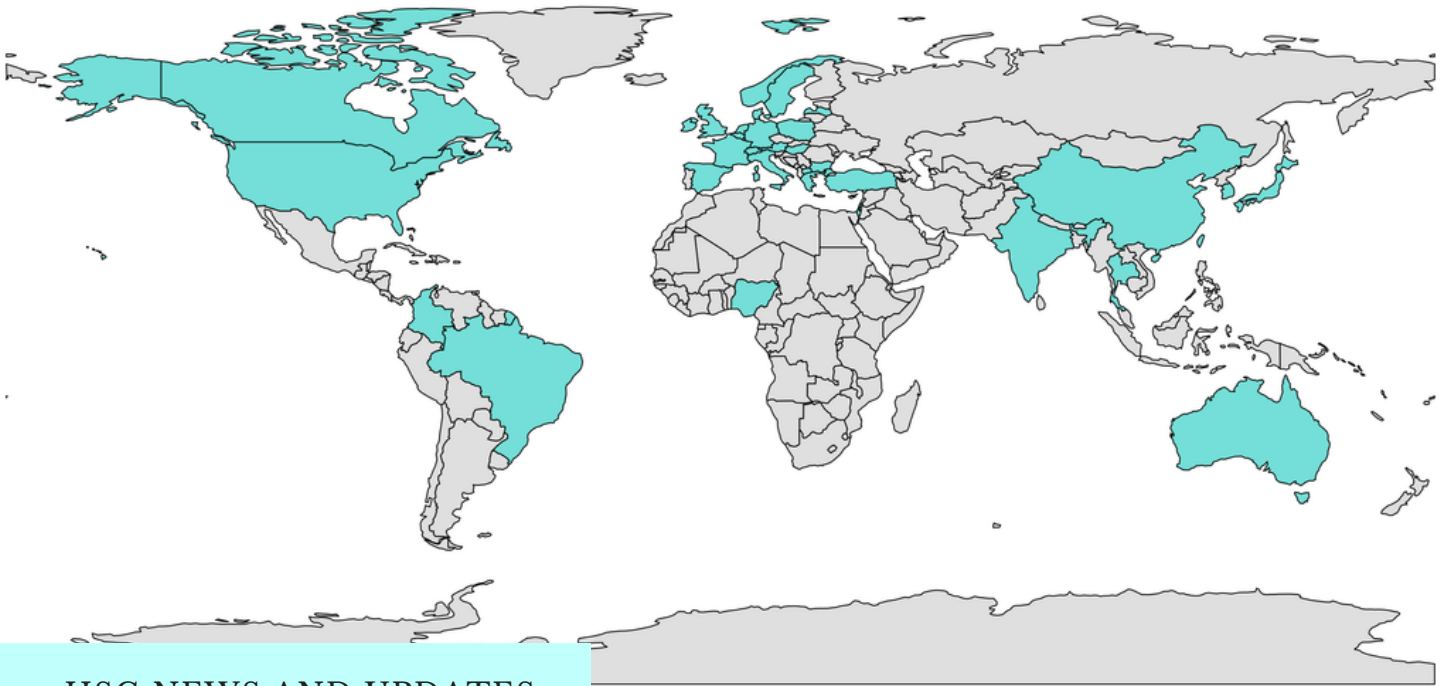


# HIPPOCAMPAL SUBFIELDS GROUP



## HSG NEWS AND UPDATES

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## AN EXPANDING HSG COMMUNITY

As we move forward into 2023, we are grateful for the continual engagement and interest of our community in the activities of the HSG. Although the past few years have looked different, we are grateful for HSG members both new and old. As of 2022, we have 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.

Even when we could not be together in person, over 490 individuals joined us across Season 1 and Season 2 of our webinar series. Although we do not have plans for a 2023 Season 3, the enthusiasm of the community amazed us and we will create opportunities to learn and engage with our research community online moving forward.

We loved seeing so many of you in person at conferences this year and we cannot wait to continue connecting in person and online in the coming year

Cheers,

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



## BEYOND THE HIPPOCAMPUS: MTL CORTEX

### *Lund Meeting & SfN Pre-Conference Meeting*

In Lund, the group aimed to characterize the discrepancies in labelling parahippocampal subregions in ex vivo histological material.

Prior to SfN, the HSG held a 2-day working group meeting to build upon the groundwork laid in the Lund working group meeting in June 2022.

In San Diego, the group made progress developing the segmentation rules for the MTL cortex protocol. Starting with a group discussion and review of histology data from Lund, the group then divided into smaller working groups to focus on each MTL region (entorhinal cortex, perirhinal cortex, parahippocampal gyrus).

This meeting made exciting progress in a number of areas. First, the group established a draft protocol of ranging rules for anterior and posterior boundaries of each region.

Second, we drafted protocols for boundary segmentation rules for the entorhinal cortex and parahippocampal gyrus. Boundaries for the perirhinal cortex (areas 35 and 36) proved to be less straightforward due to variability in collateral sulcus anatomy, and some transition areas between regions (especially between perirhinal and parahippocampal cortex) had less consistency in the histology data.

Future action items are to formally establish the working group team that will continue this effort, and to further work on our approach for handling collateral sulcus variability and transition zones.

Thank you to everyone who contributed to this working group meeting!

