

MULTINET Newsletter 2025

Dear colleagues, friends and family,
Another year has flown by in a second!
Which means: time for our fourth Multiscale
Network Neuroscience (MULTINET) newsletter.
Ready to find out what we have all been up
to in 2025 and what the future will bring us?
Happy 2026!!
The MULTINET-ers

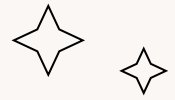




**We hope you all had a wonderful
Christmas Holiday!**



Team News



New faces

Sébastien Dam Postdoc

Just in time for
2025's newsletter,
he started on
1/12/2025!



Fond farewells

Lucas Breedt
PhD (stay
tuned for his
defense!!)

Floris Tijhuis
Research
assistant

Brigit Thomassen
Research
coordinator in the
GRIP team



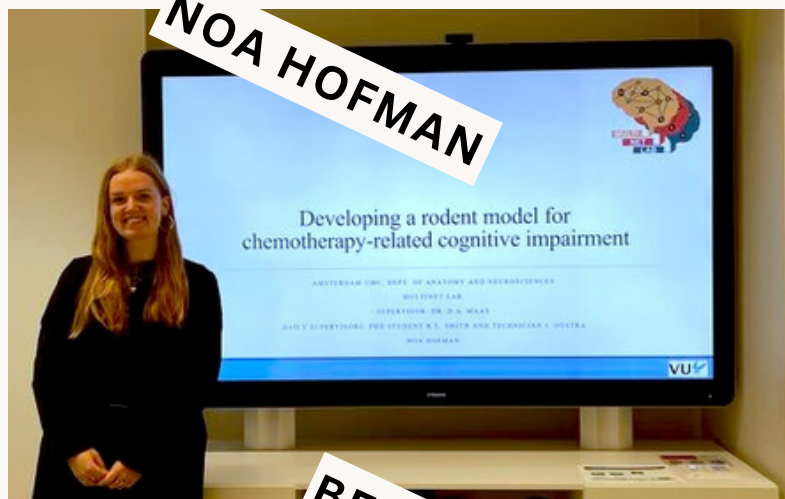


From interns to icons: Thank you so much to all interns for your hard work in 2025!

VEERLE BOER



NOA HOFMAN



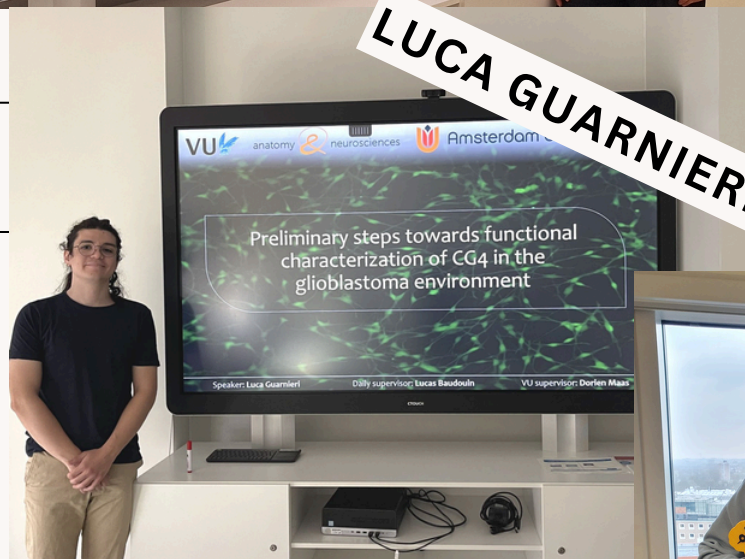
BEATRIZ MORALES GONZALEZ



ROBYN BOS



LUCA GUARNIERI



MAUD DE FIOUW



STIJN HELWEGEN





MULTINET unplugged: What happens outside the lab?

Our yearly 'end of the academic year Summer BBQ'!
Some of us were even brave enough to take dip in the (chilly) water!

Work hard, play hard! Outside of our daily work routines, we also met up with the team for fun activities! Pictures speak louder than words, so see for yourself!



Lab outing @ PONG
A great lab outing at House of Pong
Teamwork on and off the bench.

Sinterklaas avond
During a very competitive "dobbelspel" Mona won the newest member of the lab: an alpaca!



Things got intense, ping-pong balls were still turning up the next day



MULTINET unplugged continues: Too much fun to keep it to a one-pager, sorry not sorry!



Celebrating Sinterklaas at Rachel's place! Instead of traditional surprises, we kept it short and sweet with compliment notes through a little "lootjes trekken". A wholesome twist that definitely boosted the team spirit!



**Be Yourself Festival
at Thuishaven**



Yearly visit to Parade theater festival

In March we organized a MULTINET alumni get-together! New faces within the team met the MULTINET legends that moved onto new adventures! It was a great evening of catching up and nostalgia 😊. Until next time!



MULTINET HEIDAG



In January we swapped the O|2 building for a Heidag at JongWijs Westzaan!

We discussed our team culture and personalities, our problem solving styles and how we can use the different viewpoints and skills in the team even better than we already do. Each team member also pitched their vision, role or project, practicing both storytelling and giving and receiving feedback.

And of course, we also had fun, from the outdoor games that coach **Marieke** taught us (or tried to teach us 🤪), to the canoeing 🛶, to soaking up some sun ☀️, having amazing food 🍲 and chatting about life outside of work.



Project updates

As always, we have been busy with many different projects in 2025! Keep reading the next few pages for our updates on ongoing and new projects!

M2B project

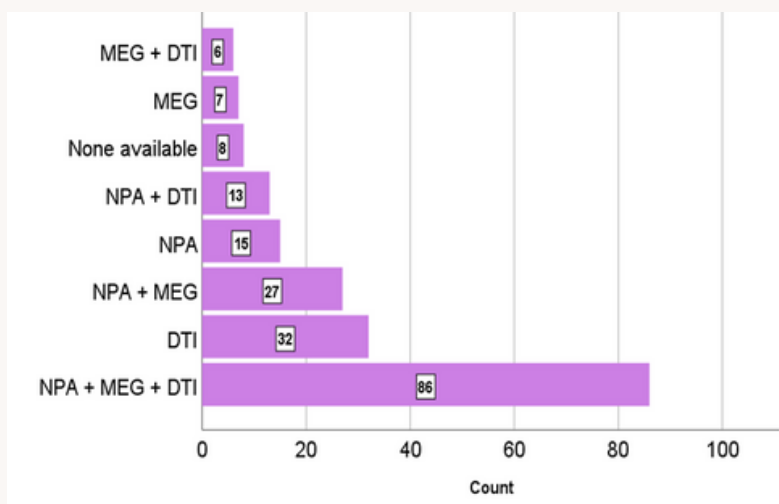
Marieke van Lingen

Even though this observational study has been running for more than 10 years now (since 2014), we can still update you all on some exciting news!

In the molecule 2 behavior study, the name says it all, we collect data from people with a glioma, a primary brain tumor. This data ranges from resected brain tissue (molecular and cellular level), to MEG and MRI-scans (the brain network), to neuropsychological tests and questionnaires (the behavioral level). A prime example of multiscale data collection!

This year, we reached the milestone of 200+ participants! On top of that, we also screened another 800+ people who could not participate in the end, leading to more than 1000 people in total! Of course, this was celebrated during our team meeting, with a beautifully baked cake by Linda!

When diving into the database, we see that at the preoperative timepoint, most participants have completed all measurements (MRI,MEG,NPA), allowing us to compare results from different scales within-subjects in the years to come!



GOALS2

Mona Zimmermann



Another successful year for the GOALS2 to study is coming to an end!

In GOALS2 we follow people with glioma during their first line treatment. We measure their brain activity 5 times using MEG and EEG, in order to investigate **how brain activity relates to stable disease and tumor progression**. Can we find a new biomarker to better distinguish between real tumor progression and treatment related changes seen on MRI? If so, we might be able to help doctors in the future make more informed treatment decisions.

