Curriculum Vitae: Clara A. MOREAU

Education

2015 - 2020 **Ph.D. in Neurosciences, University of Montreal, Canada**.
Ranked as '*Exceptional thesis'* Advisors: Sébastien Jacquemont (Geneticist, Sainte Justine Hospital, UdeM) and Pierre Bellec (Psychology Department, SIMEXP lab, UdeM): Mapping genome-wide neuropsychiatric mutation effects on functional brain connectivity: Copy number variants delineate dimensions contributing to autism and schizophrenia

2012 - 2014 **Master's degree in Cognitive Sciences** (DEC, Cogmaster)
Descartes University & Ecole Normale Supérieure, Paris - France

2009-2012 **BSc degree in Psychology**; Descartes University, Paris-V France

Research experiences

2023 - current position. **Postdoctoral researcher**
Imaging Genetics Center, Keck School of Medicine, USC, Los Angeles, USA.
Advisor: Paul M. Thompson - Los Angeles, CA.

2021 - 2022 **Postdoctoral researcher** (2 years)
Human Genetics and Cognitive Functions Unit, Pasteur Institute, University of Paris, France
Advisor: Thomas Bourgeron

2014-2015 **Research Assistant** (1 year) Medical Genetics Department, Centre Hospitalier Universitaire Vaudois (CHUV), Lausanne, Switzerland
Advisor: Sebastien Jacquemont.
Skills: MRI Protocol development and Scanning, Website development for family recruitment, neuropsychological assessment.

2019 **Internship** (2 months)- Imaging Genetic Center, USC, USA
Advisor: Paul M. Thompson.
Skills: DTI analyses, ENIGMA CNV working group

2014 **Internship** (6 months) - Neurospin Institute, CEA, France.
Advisors: Marion Noulhiane & Lucie Hertz-Pannier (UNIACT)
Skills: fMRI analysis (SPM, Matlab) - Neurodevelopmental cohort.

2013 **Internship** (summer) - Neuroscience Department, University of Montreal, Canada
Advisor: Pierre Jolicoeur
Skills: MEG/EEG analyses for an auditory task.

2012 **Internship** (3 months) - Necker Children Hospital, INSERM – UMR 663 Paris, France.
Advisors: Marion Noulhiane
Skills: Neuropsychological assessment and data analyses - Memory & Synesthesia

2012 **Internship** (summer) - Centre de Recherche en Neurosciences de Lyon.
Advisors: Nadine Ravel and Rémi Gervais
Skills: Recording olfactory cells in mice and signal processing

Teaching

2022: 'Génetique and neuroimagerie des troubles neurodéveloppementaux' (Master students, Paris)
2021: 'Neuroimagerie dans les troubles du spectre autistique' (for Psychiatrists, at R. Debré hospital)
2021: Moderator at the OHBM educational courses
2018-2020 (3 years): Teaching Assistant, Brain Imaging Techniques (UdeM, Pr. P. Bellec)
2018: Instructor at the Brainhack School (Imaging Genetics)

Students' supervision (n=9)

2021 (6 months): Main supervisor of P. Bergeret and L. Tran (Master internships in Bioinformatics, University of Paris Saclay).
2021 (6 months): Main supervisor of A. Debril (Psychiatrist, Master internship in Neuroscience, University of Paris Cité).

2021 (9 months): Main supervisor of L. Dry (Master internship - AgroParisTech)
2021 (6 months): Main supervisor S. Portalier (BSc–3rd year - Genetics "Magistère", Paris)
2020-2021 (1 year): Co-supervisor A. Harvey (Master internship - Informatics, DIRO, UdeM)
2019-2021 (3 years): Co-supervisor A. Proulx (Honors + Master internship - Psychology, UdeM)
2019 (6 months): Main supervisor of G. Dumais (BSc–3rd year, Neurosciences, UdeM)
2016 (6 months): Main supervisor of A. Casgrain-Cyr (BSc–3rd year, Bioinformatics, UdeM)

Symposium / Invited lecture / Oral session

04.2023 **Society of Biological Psychiatry, San Diego, USA**
Oral Session: Brain abnormalities in early-onset anorexia

04.2023 **Semel institute, UCLA**
Invited lecture: Brain abnormalities in early-onset anorexia

02.2023 **7th Whistler Scientific Workshop on Brain Functional Organization, Connectivity**
Symposium on Clinical Applications

10.2022 **Institut de Neuroscience de la Timone, Marseille France**
Invited lecture "Impact of genetic heterogeneity and pleiotropy in psychiatry on brain functional connectivity"

07.2022 **British Association of Psychopharmacology, London, UK**
Symposium: "Impact of genetic heterogeneity and pleiotropy in psychiatry on brain functional connectivity"

