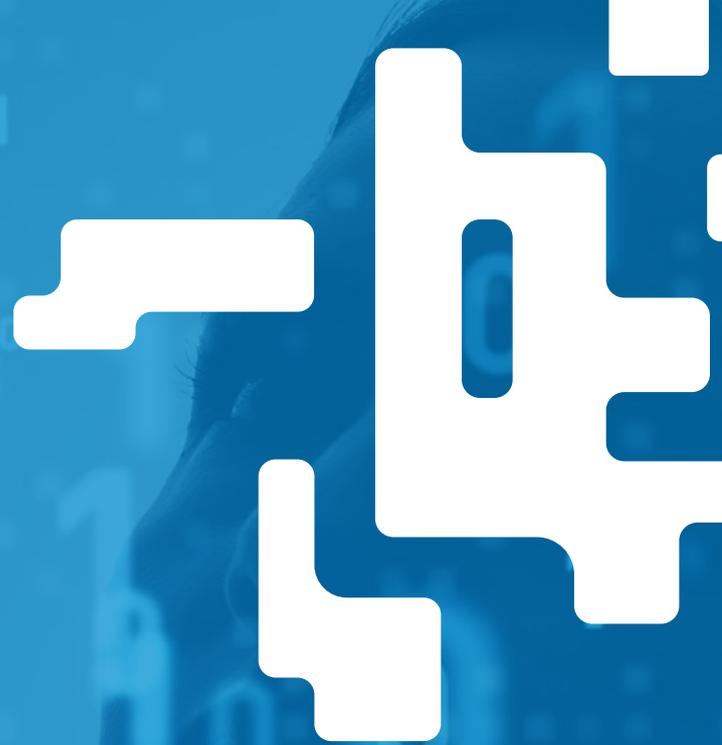




NORMENT
Norwegian Centre for
Mental Disorders Research



NORMENT

Annual Report 2019



UiO: University of Oslo



UNIVERSITY OF BERGEN



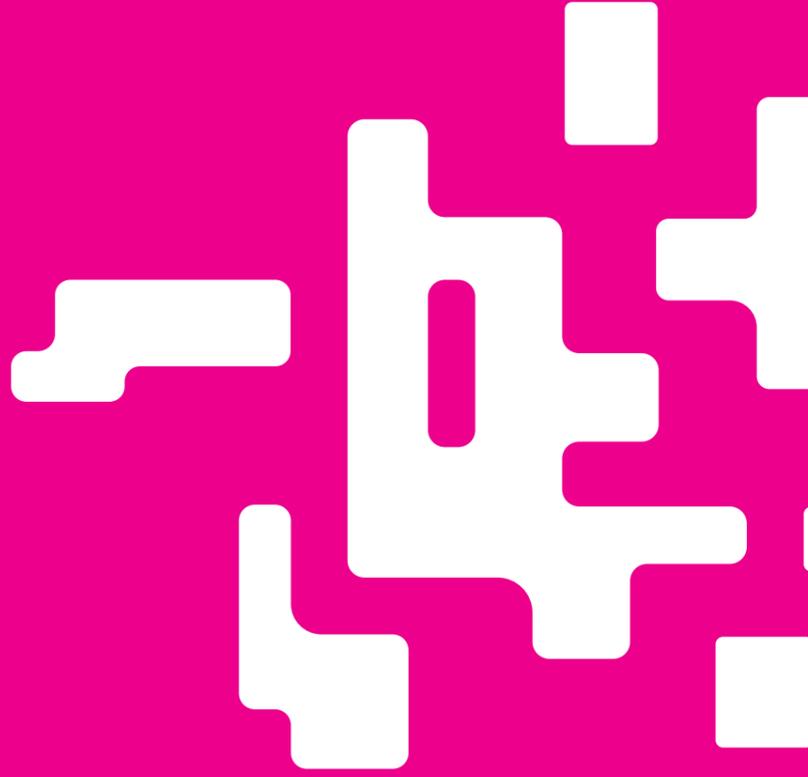
Oslo
University Hospital



Haukeland University Hospital



The Research Council of Norway



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Leader's Comments



We have now reached the peak of the Centre period, seven years after the start up. All the members of the NORMENT team now have a unique opportunity to make a difference, leveraging the infrastructure, expertise and talented co-workers that are gathered at the Centre. This is also reflected in our research production, with an all-time high number and quality of our research publications.

Further illustration of the scientific quality comes from the awards in 2019. First and foremost, the Anders Jahre's Medical Prize for Younger Researchers to Core Researcher Lars T. Westlye for his unique contributions to understanding underlying brain mechanisms in mental illness. In addition, I received the Excellent Researcher Award from Oslo University Hospital. Although these awards are given to individual researchers, they are in fact a tribute to the excellent teamwork in these groups, and a strong contribution from many researchers across multiple groups at NORMENT.

In addition, we were also successful in competing for external funding, with several grants from the Research Council of Norway and Regional Health Authorities to NORMENT researchers, including Early Investigator Grants to Daniel Quintana and Ida Sponderby. We also received an EU Grant from the Horizon 2020 program, coordinated by NORMENT. These grants will ensure a large level of activity at the Centre in the coming years.

The NORMENT research activities are not only seen in scientific reports and presentations at international scientific meetings. We have also developed a series of dissemination activities, reflected with our presence on [Twitter](#). Our [Facebook page](#) was launched when we announced our public event "Sinnssyk forskning: Arv og miljø" ("Insane research: Heritability and environment"), which was a well-received seminar presenting our activities for the lay people. Based on a close collaboration with user groups, we have organized a series of public meetings, with

most activity in collaboration with the Norwegian Bipolar Association. This is an important aspect of our work, and NORMENT researchers were also present at "Arendalsuka", which is a meeting place for politicians, institutions and advocacy groups.

Working in the frontline of research is a very dynamic activity, and we need to adjust our projects and plans according to recent discoveries and new opportunities based on methods and tools. We have already started to plan for the phase after 2023 when our current Centre funding from the Research Council of Norway fades out. However, thanks to a unique ability to attract funding and excellent young scientists, as well as a CR team with strong commitment for long term effect of the Centre period, we have now launched the "NORMENT 2050" plan. This will ensure that the infrastructure, biobank, database as well as expertise and know-how will be maintained and made available for researchers after 2023. Thus, I am confident that the Centre will ensure long-time opportunities for frontline research in mental disorders also after the formal Centre of Excellence status is ended.

I would like to use the opportunity to thank the whole NORMENT team for their efforts in 2019. It is a pleasure and privilege to be the Director of NORMENT with such an outstanding team of people. I look forward to a fruitful and collaborative year in 2020, and all the exciting results and new discoveries.

A handwritten signature in blue ink that reads "Ole A. Andreassen".

Ole A. Andreassen
Centre Director

Brain age gap by group, per test sample

Scientific Highlights 2019

Our research resulted in many exciting and important findings in 2019, of which several were published in prestigious scientific journals with NORMENT researchers as lead authors.

Tobias Kaufmann and colleagues analyzed brain imaging data from more than 40,000 individuals across the lifespan, and demonstrated distinct patterns of brain aging in specific brain disorders, including schizophrenia ([Nature Neuroscience](#)).

Dag Alnæs and co-authors found that schizophrenia appears to be associated with increased interindividual differences in brain structure, possibly reflecting clinical heterogeneity, gene-environment interactions, or secondary disease factors. This paper also got an editorial comment ([JAMA Psychiatry](#)).

Olav Smeland and Kevin O'Connell were lead authors on genetic studies of mental disorders, showing an extensive genetic overlap between schizophrenia, bipolar disorder, and intelligence ([Molecular Psychiatry](#)) and an overlap between genetic risk for bipolar disorder and attention-deficit/hyperactivity disorder ([Molecular Psychiatry](#)), respectively.

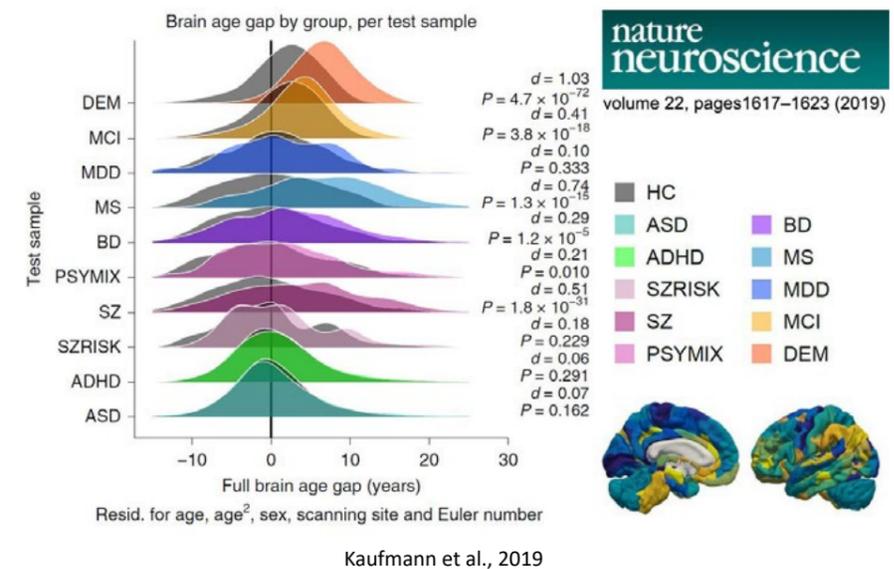
Daniel Quintana and colleagues characterized oxytocin gene networks in the human brain by using gene expression and functional MRI data ([Nature Communications](#)). Based on our long-standing collaboration with University of California San Diego, Oleksandr Frei and co-workers published a method for characterizing overlapping genetic factors between two related traits or disorders ([Nature Communications](#)).

Dennis van der Meer and Ida Sørnderby had the leading role in a large neuroimaging and genetic study through the ENIGMA consortium, which showed that a specific genetic variant (15q11.2 BP1-BP2) was associated with brain morphology and cognition ([JAMA Psychiatry](#)).

Through international collaborations, NORMENT researchers were co-leading in discoveries of genetic risk factors in bipolar disorder (Stahl et al., *Nature Genetics*) and Alzheimer's disease (Jansen et al., *Nature Genetics*). Further, several researchers from the Centre were involved in findings of genetic risk variants in a range of mental disorders, including genetic relationships across psychiatric disorders (Psychiatric Genomics Consortium, *Cell*).

We also identified important clinical and biological characteristics of psychotic disorders that may be useful for prediction of illness course. These include substance use (Icick et al.), adverse life events (Aas et al., Wortinger et al.), cardiovascular factors (Rødevand et al.), metabolomics (NE Steen et al.), brain neurochemistry (Hjelmervik et al.), immune factors (Wedervang-Resell et al., Gohar et al.), cognitive functions (Engen et al., Vaskinn et al., Gjerde et al.), sleep disturbances (Laskemoen et al.), stigma (Simonsen et al.), and treatment effects (Di Sero et al., Dwyer et al., Akkouch et al.).

For a complete list of NORMENT publications in 2019, [see page 82](#).



Prizes and Awards



Anders Jahre's Prize to Lars T. Westlye

Associate professor Lars T. Westlye received the [Anders Jahre's Medical Prize](#) for Younger Researchers on October 31, 2019 for his contributions to understanding how innate characteristics and personality can explain predisposition to mental illness.

The Jahre's Awards honor research of outstanding quality in basic and clinical medicine. The prizes are awarded by the University of Oslo and are among the largest within Nordic biomedical research. The prize for younger researchers amounts to 400.000 NOK, which Westlye shared with Jenny Mjösberg from Karolinska Institutet in Stockholm.

During the Prize seminar, Westlye gave an open lecture on population-based brain imaging in clinical neuroscience. He received the prize during a formal ceremony in the University Aula, where the winners also were honoured with speeches and music.

Excellent Researcher Award to Ole A. Andreassen

Professor Ole A. Andreassen received the [Excellent Researcher Award](#) from Oslo University Hospital on August 23, 2019.

The committee stated that Andreassen's research on causes and mechanisms of severe mental disorders has contributed to increased understanding of the development and putative treatment of diseases, and that he has been a pioneer in psychiatric molecular psychiatry and in building up large national biobanks and databases, as well as international studies in psychiatry. Andreassen also has published extensively in highly ranked journals and is currently one of the most cited researchers in Norway.

The Excellent Researcher Award is awarded yearly to honour the best researchers at the hospital, and the prize money of NOK 300.000 is to be used on research.



Paper awards

Researcher **Tobias Kaufmann** was awarded the 2018 [Excellent Paper in Neuroscience Award](#) by ERA-NET NEURON on January 22, 2019, for his publication "Delayed stabilization and individualization in connectome development are related to psychiatric disorders", which was published in Nature Neuroscience in 2017.

Associate professor **Leif Oltedal** received the Fulbright Article of the Year Prize at The Norwegian Nobel Institute in Oslo, Norway, on June 6, 2019 for his publication "Volume of the human hippocampus and clinical response following electroconvulsive therapy", which was published in Biological Psychiatry in 2018.

PhD student **Erik Kjelby** received the prize for the best acute psychiatric research paper from the Norwegian forum of acute psychiatry in Oslo, Norway, on February 6, 2019, for the paper "Trajectories of depressive symptoms in the acute phase of psychosis: implications for treatment".



Other awards

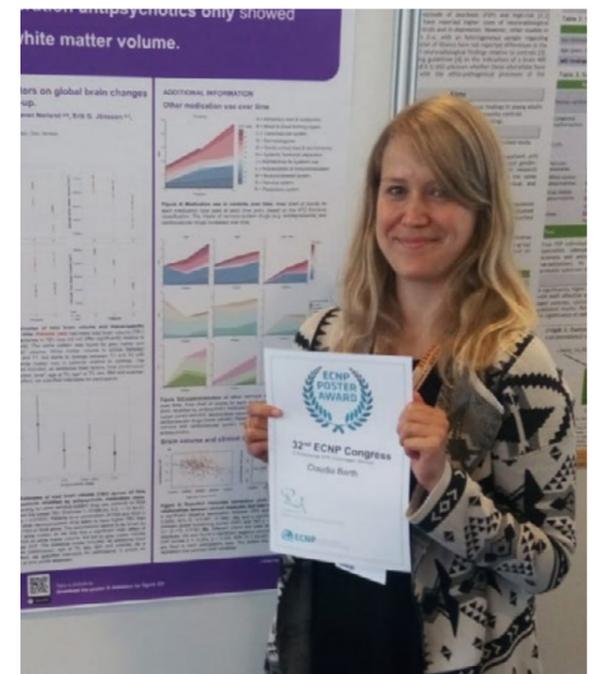
Researcher **Christian K. Tamnes** and associate professor Lars T. Westlye received the Communication Prize from the Department of Psychology, University of Oslo, on November 4, 2019, for their use of social media to promote psychological research of their own, their staff members and peers.

Postdoctoral fellow **Claudia Barth** received the ECNP Poster Award in Copenhagen, Denmark, in September 2019, for her poster "Exploring the impact of iatrogenic factors on global brain changes in chronic schizophrenia – a 13-years follow-up".

PhD student **Gabriela Hjell** received the ECNP Travel Award at the European College of Neuropsychopharmacology in Copenhagen, Denmark, in September 2019, for her study "Disentangling the relationship between cholesterol, aggression and impulsivity in severe mental disorders".

PhD student **Daniel Roelfs** received the Sparbanken Skånes master prize from Sparbanksstiftelsen Färs & Frosta in Lund, Sweden, on October 29, 2019, for his master thesis entitled "A Study of Cortical Excitability Indices in Schizophrenia".

Postdoctoral fellow **Thomas Wolfers'** PhD thesis was ranked Top 3 at the Dutch Society of Brain and Cognition Dissertation Award in 2019.



About the Centre



The Norwegian Centre for Mental Disorders Research (NORMENT) is a research centre focusing on understanding the causes and mechanisms underlying severe mental illness. The goal is to better understand why some people develop psychotic symptoms (perceptual disturbances, hallucinations, delusions) and mood disturbances (depression, manic episodes). Ultimately, the hope is that by understanding more about how and why mental illness develops we can contribute to increase the quality of prevention and treatment.

NORMENT was established as a Norwegian Centre of Excellence (CoE) in July 2013, with a 10-year CoE grant from the Research Council of Norway, as well as being funded by several other institutions.

The Centre is based on collaboration between the University of Oslo (host institution), the University of Bergen, Oslo University Hospital, and Haukeland University Hospital. The research on severe mental illness has a long history both in Oslo and Bergen, and is based on many years of collaboration across the current NORMENT sites. In Oslo, the main research project preceding the Centre of Excellence was a network project called the "Thematically Organized Psychosis" (TOP) study, a thematic effort focused on psychotic disorders. The term "TOP" is still used about the main study protocol at the Centre, in which a large number of people have participated over the years.

In 2019, more than 200 people with various professional backgrounds such as Medicine, Psychology, Biology, Neuroscience, Mathematics, Statistics, Engineering, and Administration were involved at NORMENT, either as employees or affiliated to the Centre.

The research at NORMENT is being carried out in 15 research groups. The main research topics include Genetics (genetic susceptibility and heritability), Brain Imaging (brain structure and function), Outcome Prediction (estimation of illness course and outcome), and Clinical Intervention (test out new treatment). Most if not all research activities depend on a tight collaboration and efficient use of resources across different research groups and scientific disciplines. An important aim is to create a synergy effect where ideas, knowledge, and competence at the Centre as a whole become greater than its individual components. Using a "vertical synergy" approach, severe mental illnesses are studied across different levels and by combining different methods, to get the most complete picture of mechanisms involved in these complex disorders.

Most of NORMENT's research is made possible thanks to a large growing database where several thousand participants, both people with mental illness and healthy individuals, have generously volunteered to take part in extensive and time-consuming clinical assessments, neuropsychological testing, and brain imaging, as also provided samples for analysis of genetic and biological factors.



Inclusion of new participants into the studies represents a major activity at the Centre, also thanks to state-of-the-art facilities and an outstanding team of technical and administrative support personnel. NORMENT also has a focus on user involvement and has an active User Council and an employed user representative that give valuable perspectives and input.

Over the last years, NORMENT has contributed to a series of important discoveries which have been published in recognized international scientific journals such as Science, Cell, Nature Genetics, JAMA Psychiatry, Molecular Psychiatry, Biological Psychiatry, and Schizophrenia Bulletin. NORMENT has so far:

- been involved in discoveries of new **gene variants** associated with severe mental illness, including large international studies reporting over 100 gene variants related to schizophrenia and 30 risk variants associated with bipolar disorder
- gained new knowledge about the **immune system** and related genes in mental illness
- developed novel and promising **statistical tools** to study mental disorders
- determined that complications before or during birth may affect **brain development** and play an important role in psychiatric illness
- identified **gene variants** related to specific regions and properties of the brain
- detected how **brain connections** evolve during development and are associated with mental health
- identified factors affecting illness progress and outcome, such as **childhood trauma** and its interaction with genes
- shown that **cannabis use** reduces the age of onset in bipolar disorder

In the years to come, the research at NORMENT will particularly focus on immune factors and neuronal processes, based on the discoveries of new risk genes for schizophrenia and bipolar disorder. One promising new area of research is to use human stem cells developed from skin cells to investigate molecular and cellular mechanisms in mental illness. We will also start more clinical trials and interventions to follow up our new findings, and improve our approaches for analysing large amounts of data ("big data"). The Centre also seeks to be in the forefront of the development of new digital tools, including apps and other new technology. Altogether, we aim to contribute substantially to a better understanding, care and treatment of severe mental disorders.

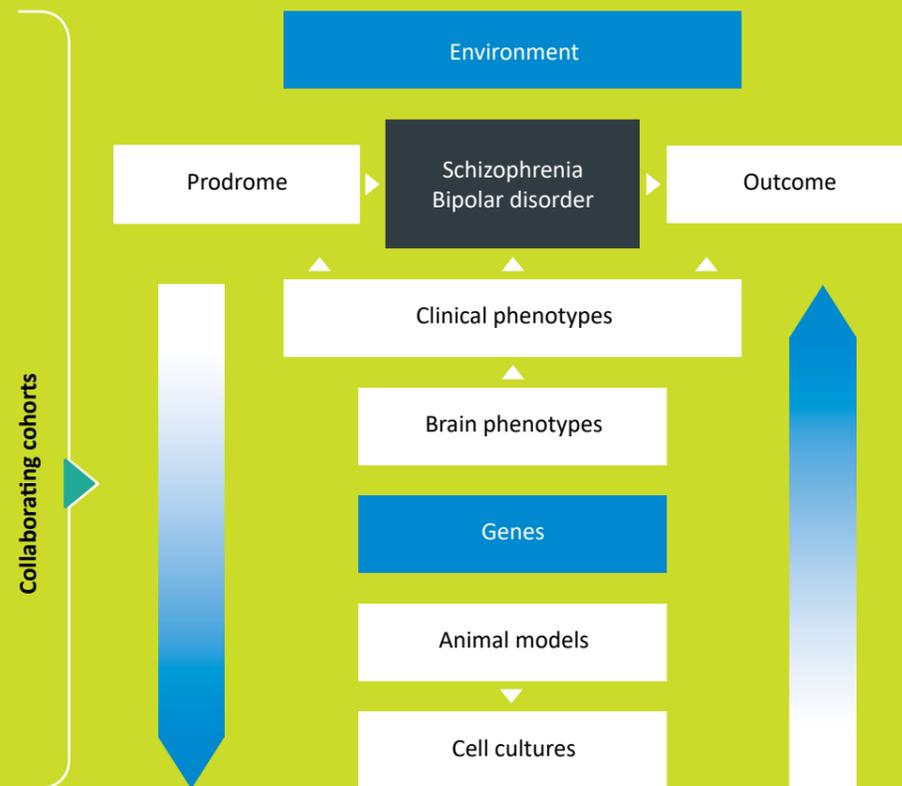
Vision Statement

NORMENT's primary objective is to explore and reveal the underlying pathophysiology of psychotic disorders based on recent discoveries of genetic risk factors, develop tools for stratification and outcome prediction, and translate findings into clinical interventions.