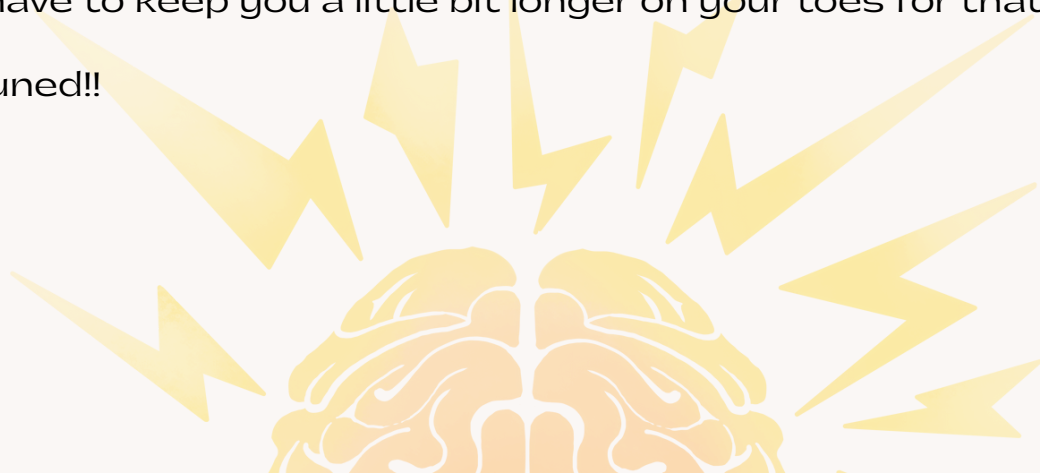
The study is already going on for 4 years now and we have **included over 65 people** with glioma with the help of **Mona, Brigit and Marike!** This year we got the very exciting news from our funder, **KWF, that we can extend the study by another 9 months** to maximize the number of measurements! This will help us be more confident in the final conclusions we can draw.



While we are still including participants and following them until spring of 2026, behind the scenes we have been really **busy preparing the first data** and getting everything up to speed for the final analyses. We have spent **hours and hours preprocessing** all the brain activity data that we have gathered over the years and are currently in the process to extract exactly the timeseries that we need for our final data analyses.

So while I promised that in this year's newsletter we would report on exciting findings, I have to keep you a little bit longer on your toes for that.

But stay tuned!!





TMULT

Marike

Huge milestone alert!!!

Beginning of 2025, Lucas Breedt and Marike van Lingen finished the data collection of the TMULT study led by Lucas. And tumultuous it was indeed ;)

In the summer of 2023 this project set out to explore the effect of transcranial magnetic stimulation (TMS)-induced virtual lesions on cognition in healthy subjects. And this turned out to be a popular study for enlisted participants on hersenonderzoek.nl! We received many applicants and have performed a baseline and post-TMS measurement in ~ 100 people!!

Some weeks, it felt like we were running a call center, other weeks we were acting as logistical wizards and MRI technicians, learning to handle every possible error message on the GE MRI scanner, and running marathons from the TMS room to the MRI room to prevent the TMS effects from fading. We even spent a few weekends scanning the last participants, and collected countless other fond memories along the way!

Lucas is now writing up his article, so results will follow soon!





TRUE-GRIT

Maxine Gorter

The **TRUE-GRIT** study continues to move forward, even though inclusions are progressing a bit slower than anticipated. To date, we have enrolled five patients, and recruitment remains ongoing.

We would also like to take a moment to thank our **wonderful research assistant Brigit** (on the right), who recently completed her time with us. She played an important role in setting up and running the study, and we are very grateful for her contributions.

A positive development is the **upgrade of our TMS rooms**, which are now more professional and comfortable for both patients and lab staff – a great step in improving the study environment.

We look forward to sharing more progress in the coming year. Stay tuned!



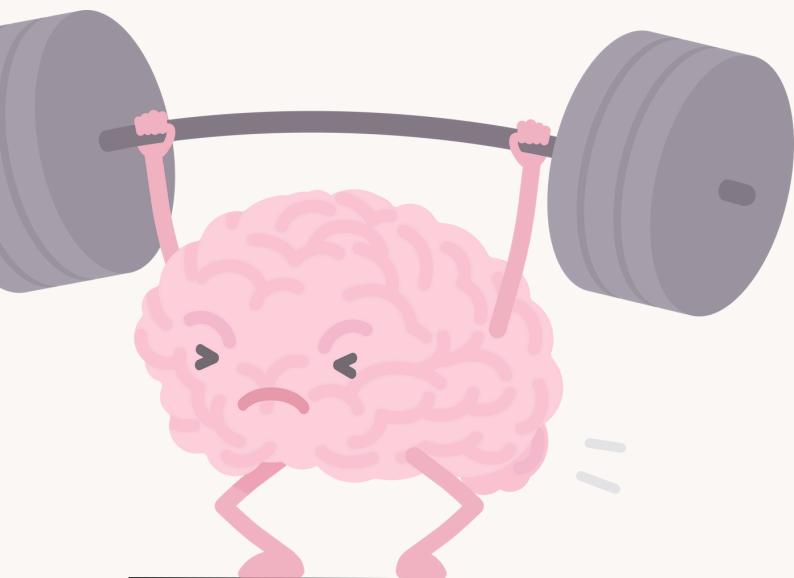
Feelfit

Marieke Blom

We have now included the first 17 out of our target of 36 patients in the Feelfit study!

We are including patients with a primary brain tumor and decreased self-reported physical fitness. The goal is to improve their self-reported physical fitness with a High-Intensity Interval Training (HIIT) program.

Participants attend supervised training sessions at VUmc twice a week for 12 weeks. During the program, we continuously monitor their experience during the exercise sessions and adjust the intensity as needed.



So far, the feedback has been positive. While all participants share the challenge of reduced self-reported physical fitness, their personal goals and motivations are unique.

In addition to aiming to improve self-reported physical fitness, we also perform various measurements for secondary outcomes, including MEG, MRI, questionnaires, and a cardiopulmonary exercise test.

Alpe d'HuZes

Marieke Blom

We're not quite done with the Marieke updates! Normally, Marieke supervises patients on a bike, but this time she's getting on one herself and cycling all the way up the Alpe d'HuZes!

She would greatly appreciate your support. You can make a donation by scanning the QR code below or following [this link](#).



DaMAGE in 2025: from oligodendrocytes to thinking

After laying the groundwork in 2024, the DaMAGE project led by Lucas Baudouin took a big step forward this year by connecting what happens at the level of brain cells with how patients actually think and function.

We zoomed out from the lab bench to the whole brain and asked a key question. Why do some people with glioma experience cognitive difficulties, while others with seemingly similar tumors do not? To tackle this, we combined three perspectives. Brain imaging, cognitive testing, and direct analysis of human brain tissue.

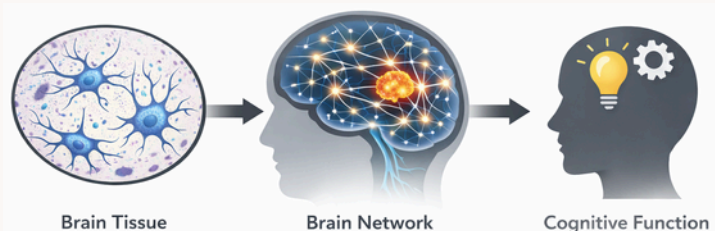
First, we looked at how tumors are positioned within the brain's communication network. Using advanced brain scans, we examined how strongly each tumor was connected to the brain's core wiring system, the set of connections that keeps information flowing efficiently across the brain. We found that patients with cognitive difficulties did not have more connections overall, but their tumors were more deeply embedded in this core network. In simple terms, the tumor was plugged into more critical communication routes.

Then we turned back to the cells that protect these routes. In tissue samples taken during surgery, we studied oligodendrocytes, the cells responsible for producing myelin, the insulation that allows brain signals to travel smoothly. We compared regions with little tumor presence to areas where tumor cells were densely infiltrating the tissue.

Here, a striking pattern emerged. In patients with cognitive impairment, oligodendrocyte cells showed much stronger changes as tumor infiltration increased. Their numbers rose sharply in heavily infiltrated regions, but their ability to mature normally was reduced in the surrounding tissue. In patients whose cognition was preserved, these changes were far more subtle.

Together, these findings suggest that cognitive problems in glioma are not caused by a single factor. Instead, they appear when tumors interfere with the brain at multiple levels at once. They embed themselves into key communication hubs while also disturbing the cells that maintain the brain's wiring locally.

This multiscale view, linking brain networks to cellular behavior, is at the heart of the DaMAGE project. By bridging these levels, we move closer to understanding why cognitive symptoms arise and how they might one day be predicted or even prevented. More connections, more insight, and many exciting next steps ahead!



