

CRC1451 - Key mechanisms of Motor Control in Health and Disease

Newsletter May 2023 "Welcome Spring"

Welcome to #6 of the CRC1451 Newsletter



Dear readers,

In the first quarter of 2023, our early career researchers had the chance to participate in the intensive INF methods course (more information here: https://bit.ly/43XUVgZ). Apart from that, our lecture series started at full speed again in the New Year with excellent speakers in the Motor Control Science Club, a fabulous Gender & Diversity in Science Lecture by Ariel Levine from NIH USA, and continuous valuable iRTG lectures. We have modified the time slot for the Motor Control Science Club to further improve attendance possibilities: Future Motor Lectures will be held on Mondays at 1 pm or 5 pm. Watch out for future announcements: times and dates might have changed.

"Spring is the time of plans and projects." This quote by Leo Tolstoy defines spring for most of us; and for our Annual Retreat 2023! The entire CRC1451 came together in Moers on April 20 and 21. Finally, after we started in the middle of the pandemic, we had an open personal meeting without any restrictions. According to the evaluation, everybody enjoyed his or her time despite an intensive schedule. They had plenty of opportunities to discuss the projects, interact and make further plans. We thank the entire CRC1451 team for their enthusiasm and for making this Retreat valuable. Great work, everyone!

Now we are looking forward to a busy summer. Projects are running while we are preparing for the next funding period. Please be aware that we are very proud of the entire team and enjoy seeing the development of the projects. Please also feel free to comment and discuss your topics with the Central Office and/or Management Team anytime. We hope you like browsing through our newsletter. Whenever you have any issues, scientific progress, scientific pictures, etc., please contact sfb1451-sekretariat@uni-koeln.de.

Please note the next General Assembly date, where the spokesperson and vice-spokespersons will be (re-)elected.



Gereon Fink Spokesperson



Silvia Daun Vice-Spokesperson



Christian Grefkes Vice-Spokesperson

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CRC1451 Team, Moers Annual Retreat 2023

# 1. Introduction of New Employees



## Taylan Kuzu

Who are you and where do you come from? My name is Taylan Deniz Kuzu and I am from Gummersbach, a small town near Cologne.

What is your professional background and where did you study? I studied human medicine at Ruhr University Bochum (German: Ruhr-Universität Bochum, RUB).

What is your role in the CRC1451? I will support the work of ZO3 and the walking laboratory.

## What was your motivation to join the CRC1451 team?

My motivation is my profound curiosity in understanding the human brain and its organization. I am not only interested in the way motor control works from the fundamental level, but also how pathologies arise with respect to this system and what possible therapies could be applied.

## What do you like to do when you are not doing science?

Apart from my specific academic scientific activities, I like to explore natural sciences in general and read a lot about a variety of different topics. Beyond science, I enjoy playing the piano and doing athletics. I also volunteer in the area of sustainability in healthcare. On weekends, I like to do activities with friends.



## Jonas Günther

## Who are you and where do you come from?

My name is Jonas Günther, I grew up in Rhineland-Palatinate and Rhineland-region, studied in Cologne and have grown fond of the city and it's people, so I still live here.

## What is your professional background and where did you study?

Throughout my medical studies at University of Cologne, I was interested in Neuropsychiatry and could be part of a depression & exercise trial at the Departement of Child and Adolescent Psychiatry; here I specialised on neuroimmunological aspects. Besides my medical studies I worked as a student assistant in diverse roles, e.g. as a tutor in a medical-communications semi-

nar or during the pandemic for the local public-health-authority. Especially meaningful to me were some interesting opportunities to take part in academic-politics: I was engaged in representation of medical students on faculty and national level, such as the development of the National Competence Based Catalogues of Learning Objectives or quality management in education. Additionally I was elected as a student representative on university level, where I, among other activities, was part of the initiation of EUniWell as a European University Alliance.

## What is your role in the CRC1451?

As a Clinician Scientist in the CRC1451 I will be particularly involved in trials with neurological patients suffering from motor control deficit.

### What was your motivation to join the CRC1451 team?

Since my school days I have been fascinated by the human brain

and its ability to cause enigmatic disorders on the one hand, and to (re)learn highly complex skills on the other. The opportunity to work with, and for patients is a privilege and a major motivation for me. The CRC1451 offers me a highly interesting chance to explore these clinically very relevant questions in an interprofessional and multidisciplinary environment, which is especially attractive for me as a Clinician Scientist at the beginning of my career.

### What do you like to do when you are not doing science?

In my spare time, I volunteer as a lifeguard and instructor in the local lifesaving society and go on hiking tours around Cologne and further afield.



## Rastislav Pjontek

#### Who are you and where do you come from?

My name is Rasti Pjontek, I come from Slovakia, and I moved to Germany after finishing high school to study medicine.

