

summer edition

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Science News: The Frankfurt Alliance: A New Chapter for Research in Frankfurt and the Rhine-Main Area

in January 30, 2024, an important event took place in the magnificent Kaisersaal of Frankfurt's Römer: The ceremonial launch of the Frankfurt Alliance. The signing of the Memorandum of Understanding marked a milestone for the future of research in Frankfurt. The groundbreaking alliance of 16 renowned institutions, including the Max Planck Institute for Brain Research, has a clear goal: to strengthen Frankfurt as a research location in Europe and worldwide.

On January 30, 2024, political representatives and the heads and directors of the 16 participating institutions gathered in the magnificent Kaisersaal of Frankfurt's Römer for a festive kick-off event. The Frankfurt Alliance was officially presented and the Memorandum of Understanding was signed.

The members, Max Planck Institutes, Leibniz Institutes, Fraunhofer Institutes, the GSI Helmholtz Centre for Heavy Ion Research, the Paul Ehrlich Institute and the Goethe University Frankfurt, want to jointly tackle the major challenges of the 21st century and develop innovative solutions. The central tasks are to attract talented young

scientists, to promote the joint use of equipment, to present a united front to politicians and to inspire the public with enthusiasm for science. The future of Frankfurt as a research location is promising, and the Frankfurt Alliance will undoubtedly play a central role in its further development.

The Max Planck Institute for Brain Research looks forward to the continuation of existing successful collaborations and the creation of new joint projects within the Frankfurt Alliance.



Frankfurt Alliance – after the signing of the Memorandum of Understanding in the City Hall. © Peter Kiefer/Goethe University Frankfurt

Science News: Transgender Scientists shed Light on the Hurdles they face in Academia



in a first-of-its-kind commentary published March 14, 2024, in the journal *Cell*, 24 transgender scientists and their family members openly share their experiences in STEMM (science, technology, engineering, mathematics, and medicine) fields. The landmark commentary is featured in a sex- and gender-focused issue of *Cell* that covers a range of topics, including gender equity, the history of sex and gender research, and ways to improve the quality of research by incorporating more rigorous sex-related variables.

The barriers faced by trans people, exacerbated by anti-scientific transphobic arguments, impede their participation in science and career advancement. The commentary highlights the legal and material challenges that hinder trans people's educational attainment and productive research careers.

Neuroscientist and commentary author Dori Grijseels of the Max Planck Institute for Brain Research says: "I hope that trans scientists can see this piece as a beacon of hope. It can be incredibly isolating to be a trans scientist, especially in particularly hostile places, but I hope that this commentary can give a sense of community to those scientists."

Trans people are disproportionately subject to harassment and discrimination, and face heightened scrutiny regarding professional attire and behavior. The authors argue that rigid expectations of gendered behavior in the workplace perpetuate the marginalization of trans people, as well as cis people with non-conforming gender expressions. They also highlight the unique pressures faced by

trans women of color and the consequences of appeals to professionalism.

The commentary outlines actionable steps for cis researchers to support their trans colleagues: showing respect without singling them out, educating themselves and others, and using privilege and influence for institutional and policy advocacy. The responsibility for these changes should not fall solely on trans researchers, as inclusive practices benefit the entire scientific community. "While it's natural to feel hesitant about potentially making mistakes while trying to help, the risk of inaction — fueled by a fear of making mistakes — is far greater than the risk of attempting to make a positive change," says neuroscientist and commentary author Eryn S. Dickinson of Yale University.

"When cis and trans people alike challenge sex and gender essentialism, we enshrine bodily autonomy and intellectual freedom. When we build institutions and systems to support all who contribute, we move to rectify scientific inequity and injustice," the authors conclude.

Friends of the Max Planck Institute for Brain Research

Institute News: Brain Research and Large Language Models – a Quantum Leap?



in May 2024, the National Academy of Sciences Leopoldina and the Max Planck Institute for Brain Research co-hosted a thought-provoking symposium to bring together experts from computer science and neuroscience. The event focused on discussing the advancements in artificial intelligence (AI) and its implications for the future of cognitive science.

