RYSSA MOFFAT
POSTDOCTORAL RESEARCHER

CONTACT

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ACADEMIC APPOINTMENTS

2023–present — **Postdoctoral Researcher**
ETH Zurich, Department of Humanities, Social and Political Sciences
Social Brain Sciences Lab, Director: Emily S. Cross

2021–2023 — **Postdoctoral Research Fellow**
Macquarie University, Faculty of Medicine, Health and Human Sciences
Social Brain in Action Lab, Director: Emily S. Cross

EDUCATION

2022 — **Macquarie University, Newcastle University, Universities of Groningen & Potsdam**
PhD in Cognitive Science (joint degree)
Thesis: *Recognition and cortical haemodynamics of vocal emotions – an fNIRS perspective*
Committee: David McAlpine, Deniz Baskent, Lindsey van Yper, Robert Luke

2018 — **Universities of Eastern Finland, Groningen & Potsdam**
M.Sc. in Clinical Linguistics (joint degree)
Thesis: *Coarticulation as a synchronic predictor of reading dysfluency*
Committee: Martijn Wieling, Aude Noiray

2016 — **University of Ottawa**
HBA, Major in German Language and Culture, Minor in Linguistics
Exchange year at University of Bonn

RESEARCH OVERVIEW & TECHNICAL SKILLS

My research spans *social and cognitive neuroscience and psychology*. I am interested in how humans of all ages navigate real-world social interactions. I *combine quantitative and qualitative approaches, including behavioral and neuroimaging methods* (fNIRS) to study group and individual-level psychological processes using *multivariate statistical approaches*. My technical skills include:

- **Statistical Analysis** using R (Frequentist & Bayesian approaches), MATLAB & Python for signal processing
- **Neuroimaging** expertise (fNIRS), mobile & hyperscanning techniques, including design, recording, analysis
- **Experimental design** and programming (Python, R, MATLAB)

GRANT FUNDING & INDUSTRY COLLABORATIONS

Oct 2023–Jul 2024 — **Cortivision – Pathfinder Program**
Title: "Probing the development of behavioural and neural synchrony in intergenerational interactions via collaborative art tasks"
Role: PI
Total Award Amount: Equivalent to €86,000. Loan of two fNIRS devices for duration of project.

Oct 2023 — **Caran D'Ache – Partnership with in-kind support**
In-kind support: Equivalent to €1000. Donation of 30 sets of NEOCOLOR pastels for research involving intergenerational collaborative art.

AWARDS & FELLOWSHIPS

| 2022 | *Australasian Society for Social and Affective Neuroscience* |
| | Conference Travel Funding, AUD$ 100 |

2019   *Conference on Implantable Auditory Prostheses (CIAP)*
Conference Travel Funding, USD$ 1000

2019   *Macquarie University*
Postgraduate Research Funding AUD$ 5000

2018-2021   *IDEALAB PhD Fellowship*
Highly competitive fellowship (~5 awarded/year) providing full tuition, stipend, & travel costs

2016-2018   *EMCL+ Mobility Grant*
Competitive scholarship providing tuition for 2-year MSc program

PUBLICATIONS & PRESENTATIONS

* indicates co-first authorship   **^** indicates mentored student

PREPRINTS

1. Moffat, Naudszus & Cross. (2025). Cardiac synchrony remains stable across repeated intergenerational encounters but is enhanced during high stakes collaboration. *bioRxiv*.

2. **Moffat**, Dumas & Cross. (2025). Longitudinal intergenerational hyperscanning reveals indices of relationship formation and loneliness. *bioRxiv*.

3. Leisten*****, **Moffat***, Caruana & Cross. (2025). Children with greater sustainability and equity understanding demand more from educational robots: Advice for educators and policymakers. *PsyArXiv*.

PEER-REVIEWED ARTICLES

4. **Moffat** & Cross. (2025). Individual abilities to estimate levels of movement synchrony predict action observation network activation. *Imaging Neuroscience*.

5. **Moffat***, Cahill*****, Cross & Caruana. (2025). "It'll cheer you on!" Children with and without reading difficulty value robot reading companions that are smart, supportive, and personal. *Scientific Reports*.

6. Casale***^**, **Moffat*** & Cross. (2024). Aesthetic evaluation of body movements shaped by embodiment and arts experience: Insights from behaviour and fNIRS. *Scientific Reports*.

