Completed analyses in GEMRIC

Site - boardmember	Proposer	Title	Aim&Hypotheses	Method	Status	Last progress reports	Monpoly rule
Leif Oltedal Bergen, Norway	**Leif Oltedal**	ECT-induced structural brain changes; a collaboration using data from multiple centers.	ECT induces structural brain changes occur both in cortical and subcortical regions. The changes are largest in, but not restricted to the hippocampus and medial temporal lobe cortical regions. The dentate gyrus (stem cells, neurogenesis) is expected to show the largest changes. The structural changes are hypothesized to depend on; a)Age; relative change negatively correlated to age b) Stimulus time and number of sessions; relative change positively correlated to "dose" c) Clinical response parameters; remission rate correlates with relative change	Structural FreeSurfer, Quarc, R	3 papers published: Oltedal et al 2017, Oltedal et al 2018, Ousdal et al 2019.		
Miklos Argyelan New York, USA	**Miklos Argyelan**	Electrical field modelling of ECT therapy to predict response and side effects	Structural differences leading to greater electrical fields influencing the SCC will predict enhanced treatment response and above threshold electrical fields reaching hippocampus will cause memory side effects.	Structural analyses (Freesurfer) + Electric Field modeling	1 paper published: Argyelan et al 2019	apr.2021 second manuscript in preparation update sep.2022, apr 2023, nov 2023	
Katherine Narr Los Angeles, USA	**Benjamin Wade**	Factor analysis of ECT-related change in clinical response scales and relationships with brain features	i) At pre-treatment, sub-items of the HDRS and (separately) the MADRS will cluster to form lower-dimensional latent variables reflecting key aspects of depression subtypes such as anxiety and somatoform disturbances. ii) Over ECT index, we will observe more pronounced reductions in specific aspects of depression as captured by the HDRS and MADRS scales.	Clinical + Structural	1 paper published: Wade et al 2019		

Indira Tendolkar Nijmegen, Netherlands	**Indira Tendolkar & Philip van Eijndhoven**	Prediction of response to ECT by support vector classification	Is it possible to reliably categorise ect patients in reponders vs non-responders on the basis of structural changes after ect treatment	Structural FreeSurfer, Quarc, R	1 papers published: Mulders et al. 2019		
Ronny Redlich Department of Psychiatry, Münster, Germany	**Nils Opel**	Influence of pre-treatment BMI on clinical and brain structural changes during ECT	Assess if pre-treatment BMI might influence clinical and brain structural effects of ECT in MDD.	Structural Statistical analyses using Freesurfer estimates	1 paper published: Opel et al. 2021		
Akihiro Takamiya Tokyo, Japan	**Akihiro Takamiya**	Brain structure and ECT response in psychotic depression.	i) To investigate brain structural differences between PD and NPD ii) To investigate the relationship between brain structural differences and ECT response iii) To investigate whether PD showed different longitudinal structural changes with ECT.	Structural. Freesurfer & SPM-VBM approach Supervised machine learning analysis	1 paper published: Takamiya et al. 2021		
Guido van Wingen AMC, Amsterdam Netherlands	**L.A. van de Mortel**	Relation between ECT-induced structural and functional brain changes	Brain regions displaying significant structural changes after ECT contribute to changes in its local function and functional connectivity with other brain regions.	**Structural**: FreeSurfer, VBM; **Functional**: ALFF, ReHo, Graph approaches	1 paper published: van de Mortel et al. 2022	apr2021 nov 21 apr. 2022	nov.21
Annemieke Dols Amsterdan, Netherlands	**Mardien Oudega**	Gender differences in symptoms of severe depression and response to ECT	Is there a difference in presentation of severe depression and response to ECT in females and males?	Clinical (no imaging) Classical statistics	1 paper published Machteld et al. 2023	nov.20 apr.21 apr. 2022 sep. 2022	nov.21