The main research topics at the Centre are Genetics, Brain Imaging, Outcome Prediction, and Clinical Intervention, which are reflected in the following subgoals:

1. Disclose the complete genetic architecture of psychotic disorders and determine their functional impact
2. Identify novel brain imaging phenotypes linking genes and clinical phenotypes in a longitudinal setting
3. Use genetic, environmental and clinical factors to predict disease progress and outcome
4. Translate pathophysiological discoveries into clinical and pharmacological interventions

We benefit from the homogeneity of the Norwegian population (genetic background, health care system, registries) as the basis for collecting large samples of affected and unaffected people. These individuals are characterized with the same clinical, cognitive, biochemical and imaging protocols to identify new disease mechanisms which are then studied functionally in animal and cell culture models. The aim of this "vertical synergy" approach is to obtain different levels of understanding by bringing together transdisciplinary expertise and methods.



Scientific Aims

GENETICS: Disclose the complete genetic architecture of psychotic disorders and determine their functional impact

Large international genetic studies including NORMENT studies have generated evidence of novel risk genes. Emerging data show overlapping genetic architecture in bipolar disorder and schizophrenia, and involvement of many genes with small effects (polygenic architecture), but also rare variants and copy number variants with larger effects.

Still, the identified genetic variants explain only a small fraction of disease susceptibility. We have developed statistical models supporting that there is a large potential for gene discovery in bipolar disorder and schizophrenia, with relatively small increase in sample size.

Aims:

- Uncover new rare genetic variants conferring risk of bipolar disorder and schizophrenia
- Leverage new statistical methods to determine the polygenic architecture of bipolar disorder and schizophrenia
- Discover biomarkers and biological mechanisms of psychosis risk genes

BRAIN IMAGING: Identify novel brain imaging phenotypes linking genes and clinical phenotypes in a longitudinal setting

Non-invasive MRI technology provides a large opportunity to identify genetically determined brain pathology in patients with psychotic disorders. We will use these methods in our integrated study of brain abnormalities related to clinical characteristics, including developmental trajectories.

Aims:

- Explore brain network dynamics in psychotic disorders and associated phenotypes
- Identify genetic determinants of brain abnormalities
- Determine brain abnormalities underlying key clinical phenotypes and their genetic architecture

OUTCOME PREDICTION: Use genetic, environmental and clinical factors to predict disease progress and outcome

The first episode of schizophrenia and bipolar disorder remits in the majority of patients, but with significant risk for relapse. Psychotic disorders thus have a wide range of possible trajectories, which underlines the importance of ascertaining early predictors of treatment response and of clinical outcome.

We will delineate the course of key clinical and cognitive characteristics, with structural and functional imaging, expanding to the genetic and molecular levels of explanation in a longitudinal design. We expect that these multifactorial data and novel statistical tools will enable us to better predict course and outcome with a clinically useful level of confidence.

Aims:

- Define clinical trajectories from premorbid stages and related pathophysiological processes
- Identify gene-environment interactions at critical phases of neurodevelopment with relation to clinical outcome, including mortality
- Develop prediction and stratification tools for disease course and outcome

CLINICAL INTERVENTION: Translate pathophysiological discoveries into clinical and pharmacological interventions

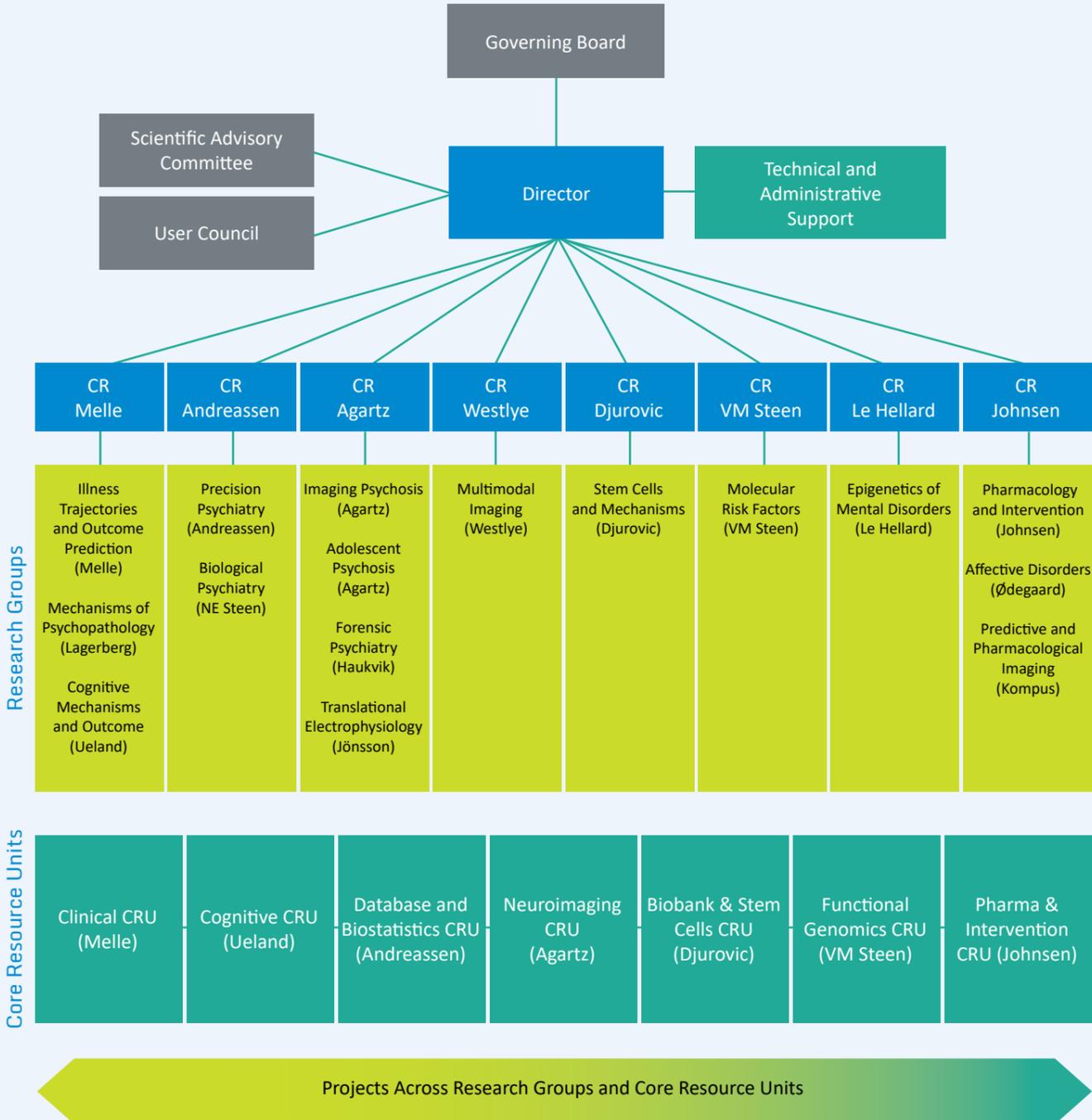
It is a major challenge to move from statistical genetics associations in large samples, to the underlying disease mechanisms of psychosis in individual patients. We will use our rich database and stem cells technology to study immune- and lipid-related pathways based on our previous findings.

Aims:

- Determine immune and lipid-related mechanisms in psychotic disorders
- Develop a stratification approach based on immune dysfunction profiles
- Perform immune system-related interventions in psychotic disorders



Organization of the Centre



CR: Core Researcher, CRU: Core Resource Unit

Governing Board



*Replaced by Trine Waaktaar 01.01.2020



Scientific Advisory Committee



Professor Terry Jernigan:
Professor in Cognitive Science, Psychiatry, and Radiology, and Director of the Center for Human Development, University of California, San Diego (UCSD), USA, as well as Co-Director of the Coordinating Center for the ABCD Study.

Professor Michael Foster Green:
Professor-in-Residence at the Department of Psychiatry and Biobehavioral Sciences and the Semel Institute for Neuroscience and Human Behavior at the Geffen School of Medicine at the University of California Los Angeles (UCLA), USA. He is also Director of the Treatment Unit of the Department of Veteran Affairs VISN 22 Mental Illness Research, Education, and Clinical Center (MIRECC).

Professor Peter Falkai:
Professor of Psychiatry and Psychotherapy and Chairman of the Department of Psychiatry and Psychotherapy of the Ludwig-Maximilian University in Munich, Germany. He was Chairman of the DGPPN from 2011-2012 and Chairman of the Council of National Societies (NPAs) of the European Psychiatric Association (EPA) from 2012-2014.

- Their tasks are as follows:**
- Provide advice to the NORMENT leadership in strategic decisions.
 - Contribute to NORMENT’s research activity by evaluating and advising on the activities within each of the research groups of the Centre and by acting as scientific advisors to the Centre Director.
 - Take an active part in NORMENT’s annual meetings. Participate in preparing an annual written evaluation with SWOT analysis. Contribute by giving an annual lecture at postgraduate level.



Centre Management

Ole A. Andreassen Professor Director	Ingrid Melle Professor Deputy Director (Oslo)	Vidar M. Steen Professor Deputy Director (Bergen)	Christine Lycke Brandt* Administrative Manager
			

*Replaced Áshild Maria Eftevåg in September 2019

Scientific Management

Eight Core Researchers (CR) with complementary expertise from different disciplines constitute the scientific management of the Centre.

- Ole A. Andreassen, Professor, University of Oslo
- Ingrid Melle, Professor, Oslo University Hospital
- Vidar M. Steen, Professor, University of Bergen
- Ingrid Agartz, Professor, University of Oslo
- Srdjan Djurovic, Professor, Oslo University Hospital and University of Bergen
- Stephanie Le Hellard, Professor, University of Bergen
- Lars T. Westlye, Associate Professor, Oslo University Hospital
- Erik Johnsen, Professor II, Haukeland University Hospital

In addition to being part of the scientific leader team, each CR is the head of a Research Group ([see page 29](#)).



From the left: Erik Johnsen, Ingrid Agartz, Srdjan Djurovic, Stephanie Le Hellard, Ole A. Andreassen, Ingrid Melle, Vidar M. Steen, Lars T. Westlye

User Involvement

Lena-Maria Haugerud



Fred Gerkum



Inger Hagen



Fabian Stang



User Council

NORMENT's User Council represents the user community, and consists of individuals who have lived experience, competency and expertise related to mental health. The members of the User Council complement and support the Centre in its effort to carry out research that is relevant for society.

The User Council meets four times a year and provides input to research strategy, gives advice on practical research protocols, and is consulted on matters that affect participants in the studies. The User Council also contributes to dissemination activities, and the members of the Council help strengthen the communication between NORMENT, the user organizations and the community at large.

In 2019, the members of the User Council were:

Lena-Maria Haugerud, National Association for Prevention of Self-Harm and Suicide (LFSS)

Fred Gerkum, Norwegian Bipolar Association

Inger Hagen, The Carers Centre Oslo, and Mental Health Carers Norway (LPP)

Fabian Stang, Lawyer and Politician

In addition to the three regular meetings in 2019, the members of the User Council participated at the NORMENT public event in May and the NORMENT Annual Retreat in September.

User Representative

NORMENT has employed a part time User Representative to further strengthen the user perspective in the research. The User Representative participates in daily activities at the Centre and brings the user perspective into group meetings, project planning, dissemination activities, and practical operation procedures. Further, the User Representative is involved in projects where the user perspective is particularly relevant, such as the development of smartphone apps and other digital methods of data collection, and acts as a link to user organizations, such as the Norwegian Bipolar Association.

In 2019, the User Representative was **Marthe Hagen**.

Technical and Administrative Support

In order to perform excellent research, NORMENT is dependent on well-organized support functions that ensure a stable and efficient infrastructure. The Centre is lucky to have a great team of technical and administrative personnel who continuously work to fulfil these functions in a good way. Support functions span from IT assistance and project economy to communication and project coordination.

Technical and administrative support has become increasingly important as the Centre has grown from about 80 employees in 2013 to about 220 people involved in 2019. In addition, NORMENT affiliates are located at several sites in Oslo and Bergen, and are employed at four different institutions (University of Oslo, University of Bergen, Oslo University Hospital, Haukeland University Hospital).

The Centre size and organization demand well-working support systems, also for internal communication and information flow. Our intranet has become an important arena for exchange of information across the Centre, such as templates, meetings plans, project descriptions, and presentations and video recordings from meetings. In 2019, we continued with successful live stream of our vertical synergy meetings, making them available for more people and limiting the number of plane trips between Oslo and Bergen. Support personnel also had an important role in organizing the Centre meetings, such as the Annual Retreat, which also this year was a professional and successful event.

Technical support for data storage and computational platforms is also essential. The central database with all research data is carefully quality controlled and stored on a secure server that is available across the Centre. Database staff clean and prepare data for analysis and ensure data security and adherence to national and international regulations. Support personnel also keep track of project budgets and yearly reports required by funding agencies, and work to improve central administrative systems, procedures and protocols that are essential for an efficient research organization.



The Centre administration is located in Building 49, Ullevål Hospital, Oslo

Core Resource Units

The daily infrastructure for collection, storage, and processing of scientific data at NORMENT is divided into seven different Core Resource Units (CRU). These are sections that are responsible for and have expertise in different methodological aspects of the data collection, and reflect that the Centre has a strong focus on “vertical synergy” and thereby the integration of various research methods and approaches.

Most scientific projects at the Centre include several Core Resource Units, since they are based on data collected from different groups and involve both clinical and other information about the participants.

The main responsibilities of the different Core Resource Units are described below.

Clinical CRU

Leader: Ingrid Melle

Manager clinical assessment: Trine Vik Lagerberg

The Clinical CRU has the main responsibility for recruitment and standardized scheduled clinical assessments of participants with psychotic disorders in the core research studies at NORMENT. This includes development and maintenance of the common clinical assessment protocol and quality assurance of assessments. The quality assurance includes standardized training of assessment team members, quality assurance and reliability of ratings, preparation of data for entry into the clinical database, and supervision of assessment team members. The assessment team consists of PhD students and research assistants with clinical qualifications to do diagnostic and symptom assessments, in most cases psychiatrists/psychiatric residents or clinical psychologists from the “Illness trajectories and functional outcome”, “Mechanisms of psychopathology”, and “Biological psychiatry” research groups at the Centre.

Cognitive CRU

Leader: Torill Ueland

Manager cognitive assessment: Hanne Christine Mohn

The Cognitive CRU conducts neuropsychological assessment of participants recruited for the core research studies at NORMENT. This includes assessment of patients with psychotic disorders and healthy control individuals at all time-points (baseline and follow-up). The group provides neuropsychological reports for clinical participants. The work of the group also includes development and maintenance of the cognitive assessment protocol and quality assurance of assessments. Quality assurance includes standardized training of assessment team members, calibration to ensure reliability of ratings, as well as preparation of data for entry into the database, and supervision of assessment team members. The assessment team responsible for the clinical participants consists of clinical psychologists and PhD students with qualifications to do neuropsychological assessments. The assessment team responsible for assessing healthy controls consists of psychology students and master degree holders.

Database and Biostatistics CRU

Leader: Ole A. Andreassen

Manager: Thomas Bjella

The main purpose of the Database and Biostatistics CRU is to develop and maintain secure and accessible storage structures, analytical tools, and communication platforms that facilitate and accelerate the process between data collection and data distribution at NORMENT. The unit is connecting the seven Core Resource Units at the Centre, and is integral in defining data properties for all research groups. This includes: 1) Database solution for integration of multidisciplinary data: Setting up a common procedure for data formatting, data transfer and data storage across all units; 2) Communication: Better and transparent communication lines, and regular update intervals on all data; 3) eHealth: eNORMENT service, make all data collection from electronic data capture systems; 4) Ethics and GDPR: Ethical approval for digital consent, and remote web form access; 5) Biostatistics service: Distribute method descriptions and guidelines for big data analysis, and provide code and consultation for data analysis.



Neuroimaging CRU

Leader: Ingrid Agartz,

Manager MRI: Lars T. Westlye, Manager EEG: Torbjørn Elvsåshagen

The Neuroimaging CRU has the main responsibility for providing solid state-of-the-art methodology and infrastructure for magnetic resonance imaging (MRI) and electroencephalography (EEG) in the study of severe mental illness. This includes implementation of standard protocols for MRI and EEG, coordination between different research projects at the Centre, and a close collaboration with the Core Facility at the Department of Radiology, Oslo University Hospital. The Neuroimaging CRU works to guarantee streamlined logistics from collection to storage and processing of imaging data, including access to optimal methods for large-scale as well as innovative imaging (e.g. brain structural, functional, blood flow, metabolism, whole body scanning, electrophysiology), and aid to research groups both within and outside NORMENT. The CRU is also responsible for coordination of internal procedures and routines, follow-up of clinical aspects of MRI (e.g., incidental findings), and training of new staff.

Biobank and Stem Cells CRU

Leader: Srdjan Djurovic

The Biobank and Stem Cells CRU coordinates all biobank activities at NORMENT. This includes biological sampling (blood, urine, saliva etc.), treatment of samples (storage, tracking, retrieval), quality control, and shipment between different partners. The CRU also coordinates with the Norwegian Institute of Public Health, and contributes to data capture, organization and data flow. The Biobank and Stem Cells CRU has also established the required competence and facilities for human induced pluripotent stem cell (hiPSC) technology unit in our Centre allowing investigation of neuronal cells from participants. Validated iPSCs are differentiated to neural progenitor cells (neural conversion) and regionalized neuronal subtypes, as well as astrocytes/glia populations under standard in-house methods. Further activities will be aimed to develop a psychopharmacological screening platform for psychiatric disorders using iPSC-derived neurons.

Functional Genomics CRU

Leader: Vidar M. Steen

Co-leader: Stéphanie Le Hellard

The Functional Genomics CRU has expertise and infrastructure for large-scale analysis of the genome, focusing on global gene expression and epigenomics. The team is also equipped for explorative studies and validation experiments in relevant cell cultures and animal models. The current prioritized tasks are RNA sequencing and DNA methylation assays of the clinical samples (patients with schizophrenia spectrum disorders or bipolar disorder as well as healthy controls). We are also responsible for implementation and development of bioinformatic tools for data analysis, including multi-omic methods for integration of corresponding genomic, transcriptomic and epigenomic data.

Pharma and Intervention CRU

Leader: Erik Johnsen

The Pharma and Intervention CRU has the main responsibility for facilitating, coordinating and running intervention studies with medicinal products and other treatments for mental disorders. The CRU furthermore follows individuals with mental disorders in a long-term perspective in order to identify markers and predictors of the course of the disorders, as well as effects and side effects of treatment. The CRU includes three research groups covering the areas 1) Pharmacology and intervention, 2) Affective disorders, and 3) Predictive and pharmacological imaging.

Research Groups

We have organized our research into groups with complementary expertise. Each group has its own Group Leader and a particular focus area of research, but there is a close collaboration across groups and scientific disciplines, as reflected in the “vertical synergy” approach at the Centre ([see page 12](#)).

The number of Research Groups increased from eight to fifteen during 2018, when we entered the second phase as a Centre of Excellence. Some of the new groups are already well-established at their institutions, while others have just recently started. The inclusion of new groups is also part of our career development strategy to give early-stage researchers more responsibility and experience.

