

Multiple Sclerosis (MS)



Group Leader

Hanne Flinstad Harbo, Professor and consultant of Neurology (MD/PhD/MHA), Department of Neurology. Oslo University Hospital (OUH) and Institute of Clinical Medicine, University of Oslo (UiO) (h.f.harbo@medisin.uio.no/uxhahb@ous-hf.no).

Group members

- Hanne Flinstad Harbo, MD/PhD/MHA, Professor, OUH/UiO
- Elisabeth Gulowsen Celius, MD/PhD, Professor, OUH/UiO
- Tone Berge, MSc/PhD, researcher OUH, Ass. prof., OsloMet – Oslo Metropolitan University
- Steffan D. Bos-Haugen, MSc/PhD, researcher, UiO
- Daniel Rinker, PhD, OUS (from December 2017)
- Pål Berg-Hansen, MD/PhD, engagement ass. professor UiO and consultant OUH
- Gro Owren Nygaard, MD/PhD, OUH
- Sigrid Aune de Rodez Benavent, MD/PhD fellow, Department of Ophthalmology, OUH/UIO
- Ingvild Sørnum Leikfoss, MSci/PhD, UiO
- Pankaj K. Keshari, MSci/PhD fellow, OUH (until dissertation May 2017)
- Anna M. Eriksson, MSci/PhD fellow, UiO
- Ina S. Brorson, MSci/PhD fellow, OUH
- Einar August Høgestøl, MD/PhD fellow, UiO
- Cecilia Smith Simonsen, MD/PhD fellow, Drammen Hospital/OUH
- Heidi Øyen Flemmen, MD/PhD fellow, Skien Hospital/OUH
- Fernanda Kropf Correia, BSc, Masterstudent, UiO (MatNat, Until Master exam in November)
- Ingrid Mo, BSc, Masterstudent, UiO (MatNat, Until Master exam in November)
- Åshild Skardhamar, MD /PhD-fellow (application in preparation), OUH

Associated Group Members

- Marte Wendel Gustavsen, MD/PhD, Skien Hospital
- Stine Marit Moen, MD/PhD, Head of research and development, MS-Center, Hakadal
- Piotr Sowa, MD/PhD fellow, Department of Radiology, OUH

We have this year had 7 medical students connected to our group, writing student theses: Harbo and Høgestøl: Ellen Aspeggen (completed March 2018), Ingerid Tutturen and Magnus Ørseng Kværner. Celius: Janany Tharmakulasingam (completed March 2018). Pål Berg-Hansen: Hedda Håkonsen Gretland, Inger Bjurstrøm, Victoria Løvstad





Research profile and aims

Multiple Sclerosis (MS) research group at the Department of Neurology, OUH and UiO, aims to identify characteristics and susceptibility factors of MS, and to contribute to a better understanding of the disease and development of better treatments. We perform genetic, immunological, clinical, epidemiological, environmental, MRI and translational studies of MS in collaboration with national and international research partners and networks.

