: From molecules to behavior

Path 1 focuses on how neural circuits emerge and how their functions are established in health and disease.

[More information](#)

## PATH 2: From behavior to molecules

Path 2 takes the opposite route, starting from studies of circuit dynamics in behaving animals, especially during multi-sensory learning. Then, we will work our way down to specific circuit elements, even sets of genes, which are associated with developmental delay and learning deficits.

[More information](#)

## PATH 3: From humans to animals and back

Path 3 bridges results from animal models to humans by comparing network activity in coordinately-designed behavioral tasks. We aim to translate results from animal studies to human brain circuits by devising specific tests for children with general developmental delay allowing for improved diagnosis and interventions.

[More information](#)

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## Scientific Advisory Board

The URPP is pleased to introduce the members of the newly formed Scientific Advisory Board! They are internationally recognized experts and will support and advise us, be it with scientific or organizational input or by supporting with data management. We are looking forward to an enriching exchange of experience and knowledge.



**Serena Counsell, Prof. Dr.**  
Perinatal Imaging and Health  
School of Biomedical Engineering and Imaging Sciences  
Kings's College London  
[Website](#)



**Leonhard Held, Prof. Dr.**  
Open Science Delegate  
Epidemiology Biostatistics and Prevention Institute University of Zurich  
[Website](#)



**Denis Jabaudon, Prof. Dr.**  
Developmental Neurobiology and Plasticity  
Geneva University Neurocenter  
[Website](#)



**Micah Murray, Prof. Dr.**

Laboratory of Investigative Neurophysiology  
University Hospital and University of Lausanne

[Website](#)



**Marie Schaer, Prof. Dr.**

Autism Brain & Behavior  
Faculty of Medicine, University of Geneva Hospitals,  
Department of Psychiatry

[Website](#)

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### Upcoming Events 2023

This year, we will participate and organize several events both for AdaBD researchers and the public. Don't miss the opportunity to meet us at one of the following events:



#### 4th AdaBD Symposium: Networks at the UZH

The 4th Symposium will take place on **January 25th, 2023** and it will be all about connecting with different networks and initiatives around the University of Zurich. Don't miss this opportunity to meet other researchers, to hear about the progress of AdaBD projects and to discuss our research during an inspiring poster session.

[More information with program and registration](#)



#### BrainFair 2023: Lernen bei Mensch und Maschine

From **March 13th to March 18th, 2023**, you can meet us at BrainFair 2023, where we will organize panel discussions about the influence of genes and environment on brain development, about support options for learning disabilities, and about learning in humans and animals. Furthermore, you can visit our exhibition booths on Saturday, where, for example, you can take a tour through a 3D reconstruction of the neural pathways in the brain using VR glasses.

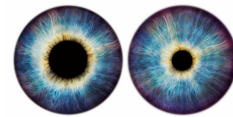
[More information](#)



#### 1st AdaBD Retreat

Our first retreat will take place **July 3rd-4th, 2023**. We are looking forward to discuss our research and have a good time together! This event will be for AdaBD researchers and their invited guests only.

*[More information will follow soon.](#)*



#### Scientifica 2023: Was die Welt zusammenhält

The URPP AdaBD will participate again in the next Scientifica which will take place on **September 2nd - 3rd, 2023**.

*[More information will follow.](#)*

## Publications

### *Preprints*

Schoenfeld G, Kollmorgen S, Lewis C, Bethge P, Reuss AM, Aguzzi A, Mante V, Helmchen F (2021) [Dendritic integration of sensory and reward information facilitates learning](#) bioRxiv,

### *2023*

Di Pietro S, Williger D, Frei N, Lutz C, Coraj S, Schneider C, Stämpfli P, Brem S (2023) [Disentangling influences of dyslexia, development, and reading experience on effective brain connectivity in children](#). *NeuroImage* 268, 119869

### *2022*

Denoth-Lippuner A, Royall LN, Gonzalez-Bohorquez D, Machado D, Jessberger S (2022) [Injection and electroporation of plasmid DNA into human cortical organoids](#). *STAR Protocols* 3, 101129.