Miklos Argyelan New York, USA	**Miklos Argyelan**	Common causal circuit in depression - replication in ECT cohort	1. Spatial similarity between ECT induced volume changes and the depression network (Siddiqi et al, 2021) will be predictive of response. 2. Spatial similarity between "ECT induced EF generated functional resting state correlation maps" and the depression network (Siddiqi et al, 2021) will be predictive of non-response.	1. Structural ROI, volume change with Freesurfer 7 .x and mean average of the "Siddiqi map" 2. Functional voxel based	1 paper published Argyelan et al. 2023		sep.23
Jeroen van Waarde Rijnstate, Amsterdam, Netherlands	**Freek ten Doesschate**	Dynamic causal modelling in depression and its treatment with ECT	Study the effective intra- and internetwork connectivity of the SN, DMN, DAN and FPN in depression and how it is affected by ECT.	Functional (resting-state) Independent Component Analysis (ICA) and Dynamic Causal Modeling (DCM)	1 paper published Ten Doesshate et al. 2023	nov.20 apr.21 apr. 2022 sep.2022	nov.21
Annemieke Dols Amsterdam, Netherlands	**Anemieke Dols & Guido van Wingen**	Does a neuroimaging marker predict the outcome of electroconvulsive therapy in severe depression? A replication study applying multivariate pattern analysis.	Electroconvulsive therapy is the most effective intervention for severe depression. Initial studies have identified neuroimaging biomarkers that may enable personalized treatment. However, sample sizes were small and replication across larger multicenter datasets is required. Therefore, we aimed to develop robust maging markers based on multicenter data from the Global ECT-MRI Research Collaboration (GEMRIC).	Multimodal data (i.e., clinical, sMRI and resting-state fMRI) and evaluated which data modalities or combinations thereof could provide the best predictions for treatment response (≥50% symptom reduction) or remission (minimal symptoms) using a support vector machine classifier.	1 paper published Bruin et al. 2023	nov.20 apr.21 nov.21 apr. 2022	nov.21

Jeroen van Waarde Rijnstate, Amsterdam, Netherlands	**Freek ten Doesschate**	The effect of electroconvulsive therapy on resting-state networks using longitudinal independent component analysis (L-ICA)	Leaver et al. (2016) found effects of ECT in several resting-state networks. We aim to replicate and extend these findings using a larger sample and more sensitive methods. Regarding the effects of electrode placement, we expect a bilateral treatment to have a more widespread effect on resting-state connectivity, whereas unilateral treatment is also expected to show more lateralized effects.	Resting-state fMRI. Longitudinal ICA.	1 paper published Verdijk et al. 2024	nov. 2021 apr. 2022 sep. 2022, apr 2023, nov 2023, apr 2024	nov.21

Ongoing analyses in GEMRIC

Site - boardmember	Proposer	Title	Aim&Hypotheses	Method	Status	Last progress reports	Monopoly rule valid through
Leif Oltedal University of Bergen, Norway/Louise Emsell, Leuven	**Olga Therese Ousdal (and Maarten Laroy)**	Effects of ECT on amygdala and hippocampus subfield volumes. Amendment 27.04.2021: + cognitive side effects	Assess ECT-related volumetric increases in different hippocampal and amygdala subfields. We predict that the volumetric changes of hippocampal subfields essential for memory encoding and retrieval (i.e. dentate gyrus, cornu ammonis 1-4 and subiculum) will be specifically related to memory impairments pre-post ECT. We predict that subfield volumetric changes associated with side effects will also be associated with electric field strength.	Structural Freesurfer	Manuscript in preparation	nov.20 apr.21 (incl. amendment of proposal) nov.21 apr. 2022 sep 2022, apr 2023, nov 2023, apr 2024	nov.21
Louise Emsell KU Leuven, Belgium/ Leif Oltedal, Norway	**Maarten Laroy (and Olga Therese Ousdal)**	Characterization of gray matter volume normalization following termination of electroconvulsive therapy in depressed patients. (Project replaces earlier proposal lead by Ousdal)	This study aims to explore the characteristics of the volume normalization following termination of ECT by leveraging the statistical power afforded by the larger sample of the GEMRIC consortium dataset. Variables that are known to be related to volume increase following ECT such as age will be investigated, as well as the classic cognitive and clinical correlates.	Structural, FreeSurfer	Approved	Previous proposal (Ousdal) nov. 20 apr.21 nov.21 apr. 2022 sep. 2022, nov 2023, apr 2024	nov.21