Ongoing projects

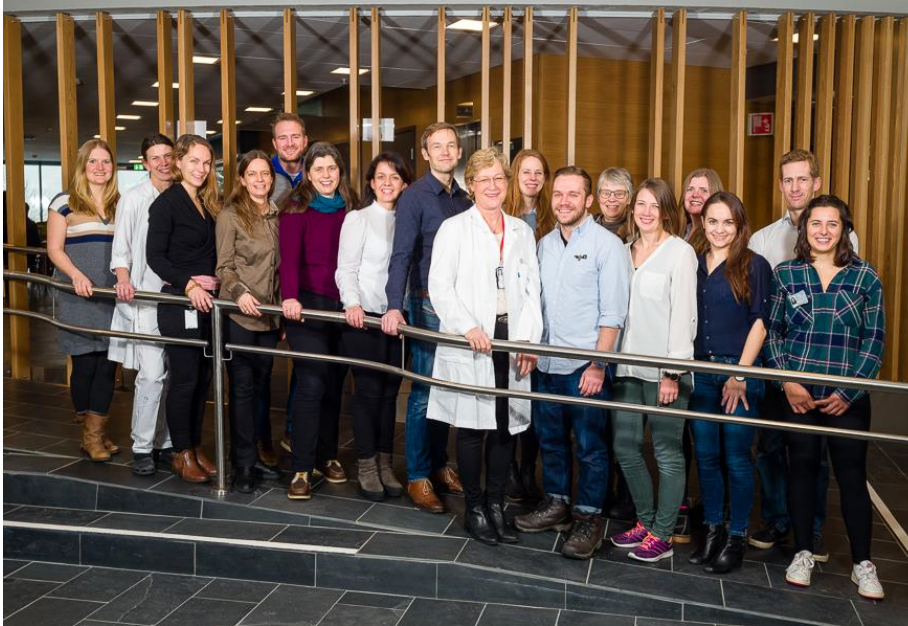
- Sigrid Aune de Rodez Benavent, PhD fellow: A longitudinal cohort study of ophthalmologic biomarkers correlated with neurodegeneration in early MS. (OUH D-position Department of Ophthalmology) Supervisor: Elisabeth G. Celius, Co-supervisors: Emilia Kerty, Bruno Laeng and Liv Droslum
- Tone Berge, researcher, Ingvild Sørum Leikfoss (Senior Engineer): Vitamin D responsive regulation of susceptibility genes for autoimmune diseases. In collaboration with Professor Lisa Barcellos at the University of California, Berkeley (Peder Seather Grant held by Harbo/Barcellos and grants from Fritz and Ingrid Nilsens legat held by Berge)
- Steffan Daniel Bos, researcher: Identification of molecular mechanisms and biomarkers of Multiple Sclerosis (MS-biomarkers) – RNA sequencing of CD4+ and CD8+ T cells as potential biomarkers of MS phenotypes. (NFR researcher project grant held by Harbo)
- Anna M. Eriksson, PhD fellow: Identification of molecular mechanisms and biomarkers of Multiple Sclerosis (MS-biomarkers) – molecular characterization of DEXI and other MS susceptibility genes (NFR researcher project grant held by Harbo). Supervisor: Tone Berge, Co-supervisors: Hanne F. Harbo and Steffan D. Bos
- Ina S. Brorson, PhD fellow from 1.12.15 (UiO grant held by Harbo): Defining and characterizing molecular pathways in multiple sclerosis. Supervisor: Steffan Bos, Co-supervisors: Hanne F Harbo and Tone Berge
- Einar August Høgestøl, PhD fellow from 1.12.15: MRI- and other biomarkers in multiple sclerosis. (NFR researcher project grant held by Harbo). Supervisor: Hanne F Harbo, Co supervisor: Lars T Westlye and Gro O Nygaard
- Daniel Rinker, Post Doc from December 2017: Integrating genetic and MRI data in multiple sclerosis
- Cecilia Smith Simonsen, PhD fellow (OUH-Drammen grant): Predictors for disease susceptibility and disease progression in Multiple sclerosis, Supervisor: Elisabeth Gulowsen Celius, Co supervisors: Stine Marit Moen and Kari Anne Bjørnerå
- Heidi Øyen Flemmen, PhD fellow (Skien grant): Socioeconomic factors as predictors for disease susceptibility and disease progression in Multiple sclerosis, Supervisor: Elisabeth Gulowsen Celius, Co supervisor: Pål Berg-Hansen.
- Åshild Skardhamar, MD, PhD fellow: Fatigue in Multiple Sclerosis. Supervisor: Elisabeth Gulowsen Celius