#### What is your professional background and where did you study?

During my medical studies at Heidelberg University, I became fascinated by the field of neurosciences. Consecutively, I sought out work experiences as a research assistant at the Institute of Neuroanatomy and in the Lab of Clinical Neurobiology, and I completed my final thesis on the topic of Copy number variations in patients with cervical artery dissections in the Lab of Molecular

Neurogenetics. After graduating from medical school, I have worked in several departments at the University Hospital RWTH Aachen, including Neuroradiology, Neurology, and ultimately Neurosurgery. Alongside my clinical duties, I have been actively involved in scientific work primarily related to neuroimaging.

#### What is your role in the CRC1451?

As a Clinician Scientist at the Department of Stereotactic and Functional Neurosurgery, my main focus is on project CO7, which aims to characterize the neuronal networks that are involved in motor tic formation and suppression. I conduct electrophysiological studies and behavioural tasks with patients suffering from Tourette syndrome and analyse neuroimages to identify specific neural circuits that contribute to the development and regulation of tics. Furthermore, I also analyse structural connectivity within the brain in patients with other psychiatric disorders, such as OCD and dementia, who have have been treated by deep brain stimulation.

#### What was your motivation to join the CRC1451 team?

During my specialization in neurosurgery, I developed a particular interest in functional neurosurgery, especially deep brain stimulation. I realized that combining my clinical work with scientific research is the best way to deepen my knowledge and expertise in this field. Joining the research team has given me the unique opportunity to merge my clinical work with scientific investigation. I hope to contribute a little bit to the advancement of knowledge in this fascinating field through my research endeavors.

#### What do you like to do when you are not doing science?

In addition to my scientific and clinical work, I am currently passionately engaged in an interprofessional education project for medical students and nursing trainees. Outside of work, I used to enjoy DJing, but since becoming a father, I mostly devote my free time to ensuring the happiness of my three wonderful children, and of course, my beloved wife.

## 2. Introduction of Guest Scientist



## Ariel Levine

#### Who are you and where do you come from?

I grew up outside of DC and was always encouraged to become a part of science by my parents. My father was a doctor and my mother a computer scientist which is why from my earliest days on, science was presented to me as a wonder which is worth, being curious about.

#### What did you study, where, and why?

I started my scientific journey by first of all, receiving an undergraduate degree in biology from Brandeis University in 2000, second I got my Ph.D. from Rockefeller University in 2008, focusing on developmental biology and embryology. Following that, I aimed for my M.D. at Cornell University in 2009. Science itself was just the field I always felt curious about from my early days on.

With Biology specifically, it was all about the pure interest which is why I started and stayed with that.

### What were the decisive steps in your career?

During my early scientific journey, I did not always was surrounded by many "helping hands" and often felt left alone. I was treated as an independent grown-up and had to help myself out. And that is, what I needed to do from the beginning on to survive in that field and what I eventually did: I decided to take ownership. I learned, that is about deciding who I want to be and knowing the value of each thing that I am doing to get me there. In addition, recognizing the wonder that science offers me goes a long way toward sustaining my joy in life. For example, I simply love watching animals walk, I am still absolutely fascinated by the beauty of neuroanatomy, and I feel privileged when I read old papers. Last but not least, I am also very grateful for the support I have received and continue to receive from so many loving people, including my long-time partner who is a huge contributor to my life.

#### What would you do differently or exactly the same again?

Honestly, I do not feel that I did major mistakes during my path. But there are indeed some lessons I failed to learn during my scientific journey. One thing which comes to mind is that I wish I pushed myself a little harder through math during school to understand big data better.

### What allows you to relax from work?

I enjoy spending time with my family, going on walks with my dog, and engaging in crafts and small art projects.

# Do you have any tips for young colleagues on how to deal with frustrations?

It is very helpful to reach the point of accepting that there are things that are beyond your control. Also, knowing how much energy you are willing to put into the things you do, based on who you are and what your values are, will keep your energy level up and sustain your joy in life.

## 3. Career path interview



## Ansgar Büschges

# What did you study and where?

Initially, I studied Biology, Philosophy and Sociology at the University of Bielefeld. When entering the advanced study period, I decided to focus on Biology only.

#### Why?

Since I was a child, on the one hand I had been very much attracted by nature, in particular by the various ways in which animals behave, on the other hand by music, the fascinating art by which human beings have detached sound production from pure communication. For my complete high school period I had been spending the mornings at an ordinary school and the afternoons at a music school. Only in the last year of my school days, I decided against studying classical guitar and in favor of studying biology.