06.2022 **Human Brain Mapping, Glasgow, Scotland**
Oral session "Imaging Genetics: Mapping the Effects of Genetic and Transcriptional Variation on the Brain"

05.2022: **McGill University, Montreal, CA**
Invited lecture: "Genetic heterogeneity and pleiotropy shape brain connectivity in psychiatry"

12.2021: **Académie de Medecine de Paris, France**
Seminaire "Troubles du neurodéveloppement sans frontière"

10.2021: **European Congress Neuropsychopharmacology, Lisboa, Portugal**
Symposium: "The genetics of autism from risk to resilience"

04.2021: **Society of Biological Psychiatry,** virtual meeting
Symposium "Brain Alterations and Mechanisms in Carriers of Genomic Structural Variants"

06.2020 **Human Brain Mapping**, (virtual),
Symposium "Neuropsychiatric genetic variation shapes brain architecture by modulating gene expression"

03.2020: **McGill University, Canada**
Feindel BIC Lecture: "Neuropsychiatric mutations delineate functional brain connectivity dimensions contributing to autism and schizophrenia".

08.2019: **Imaging Genetic Center University of South California, USA**
Invited lecture: "High-risk psychiatric mutations modulate functional brain connectivity pointing to dimensions involved in autism and schizophrenia"

06.2019 **Human Brain Mapping, Rome, Italy**
Symposium "A tough nut to crack: neurodevelopmental connectopathies." (video online)

05.2019 **Society of Biological Psychiatry, Chicago, US**
Symposium "Large Scale Imaging Studies of Rare Copy Number variants: Brain Imaging from Enigma and Other Large-Scale International Studies" (link)

04.2019 **International Society for Autism Research, Montreal**
Symposium: "Human and Animal Models: Impact of High-Risk Copy Number Variants on Brain Structure, Functional Connectivity, and Sexual Development."

Other scientific activities

Co-chair of the ENIGMA Gradient working group (with Sofie Valk (Max Planck Institute), Boris Bernhardt (McGill), Matthias Kirschner (UNIGE)) since 2023
Leader of the ENIGMA Anorexia fMRI project with Stefan Ehrlich (Dresden University)
Active member of ENIGMA CNV, ENIGMA Anorexia, ENIGMA fMRI
Co-editor (special issue: "Combining Multimodal Brain Imaging Data for an integrated characterization of Neurodevelopmental Conditions"), Frontiers in Psychiatry (2021)
Peer reviewing: Brain, Communications Biology, Biological Psychiatry, Neuroimage, Neuropsychopharmacology, Molecular Autism
PhD committee of Dominika Slušná (University of Pompeu-Fabra, Barcelona, 2022)
Grant reviewing for the Agence National de la Recherche (ANR, France)

Grants and award

2023: Co-leading the NIH R01 grant "The ENIGMA-Eating Disorders Initiative: A Global Neuroimaging Study of Anorexia and Factors Affecting Clinical Outcomes"
2023: Part of an NIH R01 grant "Global Neurogenetics Initiative"
06.2021: Exceptional abstract of the year at the OHBM conference.
06.2020: Ph.D. ranked as an '*Exceptional thesis*' and nominated for the *best thesis of the university*.
09.2019: RBIQ Grant 15,000 $CAD
08.2018: RBIQ Grant 5,000 $CAD
11.2017: RBIQ Grant 3,000 $CAD
06.2017: OHBM Travel award 500 $USD
06.2016: OHBM Travel award 500 $USD

Science Dissemination

11.2022: "De générations en générations, la recherche avance" Institut Pasteur Fundraising Comprendre l'autisme et les troubles du neurodéveloppement
09.2022: IFM Young Researchers Day (Round Table)
05.2021: Seminaire UQAM (CA) Les enjeux actuels en Neuroéducation. "Que nous ont appris les dernières avancées en neuro-imagerie et génétique sur les troubles du spectre de l'autisme?"
05.2021: Simons Foundation Autism Research Initiative. Q&A with Sébastien Jacquemont and Clara Moreau: Why brain imaging signatures for autism are so elusive
11.2020: Simons Foundation Autism Research Initiative. Gene mutations point to overlaps in brain connectivity for autism, and schizophrenia.
06.2016: Brain imaging workshop co-organizer (Brainhack) with P. Bellec, Lausanne, Switzerland
2015-2016: Podcasts: "Psychiatric Conditions" and "Inside the Brain" (Neuroimaging techniques)
03.2014: Annual Cognitive Science Forum, Paris, France Symposium (organizer and moderator) Cognition Humaine, Animale, Artificielle: continuité ou scission entre ces cognitions?
11. 2014: EPFL, CH Round Table Protecting Ideas, Liberating Innovation, and Open Collaboration
2014-2015: "Startup Weekend" workshops organizer and instructor for Ph.D. students (6 editions: Lausanne (EPFL), and Paris (ENS, CogInnov, and ESPCI)).

