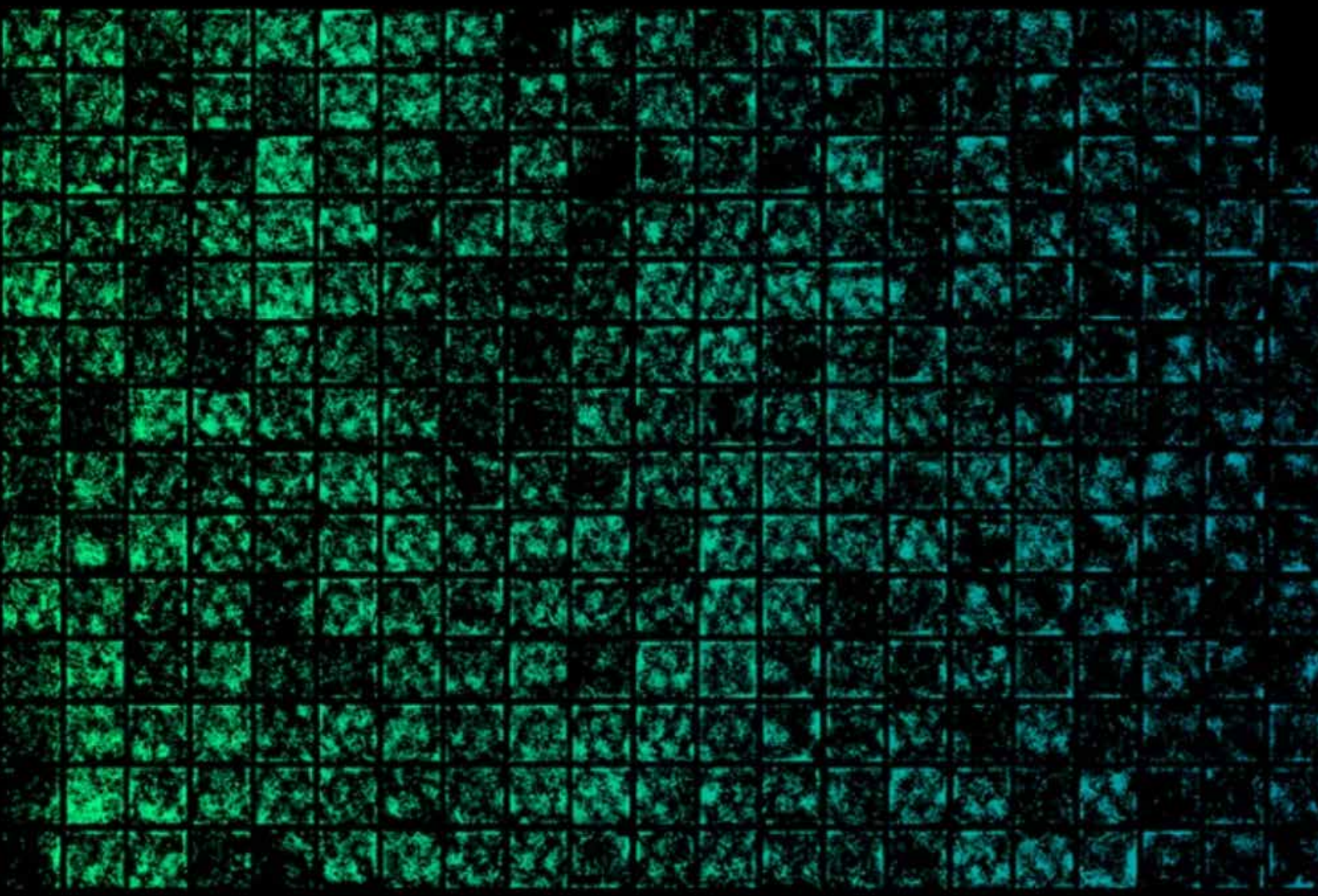
2022 AT A GLANCE

Graphic summary
of the annual report

Kavli Institute
for Systems Neuroscience



Norwegian Centre of Excellence

European Research Council
Established by the European Commission

TROND MOHN FOUNDATION

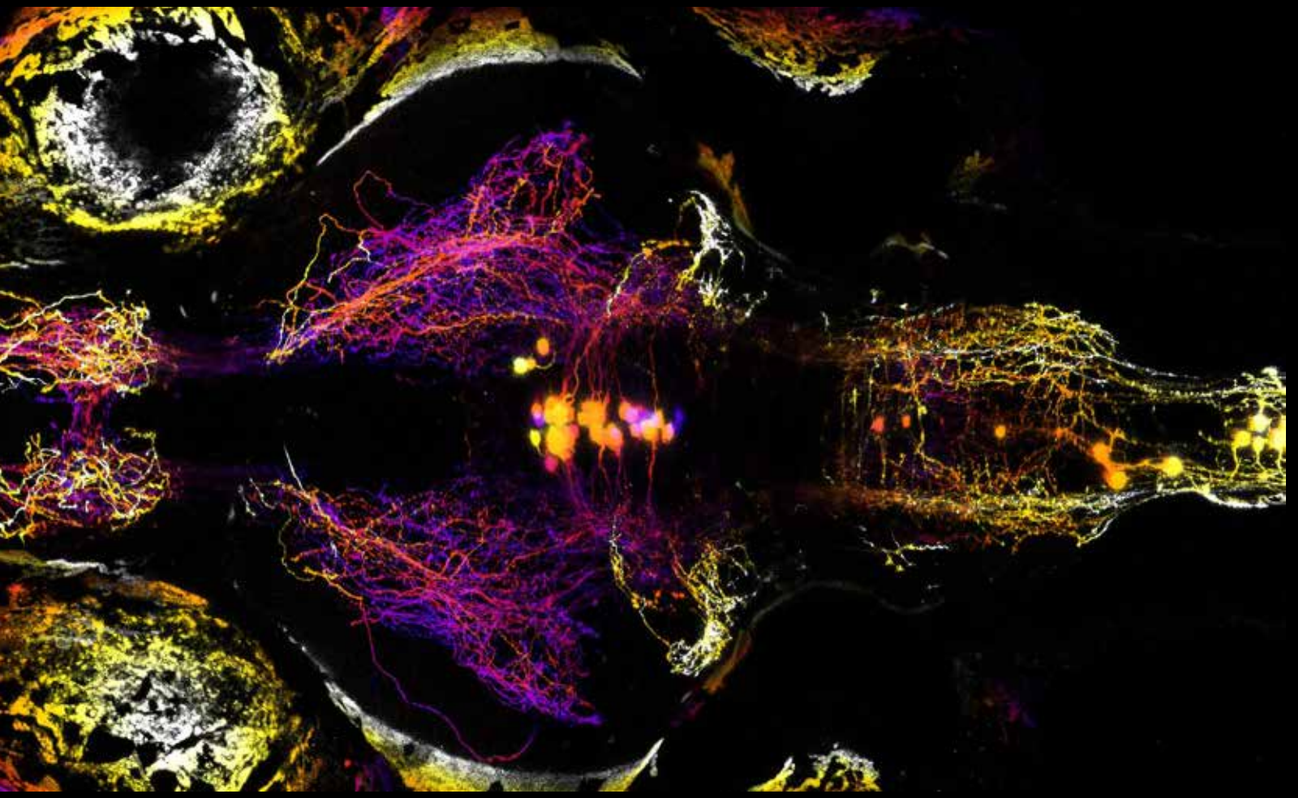
STIFTELSEN KRISTIAN GERHARD JEBSEN

THE KAVLI FOUNDATION

NTNU
Norwegian University of Science and Technology

Our Vision

To understand the emergence of higher brain functions



Live neurons in the zebrafish brain. Image courtesy by Yaksi Group

Dear reader

2022 marks the final year of the Kavli Institute for Systems Neuroscience's *Centre for Neural Computation* (CNC). During its ten years of funding by the Research Council of Norway's Centre of Excellence scheme, the centre has pioneered research on neural networks in the brain. CNC research on how the mammal brain computes space was awarded the Nobel Prize in Physiology or Medicine 2014. Basic science discoveries at CNC are milestones towards an understanding of neurodegenerative afflictions such as Alzheimer's disease. The centre has expanded in personnel and across disciplines by recruitment of new research groups, preparing the community of researchers in Trondheim to take on neuroscience research challenges of the future.

Please enjoy our graphic summary of 2022 with selected highlights from the last ten years.

For first access to the most recent brain discoveries from the Kavli Institute for Systems Neuroscience, direct your mobile camera at the QR-code on the back cover of this folder and follow the instructions.

May-Britt Moser, Edvard Moser, Bjarne Foss
Directors at the Kavli Institute for Systems Neuroscience

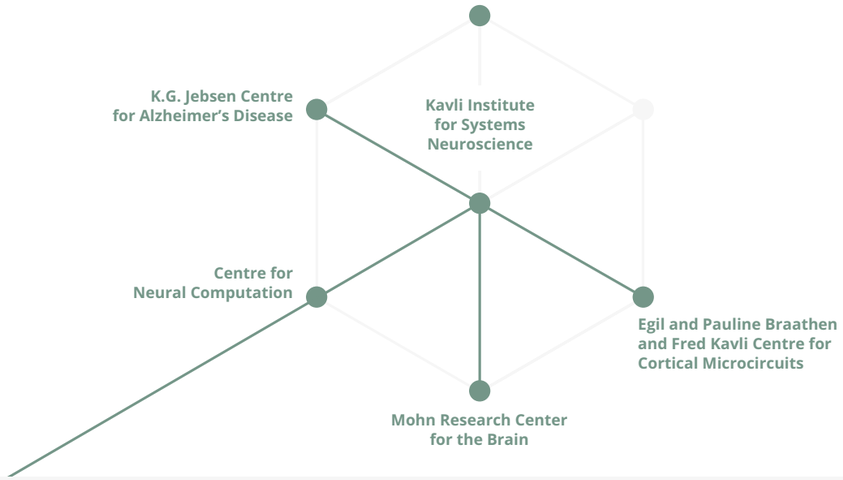
Organisational chart 2022

TRINITY OF DIRECTORS

EDVARD MOSER
Scientific Director

MAY-BRITT MOSER
Scientific Director

BJARNE FOSS
Administrative Director



RESEARCH GROUP LEADERS

MAY-BRITT MOSER
Moser Lab