All Research Groups and Group Leaders are listed below. Each group has a formal affiliation to one specific Core Researcher (CR) in the scientific management, as shown below:

	CR Melle	CR Andreassen	CR Agartz	CR Westlye	CR Djurovic	CR VM Steen	CR Le Hellard	CR Johnsen
Research Groups	Illness Trajectories and Outcome Prediction (Melle)	Precision Psychiatry (Andreassen)	Imaging Psychosis (Agartz)	Multimodal Imaging (Westlye)	Stem Cells and Mechanisms (Djurovic)	Molecular Risk Factors (VM Steen)	Epigenetics of Mental Disorders (Le Hellard)	Pharmacology and Intervention (Johnsen)
	Mechanisms of Psychopathology (Lagerberg)	Biological Psychiatry (NE Steen)	Adolescent Psychosis (Agartz)					Affective Disorders (Ødegaard)
	Cognitive Mechanisms and Outcome (Ueland)		Forensic Psychiatry (Haukvik)					Predictive and Pharmacological Imaging (Kompus)
			Translational Electrophysiology (Jönsson)					

In addition to our eight Core Researchers ([see page 21](#)), we have seven Group Leaders:



Illness Trajectories and Outcome Prediction

Group Leader: Ingrid Melle



About the group

Psychotic disorders show large variations in course and outcome. Early course parameters, including length of untreated illness and initial treatment response, are among the most important predictors of long-term outcome. Recent studies have identified a range of genetic loci and environmental risk factors associated with schizophrenia and bipolar disorder. Etiological models for psychotic disorders depict clinical illness as prompted by environmental hits, on the basis of an underlying (genetic) vulnerability.

To what extent vulnerability factors primarily shape an early change-resistant susceptibility and to what extent they are involved in active processes driving symptom formation is not known. Our aim is to identify symptom trajectories and correlates through prospective longitudinal studies of first-treatment participants. The group studies the longitudinal development of negative and psychotic symptoms including the opposite outcomes of full functional recovery versus treatment resistance and suicide with a specific focus on the correlates of vulnerability factors.

Main projects

- Long term development of schizophrenia, bipolar disorders and psychotic states that do not meet criteria for schizophrenia or bipolar disorder at first treatment
- Long term development of negative symptoms
- Long term development of substance use
- Long term development of full functional recovery
- Long term risk of suicidal behavior and suicide

Scientific Achievements 2019

- The experience of stigma is high in first episode psychosis but decreases over time
- Low levels of self-disturbances at start of treatment predict clinical recovery
- Increase in high-density lipoprotein levels predicts improved verbal learning capacity
- Lower leptin levels are associated with increased suicidal behavior in psychotic disorders
- Sleep disturbances impacts on cognitive disturbances in psychotic disorders

Mechanisms of Psychopathology

Group Leader: Trine Vik Lagerberg



About the group

The group focuses in illness mechanisms in psychotic disorder, mainly bipolar disorder. The symptom variation within and between individuals are being explored with existing clinical data, as well as with new digital methods (app and actigraphy). The group aims to improve the understanding of illness onset, relapse and remission, focusing on the complex interplay between genetic risk, environmental factors and illness expression.

Features such as substance use, affective lability, clinical insight and Vitamin D deficiency are being investigated across diagnostic categories. The group has also taken a lead in the establishment of a new specialized clinical unit for assessment and treatment of bipolar disorder, in which research will be fully integrated. Here we expect to recruit a large and representative cohort of early bipolar disorder to both translational and clinical intervention studies.

Main projects

- Digital monitoring of illness fluctuations in psychotic disorders
- Illness insight, psychotic features in bipolar disorder
- Affective lability and sleep/circadian abnormalities across psychotic disorders
- Substance use and polygenic risk in bipolar disorder
- RCT on Vitamin D supplements in schizophrenia

Scientific Achievements 2019

- Increased risk of repeated suicide attempts associated with nicotine use in bipolar disorder
- Preparations for meta-analysis of the prevalence of psychotic symptoms in bipolar disorder
- Digital self-assessment of symptoms in psychotic disorders is feasible
- The Birchwood insight scale validly captures reduced illness insight in bipolar disorder

Cognitive Mechanisms and Outcome

Group Leader: Torill Ueland



About the group

The aim of the group is to capture the variation and course of cognitive functioning in psychotic disorders and to identify mechanisms underlying cognitive dysfunction and cognitive heterogeneity. Our goal is to provide better prognostic guidance and improved individualized intervention programs including cognitive remediation.

Our studies require both large scale datasets of cognitive performance in combination with other biomarkers, as well as smaller richer datasets measuring cognition in the same individual over time. Achieving our aims entails using cognitive and clinical data, brain imaging data, genetic data and biochemical assessments, in collaboration with other research groups in the Centre.

Main projects

- Trajectories of intellectual functioning and cognition in first-episode schizophrenia spectrum disorders and bipolar disorder
- Cognition and negative symptoms in first-episode schizophrenia spectrum disorders: Long-term trajectories and associations to functional outcome
- The ecoval study: Linking social processes across explanatory levels - from electrophysiological mechanisms, through social cognition to real-world social interaction
- Cognitive heterogeneity and linkage to symptom profiles in mental illnesses
- The role of inflammation and immune activation for cognitive functioning in psychotic disorders

Scientific Achievements 2019

- Targeted training of facial emotion perception improves theory of mind in participants with schizophrenia
- Participants with first-episode psychosis with sustained negative symptoms over the first year of treatment are more cognitively impaired than participants with no or mild negative symptoms
- Homicide offenders with schizophrenia have larger social cognitive impairments than non-violent individuals with schizophrenia
- JUMP, a Norwegian vocational rehabilitation program for participants with schizophrenia, is associated with significant reductions in the use of inpatient services over a 2-year follow-up period

Precision Psychiatry

Group Leader: Ole A. Andreassen



About the group

The group uses big data and new analytical methods to clarify causes and risk factors in severe mental disorders to improve prevention, diagnosis and treatment. We apply state-of-the-art methodology to examine data from NORMENT and large databases that include several million individuals. We develop mathematical models to understand variation in the human genome, to improve our ability to identify genetic and environmental factors contributing to disease development.

This research is performed in close collaboration with international researchers and global consortia, with a strong focus on Nordic partners to leverage the large potential of registries and biobanks. The group's long-term goal is to develop the framework for precision medicine approaches – to apply the discoveries of causal factors in clinical practice – which has great potential in psychiatry.

Main projects

- Identifying genetic risk factors for psychiatric disorders (PGC) and mapping imaging genetics factors in mental disorders (ENIGMA)
- Identifying rare variants in neuropsychiatric disorders with long range phasing (Tryggve) and resilience factors in psychiatric disorders (MoBa)
- Comorbidity and longitudinal development of severe mental disorders, and role of life style factors (CoMorMent)
- Antipsychotic treatment stratification (pharmacogenetics)
- Develop novel biostatistical tools, including uni- and bivariate mixture models (MiXeR), multivariate omnibus statistical test (MOSTest), improving prediction and stratification

Scientific Achievements 2019

- Discovered novel genetic risk factors for a series of mental disorders, including bipolar disorder, ADHD, ASD, Anorexia Nervosa, Parkinson's and Alzheimer's disease
- Identified new genetic variants shared between schizophrenia, bipolar disorder and intelligence, and genetic overlap between ADHD and bipolar disorders, providing new insights into their genetic architectures
- Developed new tool for cross-trait analysis, highlighting important genetic relationships between psychiatric disorders
- Implemented multivariate tool for imaging genetics analyses increasing genetic discoveries
- Identified association between rare genetic variants (15q11.2) with brain morphology (cortical and subcortical structures) and cognition

Biological Psychiatry

Group Leader: Nils Eiel Steen



About the group

The group investigates biological mechanisms in schizophrenia and bipolar disorder by integrating genetic, biological, environmental and clinical data in a translational approach. We use the richly characterized TOP/NORMENT sample in combination with data from international genetic consortia and health registries. Several biological processes related to severe mental disorders and their treatment are investigated with a special focus on inflammation and mechanisms of cardiovascular comorbidity as well as candidate metabolism pathways and the endocrine stress regulation system.

The overall goal is to increase the knowledge of the underlying biological mechanisms of these disorders with potential implications for prevention, treatment, course prediction and diagnostics. Our aims include gaining knowledge of underlying immune mechanisms of severe mental disorders, identifying pathophysiological pathways, and identifying stress-related mechanisms of severe mental disorders.

Main projects

- Genetic factors associated with immune pathways and psychopharmacological treatment in severe mental disorders
- Immune and clinical phenotypes in psychosis spectrum disorders, impact of psychotropic drugs, and the link to cardiovascular co-morbidity
- Clinical, cognitive and social aspects related to cardiometabolic risk in severe mental disorders - underlying mechanisms and prediction of outcome
- How stress gets under the skin: The role of stress and psychophysiology in schizophrenia, bipolar disorder and in healthy individuals
- Metabolomic and proteomic biomarkers of psychotic disorders

Scientific Achievements 2019

- Cardiovascular risk in patients with schizophrenia has not decreased during the past decade while there has been a modest reduction of risk factors in patients with bipolar disorder
- Identification of kynurenine pathway-, noradrenergic- and purinergic system dysregulations across schizophrenia and bipolar disorder
- Childhood trauma is associated with level of hair cortisol and telomere length in patients with psychotic disorders, indicating long-term HPA axis dysregulation in these patients and sensitivity of telomere length to stressful life events

Imaging Psychosis

Group Leader: Ingrid Agartz



About the group

The focus of the group is brain neuroanatomy studied with advanced magnetic resonance imaging (MRI) methodology and how it relates with aetiology (genes and environmental factors) and early life risk factors (e.g. obstetric complications) as well as with the clinical phenotype, substance use, immune markers, infection exposure and medication. Advanced MRI phenotypes are used (e.g. cortex thickness, volume and area, myelin mapping, contrast, DTI). We investigate large cohorts of schizophrenia or bipolar disorders. In longitudinal follow-up studies, we investigate brain trajectories. One subproject (Youth-TOP) focuses on early-onset psychosis in adolescents, their brain development over time, biomarkers, and early risk factors. We participate in several international consortia and coordinate two international collaborations on adolescent psychosis.

Main projects

- MRI studies of primary sensory and motor brain regions in psychotic disorders
- Importance of birth and pregnancy complications to brain development cognition in severe mental illness across the age range
- Effects of exposure to infectious agents in schizophrenia and bipolar disorder
- Bridging neuroscience research with clinical applications, using machine learning approaches and multiparametric myelin mapping in psychotic disorders
- Clinical inclusion and follow-up of Youth-TOP participants at the University of Oslo and Karolinska Institutet, Stockholm, and coordination of ENIGMA-EOP study for adolescents with early-onset psychosis

Scientific Achievements 2019

- Lipid alterations in adolescent non-affective early-onset psychosis may be independent of antipsychotic medication
- Negative voice content of auditory hallucinations adolescent non-affective early-onset psychosis is associated with less perceived cognitive control and more disturbing voices
- There is limited evidence of progressive brain volume loss beyond normal aging in chronic schizophrenia over 13 years
- Exposure to severe complications during the fetal period or delivery is linked to reduced cognitive functioning in adults
- Basal ganglia structures are enlarged in patients treated with antipsychotic medication, but there is no association with estimated dopamine 2 receptor occupancy

Forensic Psychiatry

Group Leader: Unn Kristin H. Haukvik



About the group

The group has an interdisciplinary approach to the study of violence and aggression in severe mental disorders. Our main focus is to characterize how biopsychosocial factors interact to affect violence risk in severe mental disorders, by combining thorough clinical investigation with advanced brain imaging methods and registry data. As a thematic research group, we collaborate closely with the other research groups within the Centre. We also explore the potential legal implications of our research, in the intersection between law and neuroscience.

Our main aims are to use frontline MRI-methodology to map neurobiological underpinnings of violence and aggression in severe mental disorders, and combine this knowledge with social and psychological factors to increase violence prediction accuracy. We aim to link our research to the Norwegian medical model of criminal insanity and to contribute to strengthening legal rights of patients and reduce the stigma associated with violence in severe mental disorders.

Main projects

- Violence in severe mental disorders; biological, psychological, and social patterns (sTOP)
- Violence in psychosis: towards neuroimaging-informed prediction of violence risk?
- Insight and phenomenology in psychotic disorders with comorbid violence
- Neuroinflammatory biomarkers of aggression in severe mental disorders: clinical implications for prevention and treatment
- Reworking the medical model of criminal insanity in the intersection between law and science – empirical data and the legal significance of psychosis

Scientific Achievements 2019

- Violence in schizophrenia is linked to increased brain cortical folding and reduced cortical thickness in areas involved in sensory processing, emotion recognition, and reward
- Violence and aggression in schizophrenia are linked to white matter microstructural brain abnormalities that do not differ from non-violent persons with schizophrenia
- Criminal insanity is in the current medical model in Norwegian law equated with psychosis, but the legal meaning of psychosis is unclear

Translational Electrophysiology

Group Leader: Erik Gunnar Jönsson



About the group

The group studies nerve cell function in patients with psychosis and other psychiatric disorders using electroencephalography (EEG) and related electrophysiological methods. The electrophysiological indices are also analyzed in connection with clinical symptoms, genetic variation, morphological variation in the brain, computerized models of nerve cells, and stem cell based methods.

The group aims to examine whether EEG-based indices of synaptic function and neuronal excitability regulation are altered in schizophrenia and bipolar disorder. We assess effects of novel schizophrenia and bipolar disorder genetic risk loci on the EEG-based indices and to examine whether the EEG-based indices can be used to predict illness severity in schizophrenia and bipolar disorder.

Main projects

- Genes and the synapse in severe mental illnesses: From stem cells and in vivo brain function to clinical implications (examination of synaptic function in vivo using electrophysiological techniques in individuals with psychotic disorders and healthy controls, in vitro using iPSC-derived neurons from the same participants, and in silico using computational models of synaptic function)
- Sensory and motor networks in psychotic disorders: From structure and function to phenomenology (examination of the relationship between brain myelination, aberrant sensory processing and phenomenology of psychotic disorders)
- Equivalence class formation and cortical synaptic function in autism spectrum disorders (examination of the role of synaptic function and plasticity in the autism spectrum disorders and the relationship between equivalence formation and synaptic function)

Scientific Achievements 2019

- As of Dec 31st 2019 EEG data has been obtained from 799 participants
- Analyzed data – preliminary results suggest robust EEG-based synaptic function measures
- Preliminary analyses show differences in EEG-based measures of synaptic function between patients with severe mental disorders and controls
- The group has established a novel EEG-based method in our lab that enables measurements of cortical excitability indices in severe mental disorders

Multimodal Imaging

Group Leader: Lars T. Westlye



About the group

In order to characterize the dynamic mechanisms of mental disorders across the lifespan, we utilize various brain imaging modalities and approaches, with a particular emphasis on combining measures of structural and functional connectivity with clinical and genetic information.

Structural and functional brain characteristics are highly heritable, and our research aims at increasing our understanding of how gene-environment interactions influence mood, cognition and risk of mental disorders during sensitive periods in life.

Main projects

- Brains and minds in transition (BRAINMINT): The dark side of neuroplasticity during sensitive life phases
- Genetic and phenotypic architecture of the ontogenetic determinants of severe mental illness
- IMPLEMENT: Improved personalized medicine through machine learning in mental disorder
- BRAINCHART: Normative brain charting for predicting and stratifying psychosis
- COMMITMENT: COMorbidity Modeling via Integrative Transfer machine-learning in MENTAL illness

Scientific Achievements 2019

- Brain age gap is increased in several common brain disorders, is sensitive to clinical and cognitive phenotypes, and is genetically influenced
- Higher heterogeneity for cortical thickness and area, cortical and ventricle volumes, and hippocampal subfields was found in patients with schizophrenia compared to healthy controls
- Cerebellar grey matter volume is associated with cognitive function and psychopathology in adolescence
- Parous women show less evidence of brain aging compared to their nulliparous peers
- Expression of oxytocin pathway genes (OXT, OXTR, and CD38) was found to be enriched in central, temporal, and olfactory regions of the human brain

Stem Cells and Mechanisms

Group Leader: Srdjan Djurovic



About the group

The group's current research aims are to perform molecular genetic analysis to increase the knowledge and expertise in psychiatric genetics and genomics and to identify the molecular networks underlying psychiatric disease as well as to continually develop an organization to support psychiatric genetic and stem cell studies with design and planning.

Our research group is also responsible for the management and operation of the biobank and stem cell facilities at NORMENT. This CRU includes sampling, treatment of samples (storage, tracking, retrieval) and shipment between different partners, as well as data processing / coordination in order to ensure quality of associated data for the collected biobank samples.

Main projects

- We have established the required competence and facilities for human induced pluripotent stem cell (hiPSC) technology unit in our Centre allowing investigation of neuronal cells from participants
- Validated iPSCs will be differentiated to neural progenitor cells (neural conversion) and regionalized neuronal subtypes, as well as astrocytes/ glial populations under standard in house methods
- We also want to develop psychopharmacological screening platform for psychiatric disorders using iPSC-derived neurons

Scientific Achievements 2019

- Identification of molecular networks underlying psychiatric disease
- Polygenic risk scores
- Genome-wide pleiotropy analysis and genetic overlap between neuropsychiatric traits
- Alterations of inflammatory markers in severe mental disorders
- Extensive analysis of human induced pluripotent stem cell (hiPSC) technologies in psychiatric molecular genetics

Molecular Risk Factors

Group Leader: Vidar M. Steen



About the group

Our group aims at identifying and understanding genetic and biological factors that are involved in illness mechanisms and therapeutic response during pharmacological treatment of schizophrenia and bipolar disorder. We use a combination of clinical data, biomarker screening and functional studies in patient samples and various experimental models.

Our main research interest is at present directed towards the role of metabolic factors and inflammation processes in development of psychosis and during antipsychotic treatment.

The group is also responsible for running the Genomics Core Facility at the University of Bergen, to provide guidance and service on large-scale genomic analyses, such as whole genome-, exome- and RNA sequencing.

Main projects

- The effect of drug-related weight gain and lipid disturbances on psychotic symptoms, cognitive function and brain myelin in patients with schizophrenia
- Transcriptional changes in peripheral blood during drug treatment in patients with psychotic disorders: A cross-sectional and longitudinal study
- The molecular mechanisms of antipsychotic-induced metabolic effects
- Low grade inflammation and innate immune responses in peripheral blood as trait or state markers of psychosis
- Genetic risk factors for disease susceptibility and treatment outcome in schizophrenia and bipolar disorder

Scientific Achievements 2019

- Completed the global analysis of cross-sectional transcriptional changes in peripheral blood cells in schizophrenia and bipolar disorder, pointing at alterations in innate immunity
- Completed and published metabolic effects that were observed in female rats during up to one year exposure to olanzapine long-acting injections
- Initiated RNA seq examination of peripheral blood from longitudinal samples of psychosis patients treated with amisulpride, aripiprazole or olanzapine in a randomized controlled trial
- Contributed to several NORMENT and international consortia studies

Epigenetics of Mental Disorders

Group Leader: Stéphanie Le Hellard



About the group

Major mental disorders such as psychotic disorders have a complex and multifactorial etiology. Both genetic and environmental risks have been described and their interaction is still uncertain. We study how the pathology, the genetic factors and the environmental factors can modify the genome by modifying regulatory elements of the genome (epigenetic modifications).

Our aims are to understand how environmental risk factors interact with the genetic risk at the epigenetic level, to identify epigenetic biomarkers for disease status, environmental exposure and treatment. The group consists of people with background in genetics, statistics, medicine and informatics who together bring their complementary expertise to try understand the interaction between genetic and environmental risk in mental disorders. We work in close collaboration with clinicians.

Main projects

- Molecular mechanisms of cannabis exposure in the blood of patients and in cellular models
- DNA methylation modifications in schizophrenia, bipolar disorders and ADHD
- DNA methylation modifications during treatment with antipsychotics, lithium and Ritalin
- DNA methylation modifications due to childhood trauma
- An epigenome wide association from imputation in large psychiatric disorder cohorts

Scientific Achievements 2019

- We have collected Epigenome wide data for a sample of 2,100 individuals for cases and controls
- We have identified DNA methylation modification due to cannabis use in patients
- We have identified variations in DNA methylation after cessation of cannabis exposure
- We have identified differences in gene expression due to trauma in the rat brain

Pharmacology and Intervention

Group Leader: Erik Johnsen



About the group

We study schizophrenia spectrum disorders at several levels in an integrated fashion, including clinical symptoms and signs, treatment effects and side effects, brain imaging measures, as well as molecular vulnerability and disease mechanisms. The research group has more than 15 years of experience in conducting researcher initiated drug trials independently of pharmaceutical industry. The group overlaps with the Bergen Psychosis Research Group at Haukeland University Hospital and the University of Bergen.

The group aims to identify differential effectiveness among antipsychotic drugs, identify predictors of effects and side effects of treatment at the individual level, and unravel disease mechanisms and potential new treatment targets.

