NEUROSCIENCE

EPFL
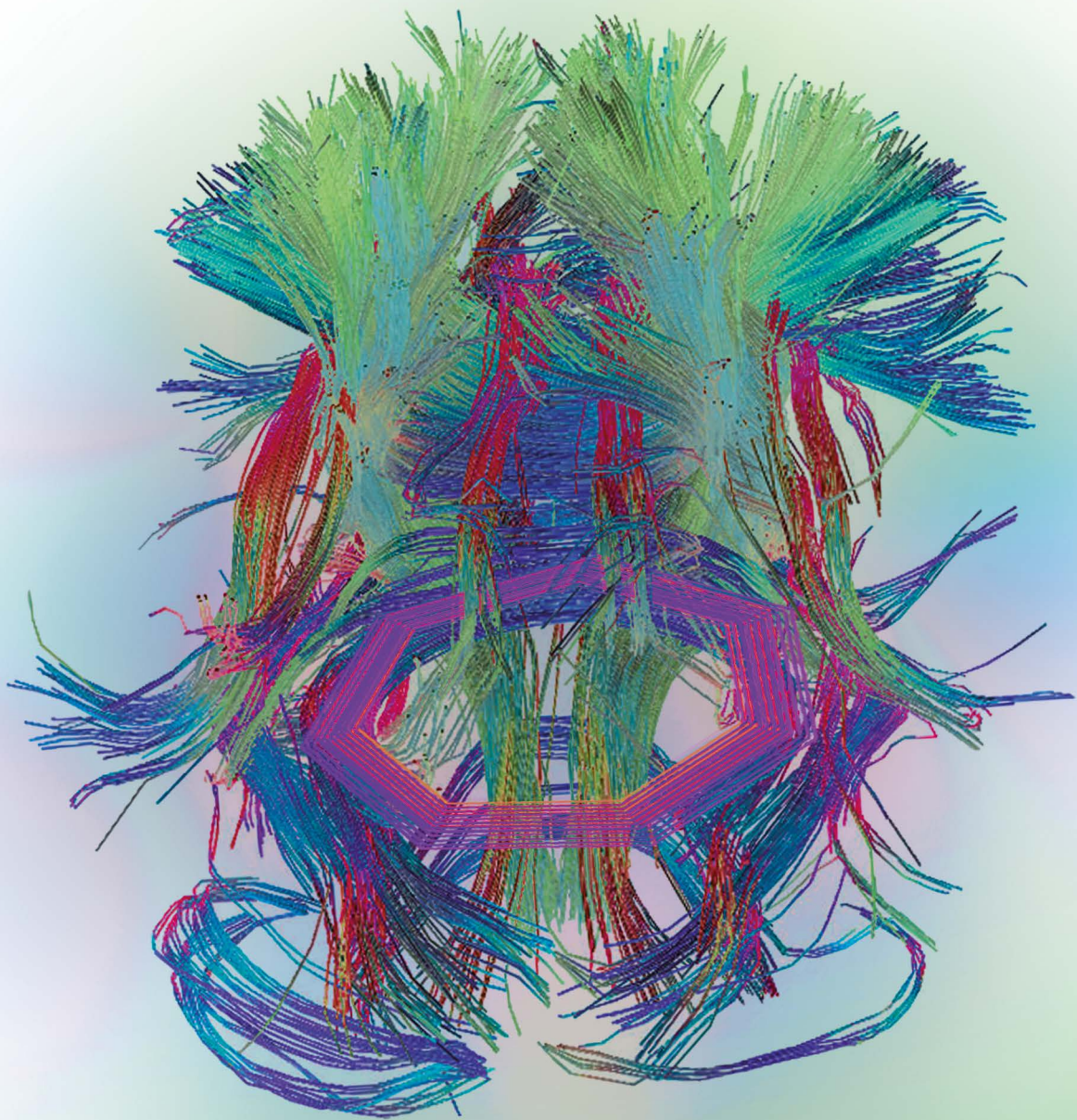
Join the EPFL PhD Program in Neuroscience and discover the fundamental principles of brain function in health and disease, by using and developing unique experimental, theoretical, technological and computational approaches.