EDVARD MOSER
Moser Lab

MENNO WITTER
Witter Lab

EMRE YAKSI
Yaksi Lab

GIULIA QUATTROCOLO
Quattrocolo Lab

TOBIAS NAVARRO SCHRÖDER
Navarro Schröder Lab

YASSER ROUDI
Roudi Lab

JONATHAN WHITLOCK
Whitlock Lab

CLIFFORD KENTROS
Kentros Lab

MAXIMILIANO NIGRO
Nigro Lab

MARYAM ZIAEI
Ziaei Lab

Institute, centres and infrastructure

> ***Understanding the brain is one of the greatest challenges to science, with brain disorders affecting one in three Europeans during their lifetime.***

KAVLI INSTITUTE FOR SYSTEMS NEUROSCIENCE (KISN)

The Kavli Institute for Systems Neuroscience is a leading research environment in Trondheim. The lab that preceded the institute was founded by Nobel Laureates May-Britt Moser and Edvard Moser in 1996 to investigate the emergence of higher brain functions.

Today, the Kavli Institute is an interdisciplinary village of experts with the common desire to understand how complex information is encoded in high-level neural networks and how complex behaviours arise from these codes and systems.

The institute staff is organized in ten research groups and several support groups such as Animal Tech, Technical Group, Kavli Communication, and an Administrative team.

Centres
The neuroscience research institute, led by Edvard Moser, May-Britt Moser and Bjarne Foss, now comprises four research centres:

- Centre for Neural Computation (CNC)
- Egil and Pauline Braathen and Fred Kavli Centre for Cortical Microcircuits (BKC)
- K.G. Jebsen Centre for Alzheimer's Disease (JCA)
- Mohn Research Center for the Brain (MCB)

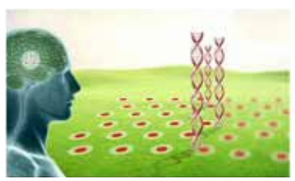
Education
The department is responsible for an international master's degree programme in neuroscience. It has joint responsibility for the PhD programme in medicine and health sciences at NTNU. The Norwegian Research School in Neuroscience (NRSN) is organised and run by the institute with support and participation of the major Norwegian universities.