Main projects

- The Norwegian Prednisolone in Early Psychosis Study (NorPEPS): A double blind, randomized placebo controlled add on effectiveness study on prednisolone in early psychosis
- The Neuroinflammation in Adolescents with Psychosis Project (NAPP): An observational cohort-study of young people with psychosis
- The Non-Pharmacological treatment of Psychosis study (NonPharm): An observational cohort study following individuals with psychosis seeking treatment without the use of antipsychotic drugs
- The European Long-acting Antipsychotics in Schizophrenia Trial (EULAST): A randomized effectiveness comparison of long-acting versus oral treatment with antipsychotic drugs
- The Placebo-controlled Trial in Subjects at Ultra-High Risk for Psychosis With Omega-3 Fatty Acids in Europe (PURPOSE): A randomized placebo-controlled study of omega-3 fatty acids in ultra-high risk for psychosis to prevent transition to psychosis

Scientific Achievements 2019

- Differential effectiveness can be found between first-line antipsychotic drugs
- Antipsychotic drugs have different and phase-specific impact on peripheral inflammatory markers
- Reduction of CRP levels are associated with delayed improvement of cognitive functions in schizophrenia
- Antipsychotic drugs differentially impact brain glutamate levels
- Substance abuse does not reduce antipsychotic effectiveness in schizophrenia

Affective Disorders

Group Leader: Ketil J. Ødegaard



About the group

We study bipolar disorders and other illnesses of depression using different methods and approaches. Our studies focus on psychopharmacology, neurostimulating treatment, sensor technology, registry research, cognitive function, genetics and brain imaging in bipolar disorders and other illnesses including depression.

The research group has a translational focus with the aim of contributing to increased etiological knowledge of pathophysiological processes in affective disorders, mainly through clinical intervention studies. The group also covers the Bergen Bipolar and Depression Research group at Haukeland University Hospital, and consists of collaborating researchers with joint projects on mood disorders.

Main projects

- The Pharmacogenomics of Bipolar Disorder study (PGBD): Identification of genes for lithium response in a prospective sample
- Monitoring of bipolar disorder using sensor technology (part of INTROMAT-study)
- Effects of ECT in treatment of depression: A prospective neuroradiological study of acute and longitudinal effects on brain structure and function
- Treatment-resistant bipolar depression: A randomized controlled trial of electroconvulsive therapy versus algorithm-based pharmacological treatment
- Blue-blocking glasses as additive treatment for mania: A randomized placebo-controlled trial

Scientific Achievements 2019

- Electric field causes volumetric changes in the human brain
- Brain changes induced by electroconvulsive therapy are broadly distributed
- Individual variability in reaction time predicts clinical response to methylphenidate in adult ADHD
- Chronotype and cellular circadian rhythms predict the clinical response to lithium maintenance treatment in patients with bipolar disorder

Predictive and Pharmacological Imaging

Group Leader: Kristiina Kompus



About the group

We work on various brain imaging modalities such as functional and structural MRI, diffusion-tensor imaging, magnetic resonance spectroscopy, linking brain imaging data to other variables such as cognition, psychiatric symptoms, inflammation markers and course of illness.

We aim to provide the optimal multimodal approach to identify imaging markers, which would reliably predict course of illness and response to psychiatric medication, enabling improved treatment options at the earliest possible timepoint.

Main projects

- Multimodal integration of DTI, fMRI, sMRI and MRS data in psychosis patients
- Excitatory/inhibitory neurotransmission: relation to hallucinations and medication
- Dynamic connectivity analysis of functional connectivity networks in psychosis patients
- Inflammation markers in blood and brain

Scientific Achievements 2019

- Emotional valence of auditory hallucinations (negative/neutral) in adolescents is related to distinct psychosocial profiles
- Auditory hallucinations in schizophrenia are related to regionally specific glutamate concentration alterations in sensory vs. frontal lobes

Collaboration Across Research Groups

NORMENT is a cross-disciplinary research centre, where sharing of competence and infrastructure is a key principle. We have set aside about half of the Centre of Excellence grant to fund our core infrastructure (Core Resource Units), to enable easy access to state-of-the-art methodology, infrastructure for recruitment and assessment of participants, and database and biobank services. Most if not all research activities at the Centre depend on this tight integration and efficient use of resources across different research groups.

A large degree of NORMENT's research is generated from multidisciplinary projects, and this is also the framework for new project developments and grant applications. Collaborative projects within the Centre are organized through the monthly Synergy Meetings and named Synergy Projects with project lists available on our intranet.

The projects are grouped under different research topics, such as Cannabis, eNORMENT (electronical data collection), Genetics, Imaging Genetics, Immunology, Methylation, mRNA, MRI, and Polygenic Risk Score.

There are specific added values of this cross-disciplinary approach that are related to the main research topics and aims of the Centre:

1. Genetics: Combine large amounts of genetic data with relevant environmental factors, and move this to experimental studies in human stem cells.
2. Brain Imaging: Use advanced imaging technology to study brain characteristics in large groups of participants who are also genotyped and extensively clinically characterized, a sample which is unique internationally.
3. Outcome Prediction: Determine the association between genes, environment, and their effect on different illness trajectories, with the potential of leading to new tools for prediction and early identification of illness.
4. Clinical Intervention: Translate genetic, immunological, imaging, and other pathophysiological findings into clinical and pharmacological interventions to improve treatment.

Being a Centre of Excellence provides great opportunities to broaden and strengthen our cooperation, align research goals, and profit from of our complementary expertise and valuable infrastructure, as well as performing more cost-efficient research through strong leadership and an integrated approach. Further, there is a large degree of sharing of postdoctoral fellows and support personnel across different groups, and several PhD students have been co-supervised by seniors and members of different research groups at the Centre.





Top Day 2019

14 June - Ullevål, Oslo.

- 09:00 **Ole A Andreassen** (chair): Overview of today's program + Update and plans
- 09:30 **Trine Vik Lagerberg:** Research activity and teams
- 10:00 **Jannicke Fjæra Anderssen:** Do sleep disturbances contribute to cognitive impairments in severe mental disorders?
- 10:20 Coffee break
- 10:35 **Ibrahim Akkouh:** The effects of inflammatory modulation on human iPSC-derived astrocytes generated from schizophrenia patients and healthy controls
- 10:55 **Linn Rødevand:** Overlap in genetic architecture between severe mental disorders, cardiovascular disease risk and loneliness
- 11:15 **Mathias Valstad:** Altered electrophysiological responses after prolonged visual stimulation
- 11:35 **Gabriela Hjell:** Disentangling the relationship between cholesterol, aggression and impulsivity in severe mental disorders
- 11:15 Lunch break
- 12:45 **Nils Eiel Steen** (Chair): Overview of afternoon session
- 12:50 **Maren C. Frogner Werner:** Polygenic risk score in treatment resistant schizophrenia
- 13:10 **Adriano Winterton:** Endophenotypes of the Oxytocin Signalling Pathway - A registered report in UK Biobank
- 13:30 **Camilla Bärthel Flaaten:** Encoding strategy use in first-episode psychosis
- 13:50 **Margrethe Collier Høegh:** Affective lability across psychosis spectrum disorders
- 14:10 Coffee break
- 14:30 **Luigi Angelo Maglanoc:** PhD Summary - Elucidating depression heterogeneity using advanced neuroimaging, symptoms and genetics
- 14:50 **Runar Smelror:** PhD Summary - Cognitive and clinical characteristics in adolescent non-affective early-onset psychosis and healthy controls



Researcher Training

NORMENT offers a range of training and development opportunities for our PhD students, postgraduate researchers, and other research staff. About 60 PhD students and 40 postdoctoral fellows worked at or were affiliated with the Centre in 2019. During the year, there have been various gatherings and meetings with the aim of providing the best possible researcher training. Scientific sharing and synergy across domains were important topics at these events, and are underlying principles for all research activities at the Centre.

PhD Education and Training of Researchers

The PhD students at NORMENT are enrolled at the mandatory PhD education programme at the University of Oslo and University of Bergen. In addition, several PhD students are members of the Norwegian Research School in Neuroscience (NRSN) which organizes courses, training, and a conference for PhD candidates in neuroscience nationwide. NORMENT is also involved in the National Research School in Bioinformatics, Biostatistics and Systems Biology (NORBIS), where PhD students and postdocs may attend courses in genetic analyses and statistics.

During 2019, NORMENT organized regular research meetings where PhD students and postdocs across research groups and scientific disciplines presented their projects, results and future plans. There were also regular workshops in academic writing and clinical supervision, as well as group meetings organized by the different research groups at the Centre where PhD students and postdocs presented their research.

The yearly **TOP Day** is also an important arena for PhD students to get training in dissemination of their research. The term "TOP" comes from the name of the main study at the Centre, the "Thematically Organized Psychosis" Study. In 2019, the TOP Day took place in Oslo on June 14. After a general introduction and updates by Centre leader Ole A. Andreassen and section manager Trine Vik Lagerberg, 11 PhD students from various groups and scientific backgrounds presented their research projects, to share ideas and give each other feedback on topics ranging from genes to clinical symptoms.

Career Development

Another important aspect of the researcher training is a continuous focus on career development of early-career investigators. In 2019, the established Career Development

Task Force initiated a number of activities, including onboarding of new employees at the Centre. A checklist for hiring and starting up new employees was developed, and an interview within 6 weeks of starting a new position was recommended. Each new employee, regardless of position in the organization, is being assigned a buddy to help them settle into their new position and have easy access to guidance on administrative issues. An information dissemination group was also formed whose aim is to centralize information.

We still emphasize guiding of early stage researchers internally at the Centre by involving them in grant writing and encouraging them to participate in the postdoctoral and mentor programme at the Universities of Oslo and Bergen, which includes courses in career planning, research management, and external funding. Likewise, several grant-writing talks have been performed by the external funding unit at the Centre. Our early-stage scientists may also participate in international research education and training at the University of California San Diego (UCSD) in the USA, funded in part by the Research Council of Norway (INTPART grant). During 2020, the task force is planning internal workshops on grant writing and writing your own Personal Career Development Plan. For outgoing, we are planning a reunion/alumni evening to gather all previous employees for an informal meeting one evening.



Manuscript workshop at NORMENT Oslo.



Early-Career Researchers Meeting

The Early Career Researchers Meeting was established in 2015 as a yearly one-day meeting for PhD students, postdocs and other researchers who are at an early stage in their career. The meeting is fully planned by the early-career researchers themselves and is an arena to discuss topics that they consider important to their scientific development and career.

The 2019 meeting took place on November 15 at The Norwegian Academy of Science and Letters in Oslo, where about 45 people attended. The topic was “Getting the word out – communication beyond dissemination”, with the purpose of discussing how to disseminate and communicate science to a wide range of audiences.

Invited speaker Saara-Maria Kauppi from the Norwegian University of Science and Technology (NTNU) provided us with tips on how to visualize research findings, and Nina Antonov, CEO of the Norwegian Bipolar Association, gave us concrete examples and suggestions on how to communicate better with user groups. Presenters from the different research groups at NORMENT covered communication directed at the general public and clinical units, as well as the use of social media in research dissemination. The talks were followed by group discussions and finally a dinner in the beautiful surroundings at the Norwegian Academy of Science and Letters.



Synergy Meetings

The Synergy Meetings are monthly meetings alternating between Oslo and Bergen, where researchers at all levels can present ideas and preliminary data to facilitate interactions and discussions. These meetings reflect our overall focus on “vertical synergy”, in which the aim is to obtain different levels of understanding by bringing together transdisciplinary expertise and methods. An important part of the meetings is to initiate new collaborative projects and discuss ongoing projects across the Centre. Each meeting ends with a to-do list, and the Synergy Projects lists on our intranet are updated.

The meetings are live streamed and recorded, to both increase the participation and reduce airplane travel.

During 2019, there were six Synergy Meetings in total, each with 20-40 participants from different groups at the Centre. The meetings covered broad topics such as Big data, Cardiovascular disease comorbidity, Registry research, Epigenetics and environment, Polygenic risk scores, and The immune system.



Annual Retreat

The Annual Retreat is the main event for everyone at NORMENT, and is organized as a two-day conference. In 2019, the meeting took place on September 18-19 at Thon Hotel Storo in Oslo. More than 130 people from Oslo and Bergen participated, in addition to members of our Scientific Advisory Committee, the User Council, and external people invited to give talks on specific topics of relevance for the work at NORMENT.

The main part of the programme consisted of plenary lectures by postdocs and senior researchers based on overall research topics at the Centre. These included the translation from big data to clinics, novel therapeutic approaches, and translation of environmental effects.

Kjetil Nordbø-Jørgensen received the prize for best scientific speaker for his presentation “Antipsychotic medication, effects on the brain, and clinical outcomes: The long-term perspective”. The prize is awarded to highlight the importance of dissemination at the Centre and the need for presenting our research in an understandable way across scientific disciplines and groups. The jury consisted of people in the administration and the User Council.



Peter Falkai giving his keynote lecture.

Peter Falkai, member of the Scientific Advisory Committee, gave a keynote lecture on trends in translational psychiatric research, while **Carl Sellgren** from Stockholm and **Kristen Brennand** from New York presented interesting new methods and findings from research on synapses and stem cells.

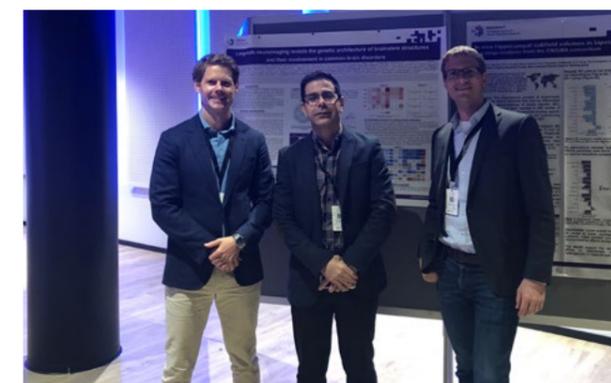
At this year's retreat, there was also a session on funding and infrastructure for the future. **Anne Elisabeth Sjølsnes** from the Research Council of Norway gave a talk on Open Science from a funder's perspective. **Thomas Bjella**, head of the NORMENT database, informed about how to balance GDPR and Open Science when using the TSD (services for secure data storage) in data collection and analyses.

The topic of this year's group activity was multidisciplinary collaborations, and synergy and translation within the Centre. Some groups were asked to identify and discuss challenges related to multidisciplinary collaboration, while other groups discussed gaps or barriers that hinder translation.

Results of the group work and suggestions for improvement were presented at the retreat. The groups also handed in a report after the meeting, to be followed up in the year to come.

During the poster session at the end of the first day, master students and PhD students, as well as postdocs, got the opportunity to present new findings and discuss projects and ideas in a more informal setting. All posters were evaluated by our Scientific Advisory Committee, and three prizes were awarded: One main prize for best poster and two runners-up.

The main poster prize was awarded to **Torbjørn Elvsåshagen** and **Shahram Bahrami** for their study entitled “Large-scale neuroimaging reveals the genetic architecture of brainstem structures and their involvement in common brain disorders”. With this prize also comes a grant of NOK 10.000 from the Dr. Einar Martens Foundation to be used on research.



Poster prize winners Torbjørn Elvsåshagen and Shahram Bahrami, with runner up Tobias Kaufmann on the right.

The two runners-up prizes were awarded to PhD student **Mathias Valstad** for his poster “Evidence for reduced LTP-like visual cortical plasticity in schizophrenia and bipolar disorder”, and to researcher **Tobias Kaufmann** for his poster “Predicting deviations from the norm in the developing human brain using cortico-genetic fingerprinting”.

For other posters, see [page 50](#)



Poster session at the Annual Retreat.



These people also presented posters at the retreat:

Aili Løchen: Early visual processing in severe mental illness: A psychophysical investigation of spatial frequency discrimination in individuals with schizophrenia and bipolar disorder

Alexey Shadrin: Partitioned analysis of genetic architecture in exonic and non-exonic regions of the genome reveals differences in polygenicity and effect size distribution across phenotype groups

Anja Torsvik: Global gene expression in whole blood reveals a shared innate immunity signature in schizophrenia and bipolar disorder

Anja Vaskinn: Schizophrenia, polygenic risk scores and theory of mind

Ann-Marie de Lange: Population-based neuroimaging reveals traces of childbirth in the maternal brain

Beathe Haatveit: Altered relationship between brain structure and cognitive functioning in patients with prominent negative symptomatology

Clara Timpe: EEG-based Measurements of Neuronal Excitability in Schizophrenia and Bipolar Disorder

Claudia Barth: Exploring the impact of iatrogenic factors on global brain changes in chronic schizophrenia – a 13-years follow-up

Daniel Roelfs: Genetic overlap between schizophrenia and brain connectivity

Dennis van der Meer: Making the MOSTest of imaging genetics

Ida Elken Sørderby: ENIGMA-CNV working group: 15q11.2 structural variants influence cortical morphology

Jonelle Villar: Identification of Epigenetic Modifications Following Antipsychotic Treatment

Justyna Beresiewicz: Multimodal analysis of MR-imaged cortical connectivity networks in schizophrenia patients and its modulation by Glx/GABA concentration in ISTG

Laura Wortinger: Is weak laterality a consequence of severe birth and pregnancy complications?

Margrethe Høegh: Affective lability across psychosis spectrum disorders

Martina Jonette Lund: Changes in directed functional connectivity related to age and sex

Monica Aas: Childhood maltreatment and polygenic risk in bipolar disorders

Oleksandr Frei: Cross-trait genetic analysis of the five major psychiatric disorders with bivariate causal mixture model

Shahram Bahrami: Identification of genetic overlap between major depression and cognition

Stener Nerland: Test-retest validation of the optimised T1/T2-ratio

Torgeir Moberget: Genetic influences on cerebellar morphology

Unn Kristin Haukvik: In vivo hippocampal subfield volumes in bipolar disorder? – a mega-analysis from the ENIGMA consortium

Annual Retreat 2019 Wednesday, 18 September		NORMENT Thursday, 19 September	
12:00 - 13:00	Lunch	08:30 - 08:40	Introduction: Srdjan Djurovic
13:00 - 13:30	Ole A. Andreassen: Welcome address and status of NORMENT.	08:40 - 09:10	Keynote lecture - Carl Sellgren: Synapse elimination by microglia in schizophrenia
13:30 - 14:10	Keynote lecture - Peter Falkai: Trends in translational psychiatric research - a European perspective	09:20 - 09:50	Keynote lecture - Kristen Brennand: Using stem cells to explore the genetics underlying neuropsychiatric disease
14:15 - 14:30	Break	10:00 - 11:15	Checkout and Photo session
14:30 - 15:30	From big data to clinics Moderator: Ida E. Sørderby	11:15 - 12:15	Novel therapeutic approaches and strategies Moderator: Mari Nerhus
14:30 - 14:45	Thomas Wolfers: Individual differences vs. the average patient: mapping the heterogeneity of mental disorders using normative models	11:15 - 11:30	Kjetil Nordbø Jørgensen: Antipsychotic medication, effects on the brain and clinical outcomes: The long-term perspective
14:50 - 15:05	Osman Gani: Can we use polygenic models to predict antipsychotic drug response?	11:35 - 11:50	Anja Vaskinn: Targeted training of affect recognition: results from a RCT
15:10 - 15:25	Dennis van der Meer: Making the MOSTest of imaging genetics	11:55 - 12:10	John Engh: Effects of high-intensity interval training on cardiorespiratory and other measures of fitness in schizophrenia - results from a RCT
15:30 - 15:45	Break	12:15 - 13:30	Lunch
15:45 - 16:00	Introduction to group activities	13:30 - 14:30	Funding and infrastructure for the future Moderator: Christine Lycke Brandt
16:00 - 17:00	Group activities	13:30 - 14:00	Anne Elisabeth Sølvsnes, Research Council of Norway: Open Science from a funder's perspective
17:00 - 17:30	Break	14:15 - 14:30	Thomas Bjella: How TSD can help your project from data collection to analyses balancing GDPR and Open Science
17:30 - 18:00	Short presentations of selected posters: Alexey Shadrin, Camilla B. Flaaten, Jonelle Villar, Justyna Beresiewicz and Vilde Brecke presented their posters on stage with short 5 minute talks	14:30 - 15:15	Group activities
18:00 - 19:00	Poster session and aperitif	15:15 - 15:30	Break
19:30	Dinner Announcement of "Doktor Einar Martens Legat Poster Prize 2019" of NOK 10.000	15:30 - 16:30	Translation of environmental effects: what have we learned from cannabis research Moderator: Anne-Kristin Stavrum
		15:30 - 15:45	Trine Vik Lagerberg: The relationship between premorbid cannabis use, cognitive functioning and polygenic risk in bipolar disorder
		15:50 - 16:05	Attila Szabo: Cannabis use is associated with increased levels of serum gp130 in schizophrenia but not in bipolar disorder
		16:10 - 16:25	Anne-Kristin Stavrum: Effects of cannabis exposure on methylation and gene expression in the blood of patients
		16:30 - 16:45	Ole A. Andreassen: Conclusive remarks and announcement of "Prize for best presentation"

PhD Dissertations in 2019

Nine PhD students at NORMENT defended their doctoral thesis during 2019:

(Previous dissertations can be found in the [2018 Annual Report](#))



Nathalia Zak:
A longitudinal investigation of cortical plasticity and structure in bipolar disorder type II, supervisor: Torbjørn Elvsåshagen, May 13, 2019



Trude Jahr Vedal:
The side effect burden of antipsychotic drugs - A naturalistic study with focus on metabolic disturbance, supervisor: Erik G. Jönsson, May 31, 2019



Saurabh Srinivasan:
A Polygenic Enrichment Approach to Human Evolution in Schizophrenia and Cognitive Function, supervisor: Ole A. Andreassen, June 13, 2019



Gerard Dwyer:
New approaches to the use of magnetic resonance spectroscopy for investigating the pathophysiology of auditory-verbal hallucinations, supervisor: Renate Grüner, October 9, 2019



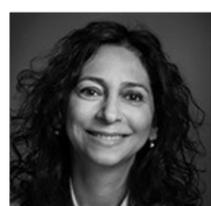
Runar Elle Smelror:
Cognitive and clinical characteristics in adolescent non-affective early-onset psychosis and healthy controls, supervisor: Ingrid Agartz, November 8, 2019



Geneviève Richard:
Identifying markers of brain health and plasticity: A neuroimaging and behavioral study of cognitive aging and cognitive training following stroke, supervisor: Lars T. Westlye, November 11, 2019



Linn Norbom:
The illumination of the developing brain, Using MRI signal intensity contrasts to probe microstructural brain maturation, and associations with psychopathology and cognition, supervisor: Christian K. Tamnes, November 28, 2019

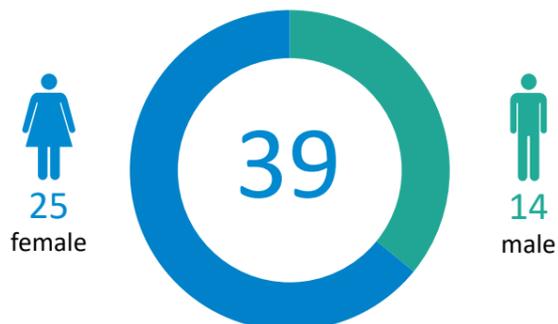


Farivar Fathian:
C-reactive protein in schizophrenia-spectrum disorders; relationship to cognitive functions and medications, supervisor: Erik Johnsen, December 5, 2019



Luigi Maglanoc:
Elucidating depression heterogeneity using clinical, neuroimaging and genetic data, supervisor: Lars T. Westlye, December 6, 2019

39 people have so far completed their PhDs at the Centre



International Collaboration

The research at NORMENT requires close cooperation with leading research environments, both nationally and internationally. Researchers at the Centre collaborate with a large number of researchers abroad (see page 58), participate in a series of international networks and consortia (see page 59), and have several bilateral research programmes with international institutions, mainly in Europe and the USA. During the years, our international collaborations have resulted in a number of important scientific findings. NORMENT also actively recruits excellent researchers from other countries through international advertisements and networking, and as a result of this the Centre staff consisted of people from 29 nationalities in 2019.

