# Clara MOREAU

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E-mail: Clara.Moreau@umontreal.ca, Born December 9, 1991 in Paris (France) @Claramoreau9

## ❖ Educational experience

2015 - 2020 **PhD Candidate**, Neurosciences Department, **University of Montreal, Canada**
Mapping genome-wide neuropsychiatric mutation effects on functional brain connectivity:
Copy number variants delineate dimensions contributing to autism and schizophrenia
Co-supervised by: Sébastien Jacquemont (Geneticist, Sainte Justine Hospital) and Pierre Bellec (Computer Science Department, SIMEXP lab, CR-IUGM, University of Montreal)

2019 **Internship** (2 months) Imaging Genetic Center, supervised by P.M. Thompson, **USC, USA**
Skills: DTI analyses (ENIGMA) - Cross-CNVs data

2014 - 2015 **Research Assistant**, Medical Genetics Department, **CHUV, Switzerland**
Skills: MRI Protocol development and Scanning, Analyses (R, Matlab), Website development for family recruitment, neuropsychological assessment. S. Jacquemont's laboratory

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

2013 - 2014 **Internship** (6 months) Neurospin Institute, **CEA, France**
Advisors: Marion Noulhiane & Lucie Hertz-Pannier (UNIACT)
Skills: fMRI analysis (SPM, Matlab) - Neurodevelopmental cohort, memory tasks.

2013 **Internship** (summer), Neuroscience department, **University of Montreal, Canada**
Advisor: Pr. P. Jolicoeur; Skills: **MEG**/EEG analyses for an auditory task.

2012-2013 **Internship** (6 months), Necker Children Hospital, **INSERM – UMR 663 Paris, France**
Advisors: Pr. M. Noulhiane and Dr C. Chiron
Skills: Neuropsychological assessment and data analyses - Memory & Synesthesia

10.2012 **Internship** (summer), Advisor: Pr. N. Ravel and Pr. R. Gervais, **Lyon, France**
Skills: Recording olfactory cells in mice (electrophysiology) and signal processing

09.2009-06.2012 **BSc degree** in Neuropsychology; Descartes University, Paris-V France
09.2006-06.2009 **Scientific Baccalaureate**; Victor Duruy High School, Paris 75007 France

## ❖ Summer school attendance

08.2017: Deep Learning - Summer school at the University of Montreal (MILA), Canada
06.2017: Workshop Brainhack - University of British Columbia, Canada
08.2016: Brain Imaging Genetics for Imagers, Summer school: Radboud University, Nijmegen
06.2016: Workshop Brainhack (fMRI) - Lausanne, Switzerland
02.2016: Workshop Brainhack (MRI) - Pasteur Institute, FR
04.2015: HackTheBrain workshop (EEG) - London, UK
08.2013: Basic and Advanced functional MRI, Summer school at McGill, Montreal, CA

## ❖ Teaching experience

06.2019-06.2020: Supervisor of A. Proulx (Honours degree, Neurosciences, UdeM)
2018 & 2019: Teaching Assistant, "Brain Imaging Techniques" (100 students, UdeM, Pr. P. Bellec)
01.2019-07.2019: Supervisors of G. Dumais (BSc–3rd year, Neurosciences, UdeM)
05.2018-06.2018: Instructor at the Brainhack School 2018 (Imaging genetics, UdeM)
05.2016-08.2016: Supervisors of A. Casgrain-Cyr (BSc–3rd year, Bioinformatics, UdeM)

## ❖ Computer skills

**Programming languages**: R, Python, Matlab; Html, JavaScript & CSS (Web development).
**Softwares**: NIAK (fMRI), SPM12 (VBM, Neuromorphometric), Freesurfer and Civet (Cortical Thickness), FSL (TBSS), EEGlab (EEG)

## ❖ Personal grant

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

## ❖ Peer-reviewing

2020: Molecular Autism
2019: Neuroimage (2 papers)