Infrastructure
The institute is the national host of NORBRAIN, a large-scale infrastructure for neuroscience technology, with facilities located at the University of Oslo (UiO), the University of Bergen (UiB), and the Norwegian University of Science and Technology (NTNU) in Trondheim. The institute is also host to the only Viral Vector Core in Norway, supplying labs across the world with state-of-the-art viral research tools.

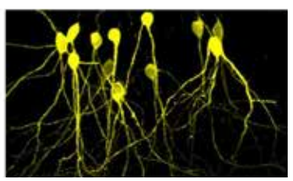
History
The Kavli Institute for Systems Neuroscience consists of a Centre of Excellence (CoE) awarded by the Research Council of Norway since 2002, a Kavli Foundation Institute since 2007, a Braathen-Kavli Centre since 2015, a department at the Faculty of Medicine and Health Sciences at Norwegian University of Science and Technology (NTNU) since 2017, a Foundation Stiftelsen Kristian Gerhard Jebsen Centre since 2020, and a Trond Mohn Foundation Research Centre since 2021.

Centre for Neural Computation

K.G. Jebsen Centre for Alzheimer's Disease



Braathen and Kavli Centre for Cortical Microcircuits



Mohn Research Center for the Brain

NORBRAIN

VIRAL VECTOR CORE

Norwegian Research School in Neuroscience

TFSR
The Research Fund of the Kavli Institute for Systems Neuroscience

10 years of Excellence!

2012

Four Research groups
at the Kavli Institute
•
CoE-Centre for
Neural Computation

2013

Kentros Group

2014

The Nobel Prize
•
Yaksi Group

2015

Egil and Pauline Braathen
and Fred Kavli Centre for
Cortical Microcircuits

2016

Doeller Group

2017

The Starmus IV festival

2018

The Grand Cross
•
Our sense of time

2019

Object vector cells
•
7 Tesla MR scanner

2020

Quattrocolo Group
Nigro Group
Navarro Schröder Group
•
ERC Synergy Grant
#KiloNeurons
•
K.G. Jebsen Centre for
Alzheimer's Disease

2021

Torus – grid cells 2.0!
•
Ziaei Group
•
Mohn Research Center
for the Brain
•
DeepMREye
•
Neuropixels 2.0

2022

The Mini2P

2012

CoE – Centre of Excellence: Centre for Neural Computation

The Kavli Institute is awarded a Centre of Excellence at the Research Council of Norway, aiming to extract the algorithms that give rise to an accessible mammalian cognitive function by taking advantage of the recent technological innovations for neural data recording and neural-circuit analysis.

Photo: Thor Nielsen / Kavli Institute for Systems Neuroscience.

Research Groups at the Kavli Institute 2012

Moser Group
Principal investigators Edvard Moser and May-Britt Moser.
Topic: Space and memory

Witter Group
Principal investigator Menno Witter.
Topic: Functional neuroanatomy

Roudi Group
Principal investigator Yasser Roudi
Topic: Statistical physics of interference and network organization

Whitlock Group
Principal investigator Jonathan Whitlock
Topic: Cognitive motor function

2013

Kentros Group

Principal investigator Clifford Kentros starts up new research group – the Kavli Institute's transgenic investigation of neural circuits group

2014

Yaksi Group

Principal investigator Emre Yaksi starts up new research group – the Kavli Institute's sensory computations group

2014

The Nobel Prize

May-Britt Moser and Edvard Moser receives the Nobel Prize in Physiology or Medicine together with John O'Keefe for their discovery of the brain's navigation system.

May-Britt and Edvard Moser discovered – in the medial entorhinal cortex, a region of the brain next to hippocampus – grid cells that provide the brain with an internal coordinate system essential for navigation.

Photo: Geir Mogen / Kavli Institute for Systems Neuroscience

Photo: Niklas Elmehed

Photo: Gunnar Hansen / Kavli Institute for Systems Neuroscience

Photo: Hege Tunstad / Kavli Institute for Systems Neuroscience

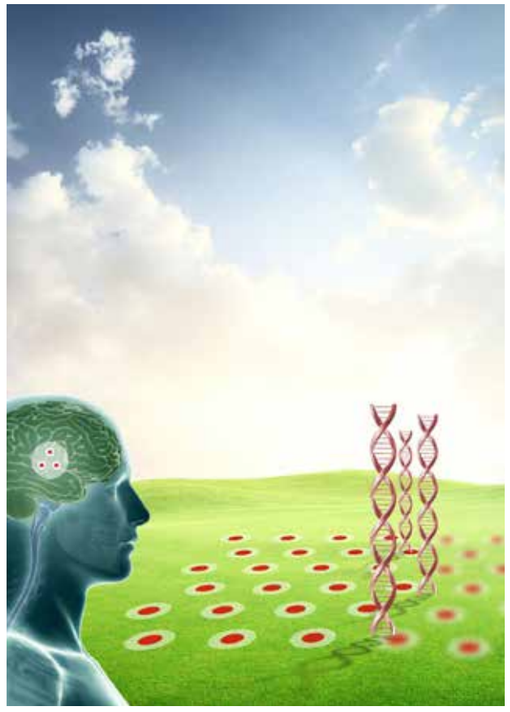
Photo: Hege Tunstad / Kavli Institute for Systems Neuroscience

2015

Egil and Pauline Braathen and Fred Kavli Centre for Cortical Microcircuit

Pauline Braathen was married to Egil Braathen for 46 years. He died in 2009 after a prolonged period of advanced Alzheimer's disease. Pauline donated US $5 million to establish Egil and Pauline Braathen and Fred Kavli Centre for Cortical Microcircuits in cooperation with The Kavli Foundation in USA.

Photo: Private



Ill. Doeller Group / Kavli Institute for Systems Neuroscience

2016

Doeller Group

Principal investigator Christian Doeller starts up new research group – the Kavli Institute's translational neuroscience group.

2017

The Starmus festival

The Starmus IV festival: Life and the universe is arranged in Trondheim with NTNU as host.

Photo: Thor Nielsen / NTNU

Photo: Thor Nielsen / NTNU

2018

Our sense of time

Researchers at the Kavli Institute for Systems Neuroscience discovers a network of brain cells that express our sense of time within experiences and memories.