Annemieke Dols Amsterdam UMC & Bergen, Norway	**Machteld A.J.T. Blanken, Alexander Lundervold**	BrainAGE as compared to chronological age as predictor of response to electroconvulsive therapy in patients with major depression.	Does BrainAGE predict response, remission and relapse? Does BrainAgeGap predict response, remission and relapse? Does BrainAGEGap decrease after successful ECT? Is there a difference in response prediction between chronological age and biological age? Our main objective is to assess whether there is a decrease of mean diffusivity in the hippocampus and amygdala in MDD populations during ECT. Our secondary objectives are i) to compare MD between MDD population and control at baseline; ii) to evaluate whether this decrease is associated with an increase of volume (hippocampi and amygdala) and iii) to evaluate whether this decrease is associated with a clinical improvement. Is there a difference in prediction outcome and utility between FreeSurfer-based brain age calculation (method adopted from ENIGMA or the Kaufman et.al. 2019 method) versus the deep learning-based approach (Bergen: L.Oltedal, A. Lundervold – state-of-the-art deep learning approach based on raw DICOMs)	Structural T1 data, Freesurfer measurements and measurements from a deep learning algorithm	Ongoing	nov.20 apr.21, apr 2023, nov 2023	nov.21
Miklos Argyelan New York, USA	**Miklos Argyelan**	The relationship between the changes in resting state dynamics and the local electrical field induced by ECT therapy	Assess the correlation of electrical field and charge with changes in slow frequency fluctuations and functional connectivity of the BOLD signal.	Functional (resting-state) Electrical Field Modeling and multivariate methods for multimodal fusion of brain imaging data	Approved	apr.2021 sep. 2022, apr 2024	nov.21
Miklos Argyelan New York, USA	**Miklos Argyelan**	**Detection of state-dependent connectivity changes in ECT**	Here, we present a longitudinal rsfMRI method, where we proactively removed the trait dependent variance in a data-driven multivariate analysis to determine the effect of a full treatment course of ECT on the state-dependent changes in functional connectivity. We hypothesized that removing the trait-dependent variance of unique connectivity fingerprints could help uncover the effect of ECT and can cluster sessions in a data driven way.	Resting state	Approved	apr.2021, nov 2023, apr 2024	nov.21

Amit Anand Cleveland Clinic, OH, USA	**Amit Anand**	ECT Effects on the Brain's Structural Functional Connectome	1. ECT effects will be associated with changes in the organization of the functional and structural networks as measured by graph theory measures	Functional (Resting-state) + Structural (DWI)	Approved	nov.2020 apr.2022, 2023 mail, apr 2024	nov.21
Carles Soriano-Mas, Barcelona, Spain	**Carles Soriano-Mas**	Modulation of voxel-wise multiband amplitude of low frequency fluctuations after ECT	Analyze fALFF changes after a complete ECT course. for the different oscillation bands, from slow-5 to slow-2.	Functional (resting-state) Analysis of the fractional Amplitude of Low Frequency Fluctuations-fALFF	Approved		nov.21
Carles Soriano-Mas, Barcelona, Spain	**Carles Soriano-Mas**	Structural covariance of the hippocampus and hippocampal volume changes after ECT	Assess the pre-ECT pattern of structural covariance of the hippocampus and to investigate the correlations between volume changes in the hippocampus with those observed in other brain areas after ECT.	Structural SPM-VBM approach	Writing manuscript	nov.20 apr.21 nov. 21	nov.21
Bogdan Draganski Lausanne, Switzerland	**Bogdan Draganski**	Interaction between ECT-induced grey matter volume changes and antidepressant medication	Assess the spatial and temporal pattern of ECT induced changes on brain volumes and structural connectivity. Assess differences between MDD and Bipolar Disorder. Assess interactions with pharmacological treatment and disease duration.	Structural SPM-VBM approach for volumetry and deterministic diffusion tractography from DWI data.	Approved		nov.21
Indira Tendolkar Nijmegen, Netherlands	**Peter Mulders**	Predicting Treatment Response to ECT using Spatial Patterns for Discriminative Estimation	i.) To assess whether Discriminative patterns based on resting-state data separating responders from non-response are similar to those based on structural changes, ii.) To assess whether discriminative patterns at baseline are predictive of treatment response to ECT.	Functional (resting-state) Spatial Patterns for Discriminative Estimation (SPADE)	Approved under the assumption that it will be attuned with older project from Amsterdam	nov.2020 apr.2021 apr. 2022 nov. 2022, apr 2023, apr 2024	nov.21