PRECOG

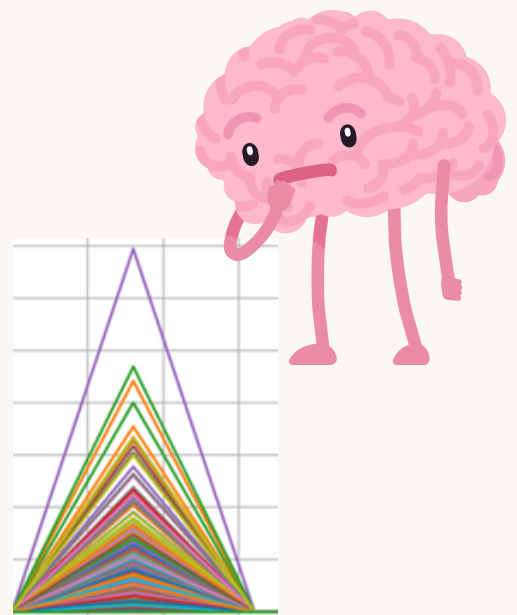
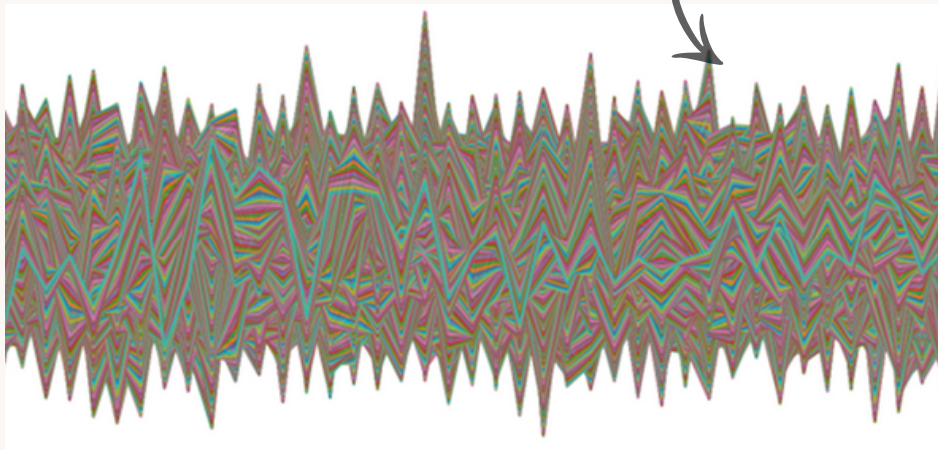
Eva Koderman

The main focus for PRECOG this year was the first scientific article, which aims to predict functional independence in patients with contrast-enhancing glioma one year after their initial resection. For this work, we're using an impressive dataset from the VUmc: 552 patients, making it one of the largest cohorts available. Even more exciting, the dataset reflects a genuinely naïve, unbiased pre-operative population with unknown molecular markers at the time of surgery. This allows us to build models that rely solely on information clinicians actually have during pre-operative decision-making.

Data collection was a true team effort. Marike van Lingen gathered the clinical variables that were not yet available and the primary outcome measure (Karnofsky Performance Status), earning the unofficial but well-deserved title of “the professional KPS imputator.” Meanwhile, Floris Tijhuis handled the imaging side—checking MRI availability and refining the algorithmic pipeline that generated advanced radiomics features. Thanks to them, I had everything I needed to dive into model development.



Emerging results show that three factors consistently stand out as the strongest predictors of survival and functional independence in patients with contrast-enhancing glioma: age at diagnosis, pre-operative functional status, and volume of the enhancing tumor component. Now comes the fun part—writing it all up, submitting, and moving on to the next challenge. Looking ahead, the upcoming project will incorporate computational modeling to introduce new and even richer predictors, with a shift toward a more complex outcome: cognitive performance. I've already been experimenting with simulated time-series data, which produced some entertaining plotting mishaps (as the figures proudly demonstrate). Expect more (and better) simulated data next year. Stay tuned!



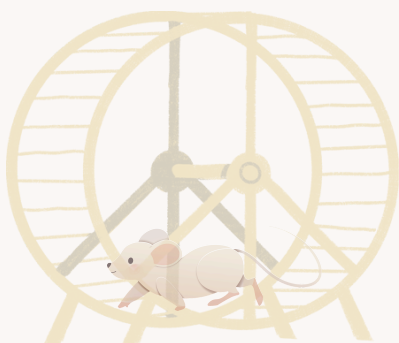
ChemoBrain Project

Rachel Smith

It's been a big year for the chemobrain team! We finally started our animal experiments in January and, after a bit of a shaky start, we now have 8 (and a half) cohorts of rats under our belts. We've learnt a lot about chemotherapy injections, coding behavioural tasks and working in the animal facility (mostly by trial and error!).

While Iza has been very busy piloting MRI and calcium imaging protocols, I have been working on the behavioural side. It took us a while to figure out why the animals were not performing the task as we expected them to, but now that we did we finally see a behavioural effect of chemotherapy!! The next step for me is working on histological analysis to investigate the cellular and molecular effects of chemotherapy

And, of course, I'm looking forward to beginning to compare the data across scales, with the help of the new TRANSCEND PhD candidate, in 2026.



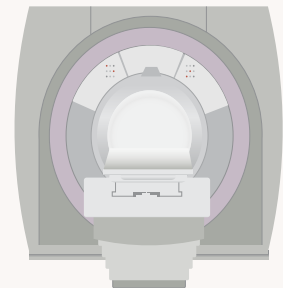
In addition, we are about to introduce our first intervention therapy: running wheels! With this intervention, we will investigate whether physical activity can modify the effects of chemotherapy-induced cognitive impairment. Here we're moving the wheels to the animals.

ChemoBrain Project

Iza Oostra

Last year, we ended our newsletter column with the announcement that we had just started our experiments and were hoping to begin MRI scans in the months ahead. Fast forward to now, and we've made major progress: nearly nine cohorts later, we have completed eight MRI scans and performed two surgeries!

As the technician on this project, I haven't been standing still. The MRI scans are currently in the final stages of piloting. This phase has been crucial for fine-tuning protocols, optimizing scan parameters, and troubleshooting practical challenges. Performing the scans firsthand provided valuable experience and confidence, bringing us one step closer to launching the full-scale experiment.



In parallel, we also started the surgical component of the project. These procedures take place at a different facility, where I am being trained by two highly skilled and experienced technicians. Their expertise has been super valuable, not only in mastering the technical aspects of the surgeries, but also in learning best practices, problem-solving in real time, and ensuring consistency and animal welfare throughout the process.

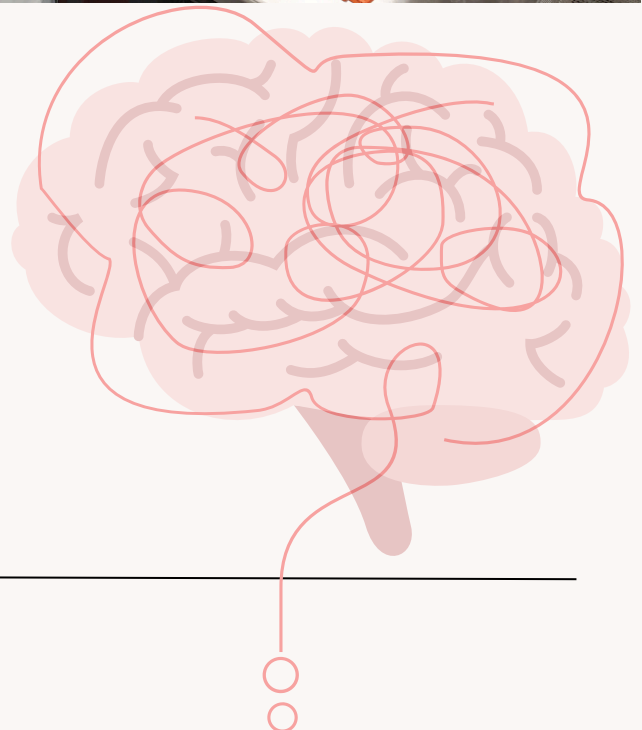
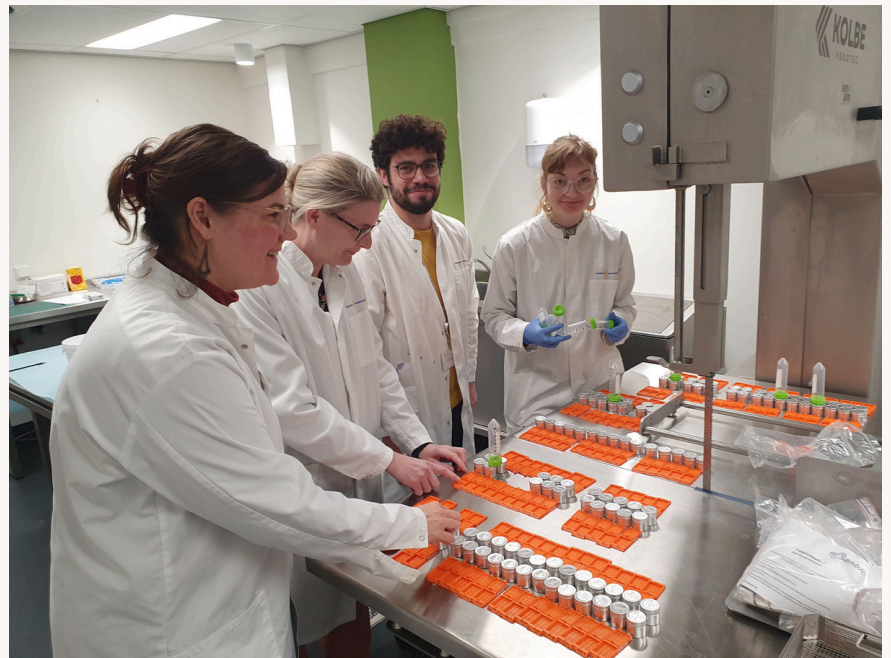
Altogether, this period has been an intense but exciting phase of learning, optimization, and progress. With both the MRI and surgical workflows coming together, we are now well on our way toward the next stage of the project!