Ill. Kolbjørn Skarpnes, Rita Elmkvist Nilsen / NTNU, Kavli Institute for Systems Neuroscience

The Grand Cross

May-Britt Moser and Edvard Moser awarded the Grand Cross of the Royal Norwegian Order of St. Olav, in recognition of their research, their social involvement, and their commitment to animal welfare in research.

Photo: Thor Nielsen / Kavli Institute for Systems Neuroscience

2019

Object vector cells

Discovery of a specialized brain cell that help us to navigate in space: object-vector cells. These cells measure the distance and direction to all objects around us.

Photo: Rita Elmkvist Nilsen / Kavli Institute for Systems Neuroscience

2019

7 Tesla MR scanner

Norway's first 7 Tesla MR-scanner arrived in Trondheim September 2019. This new brain scanner is state of the art research tool and provides high resolution mapping of human brain structure and function, it will bridge basic neuroscience research at the Kavli Institute with the Alzheimer clinic at St. Olav's Hospital.

The Siemens MAGNETOM Terra System is part of the infrastructure program NORBRAIN 2 and is managed by the Norwegian 7T MR Center.

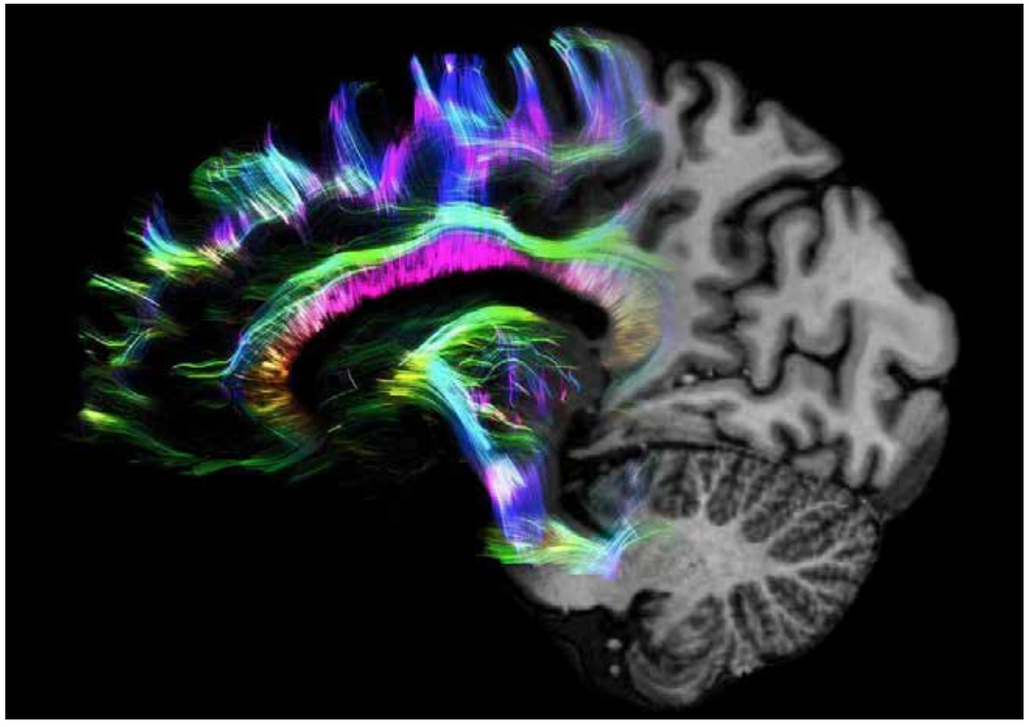


Photo: Siemens Healthineers

2020

K.G. Jebsen Centre for Alzheimer's Disease

K.G. Jebsen Centre for Alzheimer's Disease is a national research centre of interdisciplinary experts united in the common goal of determining the onset of Alzheimer's and the early stages of disease development. The vision of the Jebsen centre is to translate Nobel Prize winning research from laboratory to patient. To accomplish this, the Jebsen team of experts collaborate on a set of projects designed to bridge the gaps from basic science to clinical implementation.

Photo: Rita Elmkvist Nilsen / Kavli Institute for Systems Neuroscience

2020

ERC Synergy Grant #KiloNeurons

European Research Council awarded 10 million euros to a Synergy Grant for Professors Edvard Moser and Yoram Burak. After decades of investigating single cells, a breakthrough in technology has made it possible to record thousands of neurons interacting during cognitive operations.

New research groups

Navarro Schröder Group
Principal investigator
Tobias Navarro Schröder.
Topic: Vision and navigation

Nigro Group
Principal investigator
Maximiliano Jose Nigro.
Topic: Perception and cognition

Quattrocolo Group
Principal investigator
Giulia Quattrocolo.
Topic: Circuit development

2021

Neuropixels 2.0 – a new favorite in neuroscientists' toolboxes

Photo: Rita Elmkvist Nilsen / Kavli Institute for Systems Neuroscience

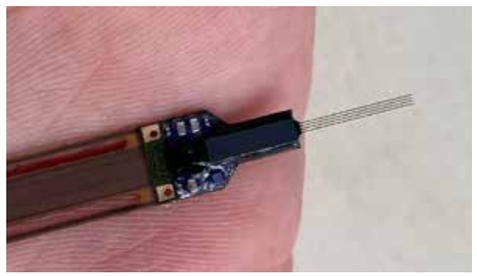


Photo: Rita Elmkvist Nilsen / Kavli Institute for Systems Neuroscience

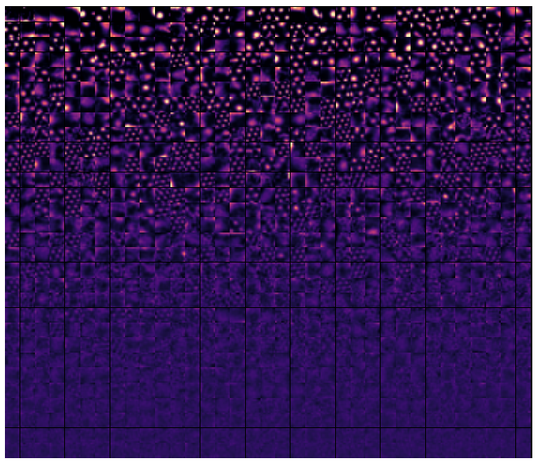


Photo: Richard Gardener / Kavli Institute for Systems Neuroscience

Neuropixels 2.0 is a tiny brain probe with several rows of even tinier microphones. These bitsy microphones can listen in on conversations between thousands of brain cells across a brain area. What they actually record, are the very neural conversations from which our intellectual abilities like learning and memory arise.