Our main areas of research are:

- Molecular neurobiology
- Molecular and cellular mechanisms of synapse and microcircuit function
- Neurodegeneration and mental diseases
- Neuron-glia interactions and brain energy metabolism
- Sensory perception and cognition
- Neuroprosthetics
- Computational neuroscience
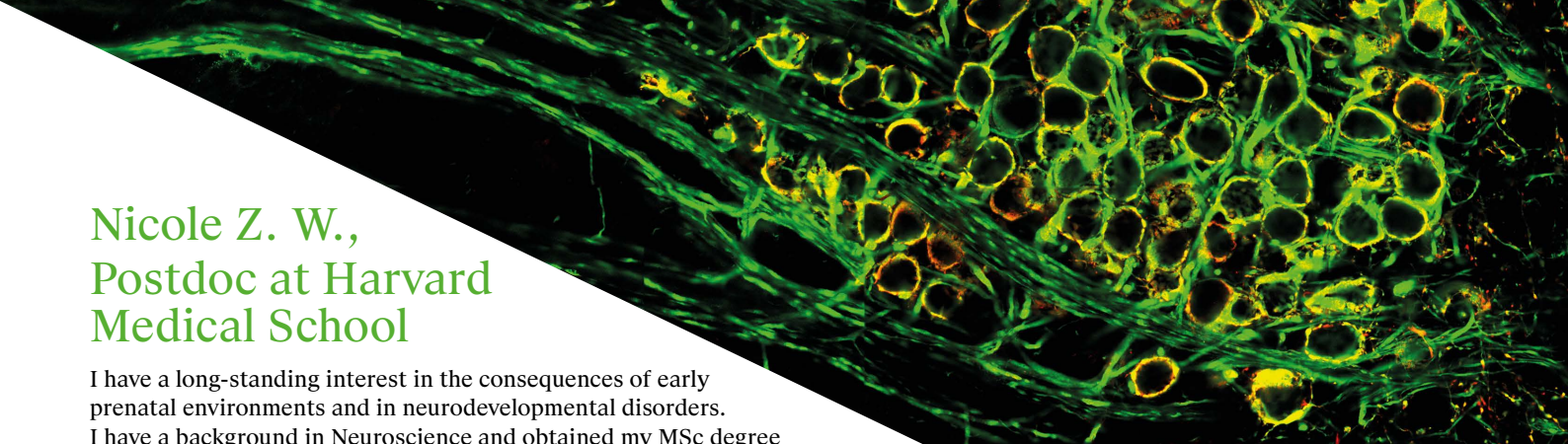- The Human Brain/Blue Brain Project

To know more:

Tej T.

During my PhD with Prof. Olaf Blanke (Cognitive Neuroscience Lab), I set up an immersive virtual reality system in combination with state-of-the-art brain imaging technologies enabling trans-disciplinary work in cognitive psychology, neuroimaging, and virtual reality. The research helped me build a multi-disciplinary base spanning systems biology, neuroimagi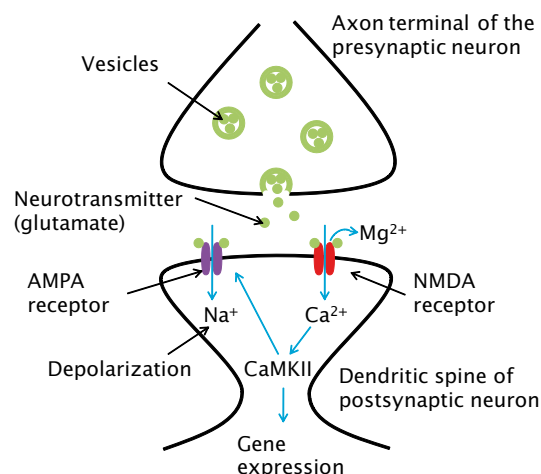ng, and computational and cognitive neuroscience. I founded MindMaze in 2011 to design and develop novel applications in Neuro-Rehabilitation and Game training. The technology platform from MindMaze will help in the treatment of various clinical conditions in neurology, psychiatry and sports rehabilitation.
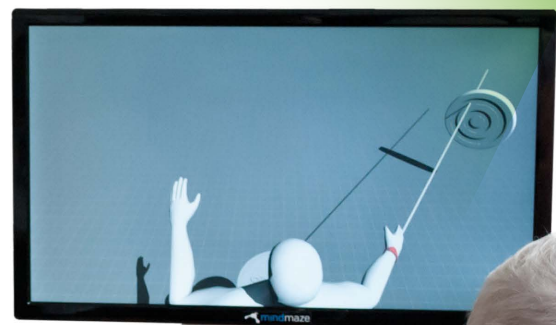
Nicole Z. W., Postdoc at Harvard Medical School

I have a long-standing interest in the consequences of early prenatal environments and in neurodevelopmental disorders. I have a background in Neuroscience and obtained my MSc degree at ETH Zurich and my PhD in Neuroscience at the EPFL. During my PhD, I investigated social cognition in individuals with autism spectrum disorders using fMRI. I am currently a postdoctoral research fellow at the Harvard Medical School/MGH and am investigating neuroinflammation in adults with autism spectrum disorders using combined MR/PET technology.