Glioma post-mortem cases

Glioma remains a difficult disease to study: we know that there are tumor cells throughout the brain, but we cannot see them on MRI or MEG, and we typically only receive tissue from around the tumor from the neurosurgeons. Moreover, we know that brain activity and connectivity are disturbed throughout the brain. How interesting would it be if we could also explore cellular properties at a distance from the tumor?

This year, we have added two postmortem glioma brains to our collection of now 3 donors. We are infinitely grateful to these people for donating their brains to science, and to the mortuary (specifically Eliane and Lina, thank you!) and team CNAB (thanks Niels and Laura!) for supporting us in this relatively new endeavor.





GRIP on fatigue

Maxine Gorter

Study results update: Blended CBT reduces severe fatigue in diffuse glioma

We are excited to share the results our clinical trial (GRIP op Vermoeidheid), published in Neuro-Oncology, showing that a blended **cognitive behavioral therapy (bCBT) program can meaningfully and measurably reduce severe fatigue in patients with diffuse glioma**. Jantine Röttgering started this study back in 2020 and Maxine Gorter took over during Jantine's work visit in UCSF and after Jantine finished her PhD.

What this study is all about:

Fatigue is one of the most burdensome symptoms for these patients, yet until now, there were no evidence-based treatments specifically targeting it. This study marks an important step forward in improving supportive care.

What we found is truly promising:

The trial was stopped early – not because of problems, but because the treatment worked so well at the first planned interim analysis.

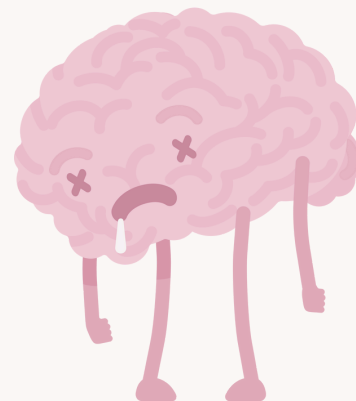
After completing the 12-week bCBT program, almost 70% recovered from severe fatigue.

The improvements were not short-lived: benefits persisted at 12-week follow-up.

Beyond fatigue, patients also reported better quality of life, less anxiety, and reduced future uncertainty. The intervention combines therapist-guided sessions with tailored online modules, making it scalable and accessible for routine clinical practice.

This study provides the evidence that a targeted psychological intervention can substantially improve fatigue and well-being in people living with diffuse glioma. It opens the door to more personalized, holistic care for a symptom that has long lacked effective treatment options.

A heartfelt thank-you to all patients who participated, and to all co-authors and collaborators – this study was truly a team effort.



Maxine got an award for best oral presentation (about these results!) at EANO conference in Prague!

Neurocognitive profiles in glioma

Maxine Gorter

We are pleased to share that our new study on neurocognitive functioning in glioma has been [published in Neuro-Oncology](#). In this work, we address a longstanding challenge in the field: although neurocognitive deficits are usually studied one domain at a time, patients rarely experience isolated problems. Instead, these difficulties often co-occur and interact.

To better capture this complexity, we developed a **data-driven classification of neurocognitive functioning**. Rather than focusing on single test scores, we identified **four distinct neurocognitive profiles**, ranging from globally impaired to relatively preserved functioning.

Key insights from the study:

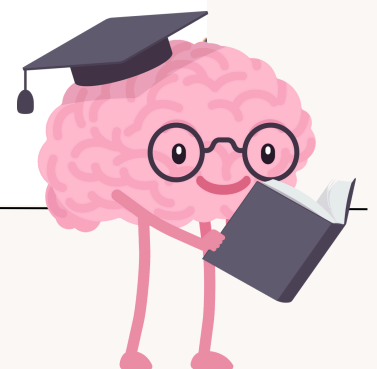
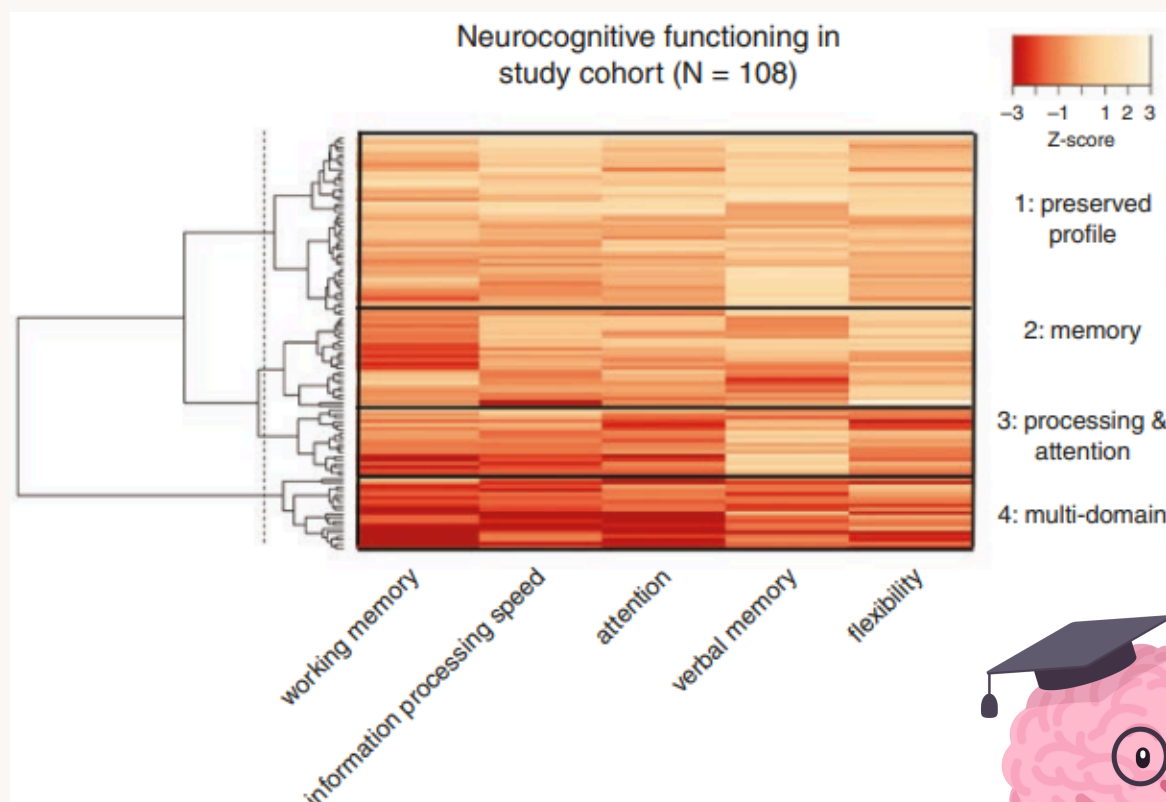
Reproducible profiles: The same four profiles emerged in an independent validation cohort.