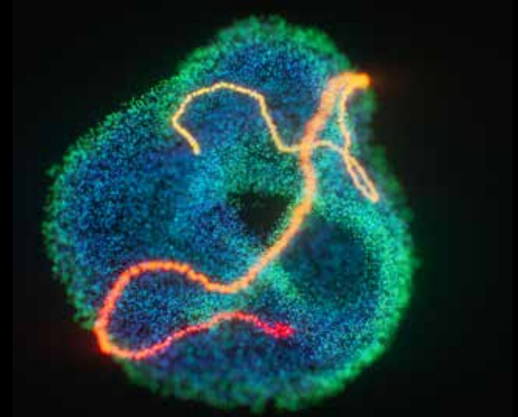
2021

Torus – grid cells 2.0!

WE MOVE ALONG THE SURFACE OF A DONUT Whether the rat is exploring, running, dreaming, or resting deeply asleep, its brain's GPS constituted by the joint activity of grid cells always move along the surface of a torus. This first insight into how the mammalian brain organizes high-level brain function in neural networks, also labelled grid cells 2.0, was published on BioRxiv in 2021 by Kavli researchers (peer-reviewed version published in Nature, 2022).

The image to the left is an artistic interpretations of the donut we navigate by, made by Helmet and Kavli Communication. The image at the bottom shows the neural data from a network of grid cells in the brain of Roger the rat, collected by Moser Group researcher Richard Gardner.

Photo: Rita Elmkvist Nilsen / Kavli Institute for Systems Neuroscience



DeepMREye for the Brain

Photo: Private

A new tool developed at the Kavli Institute reads your eyes from MRI scans. Your eye movements can reveal your thoughts, your memories, your goals and even brain disease!

Ziaei Group

Principal investigator Maryam Ziaei starts up new research group – the Kavli Institute's aging neuroscience group.

Mohn Research Center for the Brain

The university of Bergen and the Kavli Institute at NTNU are joining forces on brain research with support from the Trond Mohn Foundation. The overriding objective of the research center is to identify the core principles of the brain plasticity and neural circuit dynamics in the brain.

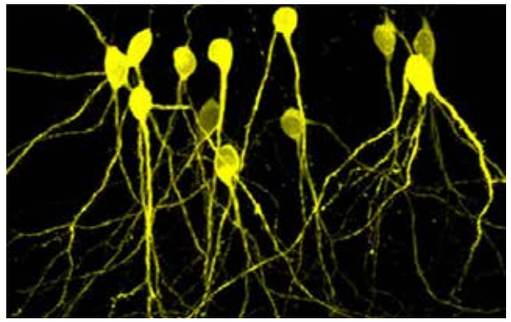


Photo: University of Bergen

2022

Mini2P – the brain explorer!

An innovation by the Kavli Institute for Systems Neuroscience.

Mini2P is an open-source miniature 2-photon microscope brain explorer for fast high-resolution calcium imaging in freely-moving mice.
Mini2P allows stable simultaneous recording of more than a thousand cells across multiple planes of densely active cortical regions in a wide spectrum of behavioral tasks without impediment of the animal's behavior.

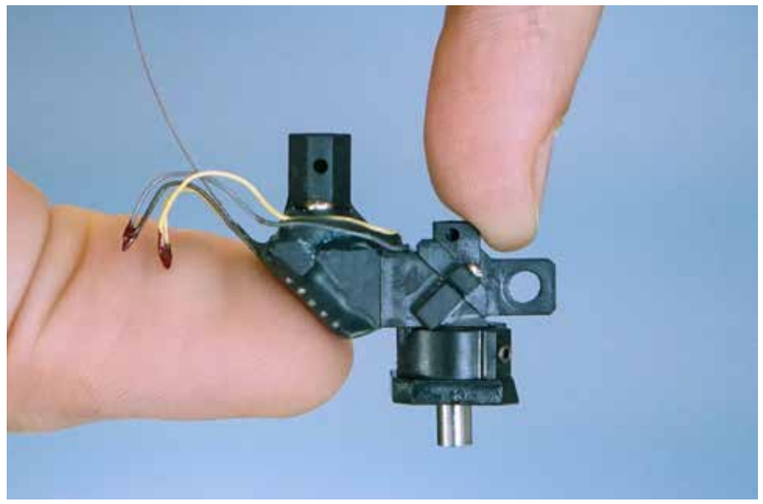


Photo: Weijian Zong / Kavli Institute for Systems Neuroscience

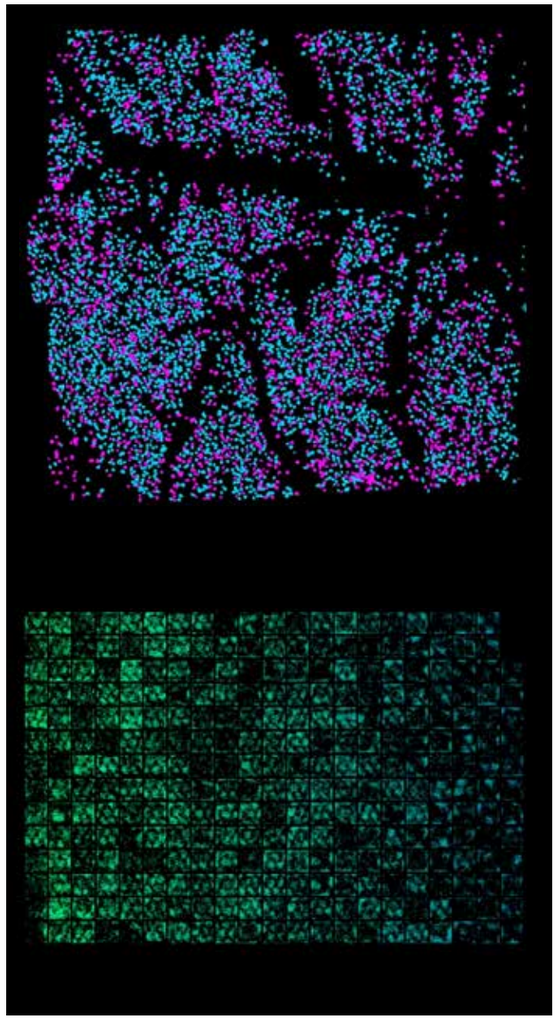


Image courtesy by Moser Group researcher Weijian Zong

Photo: Rita Elmkvist Nilsen / Kavli Institute for Systems Neuroscience

Highlights

HIGH IMPACT PUBLICATIONS

Andersson, **S.O., Moser, E.I. & Moser, MB** (2021). Visual stimulus features that elicit activity in object-vector cells. *Communications Biology 4*, 1219.