We participate actively in several working groups of the Enhancing Neuro Imaging Genetics Through Meta Analysis (ENIGMA) consortium. Ole A. Andreassen chairs the Bipolar Disorder Working Group and the CNV Working Group (Ida Sørnderby is co-chair), while Ingrid Agartz chairs the Early Onset Psychosis Working Group (Tiril Gurholt is co-chair).

As part of this consortium in 2019, Dennis van der Meer and Ida Sørnderby had a leading role in the largest Copy Number Variation (CNV) neuroimaging study to date, which showed that a specific genetic variant (15q11.2 BP1-BP2) was associated with brain morphology and cognition (JAMA Psychiatry).

We also contributed to a large ENIGMA study showing widespread white matter microstructural abnormalities in bipolar disorder (Favre et al., Neuropsychopharmacology).

Through the Psychiatric Genomics Consortium (PGC) we identified 30 genetic variants associated with bipolar disorder (Stahl et al., Nature Genetics), and reported that bipolar multiplex families have an increased burden of common risk variants for psychiatric disorders (Andlauer et al., Molecular Psychiatry).

We were also involved in PGC studies of genetic mechanisms underlying mood disorders (Coleman et al., Biological Psychiatry), and reported new genetic relationships and variants across eight psychiatric disorders (Cross-Disorder Group of the Psychiatric Genomics Consortium, Cell).

Guest Researchers

Two international guest researchers had part-time positions at NORMENT in 2019, and collaborated closely with researchers at the Centre. Professors Anders M. Dale and Wesley Thompson from the University of California San Diego, USA, contributed with knowledge and analyses, participated in project discussions, and were involved in planning of future studies with our researchers.

Anders M. Dale visited the Centre twice in 2019 to give seminars on methods development and application of new statistical tools developed in collaboration with NORMENT researchers ("MiXeR" and "MOSTest").

Several researchers from NORMENT also visited San Diego during the year for training and collaborative discussions.

Visits abroad

As part of our international collaboration, we emphasize the mobility of PhD students, postdoctoral fellows and senior scientists. In 2019, postdoc Francesca Puppo spent the whole year in San Diego, USA, to be part of the lab of Anna Devor at the University of California, working on optimization of (opto)imaging methods in stem cell derived neuronal cultures.

Postdoc Ann-Marie de Lange was a Visiting Research Associate at the Oxford Centre for Functional MRI of the Brain (FMRIB), University of Oxford, from January to June, as part of a collaboration with Assistant Professor Gwenaëlle Douaud.

Several people also had shorter stays abroad, to discuss collaborative projects and participate in project meetings. Some examples are shown here:

Beathe Haatveit and Ingrid Melle visited the Charité University Hospital Berlin, Germany, to participate in a EuroNES meeting about negative symptoms and to work on a MOTIVATE grant application.

Ida Elken Sørnderby visited the lab at Sebastien Jacquemont, CHU Sainte Justine Hospital, in Canada.

Isabella Kusztrits visited the Center for Mental Health at Swinburne University of Technology, Melbourne, Australia, as part of her PhD project.

Kjetil Nordbø Jørgensen visited Dr. Anthony C. Vernon at King's College, London, to discuss brain structure in psychotic disorders and effects of antipsychotic medication.

Margrethe C. Høegh, Thomas Bjella and Trine Vik Lagerberg, visited Mario Alvarez-Jimenez and Sue Cotton at the National Centre of Excellence in Youth Mental Health, University of Melbourne, Australia, to exchange knowledge of early onset mental disorders and digital interventions (eNORMENT/eOrygen).

Monica Aas visited Kings College London, England, to collaborate on projects related to her "Stress under Skin" project.

Oleksandr Frei, Shahram Bahrami, Jarek Rokicki, Ivan Maximov, Kevin O'Connell, Alexey Shadrin, and Ole A. Andreassen visited the Moscow Institute of Physics and Technology (MIPT), Russia, to give presentations about big data at a joint seminar and establish a new collaboration.

Torill Ueland, Anja Vaskinn, and Ann Færden visited St Petersburg Mental Health Institution in Moscow, Russia, in connection with a Russian-Norwegian collaboration in mental health and cognition.

Visits from abroad

Another part of our international involvement is to host students from European countries for internships and training. In 2019, **Adrià Marly Pèlach** from the University of Barcelona, Spain, visited the Centre as part of the Erasmus programme, and was a part of the Translational Electrophysiology Group for six months. **Ólavur Mortensen** from the Faroe Genome Project, The Faroe Islands, was a guest PhD student in the Precision Psychiatry Group from September to December 2019.

We also have regular visits from international researchers coming for project meetings, collaborative discussions and to give guest lectures. Some of these visits are mentioned below:

Professor Dost Öngür from Harvard Medical School and Editor of JAMA Psychiatry, visited NORMENT in September to give a lecture entitled "What we are looking for in a paper and future plans for scientific publishing".



Guest lecture by professor Dost Öngür.

Associate Professor Andre Marquand from the Donders Institute, Kings College London, UK, visited the Centre in January to give a lecture about using machine learning and big data neuroscience to move toward precision medicine in psychiatry.



Guest lecture by associate professor Andre Marquand.

Professor André Aleman from the University of Groningen, Netherlands, visited Oslo in October to give a workshop on transcranial magnetic stimulation (TMS) in psychotic disorders.

Dr. Sofie Valk from the Max Planck Institute for Human Cognitive and Brain Sciences, Germany, was invited speaker in relation to Linn Norbom's thesis defense in November. She gave a lecture on heritability and plasticity of macroscale brain structure.



Guest lecture by Dr. Sofie Valk.

Professor Iris Sommer from the University Medical Center Groningen, Netherlands, visited research groups in Bergen for collaborative meetings.

Dr. Gerry Dawson from P1Vital and University of Oxford, UK, visited NORMENT in September to give a seminar on eHealth.

International Partnerships

NORMENT is currently involved in three INTPART projects funded by the Research Council of Norway. INTPART is a research programme for International Partnerships for Excellent Education, Research and Innovation, and promotes the development of long-term relations between Norwegian higher education and research institutions and strong research groups and institutions in priority partner countries. As part of this programme, we have collaborations with researchers in USA (San Diego), South Africa (Cape Town) and France (Paris).

INTPART USA: Simulating the multi-scale pathophysiology of mental illness

NORMENT has collaborated closely with researchers at the University of California, San Diego for several years. The current INTPART project started in 2019 and is an extension of this collaborative effort, now focusing on multidisciplinary neuroscience.

The primary objective is to enhance the existing interdisciplinary synergy between sites, improve tools and approaches for understanding mental disease, and educate translational researchers to address questions that require integration of big data (genomics) with clinical measurements of function. This project is headed by the Simula Research Laboratory in Oslo, and also includes the Centre for Integrative Neuroplasticity (CINPLA) at the University of Oslo.

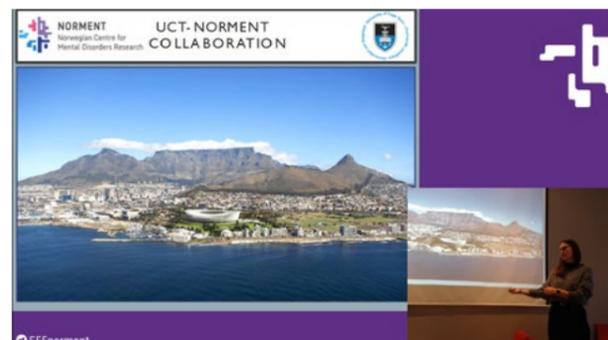
During 2019, Dennis Van der Meer, Kevin O'Connell, Olav B. Smeland, Oleksandr Frei, and Ole A. Andreassen visited San Diego for project discussions and planning.

INTPART South Africa: Integrating global mental health with brain imaging and genetics in mental illness research and education

The collaboration between NORMENT and Cape Town started in 2018. The main purpose of the project is to combine and integrate mental health research across sites and to educate researchers in modern imaging, genetic tools and transcultural clinical expertise. Principal Investigators are professor Ole A. Andreassen at NORMENT and professor Dan Stein, head of the Brain Behaviour Unit at the University of Cape Town.



Mary Mufford and Megan Campbell during a visit to Oslo.



Collaboration Seminar livestreamed for watchers in both Cape Town and Oslo, Oslo, September 2019.

During 2019, three researchers from Cape Town visited NORMENT. PhD student Mary Mufford and researcher Jonathan Ipser were in Oslo in March for training sessions in statistics and imaging, and discussions of collaborative projects on imaging genetics. Mary Mufford also visited NORMENT in September, together with master student Megan Campbell, to participate in the Annual Retreat, and to join group meetings and training sessions in Oslo.

INTPART France: Improving clinical services in bipolar disorder through education and research on illness mechanisms



Bruno Etain, Trine Vik Lagerberg and Ingrid Melle



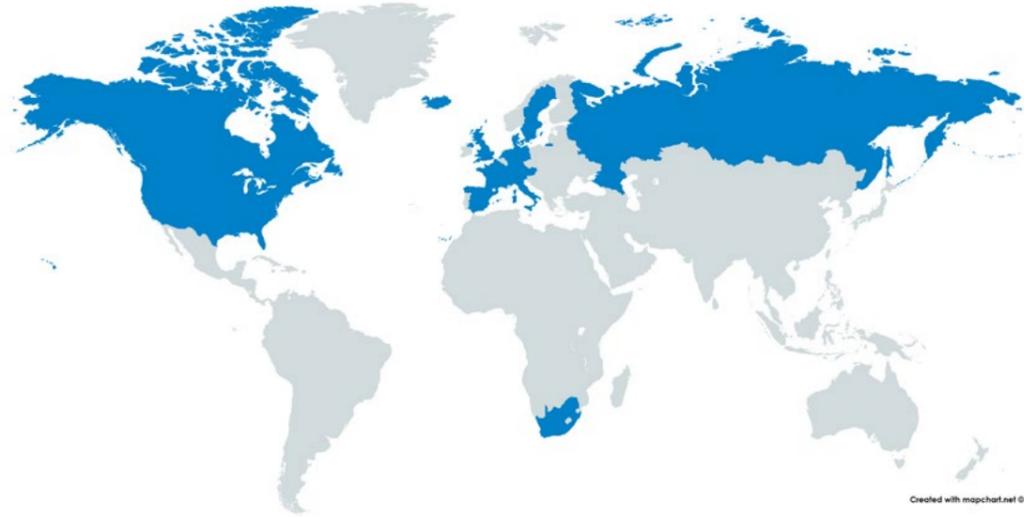
Trine Vik Lagerberg giving a talk during the first collaboration meeting in Paris, November 2019

The collaboration between NORMENT and Paris started in 2019. The project focuses on bipolar disorder, and the main aims are to provide better integration of research and clinical services, investigate early illness phases while providing front-line treatment, use new digital tools in data collection and clinical intervention, and to investigate underlying illness mechanisms including circadian rhythms and lithium response.

Principal Investigators are section manager Trine Vik Lagerberg at NORMENT and professor Bruno Etain from INSERM and the University of Paris.

During 2019, Bruno Etain visited Oslo in February to give a seminar, and Manon Meyrel and Diane Grillaut Laroche participated in the Annual Retreat in September.

Margrethe C. Høegh, Sofie Aminoff, Stine Olsen, Thomas Bjella and Trine Vik Lagerberg from NORMENT visited Paris in November for the first collaboration meeting and work on development of the Bipolar Unit at Nydalen district psychiatric centre (DPS) in Oslo.



International Collaborators

Nordic Countries

Denmark

- Christian Gerlach, Professor, University of Southern Denmark, Odense
- Randi Starrfelt, Professor, University of Copenhagen
- Thomas Werge, Professor, iPSYCH and Mental Health Centre Sct. Hans, Copenhagen

Iceland

- Hreinn Stefansson, Head of CNS Department, deCODE genetics, Reykjavik
- Kari Stefansson, CEO deCODE Genetics, Reykjavik
- Kristinn Johnsen, Director, Mentis Cura, Reykjavik

Sweden

- Anna Falk, Assoc. Professor, Karolinska Institutet, Stockholm
- Göran Engberg, Professor, Karolinska Institutet, Stockholm
- Håkan Ahlström, Professor, Akademiska Hospital, Uppsala
- Lars Farde, Professor, Karolinska Institutet, Stockholm
- Lars Nyberg, Professor, University of Umeå
- Mikael Landén, Professor, University of Gothenburg
- Patrick F. Sullivan, Professor, Karolinska Institutet, Stockholm
- Simon Cervenka, Assoc. Professor, Karolinska Institutet, Stockholm
- Sophie Erhardt, Professor, Karolinska Institutet, Stockholm
- Susanna Radovic, Assoc. Professor, University of Gothenburg

Europe

Austria

- Maria Rettenbacher, Assoc. Professor, Medizinische Universität Innsbruck, Innsbruck
- W. Wolfgang Fleischhacker, Professor, Medizinische Universität Innsbruck

France

- Bruno Etain, Senior Scientist, Hôpital Henri Mondor-Chenevier, Creteil
- Chantal Henry, Professor, Hôpital Henri Mondor-Chenevier, Creteil
- Frank Bellivier, Professor, Université Denis Diderot, Paris

Germany

- Andreas Meyer-Lindenberg, Professor, University Medical Centre Mannheim
- Douglas Garrett, Senior Researcher, Max Planck Institute for Human Development, Berlin
- Emanuel Schwarz, Research Associate, Central Institute of Mental Health, Mannheim
- Falk Kiefer, Professor, Central Institute of Mental Health, Mannheim
- Marcella Rietschel, Professor, Central Institute of Mental Health, Mannheim
- Markus Nöthen, Professor, University of Bonn
- Michael Peitz, Professor, University of Bonn
- Tania Lincoln, Professor, Hamburg University
- Thomas G. Schülz, Institute of Psychiatric Phenomics and Genomics, LMU Munich
- Vadim V. Nikulin, Principal Investigator, Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig

Italy

- Alessandro Bertolino, Professor, University of Bari
- Armida Mucci, Assoc. Professor, University of Naples
- Francesco Benedetti, Director, San Raffaele Scientific Institute, Milan
- Patrizia Capolongo, Professor, University of Roma
- Silvana Galderisi, Professor, University of Naples

Netherlands

- Andre Aleman, Professor, Groningen UMC
- Andre Marquand, Donders Institute
- Danielle Posthuma, Professor, Vrije Universiteit, Amsterdam
- Dirk J. A. Smit, Amsterdam UMC
- Dirk Schubert, Professor, Utrecht University Medical Center
- Gerben Meynen, Professor, Utrecht University
- Iris Sommer, Professor, Utrecht University Medical Center
- Marie-Josè van Tol, Senior Scientist, University of Groningen
- Vivi Heine, Professor, Vrije Universiteit, Amsterdam

Spain

- Mazahir Hasan, Research Professor, Achucarro Basque Center for Neuroscience, Bilbao
- Miguel Lopez, Senior Research Scientist, University of Santiago de Compostela

Switzerland

- Ahmad Abu-Akel, Professor, University of Lausanne
- Narly Golestani, Professor, University of Geneva
- Stefan Kaiser, Professor, University of Geneva
- Stefan Borgwardt, Professor, University of Basel
- Sven Cichon, Professor, University of Basel

United Kingdom

- Adrian J. Harwood, Professor, Cardiff University
- Ian Apperly, Professor, University of Birmingham
- Angela Vincent, Professor Emeritus, University of Oxford
- Clara Strauss, Honorary Senior Lecturer, Sussex University, Brighton
- Gwenaëlle Douaud, Assoc. Professor, University of Oxford
- James Walters, Professor, Cardiff University
- Michael O'Donovan, Professor, Cardiff University
- Stephen Smith, Professor, Oxford University

USA

- Anders M. Dale, Professor, UCSD, San Diego
- Anna Devor, Assoc. Professor, UCSD, San Diego
- Elizabeth Bromley, Assoc. Professor, Semel Institute for Neuroscience and Human Behavior, UCLA, Los Angeles
- Hauke Bartsch, UCSD, San Diego
- John Kelsoe, Professor, UCSD, San Diego
- Jordan Smoller, Professor, Harvard Medical School, Boston
- Joseph Ventura, Professor, UCLA, Los Angeles
- Judith M. Ford, Professor, Laboratory of Clinical and Cognitive Neuroscience, UCSF, San Francisco
- Kathleen Merikangas, Professor, NIMH, Bethesda
- Kent Kiehl, Professor, University of New Mexico
- Kerry Ressler, Professor, McLean Hospital, Harvard Medical School, Boston
- Melvin McInnis, Professor, University of Michigan
- Michael McCarthy, Assoc. Professor, UCSD, San Diego
- Morris Bell, Professor, Yale School of Medicine, New Haven
- Ofer Pasternak, Assoc. Professor, Harvard Medical School, Boston
- Patrick Sullivan, Professor, University of North Carolina of Chapel Hill
- Paul Thompson, Professor, USC, Los Angeles
- Rene Kahn, Professor, Icahn School of Medicine at Mount Sinai, New York
- Robert H. Yolken, Professor, Johns Hopkins School of Medicine, New York
- Steven Dilsaver, El Centro
- Susan McGurk, Professor, Boston University
- Tetyana Zayats, BROAD, Boston
- Wesley Thompson, Assoc. Professor, UCSD, San Diego
- William Horan, Senior Scientist, UCLA, Los Angeles

Other Countries

Canada

- Sheilagh Hodgkins, professor, University of Montreal, Canada
- Stephen Hart, Professor, Simon Fraser University, Burnaby

Russia

- Maya Kulygina, Senior Researcher, V. Serbsky National Research Centre of Psychiatry and Narcology, Moscow
- Oleg Papsuev, MD, PhD, V. Serbsky National Research Centre of Psychiatry and Narcology, Moscow

South Africa

- Dan Stein, Professor, University of Cape Town

International Projects and Consortia

- [Bergen Global Mental Health Research Group](#)
- BRAINCHART: Normative brain charting for predicting and stratifying psychosis
- [Brainstorm Consortium](#)
- [CHARGE - Cohorts for Heart and Aging Research in Genomic Epidemiology](#)
- [COGENT - Cognitive Genomics Consortium](#)
- [COMMITMENT - COMorbidity Modeling via Integrative Transfer machine-learning in MENTal illness](#)
- [COST Action CA17130 – Enhancing Psychiatric Genetic Counselling, Testing, and Training in Europe \(EnGage\)](#)
- [COST-MINDDS- Maximising Impact of Research in NeuroDevelopmental DisorderS](#)
- [ECNP Bipolar Disorder - European College of Neuropsychopharmacology Bipolar Disorders Network](#)
Ole A. Andreassen chairs the Bipolar Disorder Network
- [ECNP Schizophrenia - European College of Neuropsychopharmacology Schizophrenia Network](#)
- [ENIGMA - Enhancing Neuro Imaging Genetics Through Meta Analysis](#)
Ole A. Andreassen chairs the Bipolar Disorder Working Group and the CNV Working Group (Ida Søndery is co-chair), Ingrid Agartz chairs the Early Onset Psychosis Working Group (Tiril Gurholt is co-chair)
- EURICND - European IPSC Consortium for Neuropsychiatric Disorders: Srdjan Djurovic chairs the consortium
- [EuroNES - European Negative Symptoms Research Network](#)
- [GEMRIC – The Global ECT-MRI Research Collaboration](#)
Leif Olteidal coordinates the collaboration
- [GenECTic - Genomics of ECT-international consortium](#)
- [HUBIN - Human Brain Informatics Study](#)
- [HVN - Hearing Voices Network](#)
- [ICHR - International Consortium on Hallucination Research](#)
- [IMAGEMEND - Imaging Genetics for Mental Disorders](#)
- [KaSP - Karolinska Schizophrenia Project](#)
- [MINDDS - Maximising Research Impact in Neurodevelopmental Disorders](#)
- [PGBD – Pharmacogenomics of Bipolar Disorder](#)
- [PGC - Psychiatric Genomics Consortium](#)
Ole A. Andreassen chairs the Bipolar Disorder Working Group
- [PsychDPC - Psychiatric Diagnostic and Prevention Consortium](#)
- [R-LiNK - Optimizing Response to Lithium Treatment through Personalized Evaluation of Individuals with Bipolar I Disorder](#)
- [STRATA-G – Schizophrenia: Treatment Resistance and Therapeutic Advances - Genetics](#)
- [TRYGGVE 2 – Nordic collaboration for sensitive data](#)



Dissemination and Communication

Dissemination is an important part of research. At NORMENT, we have a continuous focus on communicating our findings, not only to other researchers through publications in scientific journals and presentations at scientific conferences and meetings, but also to patient organizations, health personnel, and the general public. A selection of our dissemination activities in 2019 are listed on the following pages.

