Module:
Preparing the lab I
- Find your way in the lab and prepare equipment
Finding your way in the lab
Finding your way in the lab

- Storage “coffice”
- Daniel’s office
- Changing room
- Elevator
- Exit
- WC
- Storage "coffice"
- MEG acquisition
- MEG analysis
- VideoMEG
- STIMULATION computer
- MSR cabinet
- MSR
- SUBJECT
- SUBJECT MEG (EEG) (Biochannels)
- SUBJECT preparation
- SUBJECT head digitization
- Daniel’s office
- Storage “coffice”
- Elevator
- Exit
- WC
Quick-Checklist

What equipment do I need to prepare?

• *My experimental set-up*
• MSR
• Acquisition
• Electrodes and HPI-coils
• Sound and intercom
• Set-up acquisition
• Set-up paradigm/stimulation
Preparing the MSR

The MSR
All MEG/EEG recordings are done within a two-layer MSR, model Ak3B from Vacuumschmelze GmbH.

Contains:
• MEG scanner
• Experimental setup
Preparing the MSR

Gantry position

- Supine
- Seated
Preparing the MSR

Checklist

• Screen
  • Adjust mirror
  • Turn projector on
• Pillows and cushions
• Additional electrodes and sensors
• Ear pieces for sound tubes
• ...whatever you need
Preparing the MSR

Open door
• Press (hold 1 s)
• Pull door

Close door
• Push
• Press
• Check door is closed

Adjust light in MSR
Preparing the MSR

Open door
• Press (hold 1 s)
• Pull door

Close door
• Push
• Press
• Check door is closed

Adjust light in MSR

Make sure the door is completely sealed when recording!
Preparing the MSR

Open door
• Press (hold 1 s)
• Pull door

Close door
• Push
• Press
• Check door is closed

Adjust light in MSR

Emergency
1. Release pressure
2. Use manual release
Preparing the MSR

Open door
• Press (hold 1 s)
• Pull door

Close door
• Push
• Press
• Check door is closed

Adjust light in MSR

Emergency
1. Release pressure
2. Use manual release
Checklist

Have I left ALL metal in the outside area?
- Phone
- Watch
- Belt
- Wallet
- Empty pockets: Keys, coins, etc.
- Access card

Change shoes or wear cover
Finding your way in the lab

Know where things are in the outside area:

• Preparation area
• Preparation utilities
• Stimulation cabinet
• MSR cabinet
• Stimulation/eye-tracking PC
• Acquisition PC
Finding your way in the lab

Preparation area

• Electrodes (EOG/ECG/etc.)
• HPI coils
• Aux. Measurements
• Pholemus
Finding your way in the lab

Preparation area

- EEG cabs
- GSR
- Accelerometers
- Respiration
- Cleaning/disinfection alcohol
- Extra electrodes/gel/tape/etc.
Finding your way in the lab

**Stimulation cabinet**
- Eye-tracker
- TTL triggers
- Sound stim.
- Sound amp.
- Remote control for projector
Finding your way in the lab

**MSR cabinet**
- Biopack
- Aux. Channels
- Back-panel speakers
- Misc. Channels
- Air pressure device
Finding your way in the lab

**Acquisition computer**
- Recording MEG
Finding your way in the lab

**Stimulation computer**

- Running paradigms (Presentation, Matlab, etc.)
- Presenting stimuli
- Eye-tracker
- Brain-computer interface
Finding your way in the lab

Analysis computer
• Running MaxFilter
• Data transfer
• *Not for actual data analysis*
Finding your way in the lab

Intercom

- Press 11
- Hold down T to speak
- Hold T for 5 sec to turn off two-way communication
- Press X to turn off
Finding your way in the lab

Sound mixer/intercom
• Control sound input/output
• Speak with participant
Finding your way in the lab

MSR camera
• Monitor subject inside MSR
Test everything works!

Before participant arrives:

- Stimuli presentation
  - Visuals
  - Audio
  - Etc.
- Triggers
  - Stimulation PC -> Acquisition
  - Responses -> Acquisition
  - XXXX -> YYYY
Module:
Preparing the lab II
- Recording MEG
Quick-Checklist

Before participant arrives
• Load project and settings
• Check sensors

When participant arrives
• Enter participant to database
• (Empty room recording)
Prepare for recording...

Acquisition computer
• Open Menu -> Neuromag -> Acquisition
Acquisition software

Before participants arrive
• Select project
• Load settings
• Test triggers
• Inspect channels

When participant has arrived
• Enter participant in system
  • NB! Must be under “patients” even if healthy subject.
• (Run empty room recording)
Acquisition software

Select project
Enter/Change participant
Change settings
Acquisition software

Select project
Enter/Change participant
Change settings
Acquisition software

**Settings:** Select what to record

- EOG/ECG/EMG
- Triggers
Acquisition software

Settings

Select what "BIO" channels to record
Acquisition software

Select project

Enter/Change participant

Change settings

Save settings for future use: File -> save settings

Load saved settings: File -> load settings
Acquisition software

Select project
Enter/Change participant
Change settings
Acquisition software

Select a Subject

Always add under “Patients”

List of participants: Pick if participant previously has been at NatMEG

Enter participant name

Enter participant Date of birth

Additional info.