Bellmund JLS, Deuker L, Montijn ND & **Doeller CF** (2022). Structuring time: the hippocampus constructs sequence memories that generalize temporal relations across experiences. *Nature Communications*, 13, 3395.

Bergmann T, Liu Y, Skov J, Mogus L, Lee J, Pfisterer U, Handfield LF, Asenjo-Martinez A, Lisa-Vargas I, Seemann SE, Lee JTH, Patikas N, Kornum BR, Denham M, Hyttel P, **Witter MP**, Gorodkin J, Pers TH, Hemberg M, Khodosevich K, Hall VJ. Production of human entorhinal stellate cell-like cells by forward programming shows an important role of Foxp1 in reprogramming. *Front Cell Dev Biol.* 2022 Aug 15;10:976549. doi: 10.3389/fcell.2022.976549. PMID: 36046338; PMCID: PMC9420913.

Bonyadi, M. R., Wang, R., & **Ziaei, M.** (2022). Self-Punishment and Reward Backfill for Deep Q-Learning. *IEEE Transactions on Neural Networks and Learning Systems*.

Cobar L, Kjelsberg K, Foroughi A, **Nigro MJ.** (2022) Processing of tactile inputs in the mouse perirhinal cortex. *FENS meeting 2022*.

Diaz Verdugo C.†, Myren-Svelstad S.†, Aydin E., van Hoeymissen E., Deneubourg C., Vanderhaeghe S., Vancraeynest J., Pelgrims R., Cosacak M.I., Muto A., Kizil C., Kawakami K., Jurisch-Yaksi N.* & **Yaksi E.***(2019) Glia-neuron interactions underlie state transitions to generalized seizures. *Nature Communications*. 2019 Aug 23;10(1):3830. doi: 10.1038/s41467-019-11739-z.

Fore S., Cosacak M.I., Diaz Verdugo C., Kizil C., **Yaksi E.** (2019) Functional properties of habenular neurons are determined by developmental stage and sequential neurogenesis. *bioRxiv* 722462; doi: https://doi.org/10.1101/722462

Fuglstad JG, Saldanha P, Paglia J, **Whitlock JR.** (2022) HERBS: Histological E-data Registration in rodent Brain Spaces. *bioRxiv,* doi.org/10.1101/2021.10.01.462770. (in revision at eLife)

Gardner RJ, Hermansen E, Pachitariu M, Burak Y, Baas NA, Dunn BA, **Moser M-B, Moser EI** (2022). Toroidal topology of population activity in grid cells. *Nature*, 602:123-128.

Garvert M, Saanum T, Schulz E, Schuck NW & **Doeller CF** (in press). Hippocampal spatio-predictive cognitive maps adaptively guide reward generalization. *Nature Neuroscience*.

Hovde K, Rautio IV, Hegstad AM, **Witter MP**, **Whitlock JR.** (2022) Visuomotor interactions in the mouse forebrain mediated by extrastriate cortico-cortical pathways. *bioRxiv,* doi.org/10.1101/2022.12.08.519609. (submitted to eNeuro)

Huuha, A. M., Norevik, C. S., Moreira, J. B. N., Kobro-Flatmoen, A., Scrimgeour, N., Kivipelto, M., Van Praag, H., **Ziaei, M.**, Sando, S. B., Wisløff, U., & Tari, A. R. (2022). Can Exercise Training Teach Us How to Treat Alzheimer's disease? *Ageing Res Rev,* 101559. doi.org/10.1016/j.arr.2022.101559

Jacobsen RI, Nair RR, Obenhaus HA, Donato F, Slettmoen T, **Moser M-B, Moser EI** (2022). All-viral tracing of monosynaptic inputs to single birthdate-defined neurons in the intact brain. *Cell Reports Methods* 2: 100221.

Kermen F., Darnet L., Wiest C., Palumbo F., Bechert J., Uslu O., **Yaksi E.** (2019) Investigating olfactory behaviours in adult zebrafish. *bioRxiv*: biorxiv.org/content/10.1101/859033v1

Marsili M., and **Roudi Y.** (2022), Quantifying Relevance in Learning and Inference, *Physics Reports*, 963 1-43

Mimica B, Tombaz T, Battistin C, Fuglstad JG, Dunn BA, **Whitlock JR.** (2022) Behavioral decomposition reveals rich encoding structure employed across neocortex. *bioRxiv*, doi.org/10.1101/2022.02.08.479515. (in revision at Nature Communications)

Nigro MJ, Kjelsberg K, Convertino L, Nair RR, Witter MP. (2022) Enrichment of specific GABAergic neuronal types in the mouse perirhinal cortex. *BioRxiv* doi.org/10.1101/2022.01.30.478360

Nilssen ES, Jacobsen B, Doan TP, Girão PJB, **Witter MP** (2022) Long-range inhibitory axons from medial entorhinal cortex target lateral entorhinal neurons projecting to the hippocampus. *bioRxiv* doi: https://doi.org/10.1101/2022.11.29.518323

Obenhaus HA, Zong W, Jacobsen RI, Rose T, Donato F, Chen L, Cheng H, Bonhoeffer T, **Moser M-B, Moser EI** (2022). Functional network topography of the medial entorhinal cortex. *Proceedings of the National Academy of the Sciences USA* 119, e2121655119.

