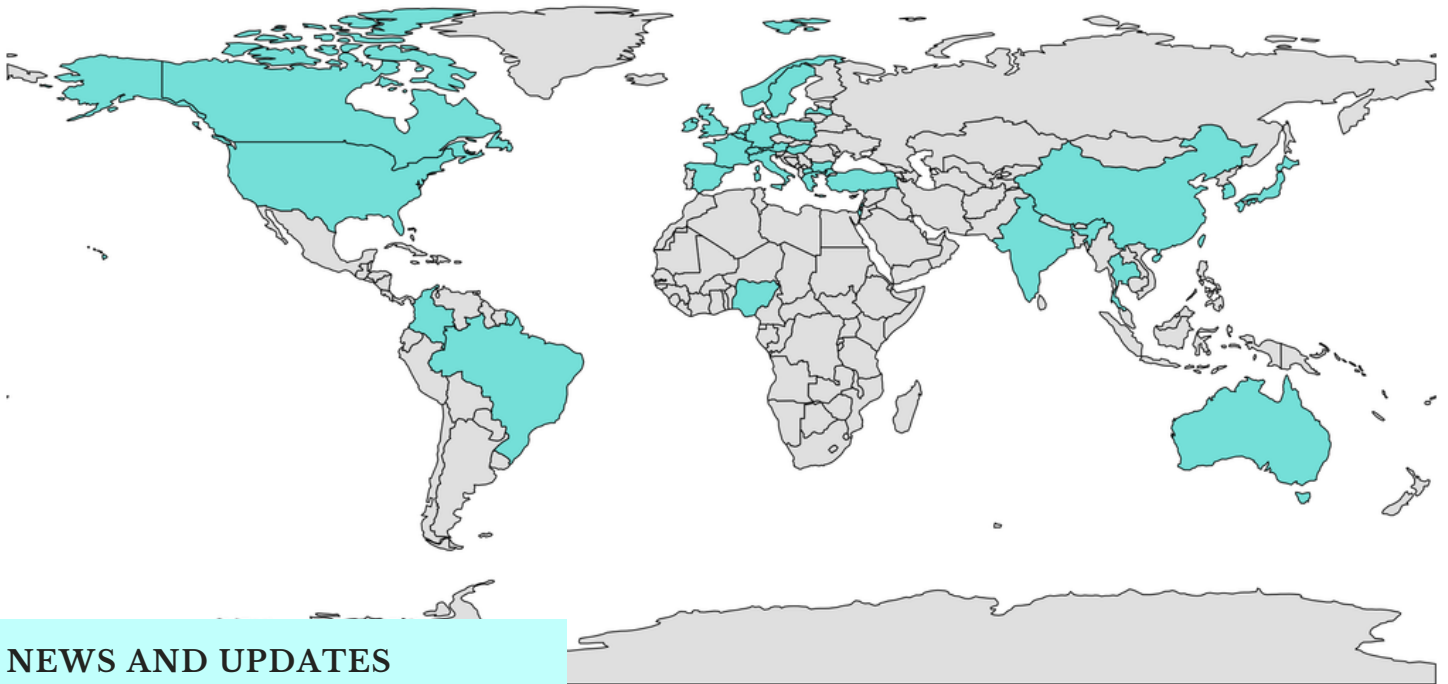


HIPPOCAMPAL SUBFIELDS GROUP



HSG NEWS AND UPDATES

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CONNECTING WITH THE HSG COMMUNITY

As we move forward into 2024, we are grateful for the strong and consistent engagement and interest of our community in the activities of the HSG. It has been a joy to work together toward progressing science and to spend time building the community with HSG members both new and old over the past year. With over 600 individuals engaged with the HSG spanning faculty, postdocs, graduate students, undergraduate students, as well as other researchers, clinicians, and those in industry roles we are excited to see the reach of the HSG community and that new members continue to join.

We were able to connect with many of you in person at different conferences and working group meetings, and, although we did not host our webinar series this year, we connected online through our new podcast, HSGPod, in addition to the Marcus Wallenberg Symposium that provided an update on group activities.

We cannot wait to continue connecting with the amazing HSG community in 2024.

Cheers,

Kelsey Canada (Chair), Hannah Baumeister, Gustaf Rådman
HSG Communication Working Group



REUNION DEL HSG - ALBACETE, SPAIN

2-Day Neuroanatomy Workshop + 2-Day Working Groups

The HSG traveled to Albacete, Spain for a 4-day scientific gathering.

The meeting included two days of neuroanatomy lectures and hands-on dissections, and two days of intensive collaborative discussion on how to translate knowledge from human brain histology to *in vivo* MRI.