7. Cross*****, Darda*****, **Moffat***, Munoz, Humphries & Kirsch. (2024). Delightful Duets: Motor synchrony and mutual gaze enhance dance enjoyment and perceptions of socialness. *Scientific Reports*.

8. **Moffat** & Cross. (2024). Awareness of embodiment enhances enjoyment and engages sensorimotor cortices. *Human Brain Mapping*.

9. **Moffat**, Roos, Casale & Cross. (2024). Dyadic body competence predicts movement synchrony during the mirror game. *Frontiers in Human Neuroscience*.

10. **Moffat**, Caruana & Cross. (2024). Inhibiting responses under the watch of a recently synchronized peer increases self-monitoring: evidence from functional near-infrared spectroscopy. *Open Biology*.

11. **Moffat** & Cross. (2024). Evaluations of dyadic synchrony: Observers' traits influence quantification and enjoyment of synchrony in mirror-game movements. *Scientific Reports*.

12. **Moffat**, Casale & Cross. (2024). Mobile fNIRS for exploring inter-brain synchrony across generations and time. *Frontiers in Neuroergonomics*.

13. **Moffat**, Baskent, Luke, McAlpine & van Yper. (2023). Cortical haemodynamic responses predict individual ability to recognise vocal emotions with uninformative pitch cues but do not distinguish different emotions. *Human Brain Mapping*.

14. Caruana, **Moffat**, Blanco & Cross. (2023). Perceptions of intelligence & sentience shape children's interactions with robot reading companions. *Scientific Reports*.

PEER-REVIEWED CONFERENCE PROCEEDINGS

15. Caruana, **Moffat**, Blanco & Cross. (2022). Talk, listen and keep me company: A mixed methods analysis of children's perspectives towards robot reading companions. *Proceedings of the 10th International Conference on Human-Agent Interaction*.

OTHER PROFESSIONAL PUBLICATIONS

16. Paquet, Prosser, **Moffat**, Davies, Degen & Sleigh. (2025). Open Science: A guide to recovery for activist burnout. [zine]. *Research Equals*.
17. **Moffat**. (2024). Invisible mechanisms of interpersonal alignment. *Nature Reviews Psychology*.

INVITED TALKS

1. *From strangers to friends: Mapping the development of intergenerational relationships with multi-brain fNIRS.* Talk given at the Faculty of Psychology and Educational Sciences, University of Geneva, Oct 2025.

2. *The beauty of moving together – Using light to understand synchrony between bodies and brains.* Talk given at Exploring the Spectrum of Light Workshop, Collegium Helvetica, Jun 2025.

3. *From speech processing to complex real-world social interactions using fNIRS.* Talk given to the Evolutionary Neuroscience of Language & Computational Neuroscience of Speech & Hearing research groups, University of Zurich, May 2025.

4. *Hyperscanning: Practicalities & Opportunities.* Talk given at the fNIRS Workshop – Hyperscanning & Developmental Studies, University of Vienna, Sep 2024.

5. *Interpersonal synchrony in movement and the brain.* Talk given to the Precision Psychiatry & Social Physiology Team, CHU Sainte-Justine Research Center, Apr 2024.

6. *Towards an fNIRS paradigm to map emotional prosody processing.* Talk given to the CI Brain Lab, Sunnybrook Health Science Centre, Feb 2020.

7. *Exploring metabolic responses to emotional prosody with fNIRS.* Talk given at Listen and Learn Workshop, Macquarie University, Nov 2019.

CONFERENCE TALKS

1. **Moffat** & Cross. *Perspectives on embodiment and enjoyment when watching or engaging in dyadic synchrony.* Talk given at International Conference on Music Perception and Cognition (ICMPC) 2025, Sao Paulo, Brazil. Jul 2025.

2. Cross & **Moffat**. *Exploring behavioural and neural mechanisms of movement synchrony from performers' and observers' perspectives.* Talk given at Joint Action Meeting X 2025, Turin, Italy. Jul 2025.

3. **Moffat**. *Multi-person fNIRS as a bridge between populations – Insights into intergenerational relationship development.* Talk given at Organisation for Human Brain Mapping (OHBM) 2025, Brisbane, Australia, Jun 2025.