Ohara S, Rannap M, Tsutsui K-I, Draguhn A, Egorov AV, **Witter MP** (2022). Hippocampal-medial entorhinal circuit is differently organized along the dorsoventral axis in rodents. *bioRxiv* doi: https://doi.org/10.1101/2022.05.30.493979; Cell Reports, Accepted for publication

Olstad, E., Ringers, C., Hansen, J.N., Wens, A., Brandt, C., Wachten, D., **Yaksi, E***., Jurisch-Yaksi, N*., (2019) Ciliary Beating Compartmentalizes Cerebrospinal Fluid Flow in the Brain and Regulates Ventricular Development. *Current Biology*, January 3, doi.org/10.1016/j.cub.2018.11.059

Polti, I., Nau, M., Kaplan, R., van Wassenhove, V., & **Doeller, C. F.** (2022). Rapid encoding of task regularities in the human hippocampus guides sensorimotor timing. *eLife*, 11: e79027. doi:10.7554/eLife.79027.

Šimić G, Krsnik Ž, Knezović V, Kelović Z, Mathiasen ML, Junaković A, Radoš M, Mulc D, Španić E, **Quattrocolo G,** Hall VJ, Zaborszky L, Vukšić M, Olucha Bordonau F, Kostović I, **Witter MP**, Hof PR. Prenatal development of the human entorhinal cortex. *J Comp Neurol*. 2022 Oct;530(15):2711-2748. doi: 10.1002/cne.25344. Epub 2022 May 23. PMID: 35603771.

Simmonds, E.G., Adjei, K.P., Andersen, C.W., Aspheim, J.C.H., Battistin, C., Bulso, N., Christensen, H., Cretois, B., Cuberto, R., Davidovich, I.A., Dickel, L., Dunn, B., Dunn-Sigouin, E., Dyrstad, K., Einum, S., Giglio, D., Gjerløw, H., Godefroidt, A., González-Gil, R., Gonzalo Cogno, S., Große, F., Halloran, P., Jensen, M.F., Kennedy, J.J., Langsæther, P.E., Laverick, J.H., Lederberger, D., Li, C., Mandeville, E.G., Mandeville, C., Moe, E., **Navarro Schröder, T.**, et al. (2022). "Insights into the quantification and reporting of model-related uncertainty across different disciplines." *Iscience.*

Tari, A. R., Selbæk, G., Franklin, B. A., Bergh, S., Skjellegrind, H., Sallis, R. E., Bosnes, I., Stordal, E., **Ziaei, M.**, Lydersen, S., Kobro-Flatmoen, A., Huuha, A. M., Nauman, J., & Wisløff, U. (2022). Temporal changes in personal activity intelligence and the risk of incident dementia and dementia related mortality: A prospective cohort study (HUNT). *eClinicalMedicine*, 52, 101607. doi.org/10.1016/j.eclinm.2022.101607

Tsao A, Yousefzadeh A, Meck WH, **Moser M-B, Moser EI** (2022). The neural bases for timing of durations. *Nature Reviews Neuroscience*, 23:646-665.

Waaga T, Agmon H, Normand VA, Nagelhus A, Gardner RJ, **Moser M-B,Moser EI**, Burak Y (2022). Grid-cell modules remain coordinated when neural activity is dissociated from external sensory cues. *Neuron* 110:1843-1856.

Ziaei, M., Arnold, C., Thompson, K., & Reutens, D. C. (2022). Social Cognition in Frontal and Temporal Lobe Epilepsy: Systematic Review and Meta-Analysis. *Journal of International Neuropsychological Society*, 1-25. doi:10.1017/S1355617722000066

Ziaei, M., Oestreich, L., Persson, J., Reutens, D. C., & Ebner, N. C. (2022). Neural correlates of affective empathy in aging: A multimodal imaging and multivariate approach. *Aging, Neuropsychology, and Cognition*, 1-22. doi.org/10.1080/13825585.2022.2036684

Zong W, Obenhaus HA, Skytøen ER, Eneqvist H, deJong NL, Vale R, Jorge MR, **Moser M-B, Moser EI** (2022). Large-scale two-photon calcium imaging in freely moving mice. *Cell* 185:1240-1256.

PRIZES, HONORS, AWARDS, AND ELECTIONS TO REPUTABLE COMMITTEES

Christian Doeller

- Elected member of Royal Norwegian Society of Sciences and Letters (official start January 2023).

Asgeir Kobro-Flatmoen

- Elected chair of the Young Academy of the KG. Jebsen Foundation

May-Britt Moser
- Vilhelm Magnus Award Neurosurgery, Nevrokirurgisk avdeling, Universitetet i Oslo
- Julius Axelrod Distinguished Visiting Neuroscientist Lecturer, University of Ontario, virtual
- Mike Hogg Award Lecture, University of Texas MD Anderson Cancer Center

Edvard Moser
- Honorary doctorate at Caesar Vallejo University, Lima and Trujillo, Peru
- International Steering Committee of the Edmond and Lily Safra Center for Brain Science at the Hebrew University of Jerusalem (SAB)
- International Scientific Advisory Board of Chinese Institute of Brain Research, Beijing (SAB)
- Elected as one of five editors of Principles of Neuroscience VII to appear in 2027

Maximiliano Jose Nigro / Luis Cobar
- Marie Sklodowska-Curie Individual Fellowship to postdoctoral fellow Dr. Luis Cobar, host supervisor Dr. Maximiliano Jose Nigro

Giulia Quattrocolo
- Selected for the Outstanding Academic Fellow Program at NTNU

Yasser Roudi
- Elected member of the Royal Norwegian Society of Sciences and Letters

Jonathan Whitlock
- Marie Sklodowska-Curie Actions Seal of Excellence (as supervisor to applicant)
- Named as Director of the Norwegian Research School in Neuroscience (NSRN)
- Named as Review Committee Chair, Human Frontiers Science Program (HFSP)
- Reviewing editor for Frontiers in Cellular Neuroscience special topic, " Topic "Recording, Analysis and Modeling of Mesoscale Neural Activities"

Menno P. Witter
- Doctor Honoris Causa UCLouvain, Belgium 5 May 2022
- Elected member of the Academia Europaea 2022
- Elected member of the EBRAINS Science and Technology Committee

Maryam Ziaei
- Elected as a subgroup leader of COST Action (CA20104) on the topic of "Impact of exercise on cognitive functions and brain biomarkers"

GRANTS

Tobias Navarro Schröder
- Helse Midt-Norge, Samarbeidsorganet, PhD and project funds to study patients with "transient global amnesia" (TGA)