Maximilian Kiebs, Bonn, Germany	**Maximilian Kiebs**	The role of brain plasticity and functional connectivity in altered memory performance after a course of electroconvulsive therapy	1. Female sex, increased age and number of ECT sessions predict the undesired effects on cognition, esp. verbal and autobiographical memory 2. In patients, other cognitive domains show either no change or improvement compared to pre-ECT performance 3. In patients, several structural and functional modulations induced by ECT19–21 positively correlate with the undesired effects in the domains mentioned above 4. At baseline, multimodal functional neuroimaging may be used to predict the occurrence of undesired effects 5. Exploratory analysis of structural (e.g. low pre-existing gray matter volume) and functional correlates of undesired effects 6. Moderating effects of treatment efficacy and number of ECT sessions are explored	Anatomical 3D-T1 VBM approach), resting state fMRI	Approved	nov.20 apr.21, apr 2023, nov 2023, apr 2024	nov.21
Antoine Yrondi Toulouse, France	**Antoine Yrondi**	Decrease in hippocampus and amygdala mean diffusivity in major depressive disorder during electroconvulsive therapy	Our main objective is to assess whether there is a decrease of mean diffusivity in the hippocampus and amygdala in MDD populations during ECT. Our secondary objectives are i) to compare MD between MDD population and control at baseline; ii) to evaluate whether this decrease is associated with an increase of volume (hippocampi and amygdala) and iii) to evaluate whether this decrease is associated with a clinical improvement.	Structural (Diffusion data)	Work in progress	nov.2020 apr. 2022 sep. 2022, nov 2023, apr 2024	nov.21

Joan C. Camprodon Massachusetts USA	**Joan C. Camprodon**	Predictors and mechanisms of ECT antisuicidal properties	FC of the ACC to nodes of the dorsal attention and executive control network will predict and explain the reduction in suicide risk as well as associated changes in positive and negative affect. 2. Diffusion properties in WM tracts connecting the ACC with the dorsal attention and executive control networks will predict and explain the reduction in suicide risk, as well as associated changes in positive and negative affect. 3. Volumetric changes in affective and default network nodes willl predict and explain the reduction in suicide risk as well as associated changes in positive and negative affect.	T1, DWI and resting-state data	Approved		nov.21
Joan C. Camprodon Massachusetts USA	**Joan C. Camprodon**	Investigating white matter fibre density and morphology changes following ECT using fixelbased analysis.	We hypothesize that ECT will not affect whole-brain white matter but that its effects are localized in specific pathways following the laterality of the stimulation. We expect an increase in right uncinate fasciculus fibre density for RUL patients following ECT. We hypothesize that this increase will be correlated with changes in HDRS-17 and its subscores of reward and suicide.	DWI data	Approved		nov.21
Joan Prudic Columbia University, New York, USA	**Joan Prudic**	Resting state functional connectivity predictors of treatment response to electroconvulsive therapy in depression	To test whether a model of brain functional connectivity patterns determined by fMRI, and trained on a previous published pilot sample of depressed patients undergoing ECT can predict response to ECT within the larger GEMRIC sample. Both the degree to which RSFC (fMRI) can predict ECT response and the degree to which changes in RSFC correlates with symptom change will be explored.	Resting-state fMRI	Approved	apr.2021 nov. 21, apr 2024	nov.21