During the 2-day neuroanatomy workshop, the faculty of the Human Neuroanatomy Laboratory at University of Castilla-La Mancha, Albacete led attendees through lectures and detailed protocols for dissection of the pig hippocampus and the human hippocampus.

UCLM faculty provided impressive support during the dissection labs, answering both technical and scientific attendee questions. Attendees echoed their appreciation of the UCLM faculty in providing the experience of interacting with the hippocampus in the context of the human brain.

During the 2-day working groups, attendees divided across sessions focused on either hippocampal head subfield segmentation (led by Dr. Marshall Dalton) or MTL cortex delineation (led by Dr. Jenna Adams). The chair of each working group set specific goals for the meeting.

The hippocampal head working group focused on determining the feasibility of applying different geometric rules to images of varying resolutions and quality. Attendees focused on testing rules applied to the anterior and middle portions of the hippocampal head. Additionally, attendees tested rule variants for the harmonized protocol to determine which best translated across different levels of expertise.

The MTL cortex working group focused on finalizing ranging rules and landmarks for each region included in the protocol. Attendees reviewed histology data annotated by different experts and discussed translation to maximize reliability and validity of the *in vivo* MRI protocol. Additionally, extensive conversations regarding the variability of the collateral sulcus including members of the UCLM faculty set the foundation for next steps.

Thanks to the amazing organizational efforts of:

Valerie Carr, Gustaf Rådman, Jenna Adams, Marshall Dalton, Laura Wisse, Ricardo Insausti, Mónica Muñoz López. A special thanks to everyone else involved on part of our gracious hosts, the Human Neuroanatomy Laboratory at University of Castilla-La Mancha, Albacete.

Recordings of the neuroanatomy dissection labs are available on our YouTube as are HSGPod episodes recapping the meeting with working group leaders:
www.youtube.com/@hippocampalsubfieldsgroup



MAKING PROGRESS IN PERSON

Lund Meeting & SfN Pre-Conference Meeting

In Lund, the goal of the three day meeting was to create a slice-by-slice MRI segmentation protocol for the entorhinal cortex, perirhinal cortex, ectorhinal cortex, and parahippocampal cortex.

Building upon the 2022 Lund meeting, attendees examined regional borders annotated on histology by world-renowned neuroanatomists, and aimed to relate these borders to gross anatomical features of the medial temporal lobe that are visible on *in vivo* MRI.

Moving beyond determining ranging of the regions (the focus of prior meetings), the meeting resulted in substantial progress in defining borders between regions. The group also dedicated time to examining collateral sulcus variability (in both type and depth) and how that variability impacted the histology annotations in order to propose rules applicable across subjects.

This meeting also including the “Marcus Wallenberg Symposium: Activities of the HSG—a progress report” which workshop attendees viewed together in person and/or presented talks in tandem with other HSG members attending or presenting remotely.

In Baltimore, the goal of the two day meeting was to complete a set of rules using geometric heuristics and identifiable landmarks to define subfields in hippocampal head.

Building upon the efforts of the Spain meeting and internal meetings, attendees reviewed a draft protocol of segmentation rules across the full anterior-posterior range of the hippocampal head.

The group revised the protocol to streamline decisions for determining the correct rule to apply based on neuroanatomical characteristics of hippocampal head using both annotated histology and *in vivo* MRI images. This included testing the applicability of the proposed rules and logic structure across subjects representing the variable morphology of subfields in the head.

This meeting also included conversations regarding quality control of images for accurate manual segmentation in hippocampal head.

The working group is currently working internally toward formal feasibility and reliability testing.

Thanks to the amazing organizational efforts of:

Anika Wuestefeld, Amanda Annettesdotter, Jenna Adams, Gustaf Rådman, Laura Wisse (Lund) Marshall Dalton, Rosanna Olsen, and a special thanks to Arnold Bakker and his lab for hosting the meeting at Johns Hopkins (Baltimore)

Funding support of Markus Wallenberg Stiftelse & Wenner-Gren Stiftelserna (Lund)

Thank you to everyone who contributed to these working group meetings!



WASHINGTON D.C. RECAP - SFN 2023

Updates from the HSG at SfN and connecting with the HSG community!



Dr. Ana Daugherty

Reliable consensus protocol to segment subfields within the hippocampal body on high-resolution in vivo MRI from the Hippocampal Subfields Group

Dr. Daugherty presented results of the finalized harmonized protocol for segmenting subfields within the hippocampal body. The geometric heuristic protocol includes labels for the internal boundaries between subiculum, each CA field, and dentate gyrus, which when combined with the external boundaries, labels subfield volumes throughout the hippocampal body. Three raters (two expert, one novice) demonstrated reliability on a MRI dataset including brains from children and adults, and all subfield volume measurements had good reliability. Training on the harmonized protocol will begin April 2024 (see Save the Date) and the manuscript and automated atlas are currently in progress.