The symposium explored the potential of large language models (LLMs), such as GPT-3, which have recently generated both excitement and concerns about their ability to rival human intelligence. While there are many similarities in the capabilities of LLMs and human intelligence, it is important to consider these features from a neurological perspective.

During the event, participants discussed the achievements and challenges in the realm of AI, comparing the capabilities of artificial systems to the human brain. They also examined the tools used to study the representation and potential improvements of LLMs. One interesting question raised during the symposium was whether these models have learned a representation of language similar to that of the human brain.

Furthermore, the symposium addressed the potential for LLMs to inspire progress in brain research. In this context, researchers explored whether neurological findings could be used to enhance the performance of current language models.

The symposium featured notable experts in computer science and neuroscience, including Alison Gopnik from Berkeley, Iryna Gurevych from TU Darmstadt, Uri Hasson from Princeton University, Melanie Mitchell from Santa Fe Institute, Björn Ommer from LMU Munich, Haim Sompolinsky from Hebrew University/Harvard University, and Mariya Toneva from the Max Planck Institute for Software Systems.

Institute News: Naked Mole-Rat Social Study: Barker Lab in South Africa

the Barker Lab is about to embark on an exciting new venture with a team of scientists at the University of Pretoria, South Africa to study one of the most fascinating creatures in the Animal Kingdom: the naked mole-rat. Native to East Africa, these small burrowing rodents exhibit remarkable traits such as cancer resistance, insensitivity to pain, and an unusually long life-span, living in highly structured colonies with a social organization similar to that of bees and ants. The primary goal of the Barker Lab expedition is to study how naked mole-rat societies are structured. Using a real-time tracking system developed at the Max Planck Institute for Brain Research to monitor the movement of animals in the colony and their vocal communication, the team is now working with scientists at the University of Pretoria to study social dynamics in the naked mole-rats and other closely related species. They aim to uncover the distinctiveness of naked mole-rats and explore the evolution of their unique behaviors.



The team includes Julian Burger a graduate student and Firdevs Murad, an MD/PhD student. The trip will involve observing naked mole-rats and Damaraland mole-rats, collecting data on their behavior and environmental interactions, and analyzing their vocal communication. This is the first time the Barker Lab sets out on such an adventure, and their colleagues at home are eagerly anticipating the discoveries that will result from their work.

Night of Science at Campus Riedberg



on Friday, June 21, the Riedberg campus was abuzz with the annual Night of Science, organized by Goethe University students. From 5 p.m. until the early morning, visitors enjoyed a wide array of scientific lectures and activities. Originally a protest against tuition fees in 2006, the Night of Science has grown into a major event, now spanning multiple institutes.

The event featured over 80 lectures, including two popular talks by the Max Planck Institute for

Brain Research. This year's topics ranged from DNA mysteries and climate change to the physics of soccer and Long Covid. Activities included robot soccer, glider demonstrations, and various booths showcasing scientific initiatives.

The Max Planck Institute for Brain Research presented two talks, one on the biology of the naked mole-rat and one on RNA research in the brain, both of which drew large crowds. Attendees engaged with speakers and enjoyed refreshments from the Institute's food truck until midnight.

Friends of the Max Planck Institute for Brain Research

Outreach Spotlight: Science meets Entertainment: Frankfurt has Brains – live!

on April 24, 2024, „Frankfurt hat Hirn – live!“ (Frankfurt has brains) delighted a packed audience at the St. Peter Jugendkulturkirche. Organized by the Hertie Foundation in cooperation with Frankfurt’s neuroscientific institutions, the event, which was aimed primarily at high school students, featured engaging „flash talks“ and activities on the subject of the human brain.

HR3 radio host Johannes Sassenroth, who hosted the evening, commended the scientists for their ability to distill complex research into five-minute presentations. The talks covered a range of topics, including circadian rhythms, categorical thinking, the impact of music on the brain, RNA research, and motor skill learning. Highlights

included mentalist Harry Keaton’s performance and various animated short films.

Throughout the evening, visitors had the chance to engage in hands-on experiments and discussions at information booths set up by the participating institutes. A particular favorite with the young audience were the „miracle berries“ (*Synsepalum dulcificum*) at the Max Planck Institute for Brain Research booth. These berries contain a glycoprotein that binds to taste buds, making sour foods taste sweet.