Clinical relevance: The profiles were associated with important clinical characteristics.

Improved comparability: This classification can support more consistent comparison and aggregation of neurocognitive data across studies.

Potential clinical utility: These profiles may help guide more targeted selection for neurocognitive interventions.

By moving beyond isolated deficits, this work contributes to ongoing efforts to provide more **personalized neurocognitive care for individuals with glioma**. A big thank you to all co-authors and collaborators for their contributions to this project.



New review on our multiscale ideas!

nature reviews neurology

<https://doi.org/10.1038/s41582-025-01171-x>

Review article

Check for updates

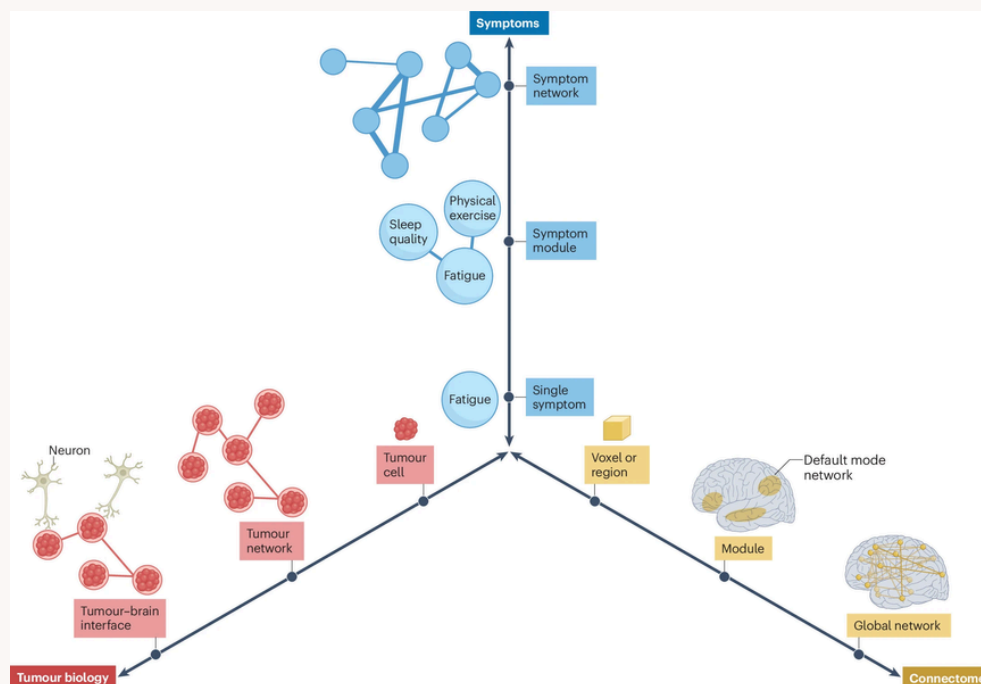
Multiscale network perspectives on glioma: from tumour biology to symptoms, survival and treatment

Linda Douw^{1,2,3}, Jaap C. Reijneveld^{3,4,5} & Ayan S. Mandal^{6,7}

We received a nice Sinterklaas present on December 5th, because a new review on multiscale networks in neuro-oncology was published in Nature Reviews Neurology on that day! Find the full article [here](#).



In short, the review posits that we can only understand symptoms in glioma by viewing the disease through a multiscale lens. Linda, Jaap and Ayan Mandal use three network scaffolds to further delineate these network viewpoints, namely symptom networks, the connectome, and tumour biology.



So far, research points to three key network layers that matter in glioma. These include how symptoms emerge, how tumors interact with the brain's communication pathways, and how tumor biology itself is organized. Each of these layers can be described and measured using network theory, allowing researchers to study patterns of organization in a unified way, from cells to whole brain systems.

What remains largely unexplored is how these layers influence one another. How do local cellular changes shape global brain networks, and how do global network disruptions feed back onto tumor behavior and symptoms? Bringing these perspectives together through multiscale network science offers a promising path forward. By integrating symptom, brain network, and tumor biology information, and potentially other networks in the future, this approach could help move toward more personalized and network informed care for people living with glioma.



Grants Galore

In 2025, we received funding for four new projects: FAIR-CARE, Adore M2M, TRANSCEND and a CCA PoC grant!



Cancer-related fatigue affects many people with cancer, yet we still cannot explain why some patients develop severe fatigue or why treatments help some but not others. Our freshly funded project **FAIR-CARE** takes a fresh approach by studying **how symptoms connect and interact, using advanced AI and Bayesian network methods**.

This project brings together an **inspiring interdisciplinary team** across Amsterdam UMC, Cancer Center Amsterdam, the NKCV and University of Amsterdam, combining oncology, psychology, neuroscience, data science and AI, namely: **Hanneke van Laarhoven, Hans Knoop, Maarten Marsman, Tessa Blanken and both Linda and Mona**.

A heartfelt thank you to the **Hanarth Foundation** for supporting this work. We look forward to improving understanding and care for people facing this challenging symptom!

Adore M2M project, PIs Linda Douw and Matthan Caan

Neurological and oncological diseases affect the brain across many scales, from cells to whole brain networks. This project develops computational tools to bridge these scales and improve understanding and treatment.

Subproject 1 develops AI based “MRI microscope” models that infer cellular pathology from non invasive MRI. Initial applications focus on iron accumulation in Alzheimer’s disease and tumor cell proliferation in brain cancer, turning standard scans into proxies for microscale disease processes.

Subproject 2 will be embedded at ANW (with Sébastien who started in December!) and addresses the challenge of multiscale complexity by integrating data across biological levels using multilayer network theory. By combining brain imaging with molecular or genetic data in disorders such as multiple sclerosis, Alzheimer’s disease, and brain cancer, this project aims to identify the most relevant treatment targets and support more personalized interventions.

Together, these approaches provide a foundation for linking cellular pathology to brain networks and clinical symptoms.



Dorien received funding from Cancer Center Amsterdam to map the functional anatomy of the tumor-brain interface to discover novel treatment avenues for IDH-mutant glioma!

TRANSCEND



The **MSCA Doctoral Network TRANSCEND** has been coming for a long time. I first started talking about the **translational gap in neuroscience** back in 2018 with two other Branco Weiss Fellows at the annual meeting in Zurich. None of us imagined where that conversation would lead, but what began as an exchange of ideas slowly grew into something much larger: a vision to **bridge the worlds of basic and clinical neuroscience**, of experiment and computation, of medicine and philosophy.

Those early discussions were driven by curiosity and an unease with the boundaries that too often separate scientific disciplines, completely reflecting our own very different backgrounds: Lara Keuck from philosophy, Klaus Eyer from immunology, and Linda from network neuroscience. Over the next years, our conversations spilled into conference halls in Philadelphia, took shape during writing marathons in Berlin, and deepened through countless debates about **how to connect scales, methods, and epistemic ways of thinking**.



Linda Douw



Lara Keuck



Klaus Eyer

CELEBRATING THE GOOD NEWS OVER ZOOM

From that shared curiosity finally emerged TRANSCEND, a **European doctoral network that now brings together 11 partner institutions and 13 doctoral candidates**, as well as various associated partners from the realms of biotech, patient organizations and start-ups.

Brilliant colleagues from all over Europe joined us:

Edwin van Dellen (UMC Utrecht)
Lisa Genzel (Donders Institute Nijmegen)
Victor Greiff (Oslo)
Sara Green (Denmark)
Kaat Alaerts (Belgium)
Daniela Latorre (Italy)
Steeves Demazeux (France)



At MULTINET, we will host a freshly hired doctoral candidate working on, not surprisingly, bridging scales of research in neuroscience. This PhD candidate will be collaborating closely with Rachel and Dorien, and will take the computational route of connecting cells, circuits, and whole-brain networks in already available data. Ultimately, our aim with this project is to have better models and methods for translational science!

Rejected grants...

They can't all be winners. While we are superhappy with the successes we had this year in terms of grants and papers, we gladly acknowledge that perhaps just as many proposals and manuscripts receive a rejection.