Dr. Nicole Gervais

Harmonized segmentation protocol of the hippocampal tail on high-resolution in vivo MRI from the Hippocampal Subfields Group

Dr. Gervais presented results of the current protocol for defining the hippocampal tail (*note*: subfields will not be defined in tail). The protocol utilizes landmarks to define boundaries and has successfully passed initial feasibility testing from two raters (two experts). The current version of the protocol presented at SfN is being reviewed via survey by the HSG community in order to assess consensus on the proposed rules.



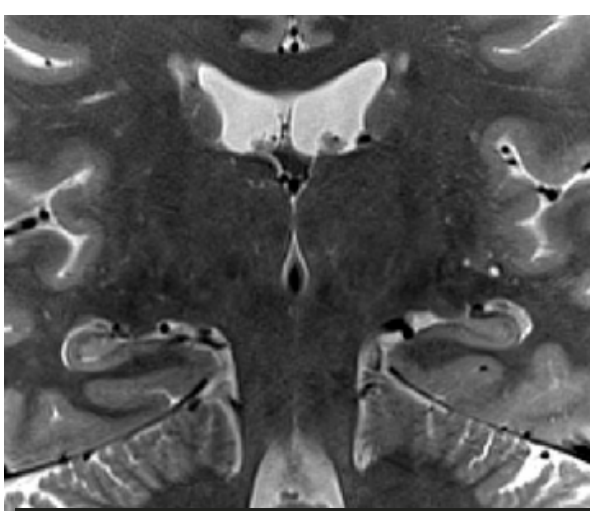
Dr. Kelsey Canada

Best practices for quality control of hippocampal subfield segmentations on T2-weighted MRI

Dr. Canada presented recent efforts of the HSG to provide recommendations for quality control practices to promote reliability and validity of hippocampal subfield measures. Results presented from our community survey and review of the literature included recommendations for correcting errors to maximize reliability and minimize bias, a summary of threats to segmentation accuracy, and a guide for reporting of QC in publications.

Manuscript preprint: www.biorxiv.org/content/10.1101/2023.11.29.568895v1

Thank you to all who stopped by the posters to chat and to those who connected with fellow HSGers at the HSG SfN Social Hour!



LOOKING AHEAD IN 2024

Working groups progress + updates, new faces on the steering committee, survey reminder, and the first harmonized protocol training coming in 2024!

Working Group Updates:

Hippocampal Head:

Chaired by Dr. Marshall Dalton, the group met in-person in both Spain and Baltimore in 2023. The group has revised the initial rules for internal and external boundaries and is moving toward initial feasibility testing.

Hippocampal Body:

Dr. Ana Daugherty (working group chair) presented results of the finalized protocol at SfN 2023. Formal reliability tests of the hippocampal body protocol with a group of expert and novice raters is complete. The manuscript is in prep as are plans for the dissemination of the protocol and resources for automated segmentation.

Hippocampal Tail:

Chaired by Dr. Robin de Flores, the working group has revised the tail protocol and passed initial tests of feasibility. We have recently distributed a survey to the HGS community for feedback on the protocol. See the "Reminder" note for the survey.

MTL Cortex:

Chaired by Dr. Jenna Adams, the group met in-person in both Spain and Sweden in 2023. The group recently completed initial feasibility testing for MTL ranging with promising results. A formal community survey will be distributed later this spring.

Advisory Council Updates:

This year, Drs. Jenna Adams and Marshall Dalton officially joined the HSG Steering committee!

Jenna is the Chair of the MTL Cortex Working Group and Marshall is the Chair of the Hippocampal Head Subfield Group. Both groups have made substantial progress over the last year (as detailed in this newsletter).



Dr. Jenna Adams



Dr. Marshall Dalton

Call for Volunteers:

In the coming months, the Acquisition Working Group will begin working to recruit individuals with Dr. Lei Wang taking lead.

Reminder:

It is not too late to fill out the Hippocampal Tail questionnaire! As we settled in following the holidays, we welcome your input and encourage your response by this Wednesday, January 31st, 2024. The more members of the HSG community are represented the better!

Save the Date:

April 10-11, 2024 | Toronto, Canada
Baycrest Academy for Research and Education

Harmonized Protocol Training Hippocampal Subfields - Body

Join us prior to CNS 2024 to learn the harmonized body protocol for hippocampal subfields! Led by Dr. Ana Daugherty, attendees will receive hands-on training, support from protocol experts, and all training documentation and workshop materials.

Registration opens February 1, 2024.

Details at hippocampalsubfields.com