

Matthijs Moerkerke

Neuroscientist

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KU Leuven — Center for Developmental Psychiatry, Department of Neurosciences

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Profile

I am a postdoctoral researcher at Ghent University (Belgium) and voluntary research fellow at KU Leuven (Belgium).

My research focuses on neurophysiology, pain science, and neuroendocrine mechanisms, with particular interest in the role of oxytocin.

I investigate how stress physiology, neuroendocrine signaling, and brain mechanisms interact with behavior and clinical outcomes, combining neuroimaging, physiological recordings, and clinical trial methodologies.

My work aims to translate neurobiological insights into improved diagnostics, treatment strategies, and rehabilitation approaches for neurological and neurodevelopmental conditions.

Education

- **PhD Thesis: The Role of Oxytocin in Autism** — KU Leuven (2022)
 - **PhD in Neuroscience Certificate** (2022)
 - **Postgraduate Studies in Advanced Medical Imaging** — KU Leuven (2017)
 - **Master of Biomedical Sciences** — KU Leuven
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Additional Training

- **Research stay - Stanford University, USA (2025)**
Pediatric Pain Research Laboratory, Prof. Laura Simons
Supported by Faculty Travel Grant (KU Leuven) and FWO Travel Grant
- **Research stay - University of Oslo, Norway (2023)**
Oxytocin research laboratory, Prof. Daniel Quintana
Supported by FWO Travel Grant
- **Oxytocin Conference and Workshop - invited talk**
Ettore Majorana Foundation, Erice, Italy (2022)
Supported by FWO Travel Grant
- **Regulatory Medical Writing Training Programme** (2021)

- **FreeSurfer MRI Analysis Course** — MIT-Harvard, Boston, USA (2019)
 - **Good Clinical Practice Certificate (GCP)** (2019)
 - **Spanish Language Courses** (2017)
 - **MATLAB and Octave Certificate** (2017)
 - **Laboratory Animal Science Certificate - FELASA B** (2014)
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Teaching & Mentoring

- Lecturer for *Evidence-Based Medicine & Statistics 3* (BA Rehabilitation Sciences, Ghent University)
 - Leading curricular reform and supervising eight PhD teaching assistants
 - Co-promoter of 2 PhD projects
 - Promoter of 25 MSc theses
 - Co-promoter of 12 MSc theses
 - Daily supervisor of 24 bachelor and master students
 - Jury member for 10 MSc defenses
 - Jury member for 1 PhD defense
 - Mentor for junior researchers in pain science and stress physiology
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Scientific Engagement & Outreach

Scientific outreach in mainstream media

- EOS Wetenschap — Oxytocin nasal spray may improve social bonding in children with autism
- ACAMH Podcast — Oxytocin administration, neural sensitivity and autism
- KU Leuven Blog — De invloed van oxytocine-neusspray op kinderen met autisme
- Pain in Motion Blog — The role of oxytocin in chronic pain

Scientific collaboration & service

- Steering-group member, Pain in Motion (PIM) international research consortium
- Expert panel member, Active Monitoring of Oxytocin Research Evidence (AMORE), University of Oslo
- Scientific program & award manager, Pain Science in Motion Conference 2026
- Ad hoc grant reviewer, Foundation for Prader-Willi Research (USA)

Memberships

- International Association for the Study of Pain (IASP)
- International Society for Autism Research (INSAR)
- Belgian Association for Psychological Sciences (BAPS)
- Leuven Brain Institute (LBI)
- KU Leuven Child & Youth Institute

- Leuven Autism Research (LAuRes)
 - Alliantieonderzoeksgroep UGent-VUB Motor Mind
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Skills & Methods

Languages

- Dutch — C2 (Native)
- English — C1 (Fluent)
- French — A2 (Basic)
- Spanish — A1 (Basic)

Medical imaging proficiencies

- MRI acquisition and analysis
- EEG acquisition and analysis
- Stress physiology measures
- Letswave 6, SPM 8–12, CAT12, FreeSurfer

Statistical skills

- RStudio
- JAMOVI
- SPSS
- MATLAB

Programming skills

- MATLAB
- Presentation (Neurobehavioral Systems)

Neurocognitive expertise

- Experimental design
- Cognitive and diagnostic testing

Laboratory skills

- Animal experiments
- Organ dissection
- Tissue embedding
- Microscopic evaluation
- Histological analysis

Clinical skills

- Drawing blood
- Intramuscular and subdermal injections
- ECG and EEG recordings
- CPR training