These grants were rejected in 2025:

- CCA project grant (Mona/Lucas/Dorien/Linda)
- For the second time: ENW M2 (Linda with collaborator)
- Adore project (Linda with collaborators)

Still waiting for the news:

- ZonMw open (Linda with collaborators)
- NWO XL (Linda with collaborators)



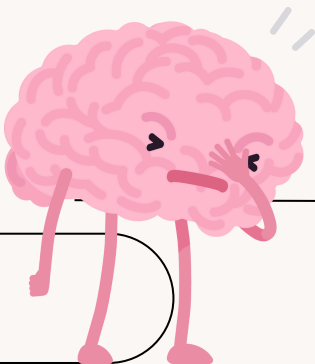
While the committee agrees with the referees about the clarity of the research questions and the objectives of this proposal and is impressed by the expertise of the researchers involved, they also notice several concerns mentioned by the referees.

WP1 may remain correlational without causal validation.



The risk of this proposal is considered substantial.

Proposal leans heavily on existing datasets with limited clarity on what new data will be generated.

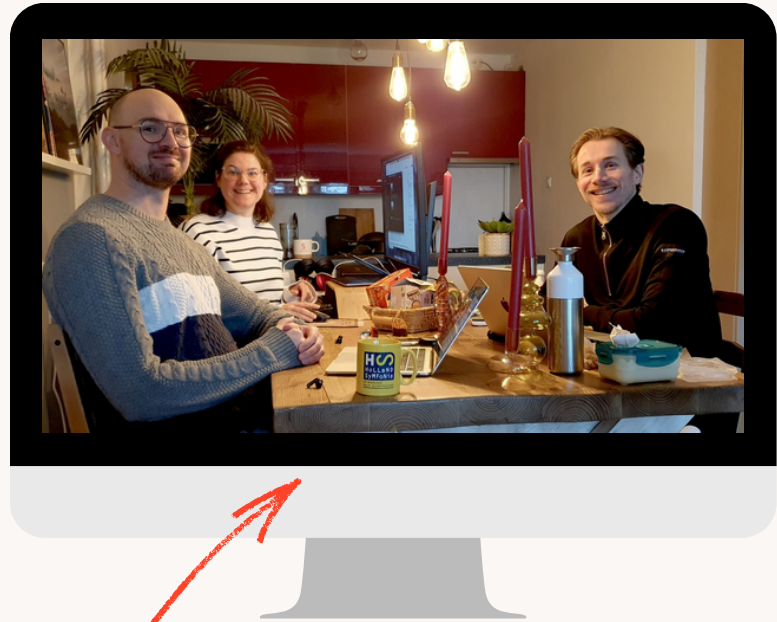


Continuing a MULTINET tradition: Paper in a day

In February, we continued something we had done once before in the MULTINET lab: writing a Paper in a Day.

During the very first edition during COVID, **Lucas, Marike and Linda** wrote the 2023 paper on multilayer correlates of cognition in glioma.

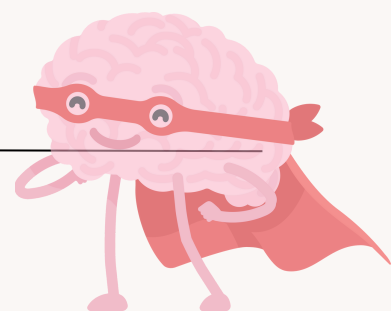
Then early 2025, **Chris Vriend from NP, Lucas and Linda** took on the challenge of writing another paper in a single day. Thanks to a well-prepared draft by Lucas ahead of the writing sprint, the team could fully focus on refining the Methods section, creating clear tables and figures, and strengthening the Introduction and Discussion. The result? A manuscript that was ready to be shared with co-authors.

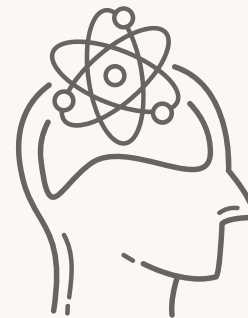


A few months later, **Mona, Linda, Marike, and Eva** brought the concept to life once again.

The day kicked off with a structured overview of Mona's newly generated results.

From there, we divided the work into small, manageable tasks and jumped right in. Fueled by plenty of snacks, movement breaks, and regular check-ins, and even some spontaneous, live data exploration, we worked with great focus and energy toward a strong first draft.





Open Science

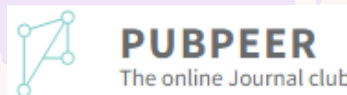
Floris was nominated for an Open Science prize at Amsterdam UMC!

He built a pipeline to process thousands of scans from brain tumor patients and check their quality. Now, the neuro-oncology patient research group has an insanely rich dataset to work with.



In 2025 we have peer-reviewed multiple research preprints with the team and published **two** of them on the [PUBPEER website](#), to practice giving constructive feedback!

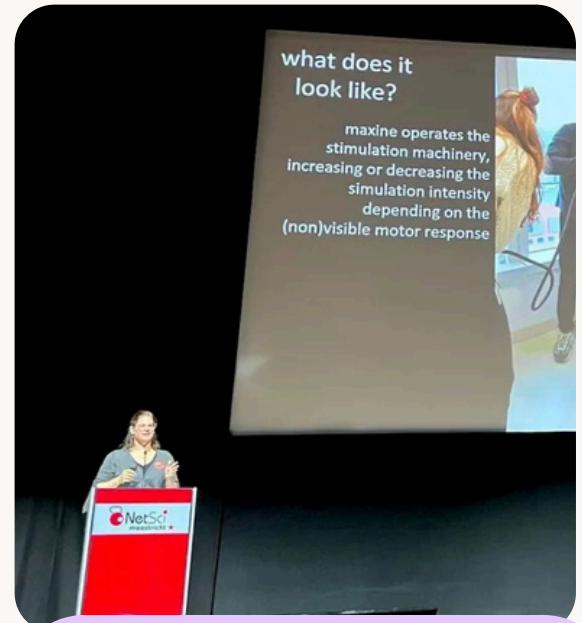
We also published our newest research plans in the preregistration registry on the [Open Science Foundation website](#)



Talks and posters

This year, we shared our research, insights, and ideas at a variety of national and international platforms. From keynote lectures to poster presentations, here's where we were spreading our MULTINET findings!

Marieke & Maxine @EANO in Prague!



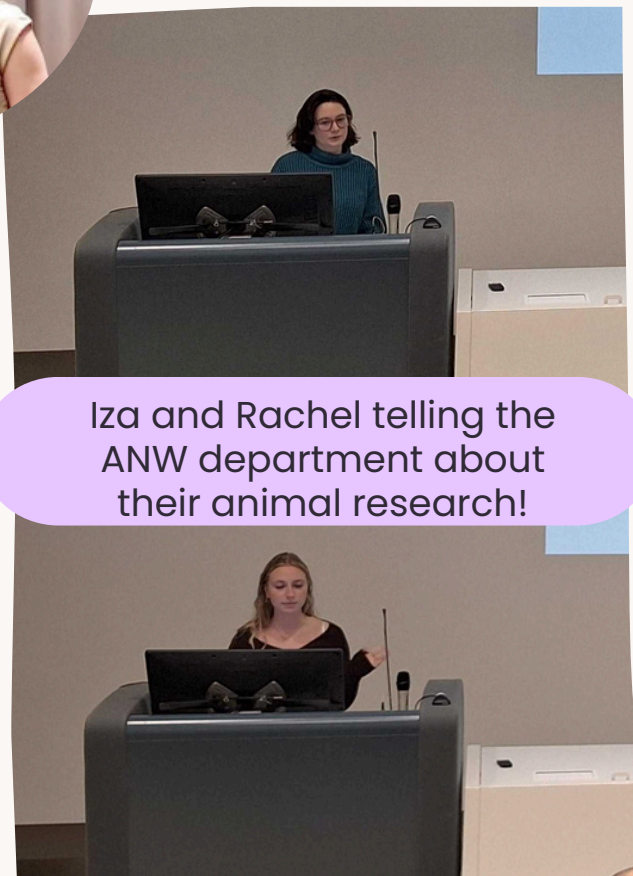
Linda @Network Science Society in Maastricht



Dorien (right) @Dutch Neuroscience meeting. Together with Anouk Schrantee organised a symposium "Bridging scales in brain function"



Linda @first EACR Conference on Cancer Neuroscience in Bilbao



Iza and Rachel telling the ANW department about their animal research!