## Why there?

According to the large number of pupils searching for study places at German universities was for many subjects confronted with a too low of number of study places these days (1980) I "was allocated" to study at the University of Bielefeld. The government prompted to implement a central mechanism for distibuting students at universities, the co-called "Zentrale Vergabestelle für Studienplätze" (ZVS). This mechanism prioritized allocating students at a university close to their place of living, in my case the University of Bielefeld. When starting my studies in Biology I was initially planning to change the university later on. However, when I entered the advanced study program phase, the research areas ethology, neuroscience and theoretical biology - which had been well established at the University of Bielefeld - had caught my attention. So, I decided to stay. I had been working as student helper in various research groups up to the period when I joined the group of Holk Cruse. This group focused on the neural underpinnings of animal locomotor behavior, which met my interests and I conducted my diploma thesis there.

## What were decisive steps in your career?

Answering this question is challenging, because one has to be aware, that trying to assess the role of decisions and steps in hindsight will only reflect our todays view on a potential impact. Such view is self-centered and it happens much, much later. Why do I emphasize this? Already about 100 years ago social scientists started to discuss that it is important to be aware of the fact that paths of individuals through life and society are influenced not only by their individual actions, but even more by the unintentional consequences of decisions by intention.

Taking this as a personal disclaimer, I allow myself to describe some steps along my educational and professional path, which I consider relevant for the overall outcome as of today: (i) I acquired my diploma in Biology in 1986 with a thesis devoted methodologically to biocybernetics. I used theory-based approaches to unravel neural underpinnings of motor control, which means to investigate signal processing in a sensorimotor system on the basis of Fourier- and Ramp-stimulus-analyses. Neurophysiology fascinated me and I wanted to pursue my interest by means of going for graduate gualification. I decided to move for my doctoral thesis to the lab of Ulrich Bässler at the University of Kaiserslautern, because in this group neurophysiological methods had been well established for some time. (ii) During the third year of my thesis, i.e. in 1988, I received an invitation from one of the leaders in the field of motor control, Keir Pearson at the University of Alberta, for doing a postdoc in his lab. Keir Pearson had heard of me and my interest in motor control from a former postdoc, Harald Wolf, who had visited Kaiserslautern upon his return to Germany from Pearson's lab. During my postdoc with Keir Pearson I studied structural and physiological underpinnings of functional regeneration of locomotor behavior upon partial deafferentation in one of the best-identified neural circuits for animal locomotion at that time, i.e. the locust flight system. It might be interesting to note that this lab was located in the medical faculty of the University of Alberta. For myself, this

period opened important new avenues for research and thinking, importantly competence to causally dissect neural circuits. I followed these new avenues, when returning for a second postdoc back to Germany to the lab of Ulrich Bässler, who gave me the complete freedom for combining the research agenda of his lab with my own ideas. (iii) Thirdly, I consider my stay at the lab of Sten Grillner as highly relevant. At the Nobel Institute I started to work on vertebrate motor control thereby not only entering new grounds but also actively broadening my experimental and conceptual competence when bridging my own research in motor control across phylogenetic boarders. I took this step after my habilitation as part of my research program as DFG-Heisenberg fellow. It was during this stay, when I received the offer for a full professorship in Animal Physiology at the University of Cologne. As far as I can judge from today, it was at least these three decisions, which rendered instrumental for my path.

## What would you do differently?

Looking back, I do not recognize any aspect of my scientific development and work in science in this respect. However, since my time as professor I realized that it is not only the quality of science that you want to achieve and do, but that it is also competence for the other areas of this profession, being it project management, leadership and teaching competence, just to name three. Today's support for early career researchers allows them to learn and profit from advice and education for becoming professional and efficient in all aspects of a job in science early on in a career. I consider this a very good development. For sure, it cannot improve the quality of science a researcher does, but by making work more efficient it will positively affect the quality of research by leaving more time for it.

### What would you do exactly the same again?

Along my professional path I used the chance to widen my scientific views and competences and to increase the impact of my scientific projects and steps by collaborating with colleagues. Collaborations still complement my interest, work and

methodological approaches and at the same time allow for me to learn and to get acquainted with other and new approaches. Alongside, I was fortunate to get to know and to work with fascinating and interesting people. This one aspect means a lot to me and it is a lot of fun.

### What allows you to relax from work?

Music is still with me, even though I did not have the time to keep up my competence in playing the guitar up to what it was long ago. Before the pandemic I enjoyed doing sports in a gym twice a week and I have started again, as I write this text. On weekends and during vacation I enjoy hiking. Finally, during the pandemic I started to do gardening for vegetables in raised beds, which is a lot of fun. The latter finds since 2020 its peak, when we prepare food from the own harvest.