- Fernanda Kropf Correia (Master project): Molecular characterization of TAGAP- a GTPase-activating protein encoded by a multiple sclerosis susceptibility gene. Supervisor Tone Berge (completed November 2017)
- Ingrid Mo (Master project): Identifying protein interaction partners for DEXI – encoded by the multiple sclerosis associated dexamethasone-induced gene, DEXI. Supervisor Tone Berge (completed November 2017)
- Tone Berge, collaboration with Professor Frode Berven at the University of Bergen; Mass spectrometry analyses of immune cells in multiple sclerosis (Funded through a grant from Biogen Idec to Berge)
- Ingvild Sørnum Leikfoss (Senior engineer), Anna M. Eriksson: CLEC16A and other candidate genes
- Hanne F Harbo, Steffan D. Bos, Elisabeth G Celius. MS chip study, collaboration with IMSGC (Harbo Oslo PI)
- Hanne F Harbo, Steffan D. Bos, Elisabeth G Celius. Exome chip study, collaboration with IMSGC. (Harbo Oslo PI)
- Hanne F Harbo, Steffan D. Bos, Pål Berg-Hansen, Mona Beyer: BorrSci study, lead from Kristiansand (South-Eastern Norway Multi- Regional Health Authority grant)
- Hanne F Harbo, Steffan D. Bos, Pål Berg-Hansen, Tone Berge, Ingvild S Leifoss, Elisabeth G Celius Mona Beyer: MultipleMS - partner in EU Horizon 2020-prosjekt (Harbo Oslo PI)
- Hanne F Harbo, Einar A Høgestøl, Sigrid de Rodez Benavent, Steffan Bos, Tone Berge, Elisabeth G Celius, Mona Beyer: Sys4MS- Biotek 2021/NFR Project. (Harbo Oslo PI)
- Einar A Høgestøl, Steffan D. Bos, Hanne F Harbo: MYO Project. With Prof Pierre Gourraud, Nantes. NFR support for travel. NFR-Aurora travel grant (Harbo Oslo PI)
- Elisabeth G. Celius, Mona Beyer, Piotr Sowa, Tobias Granberg : Neuroprotective effects of alemtuzumab in patients with MS in a clinical setting
- Cecilia Smith simonsen, Astrid Edland, Elisabeth G. Celius : Effekt av FAMPYRA® på gange, syn, kognisjon, fatigue og vannlating hos pasienter med multiple sklerose
- Elisabeth G. Celius, Pål Berg-Hansen, Stine Marit Moen and SINTEF : AutoActive :Tools and Methods for Autonomous Analysis of Human Activities from Wearable Device Sensor Data (SINTEF PI)
- Elisabeth G. Celius, Stine Marit Moen/MS-Centre Hakadal and SINTEF: Digital oppfølging og støtte for personer med multippel sklerose (MS-DOS)
- E.G.Celius, P. Berg-Hansen, Kamila Rasova, Prague, Czech republic, Sunnaas, Hakadal MS-Centre, Kysthospitalet Stavern, HiOA :Physiotherapy in the Czech Republic and Norway. Project funded by EU





MS research group OUS-UiO photo 2018 at Domus Medica 4, UiO:

From left: Synne Brune (PhD student, MD), Gro Owren Nygaard (MD, PhD), Sigrid A. de Rodez Benavent (consultant of ophthalmology, PhD student, MD), Stine Marit Moen (consultant of neurology, MD, PhD, Head of research and development MS-Centre Hakadal), Einar August Høgestøl (PhD student, MD), Tone Berge (Ass.Professor at OsloMet – Oslo Metropolitan University and researcher at OUS, MSc, PhD), Heidi Øyen Flemmen (consultant of neurology, PhD student, MD), Pål Berg-Hansen (Ass.professor, PhD and consultant of neurology, MD,) Hanne F. Harbo (professor, consultant of neurology and group leader, MD, MHA, PhD), Cecilia Smith Simonsen (PhD student, MD), Daniel Rinker (Post Doc, PhD), Elisabeth Gulowsen Celius (consultant of neurology, Professor and project leader, MD, PhD), Anna Marie Eriksson (PhD student, MSc), Ina Skaara Brorson (PhD student, MSc), Ingvild Sørum Leikfoss (Senior engineer, PhD, MSc), Steffan Daniel Bos (post doc, PhD, MSc), Maite Larrañaga Fernandez (Erasmus Bachelor Student).