Talks and posters



Amber Gadet
@Nicolaes Tulp Symposium

Maxine Gorter
@Cancer Center
Amsterdam retreat in
Noordwijkerhout



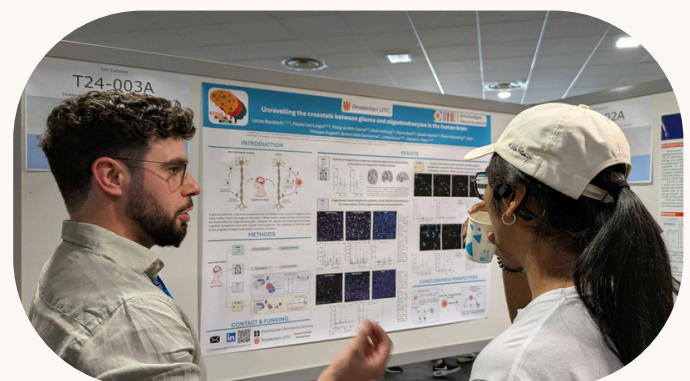
Dorien Maas @TN2
seminar on Heterogeneity
in Psychiatry



Lucas Baudouin @LWNO



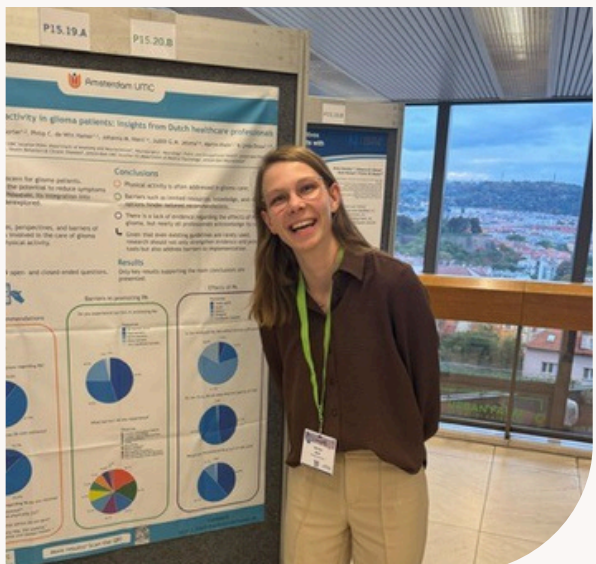
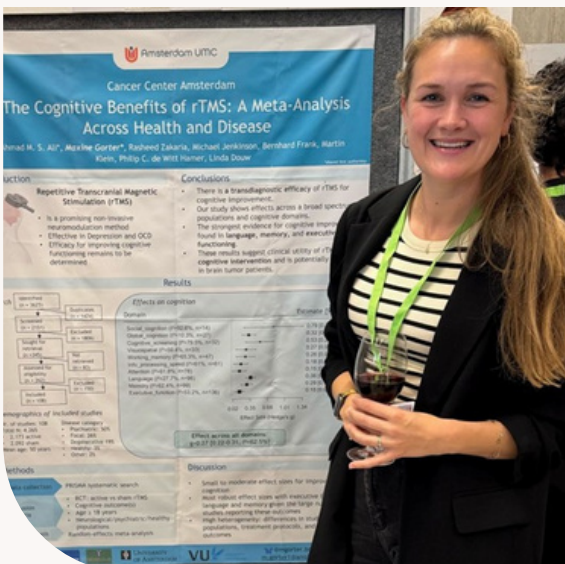
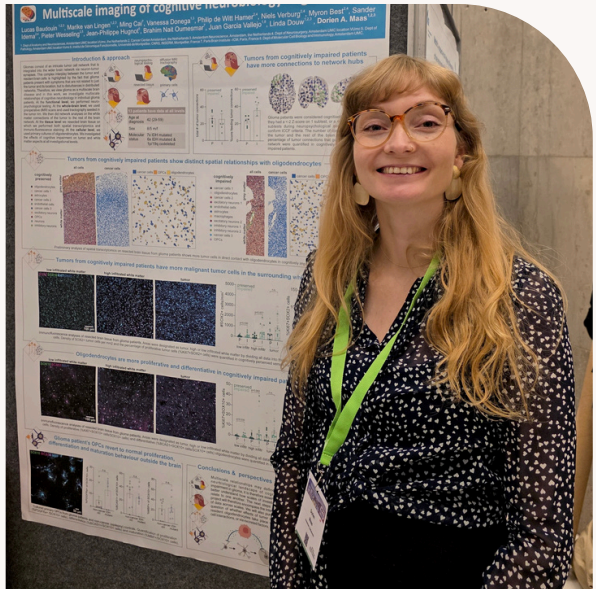
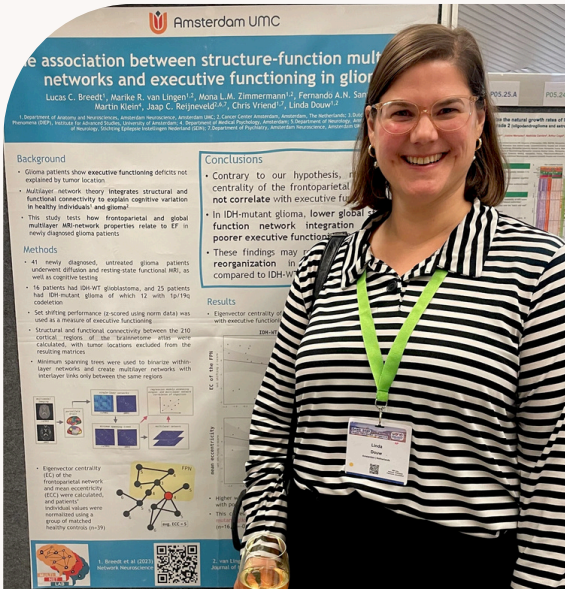
Maxine @BeNe Brain
Stimulation Conference!



Lucas Baudouin
@EuroGlia in Marseille



October 2025 in Prague



Building bridges: collaborations near & far

Mona Zimmermann

“At the start of this year I got the great opportunity to spend 3 months in the beautiful (and hilly) city of San Francisco for a collaboration with Professor Srikantan Nagarajan at the Biomagnetic Imaging Lab, UCSF.

We asked ourselves: can we combine MEG data from our two centers to better understand the deviant neurophysiological patterns we see in glioma patients? And what does this tell us about the disease trajectory of these patients?

During my time in San Francisco we indeed showed that results are consistent across our different MEG systems and glioma cohorts. This is a big win for data sharing and collaboration across our two international centers and a great start for the rest of our project where we will answer more specific questions regarding the neurophysiology in the different disease stages of glioma (stay tuned wink wink 😊).

I really enjoyed my time in San Francisco! Not only did I get the chance to visit one of the most prestigious cancer research centers in the world, I also got to explore San Francisco and California as a whole, which was amazing! The city is beautiful and vibrant and I am already missing its hilly streets and breathtaking views (quite some getting used to being back in the flattest country in the world now...).

I learned so much during my stay and am very grateful to my collaborators at UCSF, Sri and @Velmuguran Jayabal, and the financial support that I got through the Cancer Center Amsterdam and the KNAW van Leersum travel grants that made this work visit possible!”



MULTINET bloopers

Lab Tales: The Ups and Downs of Research Life

Science isn't all smooth sailing, and sometimes the best stories come from unexpected challenges! Here's a glimpse into the moments that made us laugh, sigh, or scratch our heads:

Oops!

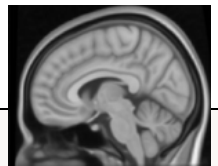


Getting stuck in the elevator

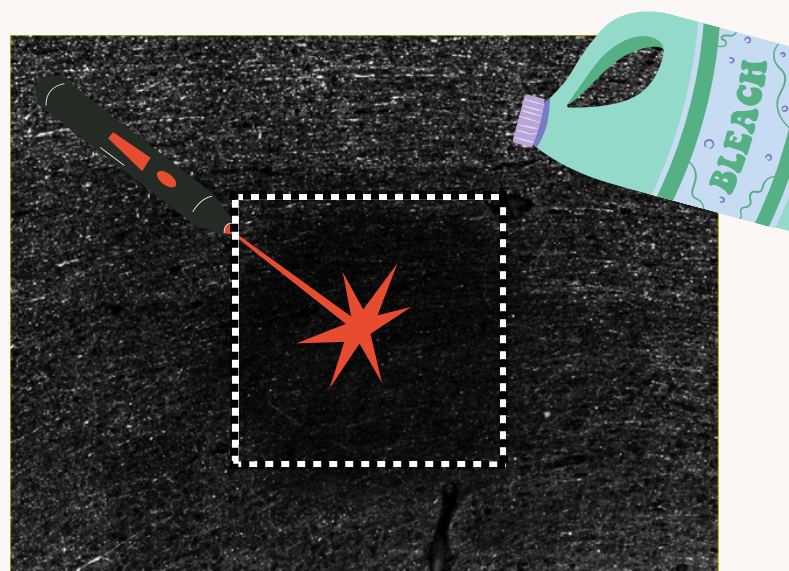
MNI standard space not being standard:
After running MRI data through our pipelines, we found out that each pipeline used a slightly different "standard" space..