Awards & Grants

- Fulbright Postdoctoral Research Award Nominee 2026
 - PhD Dissertation Award 2024 (INSAR)
 - Belgium's Got Talent Prize 2023
 - Thérèse Vandereecken Prize for Clinical Medicine 2023
 - KU Leuven Postdoctoral Research Grant 2023
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Presentations

- **Moerkerke, M.** The role of oxytocin in modulating pain and its interaction with stress in the context of musculoskeletal pain. *EFIC 2025*, Lyon, France. **(oral talk)**
- **Moerkerke, M.** PhD Dissertation Award Presentation: *The role of oxytocin in autism*. *International Society for Autism Research (INSAR) 2024*, Melbourne, Australia. **(oral talk)**
- **Moerkerke, M., Daniels, N., Tibermont, L., Van der Donck, S., Tang, T., Prinsen, J., ... Boets, B.** (2023). Chronic oxytocin administration does not rescue reduced neural sensitivity towards emotional faces in autism. *NeuroCog 2023*, Brussels, Belgium. **(oral talk)**
- **Moerkerke, M., Daniels, N., Tibermont, L., Van der Donck, S., Tang, T., Prinsen, J., Bamps, A., Debbaut, E., Steyaert, J., Alaerts, K., Boets, B.** (2023). Influence of repeated intranasal oxytocin administration on neural activity during face processing in children with autism. *International Society for Autism Research (INSAR)*, Stockholm, Sweden. **(poster presentation)**
- **Moerkerke, M., Tibermont, L., Van der Donck, S., Daniels, N., Tang, T., Prinsen, J., Steyaert, J., Alaerts, K., Boets, B.** (2022). Can longterm intranasal oxytocin administration rescue reduced neural sensitivity towards emotional faces in autism? *Oxytocin and Vasopressin: From Brain Modulation, to Epigenetic Regulation and Clinical Applications*, Erice, Sicily, Italy. **(invited oral talk)**
- **Moerkerke, M., Daniels, N., Chubar, V., Van der Donck, S., Tang, T., Prinsen, J., Claes, S., Steyaert, J., Alaerts, K., Boets, B.** (2022). Oxytocin system alterations in autism? Assessing endogenous oxytocin levels and OXTR epigenetics throughout a long-term intranasal oxytocin treatment. *Oxytocin and Vasopressin: From Brain Modulation, to Epigenetic Regulation and Clinical Applications*, Erice, Sicily, Italy. **(poster presentation)**
- **Moerkerke, M., Chubar, V., Daniels, N., Van der Donck, S., Tang, T., Tibermont, L., Steyaert, J., Alaerts, K., Boets, B.** (2022). Oxytocin receptor epigenetics in autism spectrum disorders. *KU Leuven Child & Youth Institute*, Leuven, Belgium. **(oral talk)**
- **Moerkerke, M., Tibermont, L., Van der Donck, S., Daniels, N., Steyaert, J., Alaerts, K., Boets, B.** (2021). The effect of oxytocin on reduced neural sensitivity towards emotional faces in autism. *Leuven Brain Institute (LBI)*, KU Leuven, Belgium. **(poster presentation)**

- **Moerkerke, M., Daniels, N., Van der Donck, S., Steyaert, J., Alaerts, K., Boets, B.** (2021). Validating an EEG-based biomarker of socio-communicative impairments in ASD. *International Society for Autism Research (INSAR)*, virtual. **(poster presentation)**
- **Daniels, N., Moerkerke, M., Prinsen, J., Boets, B., Steyaert, J., Alaerts, K.** (2021). Measurement of sympathetically driven autonomic arousal during eye contact in children with and without an autism diagnosis. *International Society for Autism Research (INSAR)*, virtual. **(oral presentation / open access abstract)**
- **Moerkerke, M., Daniels, N., Van der Donck, S., Steyaert, J., Alaerts, K., Boets, B.** (2021). Neurobiological marker and intervention for socio-communicative impairments in autism spectrum disorders. *European Neuropsychopharmacology*, 44(S51-S52). <https://doi.org/10.1016/j.euroneuro.2021.01.079> **(poster presentation)**
- **Moerkerke, M., Daniels, N., Stuer-Jespers, A., Steyaert, J., Alaerts, K., Boets, B.** (2018). In search for an innovative neural marker and intervention for socio-communicative difficulties in children with and without autism spectrum disorders. *Understanding the Neuroregulatory Actions of Oxytocin and its Potential Clinical Applications*, Erice, Sicily, Italy. **(poster presentation)**