## ❖ Science Dissemination

2019: BIDS contributor (Brain Imaging Data Structure) to integrate genomic information (C. Pernet).
06.2016: Brain imaging workshop co-organizer (Brainhack) with P. Bellec, Lausanne, Switzerland
2016: In charge of the science dissemination for the "Brain and Development research" section at the Ste Justine Hospital, Montreal
2015-2016: Radio show: "Psychiatric conditions" and "Inside the Brain" (Neuroimaging techniques)
2014-2015: "Startup Weekend" workshops organizer and teacher, for PhD students (6 editions: Lausanne (EPFL), and Paris (ENS, CogInnov, and ESPCI)).
2014-2015: Board member and web manager for the national political committee "Science en marche" (french organization of researchers).
2014: Conference co-organizer at the ENS University of Paris: "Conciliate Open Science, Patents, and Intellectual property issues?"
2014-2015: Co-founder of Artificial intelligence lab at La Paillasse (citizen lab, Paris).
06.2015: Open innovation "Lift Conference", Shanghai, China
03.2013: Co-organizer of the annual french Cognitive sciences Forum (Consciousness process of intelligence across the animal, the human, and the computer)
2013-2015: Secretary of "Hack your PhD" association (To promote Open Access of scientific publications) and Open Knowledge Conference, Geneva, Switzerland
2012-2015: Active member of "Cognivence" and « FRESCO » (French Federation of Cognitive Science students)

## ❖ Other experiences and skills

**Language**: French (native), English (fluent), German (working knowledge)
**Job:** Summers 2010, 2011 and 2012: Saleswoman in Paris, "Berthillon" (full time)
Sept 2010 to June 2012: Waitress in a restaurant in Paris (half-time)
**Others**: Driving license (car (2011), motorboat (2016), sailboat (2017)), Diving license (PADI, 2018), and Violin player.

# Talks, posters, publications

## ❖ Invited speaker

### *International conferences*

06.2020 (coming) Human Brain Mapping, (online 15 min),
Symposium "**Neuropsychiatric genetic variation shapes brain architecture by modulating gene expression**"

06.2019 Human Brain Mapping, Rome (15 min),
Symposium "**A tough nut to crack: neurodevelopmental connectopathies.**" (video online)

05.2019 Society of Biological Psychiatry, Chicago (20 min),
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 (20 min),
Symposium: "**Human and Animal Models: Impact of High-Risk Copy Number Variants on Brain Structure, Functional Connectivity, and Sexual Development**." (link)

### *Local conferences*

03.2020: Feindel BIC Lecture McGill University, Canada *(coming, 45 min)* "**Neuropsychiatric mutations delineate functional brain connectivity dimensions contributing to autism and schizophrenia**" (link).

08.2019: Imaging Genetic Center (45 min) University of South California, USA **"High-risk psychiatric mutations modulate functional brain connectivity pointing to dimensions involved in autism and schizophrenia"**

05.2016: University of Montreal, Canada (45 min)
**"From the first human genome to recent application in genome edition: ethical issues."**

11.2014: EPFL, Switzerland (description and video online)
**"Protecting Ideas, Liberating Innovation, and Open collaboration"**

09.2014: University of Lausanne, Switzerland (description and video online)
**"Open Access, Open Data and Open Science: reality, and amalgam"**

03.2014: Cité des Sciences et de l'Industrie, Paris, France
**"Conciliate Research, Innovation & Open Science?"**

03.2014: Annual Cognitive science forum 2014, Paris, France (video online, speaker and moderator of the round table)
**"Artificial, animal, and human cognitive processes: How could we redefine Intelligence?"**

## ❖ Publications


Martin-Brevet, S., Rodríguez-Herreros, B., Nielsen, J. A., **Moreau, C.**, … Jacquemont, S. (2018). Quantifying the Effects of 16p11.2 Copy Number Variants on Brain Structure: A Multisite Genetic-First Study. *Biological Psychiatry*.

Sønderby, I. E., Gústafsson, Ó., …, **Moreau, C.**, 16p11.2 European Consortium, for the ENIGMA-CNV working group. (2018). Dose-response of the 16p11.2 distal copy number variant on intracranial volume and basal ganglia. *Molecular Psychiatry*.

Jønch, A. E., Douard, E., **Moreau, C.**, (...), 15q11.2 Working Group. (2019). Estimating the effect size of the 15q11.2 BP1-BP2 deletion and its contribution to neurodevelopmental symptoms:

recommendations for practice. *Journal of Medical Genetics*.