Images have different orientations/fields of view - alignment/orientation labels may be incorrect!

mni_icbm152_t1_tal_nlin_sym_09a
[104 116 89]: 59.78411236254033
MNI152_T1_1mm
[84 108 89]: 5570



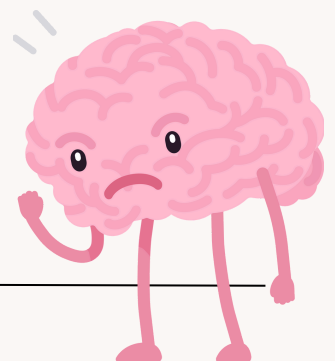
IHC: getting an email that your antibody doesn't work, right after you finished your staining with this exact AB. Or microscoping you tissue a bit too enthusiastic and bleach your staining..



Subject: FYI Chicken **secondary** antibody

Hi everyone,

FYI, we have discovered that the donkey-anti-chicken-AlexaFluor488 (S153) **secondary** antibody does not work anymore. I have ordered a new vial and will trash the old one. But in case you have used it in the last 6 months and your staining didn't work, it might be worth to try a different **secondary**.





MULTINET et al 2025:

Expand your reading list with our 2025 publications:

Blom, M. E., Gorter, M., Belgers, V., Röttgering, J. G., de Witt Hamer, P. C., Niers, J. M., ... & Douw, L. (2025). Self-reported physical functioning and physical fitness in glioma patients. *Neuro-Oncology Practice*.

Gorter, M., Röttgering, J. G., Belgers, V., van Lingen, M. R., de Witt Hamer, P. C., Douw, L., & Klein, M. (2025). Distinct and reproducible neurocognitive profiles in stable diffuse glioma: A data-driven approach to understanding cognitive heterogeneity. *Neuro-Oncology*, *noaf197*.

Belgers, V., Tolver, A., Klein, M., Douw, L., Niers, J. M., Piil, K., & de Witt Hamer, P. C. (2025). Baseline factors relating to depressive symptoms at one year postoperative in patients with diffuse glioma. *Neuro-Oncology Practice*, *12*(1), 122-130.

Belgers, V., Van Genderen, M. N., De Schotten, M. T., Cakmak, M., Douw, L., Ferles, A., ... & de Witt Hamer, P. C. (2025). Impact of resection location on depressive symptoms following glioma surgery. *Neuro-Oncology Advances*, *7*(1), *vdaf222*.

Zimmermann, M. L., Ulrich, C., Breedt, L. C., van Lingen, M. R., De Witt Hamer, P. C., Klein, M., ... & Douw, L. (2025). The relationship between deviant brain activity and executive functioning in glioma patients. *Neuro-Oncology Advances*, *7*(1), *vdaf168*.

Pontillo, G., Prados, F., Wink, A. M., Kanber, B., Bisecco, A., Broeders, T. A., ... & Yousry, T. (2025). More Than the Sum of Its Parts: Disrupted Core Periphery of Multiplex Brain Networks in Multiple Sclerosis. *Human Brain Mapping*, *46*(1), *e70107*.

van der Pal, Z., Douw, L., Genis, A., van den Bergh, D., Marsman, M., Schranter, A., & Blanken, T. F. (2025). Tell me why: A scoping review on the fundamental building blocks of fMRI-based network analysis. *NeuroImage: Clinical*, *103785*.

van der Pal, Z., Geurts, H. M., Haslbeck, J. M., van Keeken, A., Bruijn, A. M., Douw, L., ... & Schranter, A. (2025). Stimulant medication and symptom interrelations in children, adolescents and adults with attention-deficit/hyperactivity disorder. *European child & adolescent psychiatry*, *34*(6), 1917-1929.

van Dam M, Röttgering JG, Nauta IM, de Jong BA, Klein M, Schoonheim MM, Uitdehaag BMJ, Hulst HE, Douw L (2025). Understanding the complex network of objectively assessed cognition and self-reported psychological symptoms in people with multiple sclerosis. *Multiple Sclerosis Journal* *31*(1):93-106.

Röttgering JC, Choi E, Douw L, de Vries R, Brie M, Taylor JW, Klein M, Weyer-Jamora C (2026). Improving fatigue and neurocognitive impairment in progressive neurological disorders: a systematic and narrative review. *Heliyon* *12*(1):e44183.

Alexandersen CG, Douw L, Zimmermann MLM, Bick C, Goriely A (2025). Functional connectotomy of a whole-brain model reveals tumor-induced alterations to neuronal dynamics in glioma patients. Network Neuroscience, in press.

Voets NL, Ashtari M, Beckmann CF, Benjamin CF, Benzinger T, Binder JR, Bizzi A, Bjornson B, Chang EF, Douw L, ..., Bartsch A, Bookheimer S (2025). Consensus recommendations for clinical functional MRI applied to language mapping. Aperture Neuro 5, in press.

van den Bergh D, Douw L, van der Pal Z, Blanken TF, Schranter A, Marsman M (2025). Jointly estimating individual and group networks from fMRI data. Network Neuroscience, in press.

Vriend C, Fitzsimmons SMDD, Aarts I, Broekhuizen A, van der Werf YD, Douw L, Visser HAD, Thomaes K, van den Heuvel OA. Treatment outcome is associated with pre-treatment connectome measures across psychiatric disorders – evidence for connectomic reserve? Neurolmage: Clinical 48:103870.

Gorter M, Röttgering JG, Belgers V, Blom MEC, Thomassen B, De Witt Hamer PC, Niers JM, Kouwenhoven MCM, Bienfait HP, Gathier CS, Compter A, Geurts M, Snijders TJ, Van de Ven PM, Douw L, Knoop H, Klein M (2025). Bayesian adaptive randomized trial of blended cognitive behavioral therapy for severe fatigue in stable diffuse glioma. Neuro-Oncology, in press.

Douw L, Reijneveld JC, Mandal AS (2025). Multiscale network perspectives on glioma: from tumour biology to symptoms, survival and treatment. Nature Reviews Neurology, in press.

New preprints



van der Pal Z, Reneman L, Geurts HM, Boucherie DE, Douw L, Schranter A. Methylphenidate effects on target-enriched functional connectivity and response inhibition in stimulant treatment-naïve individuals with ADHD. medRxiv.

Maas DA, Bancel-Vega R, Baudouin LR, Bun P, Mano-Saillet B, Habermacher C, Verburg N, Rusconi F, Angulo MC. Cell-autonomous mitochondrial calcium flux governs oligodendrocyte regeneration. bioRxiv.

Fitzsimmons S, Coomans C, Breedts L, Batelaan N, van der Werf Y, van den Heuvel O, Douw L, Vriend C. Structural-functional multilayer brain network properties of the stimulation location predict outcome of repetitive transcranial magnetic stimulation for obsessive-compulsive disorder. medRxiv.

Blom, M. E., Gorter, M., de Witt Hamer, P. C., Niers, J. M., Jelsma, J. G., Klein, M., & Douw, L. (2025). Promoting physical activity in glioma patients: insights from Dutch healthcare professionals. medRxiv, 2025-09.

Vansina E, Douw L, Kaiser A, van der Pal Z, Boucherie DE, de Vries TJ, Pattij T, Cohen JR, Hoekstra PJ, Reneman L, Schranter A. Effects of a 4-month methylphenidate treatment on functional connectivity in attention-deficit hyperactivity disorder. medRxiv.

This year brought exciting collaborations, challenges, and plenty of growth, both in our work and our team!

A huge thank you to everyone who contributed, supported, and followed our journey. If you can't wait a whole year for another *flashing* newsletter, click on the link and follow us on LinkedIn to stay updated and keep in touch!

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FOR A CHAT

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