We use our [website](#) to share news and events, and researchers at the Centre contribute with texts about their research ("Researcher of the month") to reach out to a broader audience.

Twitter is used to share news about publications, meetings, thesis defences, and other information related to science and mental disorders. Since the creation of our [Twitter](#) account in 2016, we have posted about 640 tweets (86 in 2019). At the end of the year, NORMENT had about 600 followers on Twitter.

In March 2019, we also launched our [Facebook](#) page, mainly targeted towards users, health personnel and the general public. During the year, we had 47 Facebook posts, to share news and events from the Centre. More than 500 people are now following us on Facebook.

154 Publications in scientific journals

112 International scientific presentations (73 oral presentations, 39 posters)

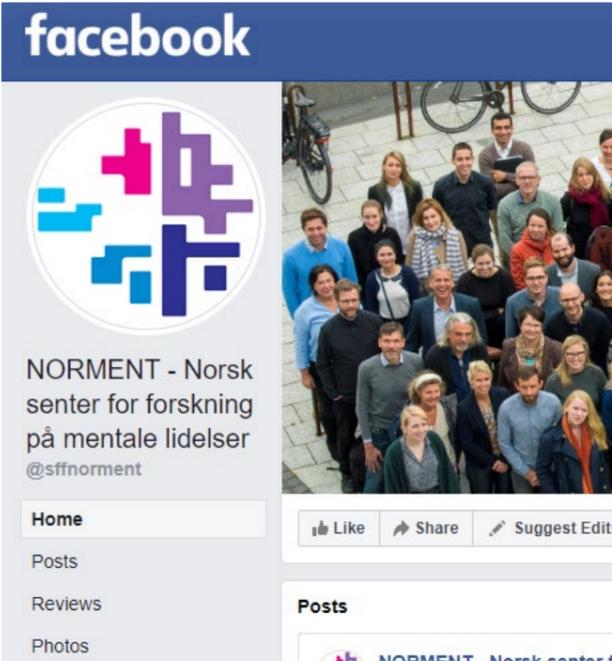
75 National scientific presentations (46 oral presentations, 29 posters)

110 Oral presentations for patient organizations and health personnel

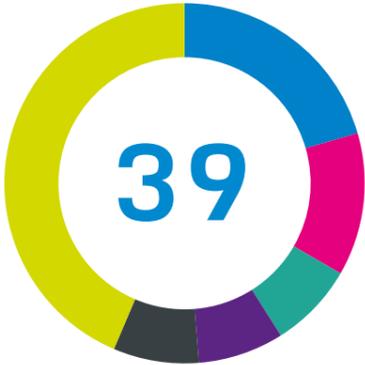
32 Oral presentations and other activities for the general public

32 News articles, interviews and feature articles in the media

46 Employees involved in teaching activities



- OHBM (8)
- SIRS (5)
- SOBP (3)
- WCPG (3)
- ISBD (3)
- Other (17)



Poster presentations at international scientific conferences

OHBM: Organization for Human Brain Mapping
 SIRS: Schizophrenia International Research Society Conference
 SOBP: Society of Biological Psychiatry
 WCPG: World Congress of Psychiatric Genetics
 ISBD: International Society for Bipolar Disorders

Scientific Conferences and Meetings

Selected International Oral Presentations

Aas, Monica: Elevated hair cortisol is associated with childhood maltreatment and cognitive impairment in schizophrenia and in bipolar disorders, SIRS, Orlando, USA, April, 2019.

Aas, Monica: Telomere length is associated with childhood trauma in patients with severe mental disorders, SIRS, Orlando, USA, April, 2019.

Agartz, Ingrid: Environmental Risk Factors and Brain in Severe Mental Disorders: How can we deal with Heterogeneity Advanced Image Analytics for Clinical Neuroimaging Symposium, OHBM, Rome, Italy, December 6, 2019.

Anderssen, Jannicke: Are sleep disturbances related to cognitive impairments in psychotic disorders? ECSR, Berlin, Germany, September 09, 2019.

Andreassen, Ole: Can Gene Discovery in Schizophrenia Provide Clues for Repurposing Drugs for Antipsychotic Treatment? EPA, Warsaw, Poland, April 8, 2019

Andreassen, Ole: Opportunities for population-based studies in Nordic countries based on eHealth, registries and biobanks, WFSBP Congress, Vancouver, Canada, June 4, 2019

Andreassen, Ole: Update from ENIGMA Bipolar working group, ECNP, Copenhagen, Denmark, September 7, 2019.

Andreassen, Ole: Predictive potential of imaging and genetics in psychiatric disorders, SIBP, Naples, Italy, October 3, 2019.

Djurovic, Srdjan: Stem cell methods and cell phenotyping approaches for study of neurodevelopmental disorders workshop, COST meeting La Valletta, Malta, February, 2019.

Faerden, Ann: Apathy and functional outcome: Does persistence matter? ECSR, Berlin, Germany, September 26-28, 2019.

Frei, Oleksandr: Cross-trait genetic analysis of the five major psychiatric disorders with bivariate causal mixture model, WCPG, Anaheim, USA, October 30, 2019.



Gurholt, Tiril: In vivo hippocampal subfield volumes in bipolar disorder – a multisite ENIGMA mega-approach, SOBP, Chicago, USA, May 16, 2019.

Haukvik, Unn Kristin: Imaging violence in schizophrenia, Nordic symposium of forensic psychiatry, Gothenburg, Sweden, August 21, 2019

Henriksen, Tone Elise: Treating mania by blocking blue light exposure: potential neurobiological pathways on sleep and activity patterns, World Conference on Cognitive Therapies, Berlin, Germany, July 7, 2019.

Kaufmann, Tobias: Predicting deviations from the norm in the developing human brain using cortico-genetic fingerprinting, OHBM, Rome, Italy, June 9-13, 2019.

Kessler, Ute: Mechanism of Action and Biological Changes in ECT, NACT Congress, Nordic Association of Convulsive Therapy, May 22-24, 2019.

Lagerberg, Trine Vik: The relationship between Cannabis use, Cognitive functioning and Polygenic risk in Bipolar disorder, ISBD, Sydney, Australia, March, 2019.

Maximov, Ivan: Influence of diffusion pipeline on data analysis: UK Biobank example for age-diffusion dependences, European Society of Magnetic Resonance in Medicine and Biology, Rotterdam, Netherlands, January 10, 2019.

O'Connell, Kevin: Shared genetic architecture between autism spectrum disorder, loneliness and intelligence, WCPG, Anaheim, USA, October, 2019.

Quintana, Daniel: Functional implications of oxytocin receptor expression patterns in the human brain across the lifespan, SCNP, Gothenburg, Sweden, April 25, 2019.

Syrstad, Vigdis: Distribution of active and resting periods in the motor activity of patients with cyclothymic temperament, ISBD, Sydney, Australia, March 22, 2019.



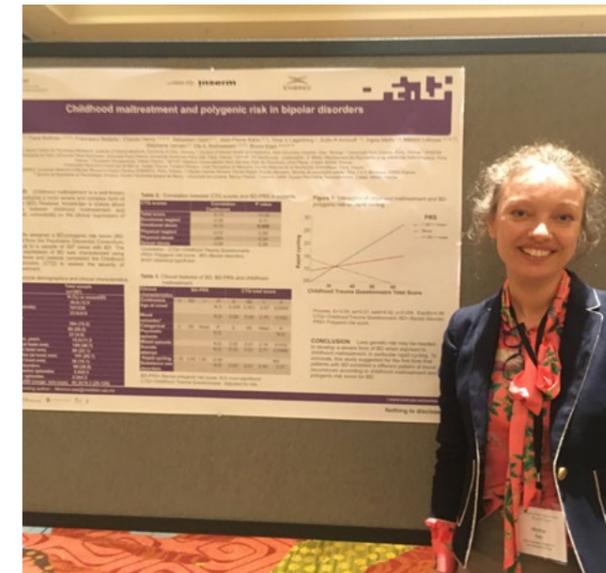
Sønderby, Ida Elken: ENIGMA-CNV: Unraveling the effects of rare copy number variants on brain structure, WCPG, Anaheim, USA, October 30, 2019.

Vaskinn, Anja: Training of facial affect recognition in schizophrenia: transfer effects to theory of mind, ECSR, Berlin, Germany, September 27, 2019.

Wolfers, Thomas: Understanding heterogeneous mental disorders using normative models, SOBP, Chicago, USA, May, 2019.

Selected International Poster Presentations

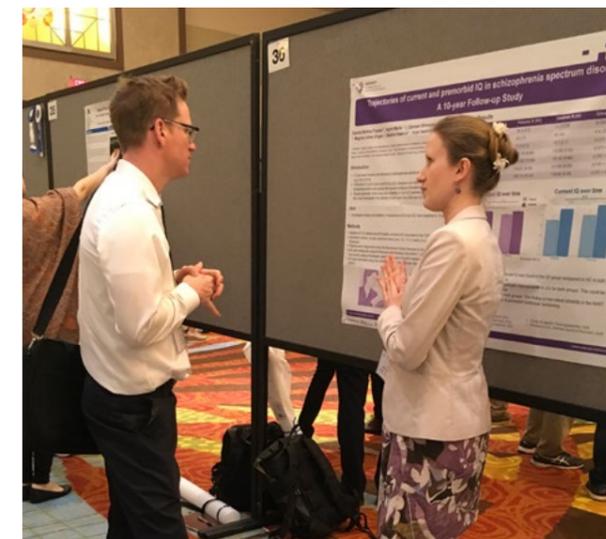
Aas, Monica: Abnormal cortisol levels during the day and cortisol awakening response in women at risk of postpartum psychosis: The role of stressful life events and inflammation, SIRS, Orlando, USA, April, 2019.



Bahrami, Shahram: Genome-wide analysis shows multiple genetic loci shared between major depressive disorder and intelligence, International Society for Computational Biology, Basel, Switzerland, July 21-25, 2019.

Barth, Claudia: Exploring the impact of iatrogenic factors on global brain changes in chronic schizophrenia – a 13-years follow-up, ECNP, September, 2019.

Bless, Josef: Temporal signatures of auditory verbal hallucinations: An app-based experience sampling study, SIRS Conference, Orlando, USA, April 10-14, 2019.



Bärthel Flaaten, Camilla: Trajectories of current and premorbid IQ in schizophrenia spectrum disorders: A 10-year Follow-up Study, SIRS, Orlando, USA, April, 2019.

de Lange, Ann-Marie: Population-based neuroimaging reveals traces of childbirth in the maternal brain, UK Biobank Annual Meeting, London, UK, June, 2019.

Elvsåshagen, Torbjørn: Large-scale neuroimaging reveals the genetic architecture of brainstem structures and their involvement in common brain disorders, SOBP annual meeting 2019, Chicago, USA, May 16, 2019.

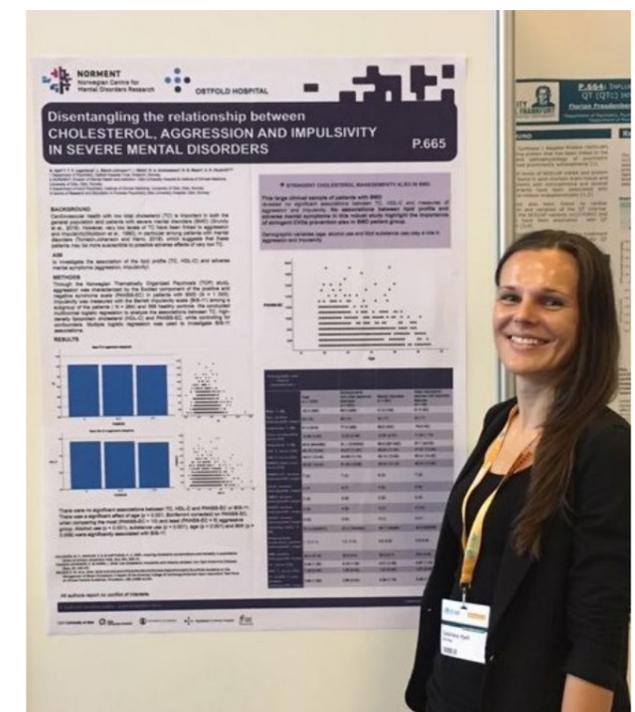
Frei, Oleksandr: Cross-Trait Genetic Analysis of the Five Major Psychiatric Disorders With Bivariate Causal Mixture Model, WCPG, Anaheim, USA, October 29, 2019.

Granerud, Guro: Equivalence class formation and priming with words and pictures, Association for Behavior Analysis Annual Convention, Chicago, USA, April 5, 2019.

Gurholt, Tiril: Mega-analysis of subcortical structures and intracranial volume in Early Onset Psychosis: An ENIGMA study, SOBP, Chicago, USA, May 16, 2019.

Haatveit, Beathe: Altered relationship between brain structure and cognitive functioning in patients with prominent negative symptomatology, ECSR, Berlin, Germany, September 26-28, 2019.

Haukvik, Unn Kristin: In vivo hippocampal subfield volumes in bipolar disorder? – a mega-analysis from the ENIGMA consortium, OHBM, Rome, Italy, December 6, 2019.



Hjell, Gabriela: Disentangling the relationship between cholesterol, aggression and impulsivity in severe mental disorders, ECNP, Copenhagen, Denmark, September, 2019.

Høegh, Margrethe C.: Affective lability across psychosis spectrum disorders, ISBD, Sydney, Australia, March 20-23, 2019.

Ihler, Henrik Myhre: Exploring the relationship between cannabis use and a two-factor model of negative symptoms, ECSR, Berlin, Germany, September 26, 2019.



Jakobsen, Petter: The detecting and predicting mood transitions in bipolar disorder study protocol, ISBD, Sydney, Australia, March 21, 2019.

Jørgensen, Kjetil Nordbø: Optimizing the T1/T2 ratio for analysis within and between subjects, OHBM, Rome, Italy, June 9-13, 2019.

Kaufmann, Tobias: Predicting deviations from the norm in the developing human brain using cortico-genetic fingerprinting, OHBM, Rome, Italy, June 9-13, 2019.

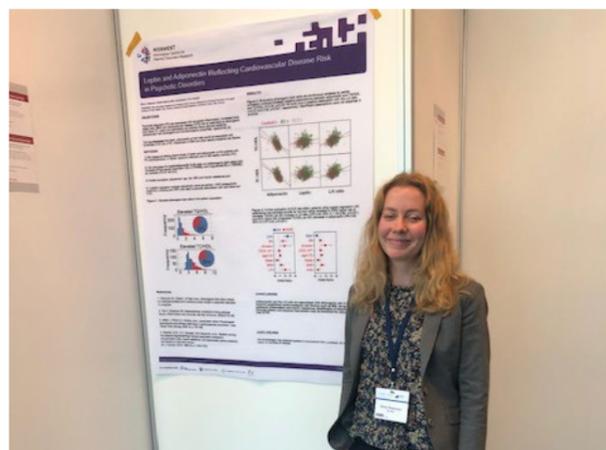
Lagerberg, Trine Vik: MyDay – app monitoring of illness fluctuation and complex interplays in bipolar disorder, ISBD, Sydney, Australia, March, 2019.

Lund, Martina: Changes in directed functional connectivity related to age and sex, OHBM, Rome, Italy, June 10, 2019.

Mørkved, Nina: Childhood Trauma Subtypes in Relation to Cognitive Functioning in Schizophrenia Spectrum Disorders, SIRS, Florida, USA, April, 2019.

Nerland, Stener: Optimizing the T1/T2 ratio for within and between subject analysis, OHBM, Rome, Italy, June 9, 2019.

O'Connell, Kevin: Characterizing the Genetic Overlap between Psychiatric Disorders and Sleep-Related Phenotypes, WCPG, Anaheim, USA, October 2019.



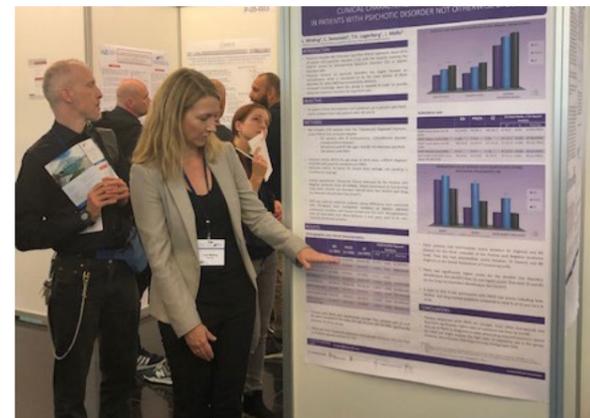
Reponen, Elina: Leptin and adiponectin reflecting cardiovascular disease risk in psychotic disorder, ECSR, Berlin, Germany, September 26, 2019.

Shadrin, Alexey: Estimating polygenicity and effect-size distribution in functional categories of the genome using summary statistics data from genome-wide association studies, 2019 WCPG, Los Angeles, USA, October 26-31, 2019.

Stautland, Andrea: Bipolar disorder with comorbid migraine may respond poorly to lithium treatment, 6th Congress on Neurobiology, Psychopharmacology and Treatment Guidance, Chalikidiki, Greece, June 28, 2019.

Szabo, Attila: Reduced IL-1 β -induced chemokine response in human iPSC-astrocytes in schizophrenia revealed by RNA-sequencing, PNIRS, Berlin, Germany, June 4-8, 2019.

van der Meer, Dennis: ENIGMA-CNV working group: 15q11.2 structural variants influence cortical morphology, OHBM, Rome, Italy, June 12, 2019.



Widing, Line: Clinical characteristics and substance use in patients with psychotic disorder not otherwise specified, ECSR, Berlin, September 26, 2019

[Selected National Oral Presentations](#)

(For presentations at the Annual Retreat, [see page 51](#))

Andreassen, Ole: Hvordan bygge fremragende forskningsmiljø – store muligheter innen psykisk helse, Sykehuset Østfolds forskningsdager, May, 2019.

Balafkan, Novin: Role of induce pluripotent stem cells in precision medicine, The Norwegian Psychiatric Association Annual Congress, Stavanger, Norway, March 2019.

Berg, Akiah: Alvorlig psykisk lidelse og trauma hos mennesker med migrasjonserfaring, Bergen Tidlig Psykose Symposium, Bergen, Norway, June 4, 2019.

Drosos, Petros: Antiinflammatorisk behandling av psykose, Psykiatriveka 2019, Stavanger, Norway, September 12, 2019.

Frei, Oleksandr: Bivariate causal mixture model quantifies polygenic overlap between complex traits beyond genetic correlation, Scandinavian approach for personalized medicine in psychiatry, Oslo, Norway, Jan 23, 2019.

Kjelby, Eirik: Elderly patients with no previous psychiatric history: Factors relating to admissions, Alderspsykiatrisk verksted, Sem Gjestegård, Asker, Norway, June 5, 2019.