Louise Emsell, KU Leuven, Belgium	**Maarten Laroy**	Functional connectivity changes in the hippocampus and their association with cognitive functioning following electroconvulsive therapy	1. The increase in hippocampal gray matter volume following ECT is negatively correlated with changes in cognitive performance after a course of ECT. 2. Changes in hippocampal based functional connectivity networks following ECT are negatively correlated with changes in in cognitive performance after a course of ECT. 3. Functional changes following ECT are more pronounced in patients treated with bilateral (bilateral or bifrontal) electrode position compared to patients who received right unilateral stimulation, which in turn results in stronger negative effects on cognitive performance following ECT.	Structural, Functional, FreeSurfer, SPM	Approved	nov.21	apr.21
Maximilian Kiebs, Bonn, Germany	**Maximilian Kiebs**	Neurocognitive data of The Global ECT-MRI Research Collaboration (GEMRIC): Rationale and Multi-site investigation	1. In patients, cognitive performance shows either no change, improvement or decrease compared to pre-ECT performance 2. Matched controls show no change in cognitive performance 3.Exploratory analysis of moderating effects ECT-parameters (stimulation protocol, sessions per week and number of sessions), age and sex have a significant effect on the cognitive performance after ECT compared to baseline 4.Descriptive statistics of each cognitive task (clinical, sociodemographic, n MRI, ECT-parameters, n blood draw)	Descriptive statistics of each cognitive task. Pre-Post AN(C)OVA of each instrument. Regression analysis of ECT-parameters, age.	Approved	Apr.2022, apr 2023, nov 2023, apr 2024	nov.22

Joan Camprodon, Boston, MA, USA	**Lipeng Ning, Joan A. Camprodon**	Joint structural-functional connectivity and electric field-based analysis for ECT treatment response	**Aim 1:** Longitudinal effects of ECT on structurally constrained effective connectivity, and its relationship to clinical response **Hyp 1**:ECT affects the dMRI-based microstructural and rsfMRI-based EC measures of specific pathways following the laterality of the stimulation **Aim 2**: The relationship between the properties of the electric field induced by ECT and the longitudinal effects of ECT on structurally constrained effective connectivity **Hyp 2**: Changes of microstructural and EC measures of a subset of brain connections are correlated with the difference of electric potential induced by ECT between the underlying brain regions. **Aim 3**: The predictive value of structurally constrained effective connectivity and E-field properties combined on ECT clinical response **Hyp 3**:dMRI and fMRI measures at the baseline and the electric field measures of specific pathways will be correlated with changes in clinical depression severity.	Autoregressive model with structual contraints, minimum-entropy-based causality measure	Approved 04.2022	apr.2023	apr.23

Hannah Maier, Hannover, Germany	**Hannah Maier**	Brainstem Connectivity and its implication in patients with Major Depressive Disorder undergoing Electroconvulsive Therapy	The brainstem plays a crucial role in regulating autonomic, limbic, and sensory-motor functions. The acute and chronic stress systems heavily rely on the brainstem, e.g. the nucleus tractus solitarii (NTS), which produces (non-)catecholamines that are sent to the nucleus paraventricularis in the hypothalamus, as well as other nuclei like the locus coeruleus (LC) producing norepinephrine. Studies comparing the intrinsic activity of the brainstem in healthy controls and treatment-resistant depressed patients, with or without treatment, have shown marginal differences. However, these studies have small sample sizes, and electroconvulsive therapy (ECT) has not yet been investigated. The objective of this research is twofold: (1) to determine whether patients exhibit hyperconnectivity from brainstem seeds, to cerebral areas such as the nucleus paraventricularis that normalize during ECT, and (2) to investigate whether individuals with major depressive disorder (MDD) who respond to ECT exhibit different brainstem functional connectivity compared to non-responders.	Clinical characterization,ECT parameters,MADRS, BDI-II	Approved 04.2023		apr.24
Guido van Wingen AMC, Amsterdam Netherlands	**Liu Weijian**	White matter integrity change in responders and non-responders to ECT for severe depression: Tract- and voxel-based analyses of diffusion data	This study aims to investigate the white matter integrity indicators changes that occur after ECT while separating responders and non-responders. We hypothesize that ECT normalizes altered white matter integrity indicators in important brain circuits that are implicated in the pathophysiology of depression.	MRI: T1, resting state fMRI	Approved	nov2023, apr 2024	apr.24