Database id (NB!)
Acquisition software

Before participant arrive
• Select project
• Load settings
• Test triggers
• Inspect channels

When participant has arrived
• Enter participant in system
  • NB! Must be under ”patients” even if healthy subject.
• (Run empty room recording)
Acquisition software

- **Start/restart**
- **Stop**
- **Plot/record averages**
- **Record MEG data**
- **Record continuous HPI**
Acquisition software
Acquisition software
Acquisition software

• Select what to view
Acquisition software

• View before recording
Acquisition software

• View before recording
Bad channels

Open Menu > Neuromag > squiddler

Squiddler
- Heat
- Reset
- (repeat)
Bad channels

Open Menu > Neuromag > squiddler

Squiddler
• Heat
• Reset
• (repeat)
Acquisition not working?

What to do?

1) Check all settings are correct
   • Click Restart

2) Close/open Acquisition

3) Restart Acquisition
   • Menu -> Neuroumag -> Restart Acquisition -> Type: ”y”
   • Wait for restart

4) Call NatMEG personnel
Module:
Running a MEG experiment
Quick-Checklist: Prep. participant

• Inform participant
• Complete checklist. Ask about metal items.
• Collect consent form
• Show to changing area and find clothes

Be prepared to answer any questions participant might have.
Control questions

Example:

**Kontroll frågar**

Lider du av klaustrofobi?  Ja___ Nej___
Lider du av epilepsi  Ja___ Nej___
Har du metallföremål inuti din kropp (tex pacemaker, skruvar eller proteser)?  Ja___ Nej___
Har du metallföremål inuti ditt huvud (tex tandställning eller elektroder)?  Ja___ Nej___
Har Du fått metallsplitter i ögonen eller annan del av kroppen?  Ja___ Nej___
Har du någon form av kroppssmyckning som inte kan tas bort?  Ja___ Nej___
Är Du gravid?  Ja___ Nej___

Högerhänt____ Vänsterhänt____

__________________________  ________________________________
Datum Namn
Preparing for measurement

**Preparation area:**
- Attach EOG, ECG, EMG, etc. electrodes
- Attach HPI coils
- Digitalize head

**Inside MSR:**
- Place participant in MEG
- Connect EOG, ECG, EMG, etc. and HPI

**Control area:**
- Check stimulation equipment
- Test signals and check channels
When subject is in place

- Start/restart
- Assess HPI fit
- Inspect MEG
- Inspect EOG
- Inspect ECG
- Inspect ...
- Start recording
When subject is in place

- Start/restart
- Assess HPI fit
- Inspect MEG
- Inspect EOG
- Inspect ECG
- Start recording

```plaintext
HPI results:

Coil 1: (-25.0, 87.1, 34.2) [device] mm, g = 99.88% OK
Coil 2: (-78.4, -16.5, -27.2) [device] mm, g = 99.71% OK
Coil 3: (48.8, 82.6, 33.9) [device] mm, g = 99.40% OK
Coil 4: (70.3, -39.8, -38.0) [device] mm, g = 99.73% OK

Pair: 1-2 1-3 1-4 2-3 2-4 3-4
Isotran: 131.8 71.4 174.0 171.1 151.8 143.9 mm
Fitted: 131.7 73.9 174.2 172.4 150.8 143.4 mm
Diff: 0.0 -2.6 -0.1 -1.3 1.0 0.5 mm

Selected coils:

Pair: 1-2 1-4 2-4
Isotran: 131.8 174.0 151.8 mm
Fitted: 131.7 174.2 150.8 mm
Diff: 0.0 -0.1 1.0 mm

Head origin: (-2.2, -0.7, -29.0) mm [device]

Suggestion: Accept
```

Tape yellow HPI coil to body (not used)
When subject is in place

• Start/restart
• **Assess HPI fit**
• Inspect MEG
• Inspect EOG
• Inspect ECG
• *Inspect* ...
• Start recording

**What if HPI fit is bad?**
• Check HPI set is connected
• Make sure the correct preparation is loaded
• Make sure participants head is inside helmet
• Check for loose coils
• **Redo HPI/isotrak fit**: Get participant out and do everything over 😞
When subject is in place

- Start/restart
- Assess HPI fit
- Inspect MEG
- Inspect EOG
- Inspect ECG
- Inspect ...
- Start recording
  - Record
  - Record online avg.
  - Record head pos.
While recording

• Monitor participant
  • Talk to participant between sessions
  • Performance and sleepiness
  • Movements

• Monitor data quality
  • MEG (note bad channels)
  • EOG
  • Triggers
  • Online averages

• Track protocol

• Make lab notes
  • Use digital lab notebook
Save data

- A window asking to save data automatically appears when clicking Stop.
- Enter:
  - Filename (consistent file names)
  - Initials
- Data saved in your project folder

/neouro/data/sinhue/your_project_name/MEG/NatMEG_NNNN/yyymmda/your_filename.fif

NB! If recording average, then it will save both EVOKED and RAW files
Head position monitor

Open a terminal:

• Type: 
  /data/MNE/mne_visualize_hpi
While recording

- Monitor participant
  - Talk to participant between sessions
  - Performance and sleepiness
  - Movements

- Monitor data quality
  - MEG (note bad channels)
  - EOG/ECG/etc.
  - Triggers
  - Online averages

- Track protocol
- Make lab notes