Publications

- Elise Cnockaert, Mira Meeus, Barbara Cagnie, Marjolein Chys, Carmel Steverlyncx, Matthijs Moerkerke, Jessica Van Oosterwijck (2026). *Human assumed central sensitization in interictal migraine: a systematic review and meta-analysis*. Neurological Sciences.
- Joren Vyverman, Robrecht De Baere, Inge Timmers, Iris Coppieters, Jessica Van Oosterwijck, Matthijs Moerkerke (2026). *The stress-pain connection in chronic primary pain: A systematic review and meta-analysis of physiological stress markers in relation to experimental pain responses*. Neuroscience & Biobehavioral Reviews.
- Matthijs Moerkerke, Iris Coppieters, Inge Timmers, Jessica Van Oosterwijck (2026). *Oxytocin in chronic pain: From analgesic to biopsychosocial adjuvant - An opinion paper*. Neuroscience & Biobehavioral Reviews.
- Matthijs Moerkerke, Joren Vyverman, Robrecht De Baere, Patricia Clement, Tom Smeets, Iris Coppieters, Inge Timmers, Jessica Van Oosterwijck (2025). *A comprehensive mapping of stress system interactions with pain and their contribution to chronification of musculoskeletal pain: Protocol of the STRAIN study*. PLOS One.
- Tiffany Tang, Kasper Pledts, Matthijs Moerkerke, Stephanie Van der Donck, Bieke Bollen, Jean Steyaert, Kaat Alaerts, Els Ortibus, Gunnar Naulaers, Bart Boets (2024). *Face Processing in Prematurely Born Individuals—A Systematic Review*. Brain Sciences.
- Kaat Alaerts, Matthijs Moerkerke, Nicky Daniels, Qianqian Zhang, Grazia Ricchiuti, Jean Steyaert, Jellina Prinsen, Bart Boets (2024). *Chronic oxytocin improves neural decoupling at rest in children with autism*. Journal of Child Psychology and Psychiatry.
- Matthijs Moerkerke, Nicky Daniels, Laura Tibermont, Tiffany Tang, Margaux Evenepoel, Stephanie Van der Donck, Edward Debbaut, Jellina Prinsen, Viktoria Chubar, Stephan Claes, Bart Vanaudenaerde, Lynn Willems, Jean Steyaert, Bart Boets, Kaat Alaerts

(2024). *Chronic oxytocin administration stimulates the oxytocinergic system in children with autism*. *Nature Communications*.

- Matthijs Moerkerke, Nicky Daniels, Stephanie Van der Donck, Laura Tibermont, Tiffany Tang, Edward Debbaut, Annelies Bamps, Jellina Prinsen, Jean Steyaert, Kaat Alaerts, Bart Boets (2023). *Can repeated intranasal oxytocin administration affect reduced neural sensitivity towards expressive faces in autism? A randomized controlled trial*. *Journal of Child Psychology and Psychiatry*.
- Matthijs Moerkerke, Nicky Daniels, Laura Tibermont, Tiffany Tang, Margaux Evenepoel, Stephanie Van der Donck, Edward Debbaut, Jellina Prinsen, Viktoria Chubar, Stephan Claes, Bart Vanaudenaerde, Lynn Willems, Jean Steyaert, Bart Boets, Kaat Alaerts (2023). *Chronic oxytocin administration stimulates the endogenous oxytocin system: an RCT in autistic children*. Preprint. Preprint.
- Margaux Evenepoel, Matthijs Moerkerke, Nicky Daniels, Viktoria Chubar, Stephan Claes, Jonathan Turner, Bart Vanaudenaerde, Lynn Willems, Johan Verhaeghe, Jellina Prinsen, Jean Steyaert, Bart Boets, Kaat Alaerts (2023). *Endogenous oxytocin levels in children with autism: Associations with cortisol levels and oxytocin receptor gene methylation*. *Translational Psychiatry*.
- Nicky Daniels, Matthijs Moerkerke, Jean Steyaert, Annelies Bamps, Edward Debbaut, Jellina Prinsen, Tiffany Tang, Stephanie Van der Donck, Bart Boets, Kaat Alaerts (2023). *Effects of multiple-dose intranasal oxytocin administration on social responsiveness in children with autism*. *Molecular Autism*.
- Kaat Alaerts, Nicky Daniels, Matthijs Moerkerke, Margaux Evenepoel, Tiffany Tang, Stephanie Van der Donck, Viktoria Chubar, Stephan Claes, Jean Steyaert, Bart Boets, Jellina Prinsen (2023). *At the head and heart of oxytocin's stress-regulatory neural and cardiac effects: a chronic administration RCT in children with autism*. Preprint. Preprint.
- Zhiling Qiao, Stephanie Van der Donck, Matthijs Moerkerke, Tereza Dlhsova, Sofie Vettori, Milena Dzhelyova, Ruud van Winkel, Kaat Alaerts, Bart Boets (2022). *Frequency-Tagging EEG of Superimposed Social and Non-Social Visual Stimulation Streams Provides No Support for Social Salience Enhancement after Intranasal Oxytocin Administration*. *Brain Sciences*.
- Nicky Daniels, Matthijs Moerkerke, Jean Steyaert, Annelies Bamps, Edward Debbaut, Jellina Prinsen, Tiffany Tang, Stephanie Van der Donck, Bart Boets, Kaat Alaerts (2022). *Effects of multiple-dose intranasal oxytocin treatment on social responsiveness in children with autism: A randomized, placebo-controlled trial*. Preprint. Preprint.
- Stephanie Van der Donck, Matthijs Moerkerke, Tereza Dlhsova, Sofie Vettori, Milena Dzhelyova, Kaat Alaerts, Bart Boets (2022). *Monitoring the effect of oxytocin on the neural sensitivity to emotional faces via frequency-tagging EEG: A double-blind, cross-over study*. *Psychophysiology*.
- Matthijs Moerkerke (2022). *PhD Thesis: The Role of Oxytocin in Autism*. PhD Dissertation, KU Leuven. PhD dissertation.
- Matthijs Moerkerke, Mathieu Peeters, Lyssa de Vries, Nicky Daniels, Jean Steyaert, Kaat Alaerts, Bart Boets (2021). *Endogenous Oxytocin Levels in Autism—A Meta-Analysis*. *Brain Sciences*.
- Jeroen Van Dessel, Edmund Sonuga-Barke, Matthijs Moerkerke, Saskia Van der Oord, Sarah Morsink, Jurgen Lemiere, Marina Danckaerts (2021). *The limits of motivational influence in ADHD: no evidence for an altered reaction to negative reinforcement*.