Guido van Wingen AMC, Amsterdam Netherlands	**Liu Weijian**	The white matter of hippocampal, amygdala, and thalamic subnucleus change in responders and non-responders to ECT for severe depression	This study aims to investigate the white matter indicators of subfields of the hippocampus, amygdala, and thalamus changes that occur after ECT while separating responders and non-responders. By analyzing longitudinal data from a large cohort, the generalizability of the findings is expected to increase, providing a more comprehensive understanding of the biological changes that take place following ECT. We hypothesize that a significant interaction of group by time can be found in the white matter indicators of the hippocampal, amygdala, and thalamic subnucleus during the course of ECT. Changes in the white matter indicators of the subnuclei of the hippocampus, amygdala, and thalamus are correlated with changes in clinical scales.	Freesurfer, MRTrix 3	Approved	nov 2023, apr 2024	apr.24
Leif Oltedal University of Bergen, Norway	**Olga Therese Ousdal**	Changes in cortical microstructure following electroconvulsive therapy in major depression	In this project, we will investigate cross-sectional (i.e. patients vs. healthy controls) and longitudinal changes in gray matter microstructure using Gray/White matter contrast (GWC) derived from T1-weighted MRI images. We hypothesize to find widespread changes in cortical GWC pre-post ECT, but these changes may be limited to depressive circuits at long term. Since clinical response is likely to depend on cellular and subcellular processes that lead to microscopic, but not necessarily macroscopic changes in brain gray matter, we hypothesize that pre-post changes in GWC are more likely to be associated with clinical outcome compared to changes in subcortical volumes or regional cortical thickness.	T1-weighted MRI images. Gray/White matter contrast (GWC).	Approved	nov2023, apr 2024	apr.24
Leif Oltedal University of Bergen, Norway	**Vera Erchinger**	MR spectroscopy during ECT	This project aims to Investigate changes in brain neurometabolites (especially N-acetylaspartate) during ECT. Additionally, we will investigate whether there are correlations between neuromatabolite levels and other outcomes such as response, volume change , no. of ECTs/charge/electrode placement, duration of current episode, side effects and DTI-measures (reduced FA).	MRS, Osprey, R	Approved	apr.24	apr.24

Amit Anand Cleveland Clinic, OH, USA	**Amit Anand**	ECT Effects on functional connectivity of brainstem monoamine nuclei	Measure of the structural connectivity (Sc) and functional connectivity (Fc) of BSMN at baseline and after ECT treatment and also correlate with treatment response. We have selected pathways that are most likely to be abnormal in depression. DRN pathways are primarily serotonergic and have projections throughout the cortex, but the most promising targets include the subgenual anterior cingulate cortex (sgACC) and amygdala (AMYG). The VTA is dopaminergic and projects to nucleus accumbens (NA), orbitofrontal cortex (OFC) and the AMYG. Aim 1: At baseline measure, DRN and VTA and will be compared to Healthy Controls. Hypothesis 1: In TRD DRA-Amyg, DRA-sgACC, VTA-Amyg, and VTA-NAcc Sc and Fc will be altered. Aim 2: To compare DRN and VTA Sc using diffusion imaging and Fc using resting-state fMRI before and after treatment Hypothesis 2: ECT treatment will normalize DRN and VTA connectivity with target regions. Aim 3: Correlate baseline DRN and VTA connectivity and change in connectivity after treatment with ECT treatment response.	rsFMRI, DTI, DRN, VTA ROI, Functional and Structural connectivitay metrics calculated with target regions and whole brain.	Approved		nov.21
Maximilian Kiebs, Bonn, Germany	**Maximilian Kiebs**	Electroconvulsive Therapy (ECT) and Cognitive Side Effects: Investigating Grey Matter Changes in Limbic Regions	The entorhinal cortex serves as a gateway between the neocortex and the hippocampus and has a central role in memory and cognition. The temporalpole is a crucial brain region for various aspects of memory and cognition. It contributes to semantic memory, social cognition, autobiographical memory, and sensory integration, also is essential for cognition. The amygdala has a key role in processing emotional information, and can therefore influences memory formation. Another way how the amygdala can influence cognition is by driving attention to emotional cues. Compared to the amygdala the thalamus can influence memory rather indirectly by regulating the flow of sensory information to the cortex, which plays a central role in memory and cognitive processes. This study aims to examine alterations in grey matter volumes in limbic areas beyond the hippocampus in relation to the occurrence of cognitive effects after ECT.	Cortical and subcortical segmentations performed bu Freesurfer (5.3) statistics in R studio	Approved	apr.24	nov.24