Vesicles

Axon terminal of the presynaptic neuron

Neurotransmitter (glutamate)

Mg^{2+}

AMPA receptor

NMDA receptor

Na^+

Ca^{2+}

Depolarization

CaMKII

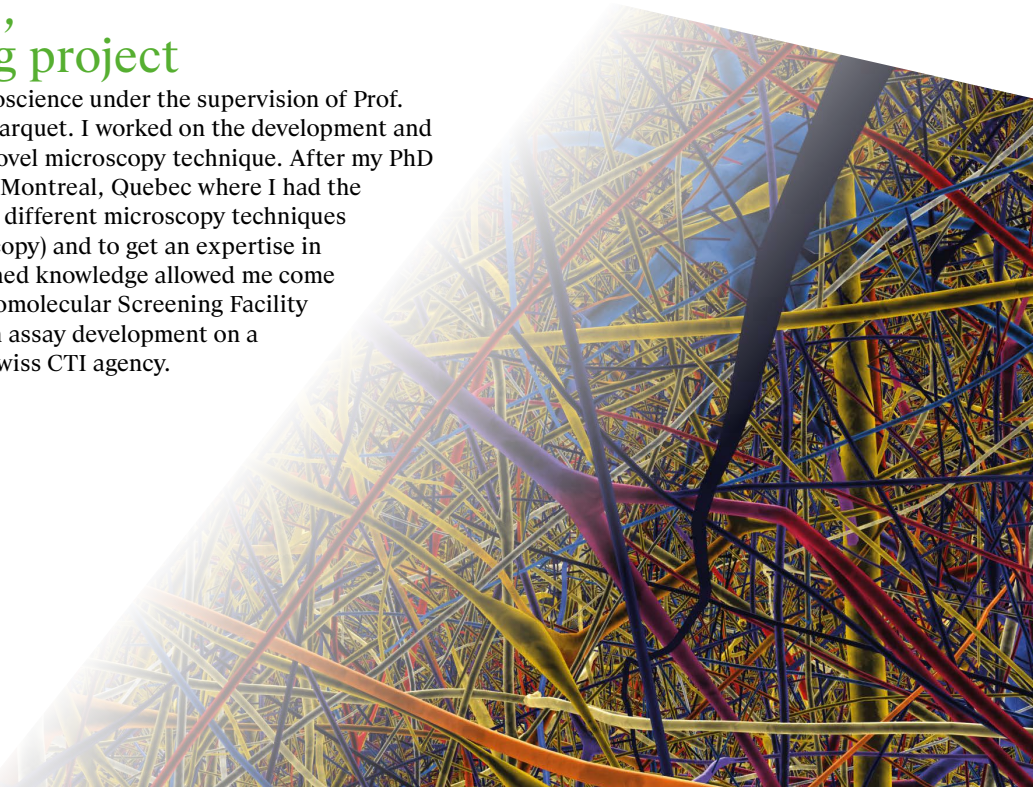Dendritic spine of postsynaptic neuron

Gene expression

An academic career, Claudia C., lecturer at Imperial College, London:

I am a Lecturer (equivalent to Assistant Professor) in the Department of Bioengineering at Imperial College London. I am doing research in Computational Neuroscience in the field of learning and memory and teach computational neuroscience for the graduate program. The EPFL PhD Program in Neuroscience allowed me to be well prepared for the different steps of my career: a first PostDoc in Paris, a second one in Columbia University in New York, before I got hired to start my own laboratory at Imperial College London in Fall 2013.

Benjamin R., an engineering project

At the EPFL I did a PhD in Neuroscience under the supervision of Prof. Pierre Magistretti and Dr Pierre Marquet. I worked on the development and application in life sciences of a novel microscopy technique. After my PhD I moved to McGill University in Montreal, Quebec where I had the chance to improve my skills in different microscopy techniques (mostly fluorescence microscopy) and to get an expertise in image analysis. This combined knowledge allowed me come back to the EPFL at the Biomolecular Screening Facility where I currently work in assay development on a project funded by the Swiss CTI agency.