Fraga-González, Gorka, Sarah V. Di Pietro, Georgette Pleisch, Susanne Walitza, Daniel Brandeis, Iliana I. Karipidis, and Silvia Brem (2022) [Visual Occipito-Temporal N1 Sensitivity to Digits Across Elementary School](#). *Frontiers in Human Neuroscience* 16 : 887413.

Gonzalez-Bohorquez D, Gallego Lopez IM, Jaeger BN, Pfammatter S, Bowers M, Semenkovich CF, Jessberger S (2022) [FASN-dependent de novo lipogenesis is required for brain development](#). *PNAS* 119.

Luo W, Cruz-Ochoa NA, Seng C, Egger M, Lukacsovich D, Lukacsovich T and Földy C (2022) [Pcdh11x controls target specification of mossy fiber sprouting](#). *Frontiers in Neuroscience* 16:888362.

Muttathukunnel P, Frei P, Perry S, Dickman D, Müller M (2022) [Rapid homeostatic modulation of transsynaptic nanocolumn rings](#). *PNAS* 119.

### *2021*

Karipidis II, Pleisch G, Di Pietro SV, Fraga-González G, Brem S (2021) Developmental [Trajectories of Letter and Speech Sound Integration During Reading Acquisition](#). *Front. Psychol.*, 16 November 2021.

Our website will be updated regularly with our newest [publications](#).

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## Congratulations

AdaBD member **Martin Müller** has been appointed as Associate Professor for Neurophysiology, starting 1st of February, 2022.

AdaBD member **Silvia Brem** has been appointed as Associate Professor for Cognitive Neuroscience of Childhood and Adolescence, starting 1st of February, 2023.

AdaBD member **András Jakab** has been appointed as Assistant Professor of Computational Imaging in Childhood Brain Disease, effective October 1, 2022.

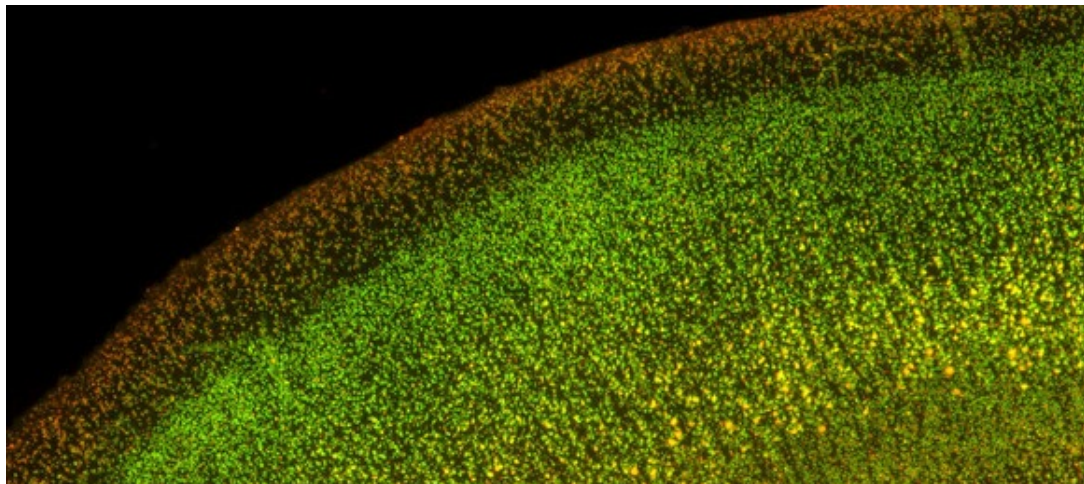
**Sarah di Pietro** finished her PhD in neuropsychiatry and started as a postdoc at the AdaBD.

**Melanie Ehrler** finished her PhD in developmental pediatrics and started as a postdoc at the AdaBD.

**Gwendolin Schoenfeld** finished her PhD at the brain research institute, where she contributed to the AdaBD project "[Dendritic adaptations during learning](#)".



**Universität  
Zürich** <sup>UZH</sup>



The mesoSPIM gallery - [mesospim.org](https://mesospim.org): Human cortex processed with MASH (EGi/iDISCO)

[Klicken Sie hier](#) um sich aus dem Verteiler abzumelden.