The Hertie Foundation and the participating institutes were very satisfied with the evening and hope to be able to organize a follow-up event in the future.



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PhD student Marcel Juengling (Schuman Lab) presented an engaging flash talk at “Frankfurt hat Hirn – live!”.

Interview with Postdoctoral Researcher Dori Grijseels



Dori Grijseels joined the MPI for Brain Research in 2023 as a Postdoctoral Researcher in the Barker Lab. They are co-author of the recent commentary „Rigorous science demands support of transgender scientists“ published in Cell (see Science News).

Dori, can you tell us a bit about your background and what inspired you to pursue a career in science?

I always liked science, even as a kid I would grow seeds and look at animals and generally had a fascination with nature. As I grew a bit older, I also started to get more interested in things to do with the brain. After secondary school I initially started studying biology, and then added an artificial intelligence major in my second year to get the intersection of biology, neuroscience and computer science. I did not really plan for a career in science, but just kept studying as I was enjoying it, so I eventually found myself doing a master, and then a PhD, and just never left.

How has your experience as a trans person shaped your journey in the scientific community?

During my PhD I got quite heavily involved in LGBTQ+ science outreach, for example with a group called LGBTQ+ STEM in the UK. Here, I really found a community of people who were as enthusiastic at science as I was, but also shared experiences in terms of being queer. This group really made me feel like there was a place for me in science, despite also seeing a lot of negatives that affected both me and my friends (e.g. homophobia, transphobia). This made me want to become a role model for younger queer people into science, and carve out a place for them free of these negative experiences.

What challenges have you faced in your career or otherwise because of your gender identity, and how have you overcome them?

As someone in a supportive lab, the main challenges for me do not come from within science, but from outside of it. I see increasingly hostile political environments in most of the countries I have lived and worked in, which for example has prevented me from accessing healthcare. I have been lucky enough to largely be in supportive labs and institutes, and have been incredibly privileged to have had to face relatively few challenges related to my gender identity so far.

How do you think the scientific community can become more inclusive and supportive of trans people?

I think we set out a lot of the ways in our Cell paper, this includes things like being respectful of names and pronouns, advocating for inclusive policies at your institute, but also getting involved outside of the science community in your local community. For me most of the major challenges are coming from the political environment, including pseudoscience being leveraged to push for anti-trans legislation, so scientists have powerful voices to speak up and reject this pseudoscience.

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Have you found any support systems or allies within the scientific community that have helped you along the way?

Absolutely! This includes people I have worked with, organisations like LGBTQ+ STEM, as well as individual role models in science. One of the major sources of support is peer or community networks, which has helped me find other queer and trans scientists. There is for example a group specifically for non-binary people in STEM (ISNBS), and a number of national queer science networks, such as PRISMA Ciencia in Spain.

What advice would you give to other trans people considering a career in science?

Trans people belong in science, and there is a community here for you that will support you and help you.

How important do you think visibility and representation are for trans people in science?

I think visibility is a double-edged sword. It is incredibly important for trans people in science to be visible, to show that we are here and that science is a place where trans people can thrive. At the same time, being a highly visible trans person can make you a target, which I have sadly seen happen. So I think visibility and representation are incredibly important, but we need to keep in mind that trans people who are willing to step up and be visible can only do this if they get support from their colleagues and institution.



What initiatives or changes would you like to see implemented at our institute to better support trans scientists?

I know a number of people in the institute are pushing for changes already, such as getting gender neutral toilets, and improving the gender options on official paperwork. These are both really important things that seem minor but can make a massive difference. Other good initiatives would be continued education for everybody, especially those in managerial positions, an official policy on trans inclusivity (e.g. containing rules around misgendering and people being free to use the bathroom they feel aligns best with their gender), and policies on special leave for gender affirming surgery or other gender-related care. I think although great work is being done by a number of individuals, significant steps can still be made.

Dori Grijseels presenting a talk at the Night of Science.

Selected Honors and Awards



Moritz Helmstaedter has been awarded the **Gottfried Wilhelm Leibniz Prize** for his pioneering work in the field of neuroscience, which has led to a fundamentally new understanding of the three-dimensional organisation and function of mammalian brain circuits.