Noora Tuovinen, Innsbruck, Austria	**Laurin Mauracher**	Grey-matter volume (GMV) and cortical thickness (CT) before and after electroconvulsive therapy (ECT): comparing bipolar depression (BD) and major depressive disorder (MDD)	The efficacy of ECT in BD is comparable to MDD. However, studies did not directly compare the effects of ECT on brain GMV/CT between BD and MDD. Although GMV and CT vary between these disorders, GMV results are inconsistent. Lower GMV was found in the anterior cingulate cortex, right dorsolateral prefrontal cortex (PFC), left hippocampus, cerebellum, temporal and parietal regions as well as higher GMV in the amygdala, insula, hippocampus, temporal pole, and lingual gyrus, and middle cingulate gyrus in MDD compared to BD. Our study will address the possible differential effects of ECT on GMV and CT in a sample of BD and MDD patients. Although we expect direct effects of ECT to be similar, there may differential changes depending on baseline differences. We hypothesize differences Especially in the dorsolateral PFC before and following ECT in GMV and CT between MDD and BD, because differences following TMS treatment in these disorders have been noted.	T1, VBM and Surface-based morphometry (SBM) using The Computational Anatomy Toolbox (CAT12)	Approved	apr.24	nov.24
Noora Tuovinen, Innsbruck, Austria	**Laurin Mauracher**	Effects of ECT on cortical thickness and correlation with outcome and cognitive side-effects	CT, measured using surface-based morphometry (SBM), has been shown to be increased after ECT in major depressive disorder (MDD) by multiple studies with relatively small sample sizes. CT increases were noted in the temporal cortex, insula, frontal regions, anterior cingulate, parahippocampal, fusiform and parietal cortices and hippocampus after ECT. There is a possible direct effect of electrode positioning to CT in temporal and insular cortices. The goal is to study CT changes following ECT in a large sample and look for predictors of treatment response using baseline CT.	T1, SBM using Freesurfer. Machine learning either SVM, PRoNTo or scikit-learn	Approved	apr.24	nov.24

Miklos Argyelan New York, USA	**Miklos Argyelan**	Spatiotemporal resting state biomarker of ECT treated depression	The impact of TMS could be explained by alterations in the temporal dynamics of resting-state connectivity. These latency differences have been observed between MDD and healthy control (HC) groups, and TMS treatment normalized these latencies in MDD patients. The baseline latency measurement in the anterior cingulate cortex (ACC), a pivotal region in the salient network, exhibit a correlation with subsequent clinical response. Hypothesis: 1) MDD individuals will display distinct latency patterns in key regions of the salient network compared to HC at baseline, 2) Electroconvulsive Therapy (ECT) treatment will restore these latencies, and 3) the baseline latency will be correlated with subsequent clinical response.	268-node parcellation (Shen parcellation) to estimate correlation delays between time courses among ROIs.	Approved	apr.24	nov.24
Katherine Narr Los Angeles, USA	**Amber Leaver**	Modulation of seizure networks during ECT	Neuroimaging studies have clearly shown robust and replicable brain plasticity after ECT, including increased hippocampal gray matter. However, it has remained challenging to determine exactly how the seizure activity itself leads to symptom improvement in ECT. Some regions e.g. the thalamus, have been implicated in antidepressant response to ECT in MRI studies. We will measure how resting-state functional connectivity within a seizure network changes after right unilateral (RUL) and bitemporal (BT) ECT. H1: Connectivity within the seizure network will increase after ECT. H2: Connectivity within right-hemisphere nodes of the seizure network will increase more after RUL ECT compared with BT ECT. H3: Change in connectivity in nodes associated with seizure termination (thalamus, cerebellum) will correlate with antidepressant response.	Resting state BOLD fMRI, demografic and clinical data, linear mixed effects models, seizure networks methods from Schaper et al and Fox et al	Approved		apr.25