Thanks to the amazing organizational efforts of:  
Rosanna Olsen, Gustaf Nilsson, Jenna Adams,  
Laura Wisse, Christine Smith (San Diego)

Hannah Baumeister, Anika Wuestefeld, David Berron, Laura Wisse (Lund)

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





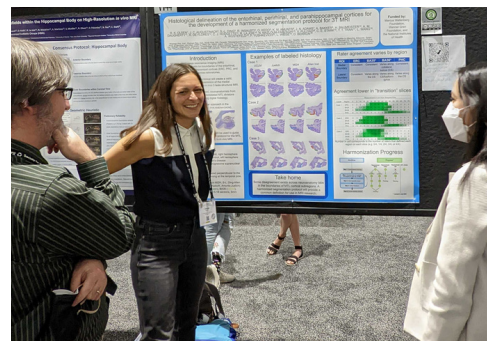
## SAN DIEGO RECAP - SFN 2022

### *Updates from the HSG presented at SfN*

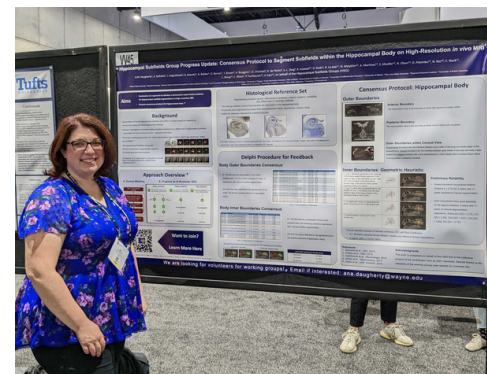
Dr. Rosanna Olsen presented a poster which describes a novel digital histology dataset, collected by the Hippocampal Subfield Group, in which the medial temporal lobe (MTL) cortex subregions were labeled by four different neuroanatomists based on cytoarchitecture. This labeled histology dataset will be used to form a valid, reliable protocol for the segmentation of the entorhinal, perirhinal, and parahippocampal cortices that can be used for in vivo 3 tesla structural MRI. Dr. Olsen reported that boundary agreement among neuroanatomists was high in the entorhinal cortex and Brodmann Area 35, especially in the two cases with a shallow collateral sulcus. Agreement was lower in Brodmann Area 36 and the parahippocampal cortex due to differences in how specific histological criteria were weighted (e.g. cell density and layer characterization), particularly in transitional zones. This collaborative effort provides important new insights into the different boundary definitions reported in published atlases and provides the groundwork for the formation of a harmonized protocol for the segmentation of the MTL cortex subregions using in vivo MRI.

*This work was funded by NIH Grant R01 AG070592.*

Dr. Ana Daugherty presented a progress update on the consensus draft protocol for segmenting subfields within the hippocampal body. The segmentation protocol is based on a novel histological reference data set labeled by multiple expert neuroanatomists. Two naïve raters demonstrated feasibility on an MRI dataset including brains from children and adults, and all subfield volume measurements had good reliability. Twenty-six labs with reported 4 years or more experience segmenting hippocampal subfields in healthy lifespan and patient populations participated in an online survey, which included detailed protocol information, feasibility testing, demonstration videos, example segmentations, and labeled histology. Due to the complexity of the internal anatomy, two approaches for segmenting the boundary between cornu ammonis (CA) 3 and dentate gyrus subfields were presented, and the majority approved a geometric heuristic-based protocol over one that referenced the endfolial pathway anatomy. All definitions were rated with high clarity and reached consensus agreement. 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 that previously reached consensus, labels subfield volumes throughout the hippocampal body.



Dr. Rosanna Olson



Dr. Ana Daugherty



## LOOKING AHEAD

*Working groups progress + updates, new faces on the steering committee, and an exiting HSG event in 2023!*

### Working Group Updates:

#### **Hippocampal Head:**

The group will be lead by Dr. Marshall Dalton. More updates to come in 2023.

#### **Hippocampal Body:**

Dr. Ana Daugherty (working group chair) presented an update at SfN 2022. The working group is now conducting a formal reliability test of the hippocampal body protocol with a group of expert and novice raters who are naïve to the protocol. With confirmation of reliability, we will disseminate the validated harmonized segmentation protocol and resources for automated segmentation.

#### **Hippocampal Tail:**

Chaired by Dr. Robin de Flores, the working group has developed a first version of the tail protocol. Given that the SRLM is not visible on MRI in many tail slices, the group is focusing solely on the outer boundaries of the hippocampal tail. The protocol has been recently tested by 3 raters (2 experts and 1 novice). Initial feasibility tests are encouraging although not perfect and a new iteration is ongoing.

#### **MTL Cortex:**

Efforts started in both Lund and San Diego this year. Dr. Jenna Adams will lead the working group which will be formalized in 2023.

### Steering Committee Updates:

This year, Drs. Robin de Flores and Kelsey Canada officially joined the HSG Steering committee!

Robin is the Chair of the Hippocampal Tail Working Group and Kelsey is the new Communication Chair of the Hippocampal Subfield Group. Robin and Kelsey also were the organizers of the 2021 and 2022 HSG Webinar series.



Dr. Robin de Flores



Dr. Kelsey Canada

### Save the Date!

**June 6-9 2023**

University of Castilla-La Mancha,  
Albacete, Spain:

*2-Day Workshop + 2-Day HSG  
Working Group Meeting*

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Dr. Ricardo Insausti will lead a  
neuroanatomy workshop including  
hands on dissection of the brain.

-  
This will be followed by a working  
group meeting to continue progress for  
the MTL cortex protocol.

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Applications open in early 2023.

[hippocampalsubfields.com](http://hippocampalsubfields.com)