Van der Meer, D., Sønderby, I. E., …, **Moreau, C**., Andreassen, O. A. (2019). Association of Copy Number Variation of the 15q11.2 BP1-BP2 Region With Cortical and Subcortical Morphology and Cognition. *JAMA Psychiatry*, 1–11. d

Urchs, S., Armoza, J., **Moreau, C.**, Benhajali, Y., St-Aubin, J., Orban, P., & Bellec, P. (2019). MIST: A multi-resolution parcellation of functional brain networks. MNI Open Research, 1(3), 3.

Cárdenas-de-la-Parra, A., Martin-Brevet, S., **Moreau, C.**, (...), Jacquemont, S., & Collins, D. L. (2019). Developmental trajectories of neuroanatomical alterations associated with the 16p11.2 Copy Number Variations. *NeuroImage*, *203*, 116155.

**Moreau, C.***, Urchs S.*, Schramm, C., Orban, P.,... Bearden, C., Bellec, P., Jacquemont, S. Neuropsychiatric mutations delineate functional brain connectivity dimensions contributing to autism and schizophrenia. *Under-review (second revision) Nature Communications, available on bioRXiv*

Douard, E., Zeribi, A., Schramm, C., **Moreau, C**., … Huguet, G., Jacquemont S. (2019). Differential effects of deletions and duplications on autism risk across the genome.
*Under-review (second revision) American Journal of Psychiatry, available on bioRXiv*

Urchs, S., Tam A., Orban P., **Moreau, C.**, ..., Evans, A.C., Bellec, P. Subtypes of functional connectivity associate robustly with ASD diagnosis.
*Under review eLife*

Urchs, S., Nguyen, H.D, **Moreau, C.**, …, Evans, A.C., Bellec, P. Reproducible functional connectivity endophenotype confers high risk of ASD diagnosis in subset of individuals.
*Under review eLife, available on bioRXiv*

Sønderby, I.E., Van der Meer, D., Kaufmann, T., **Moreau, C.**, …, Jacquemont, S., Thompson, P., Andreassen. (2020) 1q21.1 distal copy number variants are associated with cerebral and cognitive alterations in human.
*Under review Molecular Psychiatry*

Modenato C.*, Kumar K.*, **Moreau C.**, (...) Bzdok D., Bearden CE., Draganski B., Jacquemont S. Neuropsychiatric CNVs exert shared effects on human brain structure.
*Under-review Biological psychiatry, available on medRXiv*

**Moreau C**, Huguet G, Urchs S, Douard EA, Sharmarke H, Orban P, et al. The general impact of haploinsufficiency on brain connectivity underlies the pleiotropic effect of neuropsychiatric CNVs. medRxiv. 2020 Mar 23;2020.03.18.20038505.
*Submitted to Science Translational Medicine, available on medRXiv*

**Moreau C.**, Raznahan A., Bellec P., Thompson P.M., Jacquemont S. Top-down and bottom-up strategies to understand Schizophrenia and Autism
*In preparation to Annual review of clinical psychology*

Villalon-Reina, J.E.*, **Moreau, C.***, …, Bearden, C., Thompson, P., Jacquemont, S. Convergent brain mechanisms across neuropsychiatric CNVs: a multisite diffusion tensor imaging study.
*In preparation to Biological Psychiatry*

### ❖ Posters

**C. Moreau**, S. Urchs, G. Huguet, …P. Bellec, S. Jacquemont. Functional Connectivity Analyses Suggest Shared Molecular Mechanisms Across 12 Neuropsychiatric Mutations, Autism and Schizophrenia. **SOBP 2020** (online)

**C. Moreau**, S. Urchs, G. Huguet, …P. Bellec, S. Jacquemont. Brain-Wide Connectome Analyses Suggest Shared Mechanisms Across Eight High-Risk Neuropsychiatric Mutations. **INS, Denver, CO 2020**

**C. Moreau***, S. Urchs*, C. Schramm, …, Simons VIP Consortium, C. Bearden, P. Bellec, S. Jacquemont Gene dosage alters brain connectivity and delineates functional signatures contributing to autism and schizophrenia. **WCPG Anaheim, CA 2019**