Funding

- South-Eastern Norway Regional Health Authority
- The Research Council of Norway
- University of Oslo
- European Commission: EU Horizon 2020
- European Commission/The Reserach Council of Norway: Sys4MS - Biotek 2021
- Norwegian Extra Foundation for Health and Rehabilitation
- South-Eastern Norway Multi- Regional Health Authority grant
- Unrestricted research grants from Novartis, Biogen, Genzyme, Odd Fellow, Forsberg and Aulie, and Ingrid and Fritz Nilsen, UNIFOR
- The Peder Saether Foundation
- Odd Fellow Foundation

Most important national and international collaborators

National

- Mona Beyer and Rigmor Lundby, Dept. of Radiology, OUH
- Benedicte A. Lie, Dept. of Medical Genetics, OUH /UiO
- Kristine Walhovd and Anders Fjell, Dept. of Psychology, UiO
- Anne Spurkland, Institute of Basic Medical Sciences, UiO
- Bettina Kulle Andreassen, Cancer Registry, Norway
- Emilia Kerty, Dept. of Neurology, OUH/UiO
- Liv Drolsum, Dept. of Ophthalmology, OUH/UiO
- Ole A. Andreassen and Lars T. Westlye, Dept. of Psychiatry, OUH/UiO
- Camilla Stoltenberg, Norwegian Institute of Public Health
- Inger Johanne Bakken, Norwegian Institute of Public Health
- Odd Stokke Gabrielsen, Section for Biochemistry and Molecular Biology, UiO
- Greger Abrahamsen, Division of Anatomy, Molecular Immunology (MOLIMMUN), UiO
- Vibeke Sundvold Gjerstad, Division of Anatomy, Molecular Immunology (MOLIMMUN), UiO
- Trygve Holmøy, Dept. of Neurology, Akershus University Hospital
- Torbjørn Rognes, Section for Biomedical Informatics, Dept. of Informatics, UiO
- Nils Inge Landrø and Bruno Laeng, Dept. of Psychology, UiO
- Ole Landsverk, Dept of Pathology, KLM, OUH
- K.B Nilsen and L. Etholm, Dept. of Neurophysiology, OUH
- Kjell-Morten Myhr and Jan H. Aarseth, Haukeland University Hospital
- Atle Bjørnerud, Dept. of Physics, Intervention Centre, UiO/OUH
- Frode Berven, Dept. of Biomedicine, University of Bergen

International

- Lisa Barcellos, University of California, Berkeley, US
- Stephen Sawcer, University of Cambridge, UK
- Jorge Oksenberg, University of California, San Francisco, US
- Sergio E. Baranzini, University of California, San Francisco, US
- Pablo Villoslada, Hospital Clinic of Barcelona, Spain
- Steve Francis, University of California, San Francisco, US
- Anders Dahle, University of California San Diego, US
- Soheil Damangir and Gabriela Spulber, Karolinska Institute, Stockholm, Sweden
- Jan Damoiseaux, Dept. of Neurology, Canisius Wilhelmina Hospital, Nijmegen, the Netherlands
- Joost Smolders, Dept. of Neurology, Canisius Wilhelmina Hospital, Nijmegen, the Netherlands
- B. Wilhelm, Steinbeis Transfer-Centre for Biomedical Optics and Function Testing, Tübingen, Germany
- Nordic MS genetics consortium (Hillert, Olsson, Kockum, Oturai, Sørensen, Saareala)
- International MS Genetics Consortium (Adrian Ivinson, Stephen Sawcer, Stephen Hauser, An Goris)
- Helen Tremlett, Dept of Neurology, Vancouver, Canada
- Pierre Antoine Gourraud, Hôpital St-Jacques - CHU de Nantes, France
- Tobias Granberg, Karolinska, Stockholm, Sweden
- Prof. Kamila Rasova, University of Prague, Czech Republic



Doctoral dissertations in 2017

Pankaj K. Keshari 23. Jan. 2017: Title: Immunogenetic loci characterization of multiple sclerosis. Supervisors: Tone Berge, Hanne F. Harbo and Steffan D. Bos.

Piotr Sowa 29. Sept. 2017: Title: MRI biomarkers of Disease Activity and PRogression in Multiple Sclerosis. Supervisors: Mona K. Beyer, Hanne. F. Harbo.