Publications (n=26, h-index = 16, citations = 743)

Scholar profile: https://scholar.google.com/citations?user=tkN9j_cAAAAJ&hl=en
ORCID: https://orcid.org/0000-0001-6217-731X
USC personal profile: https://profiles.sc-ctsi.org/clara.moreau

First Author (n=7)

Moreau C, Deruelle C, Auzias G. (2023): Machine Learning for Neurodevelopmental Disorders. *Machine Learning for Brain Disorders*. In: Colliot O, editor(s). Machine Learning for Brain Disorders. New York, NY: Springer US; 2023. p. 977–1007

Moreau C, Harvey A, Kumar K, Huguet G, Urchs SGW, Douard EA, *et al.* (2022): Genetic Heterogeneity Shapes Brain Connectivity in Psychiatry.
Biological Psychiatry. https://doi.org/10.1016/j.biopsych.2022.08.024

Moreau C, Kumar K, Harvey A, Huguet G, Urchs S, Schultz LM, *et al.* (2022): Brain functional connectivity mirrors genetic pleiotropy in psychiatric conditions.
Brain. https://doi.org/10.1093/brain/awac315

Moreau C, Ching CR, Kumar K, Jacquemont S, Bearden CE (2021): Structural and functional brain alterations revealed by neuroimaging in CNV carriers.
Current Opinion in Genetics & Development 68: 88–98.

Moreau C, Raznahan A, Bellec P, Chakravarty M, Thompson PM, Jacquemont S (2021): Dissecting autism and schizophrenia through neuroimaging genomics.
Brain. https://doi.org/10.1093/brain/awab096

Moreau C, Urchs SGW, Kuldeep K, Orban P, Schramm C, Dumas G, *et al.* (2020): Mutations associated with neuropsychiatric conditions delineate functional brain connectivity dimensions contributing to autism and schizophrenia.
Nature Communications 11: 1–12.

Moreau C, Jean-Louis M, Blair R, Markiewicz CJ, Turner JA, Calhoun VD, *et al.* (2020): The genetics-BIDS extension: Easing the search for genetic data associated with human brain imaging.
Gigascience . https://doi.org/10.1093/gigascience/giaa104

Under review as co-first or co-last author (n=3)

Moreau C, Tran L, Ayrolles A, Bonicel R, Bergeret P, Traut N, *et al.* Unveiling Brain Mechanisms in Children with Early-onset Anorexia Nervosa
under review in ***Biological Psychiatry.***

Lefebvre A, Traut N, Pedoux A, Maruani A, Beggiato A, Elmaleh M, **Moreau C,** Delorme R. (2023): Putamen volume as a predictor of repetitive and restricted behaviors and interests related intensity in autism.
https://doi.org/10.21203/rs.3.rs-2799683/v1
under review in ***Molecular Autism*** (**co-last author**)

Villalón-Reina J*, **Moreau C***, Nir T, Romascano D, Maillard A, Jahanshad N, *et al.* (2023): 453. Diffusion tensor imaging white matter abnormalities associated with copy number variants: A normative modeling approach. *Biol Psychiatry* 93: S278. (**co-first author**)

Co-authored (n=21)

Kumar K, Modenato C, **Moreau C**, Ching CRK, Harvey A, Martin-Brevet S, *et al.* (2023) Subcortical Brain Alterations in Carriers of Genomic Copy Number Variants.
Am J Psychiatry 180: 685–98.

Rolland T, Cliquet F, Anney RJL, **Moreau C,** Traut N, Mathieu A, *et al.* (2023) Phenotypic effects of genetic variants associated with autism.
Nature Medicine 29: 1671–80

Boen R, Kaufmann T, van der Meer D, Frei O, …, **Moreau C**, *et al.* (2023) Beyond the Global Brain Differences: Intra-individual Variability Differences in 1q21.1 Distal and 15q11.2 BP1-BP2 Deletion Carriers.
Biol Psychiatry http://dx.doi.org/10.1016/j.biopsych.2023.08.018

Kopal J, Kumar K, Saltoun K, Modenato C, **Moreau CA**, Martin-Brevet S, *et al.* (2023): Rare CNVs and phenome-wide profiling highlight brain structural divergence and phenotypical convergence.
Nat Hum Behav. https://doi.org/10.1038/s41562-023-01541-9

Floris DL, Peng H, Warrier V, Lombardo MV, Pretzsch CM, **Moreau C**, *et al.* (2023): The Link Between Autism and Sex-Related Neuroanatomy, and Associated Cognition and Gene Expression.
Am J Psychiatry 180: 50–64.