**C. Moreau*,** C. Schramm*, G. Huguet, S. Urchs, Kumar K., Douard E., A. Evans, Labbe A., Greenwood C., Chakravarty M., P. Bellec‡, S. Jacquemont‡ Estimating the commonalities of any recurrent CNVs on different anatomical and functional brain metrics. **Human Brain Mapping, Rome 2019**

C. Bearden, D. Sun, A. Lin, C. Ching, S. Jacquemont, **C. Moreau**, J. Villalon. Gene Dosage Effects on Neurobehavioral Phenotypes and Development: Relevance to Idiopathic Neuropsychiatric Disorders. **SOBP, Chicago 2019**

**C. Moreau***, S. Urchs*, C. Schramm, P.O. Quirion, A. Lin, L. Kushan, A. Evans, J.D. Lewis, Simons VIP Consortium, C. Bearden, P. Bellec‡, S. Jacquemont‡ Shared functional connectivity alterations across neurodevelopmental mutations, ASD, ADHD and schizophrenia. **Enhancing Psychiatric Genetic Testing, and Training in Europe, EnGagE, Paris 2019**

**C. Moreau***, S. Urchs*, C. Schramm, P.O. Quirion, A. Lin, L. Kushan, A. Evans, J.D. Lewis, Simons VIP Consortium, C. Bearden, P. Bellec‡, S. Jacquemont‡ Mirror effects of 4 neurodevelopmental CNVs on functional connectivity and implication for idiopathic autism **Sixth Biennial Conference on Brain Connectivity, Montreal 2018**

A Jonch, E. Douard, C. Moreau, … S. Jacquemont. The true contribution of the 15q11.2 BP1-BP2 deletion to neurodevelopmental symptoms. **WCPG, Glasgow 2018**

**C. Moreau***, S. Urchs*, … , A. Evans, J. D. Lewis, P. Bellec, S. Jacquemont. Mirror effects of 4 neurodevelopmental CNVs on functional connectivity and implication for idiopathic autism **World Congress of Psychiatric Genetics, Glasgow 2018**

**C. Moreau***, S. Urchs*, … , A. Evans, J. D. Lewis, P. Bellec, S. Jacquemont. Global functional over-connectivity in 16p11.2 CNV deletion carriers. **Human Brain Mapping, Singapore 2018**

C. R. Pernet, D Rodriguez, **C. Moreau,** D. Marinazzo, A. Eklund. European Network for Brain Imaging of Tumours. **Neuroinformatics, Montreal, 2018**

**C. Moreau***, S. Urchs*, Simons Variation in Individuals Project Consortium, A. Evans, J. D. Lewis, P. Bellec, S. Jacquemont. **Altered brain connectivity in patient with 16p11.2.** **World Congress of Psychiatric Genetics, Orlando 2017**

**C. Moreau***, J.D. Lewis*, A. Evans‡, S. Jacquemont‡, and the Simons Variation in Individuals Project Consortium**.** Altered subcortical diffusivity in 16p11.2 CNVs. **Human Brain Mapping, Vancouver 2017**

J.D. Lewis*, **C. Moreau***, S. Martin-Brevet, …, S. Jacquemont‡, A. Evans‡, the 16p11.2 European Consortium, and the Simons VIP Consortium. Thickness and contrast in 16p11.2 CNVs. **Human Brain Mapping, Vancouver 2017**

F. Chouinard-Decorte, P. Rioux, J. Lewis, **C. Moreau,** …, P. Bellec, D. Glahn, A. Evans. Genetic clustering of the human functional connectome **Human Brain Mapping, Vancouver 2017**

S. Martin, B. Rodriguez-Herreros, J. Nielsen, **C. Moreau**, …, B. Draganski, S. Jacquemont. The Effects of 16p11.2 Gene Dosage on Brain Structure. **IMFAR, San Francisco 2017**

A. E. Jønch1, I. Roberts-Caldeira, **C. Moreau**, …, S. Jacquemont. Distal and proximal copy number variations at the 16p11.2 locus present similar anthropometric and phenotypic traits. 17th International Fragile X and other Early-Onset Cognitive Disorders **Strasbourg France 2015**