# Do you have any tips for young colleagues on how to deal with frustrations?

Here a couple of things come to my mind. The fact that experimental as well as theoretical approaches might not lead to the results expected is the challenge for all scientists and at the same time it is the kernel property of doing science. For myself, I learned this, being a postdoc with Keir Pearson and doing experiments to verify or falsify the hypothesis, that in the locust flight system another wing sense organ takes over the role of an experimentally lesioned sense organ during regeneration of wingbeat activity. While an initial set of experiments supported the hypothesized notion, subsequent quantitative studies rendered this idea as incomplete and the developed next steps as questionable. What helped me was the advice of my supervisor: he simply commented, that we might have not taken all possibilities into account and that we need to consider other approaches. When I finally did so, we were able to identify the mechanisms underlying regeneration. What have I learned: never stop doing experiments to strive for promoting your project and never get caught by the notion that an initiated path of research is the only one possible way.

## 4. Gender Tips

## 1. Backup-Service

The Backup-Service offers support when childcare is needed for a short period of time, for example prior to starting regular daycare, or on a day when the regular childcare facility is closed. Eligibility for the Backup-Service depends on various factors. An individual solution is sought in the personal consultation. If you are interested, please send us an application for the Paramecium daycare centre, stating exact dates, to: **backup-kinderhaus@verw.uni-koeln.de** 



The application form and additional information are provided at the following homepage: https://uni.koeln/WQ568



## 2. Individual Coaching by Ms. Hofmann

All female PI's, especially all participants of the workshop "Self-confidence, self-presentation, self-marketing", have the possibility to book an additional short coaching with Ms Hofmann to deepen their knowledge. Everybody who is interested in the individual coaching by Ms. Hofmann, please contact Claudia Wegscheid (c.wegscheid@uni-koeln.de) for further information and to make an appointment.

# 5. News

Our CRC1451 member Brunhilde Wirth was awarded the highest-ranking prize of the Deutsche Gesellschaft für Muskelkranke e.V. (DGM), the Duchenne-Erb Prize, on March 23, 2023. Her groundbreaking work in the field of spinal muscular atrophy (SMA) has been instrumental in developing innovative treatment options. For this, she had already received the Innovation Award of the State of North Rhine-Westphalia in 2019.

## Congratulations!

Brunhilde Wirth has contributed in particular over the past 33 years to the elucidation of the genetic cause of spinal muscular atrophy (SMA), the discovery of genetic factors that protect against SMA and the associated cellular pathomechanisms. These findings have been instrumental in the development of innovative therapies for people with SMA. As Chair of "SMA Europe", she has significantly shaped the scientific SMA landscape and has advocated for newborn screening for SMA nationwide.





Our CRC1451 deputy speaker Christian Grefkes-Hermann, director of the Department of Neurology at Frankfurt University Hospital and long-time member of the DGKN (German Society for Clinical Neurophysiology and Functional Imaging) Board of Directors, took office as DGKN president in March 2023. As congress president of the next DGKN annual congress (DGKN24), which will be held March 6-9, 2024, in Frankfurt am Main, he will focus on clinical neurophysiology on the way to personalized medicine.

# Events

All ongoing and past Events can be also found here: https://www.crc1451.uni-koeln.de/index.php/news-events/

## Save the Date 2024

• March 19 – 20	CRC1451 Symposium in Cologne
• March 21 - 22	CRC1451 Annual Retreat in Moers

## Cologne Theoretical Neuroscience Forum (CTNF) - 11 am CEST

The CTNF aims at regular talks on every 2nd Thursday of the month. For more information, visit the website under https://computational-systems-neuroscience.de/ctnf/

## Motor Control Science Club - 11:00 am CEST with meet the speaker lunch

> May 17	<b>Bogna M. Ignatowska-Jankowska,</b> "Distinct behavioral phenotypes induced by endocannabinoid modulation in high-precision marker-based 3D motion capture of freely moving mice"
> June 2	Aya Takeoka, "Spinal circuit plasticity for movement generation"

## GADIS Lecture (after Motor Control Science Club see above at 12:00)

> June 2

Aya Takeoka



## Early Career Researcher (ECR) & Postdoc Specials:

## iRTG Motor Lecture - 9:00 am CEST

> May 22	Jochen Roeper, "How dopamine moves us"
> June 5	Simon Eickhoff, "Machine-learning in neuroimaging: Great expectations and a challenging road"
> June 19	<b>Silvia Daun</b> , "Decoding the mechanisms underlying neural information processing in the brain during stimulus perception and motor control"
> July 3	<b>Ansgar Büschges</b> , "Neural Control of Posture and Locomotion – from system and network level to neurons and back"



More information on iRTG events will be send out by the CRC1451 iRTG coordinator Claudia Wegscheid on a regular basis. In case you don't receive the info, please contact c.wegscheid@uni-koeln.de.

All ECRs and Postdocs, please keep in touch with the iRTG coordinator to follow your duties within the CRC1451 programme. Please remember that the CRC1451 lectures and events are mandatory.

The structured programmes (PhD and Postdoc) of the CRC1451 Graduate School can be found here: https://www.crc1451.uni-koeln.de/index.php/young-researchers/

#### **Collaborative Research Center 1451**

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