Billard, Aude – Learning Algorithms and Systems

Human-Robot Interaction, Machine Learning, Dexterous Manipulation and Grasping, Computational Neuroscience and Cognitive Modeling

Blanke, Olaf - Cognitive Neuroscience

Multi-sensory perception, neuroprosthetics, intracranial human electrophysiology, cognitive neurology, virtual reality

Courtine, Grégoire - Motor control & Neuroprosthetics

Spinal cord injury, locomotion, neuroprosthetics, robotics, anatomical plasticity, electrophysiology

Gastpar, Michael - Information in Networked System

Statistical Neuroscience, Information Measures, Signal Processing

Gerstner, Wulfram - Computational Neuroscience

Computational neuroscience, models of spiking neurons, models of synaptic plasticity and STDP, models of learning

Ghezzi, Diego - Neuroengineering for Vision Restoration

Neuro-optoelectronic interfaces, visual prosthesis, optical stimulation, micro-fabrication, polymers, sight restoration

Gräff, Johannes - Neuroepigenetics

Epigenetic mechanisms in long-term memory, PTSD, neurodegeneration, stress and epigenetics

Gruetter, Rolf - Center for Biomedical Imaging

Magnetic resonance imaging, PET, MR spectroscopy, in vivo neurochemistry, hypoglycemia

Herzog, Michael - Vision

Vision, spatio-temporal vision, schizophrenia research, psychophysics, TMS, EEG, modelling

Hess-Bellwald, Kathryn - Topology and Neuroscience

Computational algebraic topology, topological data analysis, category theory and homotopy theory applied to neuroscience.

Hill, Sean - Thalamocortical Computation & BBP

Thalamocortical structure & function, models of wakefulness & sleep, neuromodulation, simulated TMS and EEG

Hummel, Friedhelm – Brain Stimulation, Neuroimaging & Clinical Neuroengineering

Stroke, Healthy Aging, Neuroplasticity, functional regeneration, brain stimulation, structural and functional neuroimaging, motor learning, motor control

Ijspeert, Auke - Motor Control & Robotics

Models of animal locomotion control, central pattern generator networks, robots as scientific tools in neuroscience

Knott, Graham - Bio Electron Microscopy

Brain ultrastructure, neuronal plasticity, electron microscopy, synaptic connectivity, synapse structure

Lashuel, Hilal - Molecular Neurobiology & Functional Neuroproteomics

Neurodegeneration, protein misfolding, protein engineering, Parkinson's disease, Alzheimer's disease

Markram, Henry - Neural Microcircuitry & BBP

Neurons, synaptic plasticity, neural & neo-cortical microcircuits, brain simulation, Human Brain Project

McCabe Brian - Neurogenetics and disease

Synapse development, neurotransmission, circuit function, motor system, locomotion, SMA, ALS

Micera, Silvestro - Translational Neural Engineering

Neural control of movement, implantable neuroprostheses, robot-based neuro-rehabilitation

Millàn del R., José - Brain-machine Interfaces

Neuroprosthetics, Statistical machine learning, Human-robot interaction, Cognitive neuroscience

Petersen, Carl - Sensory Processing

Whisker behavior, sensory perception, barrel cortex, cortical circuits

Rainer, Gregor - Visual Cognition - Uni. of Fribourg

Primary visual cortex, basal forebrain, acetylcholine, psychopharmacology, pulvinar, lateral geniculate nucleus

Ramdya, Pavan - Neuroengineering Laboratory

Drosophila melanogaster, individuality, action selection, limb control, robotics, functional imaging, electrophysiology, neurogenetics

Sandi, Carmen - Behavioral Genetics

Stress, glucocorticoids, aggression, social hierarchy, psychopathology, neural cell adhesion molecules, mitochondrial function

Schneider, Bernard - Neurodegenerative Disease

Modelling, treatment of human neurodegenerative diseases, aging, gene therapy, viral vectors

Schneggenburger, Ralf - Synaptic Mechanisms

Synaptic transmission, neurotransmitter, exocytosis, short-term plasticity, synapse development & connectivity

Schürmann, Félix - Neurosimulation Technology & BBP

In silico neuroscience, simulation, scientific computing

Thiran, Jean-Phlippe - Image Processing and Analysis

Image segmentation, multimodal fusion, MRI, quantitative imaging, diffusion MR processing, connectomics

Van de Ville, Dimitri - Medical Image Processing

Computational Neuroimaging functional MRI, signal processing, brain decoding, connectivity, networks

Contact: **edne@epfl.ch**
Application deadlines: **April 15th and November 1st**
How to Apply? **go.epfl.ch/phd-edne**