Social Cognitive and Affective Neuroscience.

- Matthijs Moerkerke, Marie-Laure Bonte, Nicky Daniels, Viktoria Chubar, Kaat Alaerts, Jean Steyaert, Bart Boets (2021). *Oxytocin receptor gene (OXTR) DNA methylation is associated with autism and related social traits – A systematic review*. Research in Autism Spectrum Disorders.
- Jeroen Van Dessel, Marina Danckaerts, Matthijs Moerkerke, Saskia Van der Oord, Sarah Morsink, Jurgen Lemiere, Edmund Sonuga-Barke (2021). *Dissociating brain systems that respond to contingency and valence during monetary loss avoidance in adolescence*. Brain and Cognition.
- Matthijs Moerkerke, Nicky Daniels, Stephanie Van der Donck, Jean Steyaert, Kaat Alaerts, Bart Boets (2021). *P.318 Neurobiological marker and intervention for socio-communicative impairments in autism spectrum disorders*. European Neuropsychopharmacology. Conference paper.
- Jeroen Van Dessel, Edmund Sonuga-Barke, Matthijs Moerkerke, Saskia Van der Oord, Jurgen Lemiere, Sarah Morsink, Marina Danckaerts (2019). *The amygdala in adolescents with attention-deficit/hyperactivity disorder: Structural and functional correlates of delay aversion*. World Journal of Biological Psychiatry.
- Jeroen Van Dessel, Sarah Morsink, Saskia Van der Oord, Jurgen Lemiere, Matthijs Moerkerke, Margaux Grandelis, Edmund Sonuga-Barke, Marina Danckaerts (2019). *Waiting impulsivity: a distinctive feature of ADHD neuropsychology?*. Child Neuropsychology.
- Jeroen Van Dessel, Matthijs Moerkerke, Edmund Sonuga-Barke, Saskia Van der Oord, Jurgen Lemiere, Marina Danckaerts (2018). *Distinctive neural response towards certain and conditional monetary loss in adolescents with attention-deficit/hyperactivity disorder*. European Neuropsychopharmacology. Conference paper.
- Jeroen Van Dessel, Matthijs Moerkerke, Edmund Sonuga-Barke, Jurgen Lemiere, Saskia Van der Oord, Marina Danckaerts (2017). *Understanding the role of the amygdala in attention-deficit/hyperactivity disorder: association between brain structure, function and delay aversion*. European Neuropsychopharmacology. Conference paper.