Lund, Martina Jonette: Age- and sex-related differences in directed functional connectivity in human resting-state fMRI data, NRSN national PhD conference, Bergen, Norway, September 25, 2019.

Lyngstad, Siv Hege: Associations between negative symptoms and the genetic risk for schizophrenia, Psykiatriveka, Stavanger, Norway, March 12, 2019.

Olteidal, Leif: Brain water after a single session of Electroconvulsive therapy. MMIV Conference: Convergence of medical data science for improved patient care, Bergen, December 9-11, 2019.

Quintana, Daniel: Open Access Publishing, Norwegian PhD School of Pharmacy Annual Conference, Oslo, Norway, May 28, 2019.

Steen, Nils Eiel: The complexity of psychotic disorders and treatments, The Norwegian Society for Pharmacology and Toxicology, Beitostølen, Norway, January 26, 2019.

Svensden, Ingrid: Mysteriet meg - Selvet, selvforstyrrelser og opplevelse av sammenheng, ISPS, Hamar, Norway, February 01, 2019.

Ueland, Torill: Kognitiv trening, Verdensdagen for psykisk helse: Nye behandlingsperspektiver ved psykose, Oslo, Norway, October 14, 2019.

Ueland, Torill: Kognitiv trening - hvordan kan vi få det til, Schizofrenidagene, Stavanger, Norway, November 7, 2019.

Vaskinn, Anja: Sosialkognitiv trening ved schizofreni: resultater fra en klinisk behandlingsstudie (RCT), forskningsformidlingsseminar, Klinikk psykisk helse og avhengighet, Oslo, Norway, June 13, 2019.

[Selected National Poster Presentations](#)

(For posters at the NORMENT Annual Retreat, [see page 49](#))

Brunstad, Solveig: Epigenetic modifications in childhood trauma and severe mental disorders, NORBIS conference, Oscarsborg Fortress, Norway, September 30, 2019

Kusztrits, Isabella: The effects of transcranial direct current stimulation on auditory perception, NRSN national PhD conference, Bergen, Norway, September 25-27, 2019.

Marquardt, Lynn: A multimodal study of transcranial direct current stimulation (tDCS) mechanisms in the healthy

brain, NRSN national PhD conference, Bergen, Norway, September 25- 27, 2019.

Slapø, Nora: Bridging the gap between brain structure and brain function using MRI and EEG, NRSN national PhD conference, Bergen, Norway, September 25- 27, 2019.

Patient Organizations and Health Personnel

[Selected Presentations](#)

Aminoff, Sofie Ragnhild: Bipolar lidelse og affektabilitet, internundervisning, Nydalen DPS, Oslo, November 7, 2019.

Andreassen, Ole: Hvordan kan resultater fra translasjonsforskning hjelpe i klinisk hverdag? Oppdatering fra SFF NORMENT, KPHA lederkonferanse, OUS, Oslo, November 18, 2019.

Andreassen, Ole: Ny genetisk kunnskap ved alvorlige mentale lidelser og overlapp med somatiske sykdommer: fra konsept til klinisk nytte? Gardermoen-kurset, Norsk Psykiatrisk forening, Oslo, November 21, 2019.

Bell, Christina: Personality disorders, Gaustad hospital, Oslo, September, 2019.



Berg, Akiah: Skam – en behandleres erkjennelse, thematic evening on shame, Vega scene, Oslo, October, 2019.

Berg, Akiah: Traume og konsekvenser for kropp, Fagmøte, Psykosomatisk avdeling, Rikshospitalet, Oslo, October, 2019.

Berg, Akiah: Transkulturell psykiatri, Norsk legeforening, Larvik, November, 2019.

Fischer-Vieler, Thomas: Presentation of the Forensic Psychiatry Group and its projects, Søndre Oslo DPS house meeting, Oslo, March 27, 2019.

Hagen, Marthe: Brukermedvirkning ved NORMENT, årsmøte i Norsk forening for farmakoepidemiologi, Oslo, April 25, 2019.

Haukvik, Unn Kristin: Nevrovitenskap og sakkyndighet, C-course for forensic psychiatrists and psychologists, Oslo, Norway, October 18, 2019.

Haram, Marit: Oxytocin - fra DNA til psykiatriske symptomer, Neurohabiliteringen, Oslo, April 10, 2019.

Haram, Marit: Hva er psykose? Søndre Oslo DPS, Oslo, December 11, 2019.

Haukvik, Unn Kristin: Nevrovitenskap og sakkyndighet, C-course for forensic psychiatrists and psychologists, Oslo, Norway, October 18, 2019.

Hirnstain, Marco: Why do people with psychosis hear voices and how can we reduce them?, Patient meeting, Sandviken University clinic, Bergen, January 22, 2019.

Hjell, Gabriela: Imaging violence in schizophrenia, Seminar for health personnel at Østfold Hospital, Fredrikstad, October 17, 2019.

Hoprekstad, Gunnhild: Utprøving av ny behandling - med og uten medikamenter, Pårørendeforeningen, Grand-seminaret, Oslo, November 23, 2019.

Hoprekstad, Gunnhild: Betennelse og psykose, behandlere ved Psykiatrisk klinikk Helse Bergen, August 27, 2019.

Ihler, Henrik Myhre: Presentation about the TOP project and "MinDag", at "Faglunsj", Seksjon for Tidlig Psykosebehandling (TPB), Gaustad sykehus, Oslo, February 14, 2019.

Johnsen, Erik: Pharmacological treatment of non-affective psychosis, Mandatory course in psychopharmacology, Bergen, January 17, 2019.

Johnsen, Erik: Immune therapy, Fagseminar at Oslo University Hospital/ Norwegian Psychiatric Association, Oslo, October 14, 2019.

Kessler, Ute: Obligatorisk emnekurs ECT for LIS i psykiatrien, Gjøvik, February 6, 2019 & in Bergen, October 19, 2019.

Kjelby, Eirik: Schizofreni og suicidalitet, Fagdag: Selvmordsforebygging innen psykisk helsevern, behandlere i Divisjon psykisk helsevern, Haukeland University Hospital, Bergen, November 11, 2019.

Lagerberg, Trine Vik: Substance use in bipolar disorder, internundervisning, Nydalen DPS, OUS, Oslo, October 31, 2019.

Nerhus, Mari: Samtykkekompetanse, Lecture to patients, World Mental Health Day, Søndre Oslo DPS, Oslo, October 10, 2019.

Simonsen, Carmen: Hva er psykose?, Familiearbeid/TIPS Sør-Øst, Oslo, April 6, 2019.

Simonsen, Carmen: Stigma ved bipolar lidelse: konsekvenser for bedring, thematic evening on shame, Bipolar Association, Vega scene, Oslo, October 29, 2019.

Smeland, Olav: Gener og miljø - hvorfor blir noen syke? Det årlige seminaret for landsforeningen for pårørende innen psykisk helse i Oslo, Grand Hotell, Oslo, November 23, 2019.

Smeland, Olav: Hvordan kan genetikken endre psykiatrien? Mandagsundervisning, Akuttpsykiatrisk avdeling Ullevål sykehus, Oslo, February 11, 2019.

Steen, Nils Eiel: Novel findings in psychotic disorders - potential for new treatment strategies?, Internal education meeting at Center for Psychopharmacology, Diakonhjemmet Hospital, Oslo, December 19, 2019

Storvestre, Guttorm Breivik: Is early debut of substance use associated with later violent offending in schizophrenia? Høstmøte i forskningsgruppen i psykiatri ved Sykehuset Østfold, Litteraturhuset Fredrikstad, October 17, 2019.

Ueland, Torill: Kognitiv trening ved psykose - Hvordan komme i gang, og hva kan vi som klinikere gjøre allerede nå? Fagtips, Oslo, November 22, 2019

Wedervang-Resell, Kirsten: Psykoselidelser hos barn og unge, Undervisning for leger i spesialisering OUS, Oslo, January 29, 2019.

General Public

Selected Presentations and Activities

Aas, Monica: Stress og Hjernen, Life Brain seminar, Litteraturhuset, Oslo, June 4, 2019.

Andreassen, Ole: Gener, psykisk sykdom og personlighetstrekk, Kulturhuset, Oslo, October 15, 2019.

Elvsåshagen, Torbjørn: Hvordan møter vi psykisk helse og økt forekomst av depresjon i befolkningen? Event chair, Nansen Neuroscience and Hjerterådet meeting, Oslo, November 23, 2019.

Engh, John Abel: Urgency and challenges associated with implementation of physical activity as treatment for patients with severe mental disorders, Rådet for psykisk helse, Arendalsuka, Arendal, Norway, August 13, 2019.

Haukvik, Unn Kristin: [Psykopoden](#), podcast (co-host), nine episodes during 2019

Henriksen, Tone Elise Gjøtterud: Korleis kan psyken og søvnen bli betre med oransje briller? Mental Helse and Helse Fonna, Husnes Bibliotek, November 17, 2019.

Le Hellard, Stephanie: Kan man arve psykiske lidelser, Bergen, September 23, 2019.

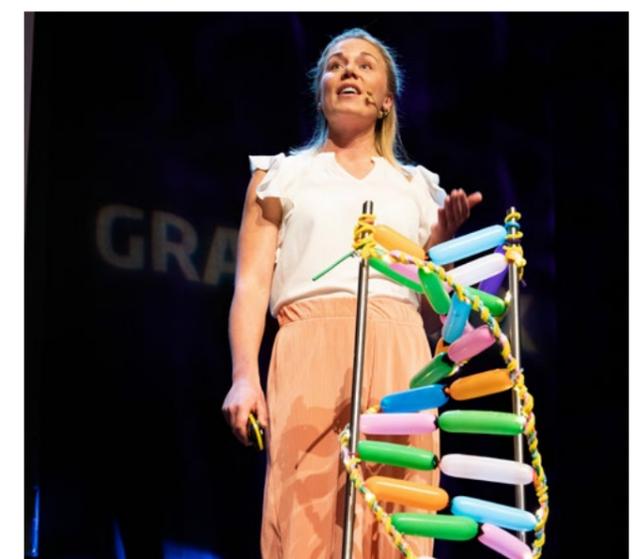
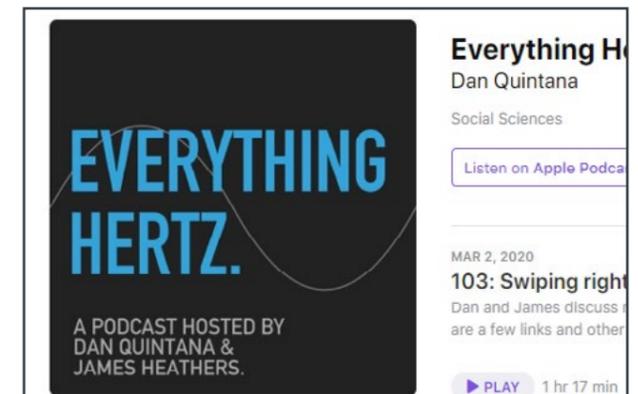
Nerhus, Mari: Ernæringsmangler og psykiske lidelser - sammenhenger, mulige mekanismer og muligheter for behandling, lecture, Adventistenes helsekonferanse, Fornebu, November 17, 2019.

Quintana, Daniel: [Everything Hertz](#), podcast (co-host), several episodes during 2019.

Romm, Kristin Lie: Åpent kveldsmøte, World Mental Health Day, Søndre Oslo DPS, Oslo, October 10, 2019.

Villar, Jonelle: #SINSSYKTVIKTIG, Kunnskapskonferanse om mental helse, Bergen, September 27, 2019.

Werner, Maren: A beautiful mind, participation in Forsker Grand Prix, Forskningsdagene, Litteraturhuset, Oslo, September 28, 2019.



NORMENT at Arendalsuka



NORMENT participated at the yearly political event “Arendalsuka” on August 15. We cohosted the event “Ensomhet: Den glemte faktor i psykisk helsearbeid?” in cooperation with SERAF – The Norwegian Centre for Addiction Research. The topic was loneliness as it is directly associated with mental illness, physical illness, drug abuse and suicide.

PhD student Linn Rødevand from NORMENT participated in a panel discussion along with Thomas Clausen from SERAF and user representative Kenneth Arcander Johansen from the Interest Organization for Substance Users - RIO. The panel presented findings on loneliness research and discussed possible solutions.

Read more about the event on the [NORMENT webpage](#) (in Norwegian)

OUS symposium



The topic of this year’s symposium at Oslo University Hospital on November 14-15, was “Mental illness in our technological society”. NORMENT was responsible for the scientific content at the two-day symposium. A wide variety of researchers had talks, several of them from NORMENT. Topics included early intervention, user involvement, app development, somatic comorbidity, and cognitive remediation.

Ole A. Andreassen, Magnus Johan Engen, John Engh, Nils Eiel Steen, Ingrid Melle, Torill Ueland, Lars T. Westlye, Vidar M. Steen, Trine Vik Lagerberg and Erik Johnsen from NORMENT presented their research at the event. Fabian Stang from the NORMENT user council gave the opening address where he highlighted the importance of funding mental health research and treatment. NORMENT employees also contributed by chairing several sessions and having stands outside the auditorium.

See the full [event program](#) (in Norwegian)

Read the [OUH blog](#) about the event (in Norwegian)

Sinnssyk forskning: Arv og miljø

On May 23, NORMENT arranged an open seminar titled “Sinnssyk forskning: Arv og miljø” (“Insane research: Heritability and environment”) covering our research on schizophrenia and bipolar disorder. More than 120 people attended the event at Oslo University Hospital.

Centre director Ole Andreassen opened the event and highlighted the importance of broad research, as mental disorders are complex and have no easy solutions. The complexity necessitates research on both hereditary and environmental factors, by combining a wide variety of research fields and methods.

Section manager Trine Vik Lagerberg approached the outdated term “insanity” and on the importance of breaking down stigma when talking about mental illness. Researcher Olav B. Smeland presented how new technology makes it easier to study the human DNA. He emphasized that discovering genes for mental disorders also can aid in finding environmental factors that either decrease or increase the risk of mental disorders.

Postdoc Torgeir Moberget gave the crowd an insight into how brain imaging is used to understand the relationship between risk factors and symptoms. Core researcher Ingrid Melle gave an update on how people actually are doing after treatment, and how NORMENT is actively mapping the long-term effects of treatment.

PhD student Gunnhild Hoprekstad gave a talk on treatment trials with and without the use of medication. Torill Ueland talked about training of cognitive functions. NORMENT user representative Marthe Hagen highlighted the importance of user involvement in the research at NORMENT.

Both the speakers from NORMENT, research groups at the centre and patient organizations had stands in the hallway after the meeting. Opening up for direct dialogue between the researchers, patients, family members and other participants at the event was a great success that mutually benefitted both the researchers and the people in the audience.

Read more on the [NORMENT webpage](#) (in Norwegian)





Media Coverage

Aas, Monica: [Barndomstraumer kan fremskynde aldringsprosessen](#), blog post, Ekspertsykehuset OUS, March 29, 2019.

Aas, Monica: [High Cortisol in Hair Indicates Child Trauma, Poor Cognition](#), news article, Medscape, April 17, 2019.

Anderssen, Jannicke: [Søvnforstyrrelser hos personer med psykiske lidelser](#), news article, Nasjonalt kompetansesenter for søvnsykdommer, April 4, 2019.

Andreassen, Ole: [Dette er de mest effektive antidepressive medisinerne](#), news article, Dagbladet, February 11, 2019.

Andreassen, Ole: [Nytt Alzheimer-gjennombrudd: Arnstein \(63\) håper sykdommen kan bremses](#), news article, VG+, February 28, 2019.

Andreassen, Ole: [Forskning på psykiske lidelser koster, men det nytter!](#), chronicle, Aftenposten, June 23, 2019.

Andreassen, Ole: [En pille for alt som er ille](#), chronicle, Dagsavisen, August 11, 2019.

Andreassen, Ole: [Fanatisme vs. Forskning](#), chronicle, Dagsavisen, November 11, 2019.

de Lange, Ann-Marie: [Giving birth sharpens the mind years later](#), news article, Daily Mail, October 17, 2019.

de Lange, Ann-Marie: [Å gå gravid gir hjernen et skikkelig løft - som varer](#), news article, Aftenposten, October 31, 2019.

Haukvik, Unn Kristin: [Når livet svinger mellom dype depresjoner og manier](#), news article, forskning.no, December 31, 2019.

Henriksen, Tone Elise Gjøtterud: [Skjermbruk og skarpt lys spolerer søvn. Kan oransje "Bono-briller" reparere døgnrytmen?](#) News article, Aftenposten, February 24, 2019.

Henriksen, Tone Elise Gjøtterud: [Korleis kan psyken og sønnen bli betre med oransje briller?](#) News article, Kvinnheringen, November 15, 2019.

Kaufmann, Tobias: [How old is your brain? This AI can tell you](#), news article, Singularity Hub, October 8, 2019.

Oltdal, Leif: [Ny elektrojokk - forskning forkaster tidligere teori](#), news article, Dagens Medisin, October 2, 2019.

Oltdal, Leif: [Elektrosjokk øker volumet i store deler av hjernen](#), news article, forskning.no, October 5, 2019.

Quintana, Daniel: [Oxytocin, the so-called "hug hormone," is way more sophisticated than we thought](#), Vox.com, February 13, 2019.

Rødevand, Linn (with Røssberg, Jan Ivar and Andreassen, Ole): [Blir vi syke av ensomhet?](#), chronicle, Morgenbladet, July 1, 2019.

Smeland, Olav (with Andreassen, Ole): [Tonje \(40\) har bipolar lidelse: Sykdommen knyttes til høy IQ?](#), news article, VG+, January 8, 2019.

Szabo, Attila: [Psychedelic drug 5-MeO-DMT induces rapid changes in inflammatory markers](#), news article, PsyPost.org, December 15, 2019.

Westlye, Lars T.: [Ønsker å slå schizofreni på målstreken](#), news article, forskning.no, October 27, 2019.

Westlye, Lars T.: [Vil tilpasse behandling av psykisk sykdom](#), TV program, NRK Nyhetsmorgen, October 30, 2019.





Societal Impact and Innovation

Mental disorders such as schizophrenia and bipolar disorders are still associated with stigma and considerable lack of knowledge. To counteract stigma and share the knowledge about these disorders, NORMENT has focused on increasing its dissemination efforts in 2019.

Our researchers have paid more attention on making the results available to the lay audience. For example, research about the genetic overlap between intelligence and bipolar disorder was highlighted in our dissemination efforts. Postdoctoral fellow Olav B. Smeland and colleagues reported that risk genes for bipolar disorder were associated with higher intelligence. These results were disseminated to users and user communities through all our different communication channels and at our public event "Sinnssyk forskning: Arv og miljø". The results were also featured by national newspaper VG. This article was written in a way that can help people associate bipolar disorder in a more positive and dignified light.

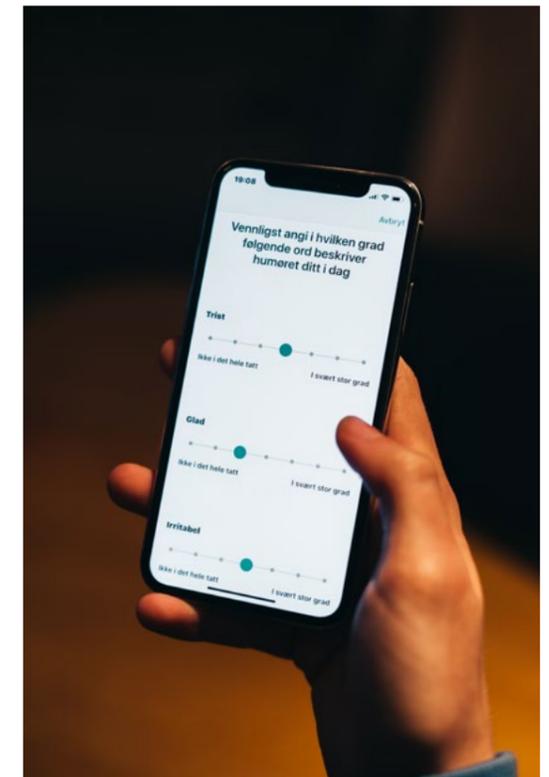
The Centre has also worked to develop tools with clinical impact, focusing on potential opportunities for prediction and stratification (genetics, imaging). These efforts can generate results that can lead to new useful tools to improve clinical treatment. These include novel statistical tools developed in collaboration with researchers at University of California San Diego, such as "MiXeR" and "MOSTest" (Frei et al. 2019, van der Meer et al. 2019). Gaining more knowledge about mechanisms and developing diagnostic tools for stratification and outcome prediction will lead to better treatment planning for psychotic disorders and will thus be directly and indirectly of huge value to society.

Other tools with potential for clinical impact have been developed as part of our eNORMENT strategy. Trine Vik Lagerberg and her team have been developing and testing a smartphone app called "MinDag" ("My Day"). The primary function of the app is to allow for collection of data from study participants on areas such as sleep, mood, symptoms, and drug use over time.