Master thesis dissertations in 2017

Fernanda Kropf Correia , November 9, 2017: Molecular characterization of TAGAP- a GTPase-activating protein encoded by a multiple sclerosis susceptibility gene. Supervisor Tone Berge

Ingrid Mo, November 7, 2017: Identifying protein interaction partners for DEXI – encoded by the multiple sclerosis associated dexamethasone-induced gene, DEXI. Supervisor Tone Berge

Three selected publications in 2017

Sowa P, Nygaard GO, Bjørnerud A, Celius EG, Harbo HF, Beyer MK. Magnetic resonance imaging perfusion is associated with disease severity and activity in multiple sclerosis. *Neuroradiology*. 2017 Jul;59(7):655-664. doi: 10.1007/s00234-017-1849-4. Epub 2017 Jun 5. PMID:28585082

de Rodez Benavent SA, Nygaard GO, Harbo HF, Tønnesen S, Sowa P, Landrø NI, Wendel-Haga M, Etholm L, Nilsen KB, Drolsum L, Kerty E, Celius EG, Laeng B. Fatigue and cognition: Pupillary responses to problem-solving in early multiple sclerosis patients. *Brain Behav*. 2017 May 17;7(7):e00717. doi: 10.1002/brb3.717. eCollection 2017 Jul. PMID:28729927

Simonsen CS, Edland A, Berg-Hansen P, Celius EG. High prevalence and increasing incidence of multiple sclerosis in the Norwegian county of Buskerud. *Acta Neurol Scand*. 2017;135(4):412-8.

Invited lectures at international congresses

Elisabeth G. Celius: Aubagio: Mechanism of action. Genzyme Academy, Barcelona. 16.6.17.

Elisabeth G. Celius: Lemtrada. Portugese Neurology Meeting, Portugal 26.5.17

Elisabeth G. Celius: Infections in patients with multiple sclerosis. Nordic Symposium, Copenhagen 28.1.17

Elisabeth G. Celius: Hormones, pregnancy and lactation in MS. Nordic nurse symposium Stockholm 21.9.17.

Elisabeth G. Celius: Con AHST. Nordic Neuroimmunology meeting Stockholm 2.3.17

Hanne F Harbo: Nordic Neuroimmunology meeting Stockholm 2.3.17: Genetic and mitochondrial disorders mimicking MS

Hanne F Harbo: NeuroMI 2017 International Symposium Personalised Medicine in Multiple Sclerosis 15.9.17: Genetics and genomic in MS

Hanne F Harbo together with Mona K Beyer: MAGNIMS meeting, Milan 15.11.17: MS studies in Oslo

Hanne F Harbo: PACTRIMS, Vietnam, 23.11.17: From Genetic Association to Functional Studies in MS



Hosting of meetings - invited guests

June 20th: Sys4MS Oslo meeting. Professor Villoslada, Barcelona, Spain and the Sys4MS consortium

September 8th: MS genetics-recent progress. Professor Stephen Sawcer, Cambridge, UK

September 21st: Research seminar: CT and MRI in brain diseases. Key note speaker: Professor Maria Rocca, Milan, Italy

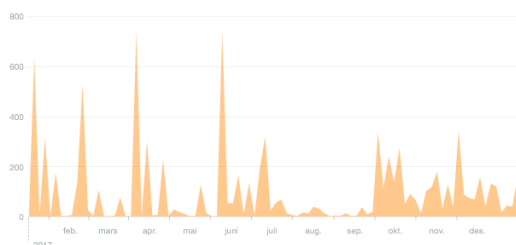
November 13th: Work shop in bioinformatics. Brook Rhead, Berkeley, California, USA

November 22nd : Nytt om MS forskning ved Oslo universitetessykehus – meeting open to the public with presentations from our group.

December 5th: The MS Dash-board and MYO projects. Professor Pierre A Gouraud, Nantes, France

Social media

- The research group has it's own designated Facebook page named " Multipel Sklerose Forskningsgruppen Oslo", currently with 198 followers. Here we keep our followers updated on our current ongoing research projects, as well as international MS research and dissemination activities concerning our research group.
- We also have our own homepage at both the Oslo University Hospital and the Univeristy of Oslo, which we update on a regular basis.
- In association with the Multiple MS project, we also manage both the Facebook page and Twitter account to promote the project in social media.



People reached with our Facebook posts during 2017



Example of Facebook post