Moritz Helmstaedter

The **Royal Society**, the United Kingdom's national academy of science, has elected

Erin Schuman as a **Foreign Member**.

The Society's decision to bestow this honor on Schuman recognizes her extraordinary contributions to neuro-science and cell biology.

She has also been awarded the prestigious **Körber European Science Prize** for her revolutionary research on neuronal protein synthesis.



Erin Schuman

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Alessandro Motta has received the **Otto Hahn Medal** for the development of connectomic analysis methods that can be used to detect learned circuit components and the inhibitory/excitatory balance in cortical connectomes.

Alessandro Motta

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Grants and Fellowships

Gilles Laurent has received his third **ERC Advanced Grant** to study the mechanisms of camouflage in cuttlefish.



Gilles Laurent

Erin Schuman and **Moritz Helmstaedter** have received a **DFG NeuroNex Grant** for developing new methods for determining synaptic weighting and its role in functional networks.



Vanessa Stempel has received a grant by the **Dollwet Foundation** to support her research on GABAergic inhibition in the periaqueductal gray of the midbrain.

Vanessa Stempel

EMBO Long-Term Fellowship and Humboldt Research Fellowship
Brain states during hibernation in *Pogona vitticeps*
Sebastian Ola Andersson

EMBO Long-Term Fellowship and Humboldt Research Fellowship
Revisiting translational regulation at neural synapses
Xiong Zhuqing

Boehringer Ingelheim Fonds Fellowship
Lucía Sanz Vilar

Joachim Herz Foundation Add-on Fellowship
for Interdisciplinary Life Science
Alena Lemazina



PhD Graduations

Congratulations to **Claudia Fusco** (Schuman Lab, IMPRS), **Marius Schneider** (Vinck Lab, IMPRS), and **Hye-A Kim** (Ito Lab) for completing their PhD projects in 2024!

Publications 2024

Journal Articles

Eckmann, S.; Young, E. J.; Gjorgjieva, J.: **Synapse-type-specific competitive Hebbian learning forms functional recurrent networks**. Proc. Natl. Acad. Sci. U. S. A. 121 (25), e2305326121 (2024)

Schmidt, M.; Motta, A.; Sievers, M.; Helmstaedter, M.: **RoboEM: automated 3D flight tracing for synaptic-resolution connectomics**. Nat Methods 21, pp. 908 - 913 (2024)

Waitzmann, F.; Wu, Y. K.; Gjorgjieva, J.: **Top-down modulation in canonical cortical circuits with short-term plasticity**. PNAS 121 (16), 2311040121 (2024)

Schmidt, M.; Motta, A.; Sievers, M.; Helmstaedter, M.: **RoboEM: Automated 3D flight tracing for synaptic-resolution connectomics**. Nat Methods (2024)

Aghi, K.; Anderson, B. M.; Castellano, B. M.; Cunningham, A.; Delano, M.; Dickinson, E. S.; von Diezmann, L.; Forslund-Startceva, S. K.; Grijseels, D. M.; Groh, S. S. et al.: **Rigorous science demands support of transgender scientists**. Cell 187 (6), pp. 1327 - 1334 (2024)

Yiling, Y.; Klon-Lipok, J.; Shapcott, K.; Lazar, A.; Singer, W.: **Dynamic fading memory and expectancy effects in the monkey primary visual cortex**. PNAS 121 (8), 2314855121 (2024)

Acker-Palmer, A.: Guiding axon regeneration: **Instructions from blood vessels**. Neuron 112 (2), pp. 175 - 177 (2024)

Laurent, G.: **Mysterious ultraslow and ordered activity observed in the cortex**. Nature 625, pp. 244 - 245 (2024)

Bapat, O.; Purimetla, T.; Kruessel, S.; Shah, M.; Fan, R.; Thum, C.; Rupprecht, F.; Langer, J. D.; Rangaraju, V.: **VAP spatially stabilizes dendritic mitochondria to locally support synaptic plasticity**. Nat. Commun. 15 (205) (2024)

Review Article

Stempel, A. V.: A conserved brainstem region for instinctive behaviour control: **The vertebrate periaqueductal gray**. Curr. Opin. Neurobiol. 86, 102878 (2024)

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