INTERNATIONAL CONFERENCES ORGANIZED

Edvard Moser
- Co-organizer of Kavli Prize lectures at NTNU

Menno P. Witter and Cliff Kentros
- Tools and the Study of Brain Systems: New Vistas. JANUBET SYMPOSIUM Kyoto University Japan. Organizing committee: Isa T and Takada M, Kyoto Univ; Tsutsui K-I Tohoku Univ; Kentros C and Witter MP NTNU KISN

Yasser Roudi
- Mathematical Methods in Computational Neuroscience, Fred Kavli Science Centre, Eresfjord, Norway 20 July-5 Aug 2022

Maryam Ziaei
- Organized and coordinated a virtual event with participants from 20 different countries across Europe as part of the COST action

PHF DEFENCES CARRIED OUT AT KISN

Ewelina Bartoszek-Kandler (f), Jan Sigurd Blackstad (m), Sverre Myren-Svelstad (m)

Annual accounts 2022

INCOME	
Norwegian Research Council: Centre of Excellence	17 500
Norwegian Research Council: Other	11 100
International funding	16 200
Other public/private Funds	12 100
Norwegian University of Science and Technology	88 100**
TOTAL INCOME	**145 000**

EXPENSES	
Payroll and indirect expenses	107 600
Equipment	4 200
Other operating expenses	33 200
TOTAL EXPENSES	**145 000**

Figures in mNOK

*** including 12,5 mNOK of Nobel Prize contribution from The Ministry of Education (Edvard and May-Britt Moser)*

THE RESEARCH FUND OF THE KAVLI INSTITUTE FOR SYSTEMS NEUROSCIENCE
Trondheim Foundation for Scientific Research (TFSR)

TFSR is a non-profit organization with the sole purpose of providing research funds to the Kavli Institute for Systems Neuroscience, in support of scientific advancement in the field of fundamental neuroscience to the benefit of humanity.

Approximately one-half of the Foundation's research fund comes from The Kavli Foundation, established by the late Norwegian-American business¬man and philanthropist Fred Kavli. Other major contributors are Pauline Braathen and the nieces and nephew of Egil Braathen, the Norwegian organization Ensliges Landsforbund (EL), Selskabet for Trondhjems Bys vel, Sparebankstiftelsen SMN, Gjensidigestiftelsen, and since 2021 Nils-Jarle Sætre with his successful fundraising campaign "Til topps mot Alzheimer". In addition, the foundation has received larger and smaller amounts from individuals, companies, organizations, as well as testamentary gifts and donations from funerals. TFSR appreciates all contributions.

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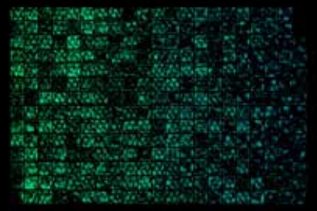

Spatial activity maps shown for 300 grid cells recorded through a miniature two-photon microscope (MINI2P).

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COVER IMAGE:
The MINI2P image is collected by Moser Group researcher Weijian Zong

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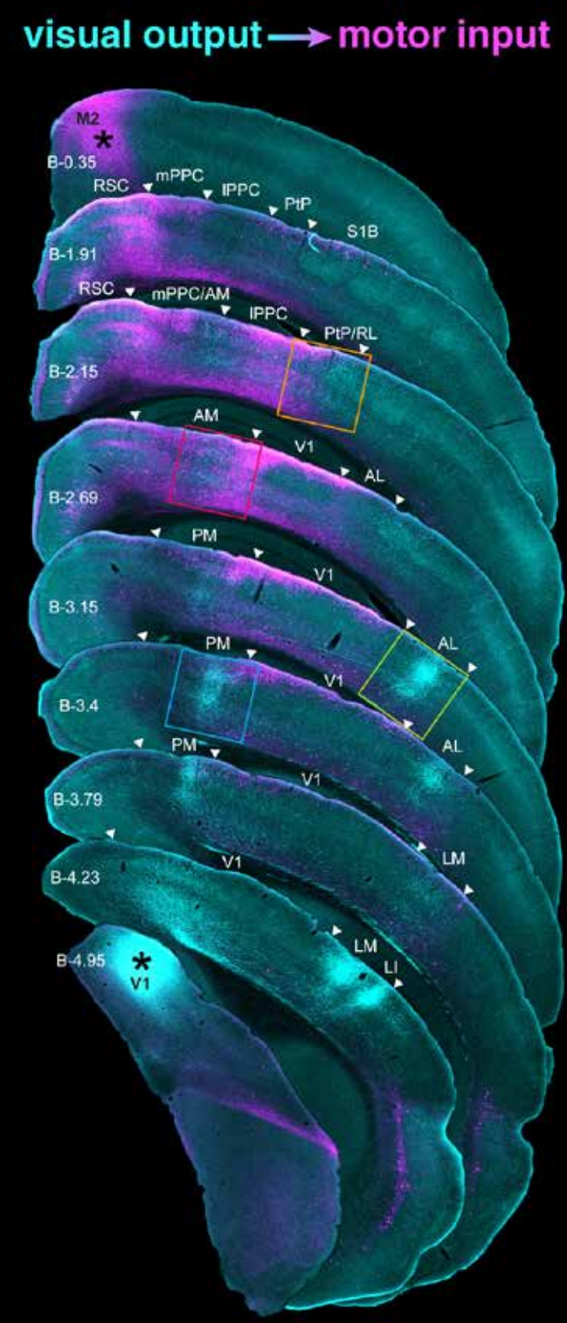

Fluorescently labeled output pathways from the mouse visual cortex (cyan) overlap with input pathways to motor cortex (magenta) in higher visual areas (colored squares). By using this dual tracer approach, we see the anatomical pathways by which the motor system receives visual input, enabling visually guided motor behavior.

Image courtesy of Karoline Hovde from the Whitlock Group

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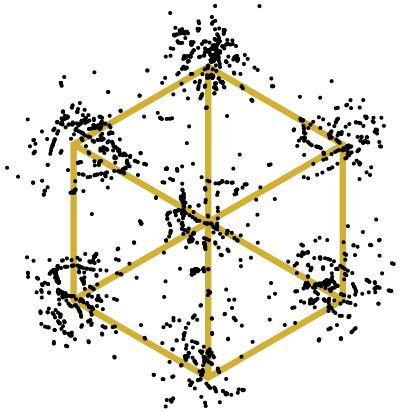

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