The overall goal with the "MinDag" project is to improve the understanding of interactions between lifestyle factors, environment, and symptoms. Having the participants track symptoms and other factors over time can also allow for new insight into early detection and diagnostics, as well as improve treatment and early signs of relapse. In 2019, the first participants started piloting the app along with an actigraph that passively tracks sleep and activity information, thereby moving the project into an active data collection phase. This will become an important vehicle

for research at the Centre, and the long-term goal is to do testing and evaluation of the app approach to translate the solutions into a digital tool for clinical use.

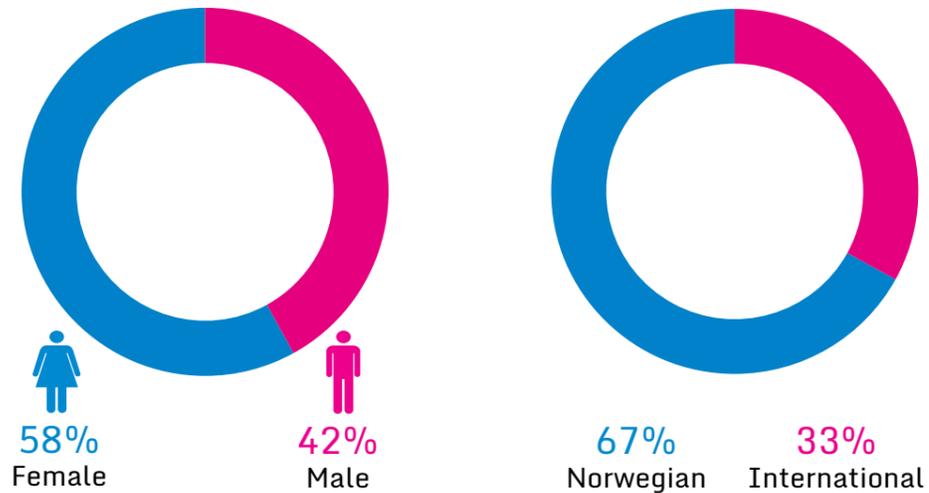
Based on long-term efforts from leading researchers in the clinical groups at the Centre, a new bipolar unit was established at Nydalen district psychiatric centre (DPS) in Oslo in early autumn 2019, after years of careful planning involving Trine Vik Lagerberg and other bipolar disorder experts at NORMENT. The aim of this unit is to provide state of the art clinical treatment for bipolar disorder, closely integrated with research at NORMENT, particularly the app solutions. Currently, in addition to receiving treatment, patients at the bipolar unit are offered to participate in NORMENT research projects and thus be able to impact the understanding of bipolar disorder and provide data for development of better treatments in the future.



The MinDag app developed by NORMENT and UiO

Facts about NORMENT

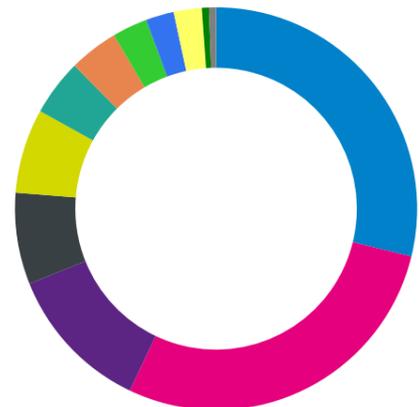
Employees



29 different nationalities are represented at NORMENT

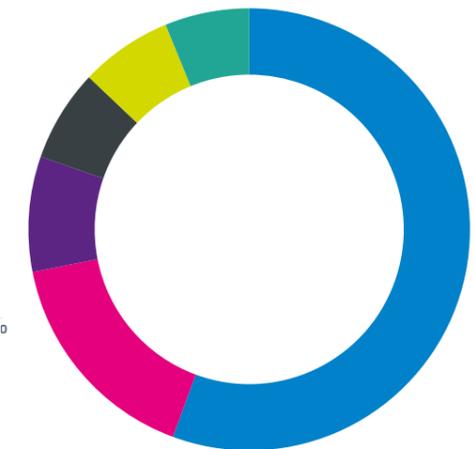
Professional Backgrounds

- Psychology 29%
- Medicine 28%
- Neuroscience 12%
- Biology 7%
- Other field 7%
- Nursing 5%
- Genetics 4%
- Engineering 3%
- Informatics 2%
- Mathematics 2%
- Business/Administration 0,5%
- Physics 0,5%



Office Locations

- Ullevål, Oslo 56%
- Haukeland, Bergen 16%
- Sandviken, Bergen 8%
- Other location 7%
- Vinderen, Oslo 7%
- Gaustad/Rikshospitalet, Oslo 6%



Staff Positions

- PhD students 29%
- Postdoctoral fellows 20%
- Other research personnel 18%
- Technical personnel 11%
- Researchers 10%
- Professors/Associate professors 6%
- Scientific assistants 4%
- Administrative personnel 3%
- Master students 2%
- User representative 0,5%



Funding

- RCN (other project funding) 24%
- Other public funding 20%
- RCN (CoE funding) 11%
- Own funding - in kind (partner institutions) 20%
- Private funding 8%
- Own financing 14%
- International project funding 2%



NORMENT Staff

Last name	First name	Position	Research group leader
Aaberg	Linn-Marie Elise	Nurse	Erik Johnsen
Aas	Monica	Researcher	Nils Eiel Steen
Agartz	Ingrid	Core researcher	Ingrid Agartz
Akkouh	Ibrahim	PhD student	Srdjan Djurovic
Alisaukiene	Renata	PhD student	Erik Johnsen
Alnæs	Dag	Researcher	Lars T. Westlye
Aminoff	Sofie Ragnhild	Post doc	Trine Vik Lagerberg
Andersen	Jostein	Master student	Lars T. Westlye
Anderssen	Jannicke	PhD student	Ingrid Melle
Andreassen	Ole	Director	Ole A. Andreassen
Andreou	Dimitrios	Post doc	Ingrid Agartz
Andresen	Athanasiu	Engineer	Srdjan Djurovic
Asp	Martine	Medical student	Ingrid Agartz
Bahrami	Shahram	Post doc	Ole A. Andreassen
Bakken	Eivind	Nurse	Nils Eiel Steen
Balafkan	Novin	Post doc	Erik Johnsen
Banerjee*	Niladri	PhD student	Stephanie Le Hellard
Barrett	Elisabeth A.	Psychologist	Trine Vik Lagerberg
Barth	Claudia	Post doc	Ingrid Agartz
Bartz-Johannessen	Christoffer	Biostatistician	Erik Johnsen
Beck	Dani	PhD student	Lars T. Westlye
Bell	Christina	PhD student	Unn Kristin H. Haukvik
Beresniewicz	Justyna	PhD student	Kristiina Kompus
Berg	Akiah	Post doc	Ingrid Melle
Berle	Jan Oystein	Associate professor	Erik Johnsen
Berzi*	Alan	Bioengineer	Trine Vik Lagerberg
Bettella	Francesco	Research technician	Ole A. Andreassen
Bjarke	Jill	Administrative personnel	Erik Johnsen
Bjella	Thomas	Database consultant	Ole A. Andreassen
Bjerkaas-Kjeldal	Kristine	Research technician	Srdjan Djurovic
Bless	Josef	Post doc	Kristiina Kompus
Brandt	Christine Lycke	Administrative manager	Administration
Brattbakk	Hans-Richard	Engineer	Vidar M. Steen
Brecke*	Vilde	Master student	Kristiina Kompus
Brunstad	Solveig	Medical student (forskerlinjen i medisin)	Stéphanie Le Hellard
Bruun	Sandra	Research coordinator	Lars T. Westlye
Buer	Liliana	Scientific assistant	Trine Vik Lagerberg
Büchmann	Camilla	PhD student	Trine Vik Lagerberg
Christensen	Karin Louise Leistad	Scientific assistant	Lars T. Westlye

* = Ended their position in 2019

Last name	First name	Position	Research group leader
Craven	Alexander R	Engineer	Kristiina Kompus
de Lange	Ann-Marie	Post doc	Lars T. Westlye
Diekmann	Silvia	Head physician	Ketil J. Ødegaard
Dieset	Ingrid	Researcher	Nils Eiel Steen
Djurovic	Srdjan	Core researcher	Srdjan Djurovic
Drachmann	Tove Matzen	Clinical assessment personnel	Ingrid Agartz
Drosos	Petros	PhD student	Erik Johnsen
Dwyer	Gerard	PhD student	Kristiina Kompus
Dæhlen*	Martine	Scientific assistant	Lars T. Westlye
Eftevåg*	Åshild	Administrative manager	Administration
Ellingsen	Dan-Mikael	Post doc	Lars T. Westlye
Elvsåshagen	Torbjørn	Post doc	Erik Gunnar Jönsson
Engen	Magnus Johan	PhD student	Torill Ueland
Engen	Kristine	PhD student	Ingrid Agartz
Enggh	John Abel	Post doc	Nils Eiel Steen
Faerden	Ann	Mentor	Ingrid Melle
Fasmer	Ole	Professor	Ketil J. Ødegaard
Fathian*	Farivar	PhD student	Erik Johnsen
Fischer-Vieler	Thomas	PhD student	Unn Kristin H. Haukvik
Flaaten	Camilla Bärthel	PhD student	Torill Ueland
Frei	Oleksandr	Post doc	Ole A. Andreassen
Frei	Evgeniia	Research technician	Srdjan Djurovic
Frid	Leila Marie	Nurse	Ketil J. Ødegaard
Gani*	Osman	Postdoctoral fellow	Ole A. Andreassen
Ghorbani	Sadaf	Post doc	Erik Johnsen
Gjerde*	Priyanthi	PhD student	Vidar M. Steen
Gjerde	Kristian Varden	PhD student	Erik Johnsen
Gjestad	Rolf	Statistician	Erik Johnsen
Granerud	Guro	PhD student	Erik Gunnar Jönsson
Gundersen	Line	Nurse	Nils Eiel Steen
Gurholt	Tiril	Post doc	Lars T. Westlye
Haakonsen	Marina Herfindal	Administrative personnel	Administration
Haatveit	Beathe	Post doc	Torill Ueland
Hagen	Marthe	User representative	Administration
Hansson	Lars	Engineer	Srdjan Djurovic
Haram	Marit	Post doc	Nils Eiel Steen
Haugen	Egil Anders	Nurse	Erik Johnsen
Haukvik	Unn Kristin	Associate professor	Unn Kristin H. Haukvik
Helleland	Tor	Administrative personnel	Administration
Henriksen	Tone Elise Gjøtterud	Associated	Ketil J. Ødegaard
Hilland	Eva	Post doc	Ingrid Agartz
Hirnstein	Marco	Researcher	Kristiina Kompus
Hjell	Gabriela	PhD student	Unn Kristin H. Haukvik

* = Ended their position in 2019

Last name	First name	Position	Research group leader
Hjelmervik	Helene	Post doc	Kristiina Kompus
Hjelmtvedt	Torkild	Nurse	Ketil J. Ødegaard
Holdhus	Rita	Engineer	Vidar M. Steen
Hope	Sigrun	Post doc	Ole A. Andreassen
Hoprekstad	Gunnhild Eldhuset	PhD student	Erik Johnsen
Huflåtten	Idun Bernadotte	Neuropsychological assessment personnel	Torill Ueland
Hughes	Tim	Researcher	Srdjan Djurovic
Høegh	Margrethe C.	PhD student	Trine Vik Lagerberg
Ihler	Henrik Myhre	PhD student	Ingrid Melle
Inderhaug	Elin	Bioengineer	Srdjan Djurovic
Jakobsen	Petter	PhD student	Ketil J. Ødegaard
Johannessen	Cecilie	PhD student	Ingrid Agartz
Johansen	Ingrid Torp	PhD student	Nils Eiel Steen
Johnsen	Erik	Core researcher	Erik Johnsen
Jönsson	Erik	Group leader	Erik Gunnar Jönsson
Jørgensen	Kjetil Nordbø	Post doc	Ingrid Agartz
Karadag	Naz	PhD student	Ole A. Andreassen
Kaufmann	Tobias	Researcher	Lars T. Westlye
Kazimierzczak	Katarzyna	Research technician	Kristiina Kompus
Kessler	Ute	Researcher	Ketil J. Ødegaard
Kjelby	Eirik	PhD student	Erik Johnsen
Kompus	Kristiina	Professor	Kristiina Kompus
Kristiansen	Ingvil Julie	Nurse	Erik Johnsen
Krogenes	Marianne	Nurse	Erik Johnsen
Kroken	Rune A	Researcher	Erik Johnsen
Krull	Florian	Postdoctoral fellow	Ole A. Andreassen
Kusztrits	Isabella	PhD student	Kristiina Kompus
Lagerberg	Trine Vik	Head of section	Trine Vik Lagerberg
Laloyaux	Julien	Postdoctoral fellow	Kristiina Kompus
Lange	Elisabeth	PhD student	Ingrid Agartz
Langeland	Marianne	Nurse	Ketil J. Ødegaard
Le Hellard	Stephanie	Core researcher	Stéphanie Le Hellard
Lengali	Lilly	Scientific assistant	Lars T. Westlye
Lofthus	Ingvild	Scientific assistant	Lars T. Westlye
Lonning*	Vera	Researcher	Ingrid Agartz
Lund	Martina Jonette	PhD student	Lars T. Westlye
Lund	Anders	Professor	Ketil J. Ødegaard
Lund-Heimark	Hallvard	Resident doctor	Erik Johnsen
Lunding	Synve Hoffart	PhD student	Nils Eiel Steen
Lyngstad	Siv Hege	PhD student	Ingrid Melle
Løberg	Else-Marie	Professor	Erik Johnsen
Løchen	Aili	Scientific assistant	Lars T. Westlye
Maglanoc	Luigi Angelo	PhD student	Lars T. Westlye

* = Ended their position in 2019

Last name	First name	Position	Research group leader
Markl	Therese	Database consultant	Ole A. Andreassen
Marquardt	Lynn	PhD student	Kristiina Kompus
Maximov	Ivan	Post doc	Lars T. Westlye
Melle	Ingrid	Core researcher	Ingrid Melle
Moberget	Torgeir	Researcher	Lars T. Westlye
Mohn	Christine	Neuropsychological assessment personnel	Torill Ueland
Mohn-Haugen	Caroline Ranem	Neuropsychological assessment personnel	Torill Ueland
Monereo*	Jennifer	Research technician	Lars T. Westlye
Myhre	Anne M.	Associate professor	None of them
Mæland*	Steffen	Postdoctoral fellow	Ole A. Andreassen
Mørch-Johnsen	Lynn	Researcher	Ingrid Agartz
Mørkved	Nina	PhD student	Erik Johnsen
Nerhus	Mari	Post doc	Trine Vik Lagerberg
Nerland	Stener	PhD student	Ingrid Agartz
Neto	Carla Fernandes	Engineer	Stéphanie Le Hellard
Norbom	Linn	PhD student	Lars T. Westlye
Nærlund	Terje	Researcher	Ole A. Andreassen
O'Connell	Kevin	Post doc	Ole A. Andreassen
Oedegaard	Ketil Joachim	Group leader	Ketil J. Ødegaard
Olsen	Stine Holmstul	Scientific assistant	Trine Vik Lagerberg
Oltedal	Leif	Associate professor	Ketil J. Ødegaard
Ormerod Skaarud	Monica	PhD student	Nils Eiel Steen
Pedersen	Geir	Researcher	Ole A. Andreassen
Pelach	Adrià	Master student	Erik Jönsson
Polushina	Tatiana	Researcher	Stéphanie Le Hellard
Puppo	Francesca	Postdoctoral fellow	Srdjan Djurovic
Quintana	Daniel	Researcher	Lars T. Westlye
Reponen	Elina Johanna	PhD student	Nils Eiel Steen
Requena	Jordi	Post doc	Srdjan Djurovic
Richard	Geneviève	PhD student	Lars T. Westlye
Roelfs	Daniel	PhD student	Lars T. Westlye
Rokicki	Jaroslav	Post doc	Lars T. Westlye
Romm	Kristin Lie	Associate professor	Ingrid Melle
Rustan	Øyvind	Scientific assistant	Lars T. Westlye
Rødevand	Linn	PhD student	Nils Eiel Steen
Sandberg	Asbjørn Arnesen	Medical student	Vidar M. Steen
Sanders	Anne-Marthe	PhD student	Lars T. Westlye
Sayeed Qureshi	Sophia	Master student	Stéphanie Le Hellard
Shadrin	Alexey	Post doc	Ole A. Andreassen
Simonsen	Carmen	Post doc	Ingrid Melle
Sinkeviciute	Igne	PhD student	Erik Johnsen
Slapø	Nora	PhD student	Erik Gunnar Jönsson
Smeland	Olav	Researcher	Ole A. Andreassen

* = Ended their position in 2019

Last name	First name	Position	Research group leader
Smelror	Runar	PhD student	Ingrid Agartz
Spindola	Leticia	Post doc	Stéphanie Le Hellard
Stabell	Lena Antonsen	Database consultant	Erik Johnsen
Stautland	Andrea	Medical student (forskerlinjen i medisin)	Ketil J. Ødegaard
Stavrum	Anne-Kristin	Post doc	Vidar M. Steen
Steen	Nils Eiel	Associate professor	Nils Eiel Steen
Steen	Vidar M.	Professor	Vidar M. Steen
Stokowy	Tomasz	Engineer	Vidar M. Steen
Storli	Ragnhild	Administrative personnel	None of them
Storvestre	Guttorm Breivik	PhD student	Unn Kristin H. Haukvik
Strømme	Maria Fagerbakke	PhD student	Erik Johnsen
Svendsen	Ingrid Hartveit	PhD student	Ingrid Melle
Syrstad	Vigdis Elin Giæver	PhD student	Ketil J. Ødegaard
Szabo	Attila	Post doc	Srdjan Djurovic
Sæther	Linn Sofie	Scientific assistant	Torill Ueland
Sønderby	Ida Elken	Researcher	Ole A. Andreassen
Tamnes	Christian K.	Associate professor	Lars T. Westlye
Tesli	Natalia	PhD student	Unn Kristin H. Haukvik
Tesli	Martin S	Researcher	Ole A. Andreassen
Timpe	Clara	Master student	Erik Gunnar Jönsson
Torsvik	Anja	Post doc	Vidar M. Steen
Trentani	Andrea	Engineer	Vidar M. Steen
Tønnesen	Siren	PhD student	Lars T. Westlye
Ueland	Torill	Group leader	Torill Ueland
Uggen	Tea K. E.	PhD student	Ole A. Andreassen
Ulrichsen	Kristine Moe	PhD student	Lars T. Westlye
Valstad	Mathias	PhD student	Erik Gunnar Jönsson
van der Meer	Dennis	Researcher	Lars T. Westlye
Vandenberghe	Matthieu	Post doc	Srdjan Djurovic
Vaskinn	Anja	Researcher	Torill Ueland
Vik	Ruth Kristine	Administrative personnel	Ingrid Melle
Villar	Jonelle	PhD student	Stéphanie Le Hellard
Værnes	Tor Gunnar	PhD student	Trine Vik Lagerberg
Weber	Sarah	Post doc	Kristiina Kompus
Wedervang-Resell	Kirsten	PhD student	Ingrid Agartz
Werner	Maren Caroline Frogner	PhD student	Nils Eiel Steen
Westlye	Lars T.	Core researcher	Lars T. Westlye
Widing	Line	PhD student	Ingrid Melle
Winterton	Adriano	PhD student	Lars T. Westlye
Wold	Kristin Fjelnseth	PhD student	Ingrid Melle
Wolfers	Thomas	Post doc	Lars T. Westlye
Wortinger	Laura	Post doc	Ingrid Agartz
Åsbø	Gina	Clinical assessment personnel	Ingrid Melle

* = Ended their position in 2019



Publications 2019



NORMENT researchers published **154** scientific papers in 2019, of which **27** were published in scientific journals with an impact factor of above 10, including *Nature Genetics*, *Biological Psychiatry*, *JAMA Psychiatry*, *American Journal of Psychiatry*, *Cell*, *Lancet Neurology*, *Molecular Psychiatry*, and *Nature Communications*.

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NORMENT

Norwegian Centre for
Mental Disorders Research

Phone: +47 23 02 73 50

www.med.uio.no/norment
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SFFnorment on Twitter
SFFnorment on Facebook

Visiting address in Oslo:

Oslo University Hospital HF
Psychosis Research Unit/TOP
Ullevål Hospital, building 49
Kirkeveien 166
N-0450 Oslo

Visiting addresses in Bergen:

University of Bergen
Haukeland University Hospital Campus
Lab. Building and Basic Biology Building
Jonas Lies vei 87
N-5021 Bergen

Haukeland University Hospital
Sandviken Hospital
Building 2
Sandviksleiet 1
N-5036 Bergen

Postal address:

NORMENT
Oslo University Hospital HF
Division of Mental Health and Addiction
Psychosis Research Unit/TOP
Ullevål Hospital, building 49
P.O. Box 4956 Nydalen
N-0424 Oslo