Villalón-Reina JE, **Moreau CA**, Nir TM, Jahanshad N, Maillard A, Romascano D, et al. Multi-site Normative Modeling of Diffusion Tensor Imaging Metrics Using Hierarchical Bayesian Regression. In: Medical Image Computing and Computer-Assisted Intervention
MICCAI 2022. Springer Nature Switzerland; 2022. p. 207–17

Ecker C, Pretzsch CM, Bletsch A, Mann C, Schaefer T, Ambrosino S, ..., **Moreau C**, *et al.* (2022): Interindividual Differences in Cortical Thickness and Their Genomic Underpinnings in Autism Spectrum Disorder.
Am J Psychiatry 179: 242–254.

Brownstein CA, Douard E, Mollon J, Smith R, Hojlo MA, Das A, ..., **Moreau C**, *et al.* (2022): Similar Rates of Deleterious Copy Number Variants in Early-Onset Psychosis and Autism Spectrum Disorder.
Am J Psychiatry appiajp21111175.

Modenato C, Martin-Brevet S, **Moreau CA**, Rodriguez-Herreros B, Kumar K, Draganski B, *et al.* (2021): Lessons learnt from neuroimaging studies of Copy Number Variants, a systematic review.
Biol Psychiatry. https://doi.org/10.1016/j.biopsych.2021.05.028

Sønderby IE, van der Meer D, Moreau C, Kaufmann T, Walters GB, Ellegaard M, ..., **Moreau C**, *et al.* (2021): 1q21.1 distal copy number variants are associated with cerebral and cognitive alterations in humans.
Transl Psychiatry 11: 182.

Modenato C, Kumar K, **Moreau C**, Martin-Brevet S, Huguet G, Schramm C, *et al.* (2021): Effects of eight neuropsychiatric copy number variants on human brain structure.
Transl Psychiatry 11: 399.

Douard E, Zeribi A, Schramm C, Tamer P, Loum MA, Nowak S, ..., **Moreau C**, *et al.* (2021): Effect Sizes of Deletions and Duplications on Autism Risk Across the Genome.
Am J Psychiatry 178: 87–98.

Bannier E, Barker G, Borghesani V, Broeckx N, Clement P, Emblem KE, ..., **Moreau C**, *et al.* (2021): The Open Brain Consent: Informing research participants and obtaining consent to share brain imaging data.
***Hum Brain Mapp*.** https://doi.org/10.1002/hbm.25351

Sønderby IE, Ching CRK, Thomopoulos SI, van der Meer D, Sun D, Villalon-Reina JE, ..., **Moreau C**, *et al.* (2021): Effects of copy number variations on brain structure and risk for psychiatric illness: Large-scale studies from the ENIGMA working groups on CNVs.
Hum Brain Mapp. https://doi.org/10.1002/hbm.25354

Costalat G, Godin B, Balmain BN, **Moreau C**, Brotherton E, Billaut F, Lemaitre F (2020): Autonomic regulation of the heart and arrhythmogenesis in trained breath-hold divers. ***EJSS*** 1–19.

Cárdenas-de-la-Parra A, Martin-Brevet S, **Moreau C**, Rodriguez-Herreros B, Fonov VS, Maillard AM, *et al.* (2019): Developmental trajectories of neuroanatomical alterations associated with the 16p11.2 Copy Number Variations.
Neuroimage 203: 116155.

Jønch AE, Douard E, **Moreau C**, Van Dijck A, Passeggeri M, Kooy F, *et al.* (2019): Estimating the effect size of the 15Q11.2 BP1-BP2 deletion and its contribution to neurodevelopmental symptoms: recommendations for practice.
J Med Genet. https://doi.org/10.1136/jmedgenet-2018-105879

Urchs SGW, Tam A, Orban P, **Moreau C,** Benhajali Y, Nguyen HD, *et al.* (2022): Functional connectivity subtypes associate robustly with ASD diagnosis.
Elife 11. https://doi.org/10.7554/eLife.56257

van der Meer D, Sønderby IE, Kaufmann T, Walters GB, Abdellaoui A, Ames D, .., **Moreau C**, *et al.* (2019): Association of Copy Number Variation of the 15q11.2 BP1-BP2 Region With Cortical and Subcortical Morphology and Cognition.
JAMA Psychiatry 1–11.

Sønderby IE, Gústafsson Ó, Doan NT, Hibar DP, Martin-Brevet S, Abdellaoui A, .., **Moreau C**, *et al.* (2018): Dose response of the 16p11.2 distal copy number variant on intracranial volume and basal ganglia.
***Mol Psychiatry*.** https://doi.org/10.1038/s41380-018-0118-1

Martin-Brevet S, Rodríguez-Herreros B, Nielsen JA, **Moreau C**, Modenato C, *et al.* (2018): Quantifying the Effects of 16p11.2 Copy Number Variants on Brain Structure: A Multisite Genetic-First Study.
Biol Psychiatry. https://doi.org/10.1016/j.biopsych.2018.02.1176