4. **Moffat** & Cross. *Rose-tinted embodiment: Mirroring impacts enjoyment, empathy, and cortical activity when observing synchronous movements.* Talk given at fNIRS UK, Colchester, UK, Sep 2023.

5. **Moffat** & Cross. *Observer's traits predict accuracy of synchrony estimation and enjoyment of dyadic mirror-game movements.* Talk given at the 9th Joint Action Meeting 9, Budapest, Hungary, Jul 2023.

6. **Moffat**, Caruana & Cross. *Cortical correlates of inhibition when observed by synchronised vs. non-synchronised peers.* Talk given at Neuroscience 2022 (SfN), San Diego, USA, Nov 2022.

7. **Moffat**, Baskent, Luke, McAlpine & van Yper. Pilot: *Processing emotional prosody in normal hearing listeners with fNIRS.* Talk given at Conference on Implantable Auditory Prostheses (CIAP), Lake Tahoe, USA, Jul 2019.

CONFERENCE POSTERS

1. **Moffat**, Dumas & Cross. I*ntergenerational relationships as seen through hyperscanning.* Zurich Social Connection Workshop, Zurich, Switzerland, Sep 2025.

2. Leisten^, **Moffat**, Caruana & Cross. *Towards hands-on social robots for accessible, equitable, and sustainable technology-based learning.* Presented at IEE RO-MAN in Eindhoven, Netherlands, Aug 2025.

3. **Moffat**, Dumas & Cross. *fNIRS insights into intergenerational relationship development.* Presented at Organisation for Human Brain Mapping (OHBM) 2025, Brisbane, Australia, Jun 2025.

4. **Moffat**, Portier, Häuselmann, Dumas & Cross. *Longitudinal insights into motor coordination and neural synchrony within and between generations.* Presented at fNIRS 2024, Birmingham, UK, Sep 2024.

5. **Moffat**, Portier, Häuselmann, Casale & Cross. *Intergenerational social interactions: How do motor and neural synchrony develop over time.* Presented at Social & Affective Neuroscience Society (SANS), Toronto, Canada, Apr 2024.

6. Casale^, **Moffat** & Cross. *Arts engagement and embodied experience shape our aesthetic perceptions of socially-intentioned body movements*. Australasian Cognitive Neuroscience Society (ACNS), Sydney, Australia, Nov 2023.

7. Peterson^, Roberts, **Moffat** & Polito. *The relationship between altered states of conciousness, nature relatedness, and pro-environmental behaviour*. 3rd Psychedelic Symposium UW Madison, Madison, USA, Nov 2023.

8. **Moffat** & Cross. *Quantifying observed motor synchrony: Movement predictability and inter-individual traits predict accuracy.* Presented at Experimental Psychology (EPC), Canberra, Australia, Apr 2023.

9. Casale^, **Moffat** & Cross. *Art experience enhances enjoyment of dynamic human movement.* Presented at Australian Society for Experimental Psychology (EPC), Canberra, Australia, Apr 2023.

10. **Moffat**, Caruana & Cross. *Cortical activity evoked by synchronised vs. non-synchronised peer observers as detected with fNIRS.* Presented at fNIRS 2022, Boston, USA, Oct 2022.

11. Caruana, **Moffat**, Blanco & Cross. *A welcome social presence: Attentive and responsive robot reading buddies are preferred*. 8th Australasian Society for Social and Affective Neuroscience (AS4SAN) Conference, Sydney, Australia, Jun 2022.

12. **Moffat**, Baskent, Luke, McAlpine & van Yper. *Cortical responses to vocal emotions with attenuated voice pitch variation measured with fNIRS.* Presented at fNIRS 2021 virtual conference, Online, Oct 2021.

13. **Moffat**, Baskent, Luke, McAlpine & van Yper. *Pilot: Mapping emotional prosody in normal hearing listeners with fNIRS*. Presented at Association for Research in Otolaryngology (ARO), San José, USA, Jan 2020.

14. **Moffat**, Baskent, Luke, McAlpine & van Yper. *Pilot: Using fNIRS to explore emotional prosody perception*. Presented at 12th Speech in Noise Workshop (SPIN), Toulouse, France, Jan 2020.

RECENT TRAINING

2025	*Hidden labour and activism in open science*. Open Science Retreat, Digital Research Academy
2024	*Integrating sustainability in every field*, ETH Zurich
2024	*Hands-on machine learning with fNIRS using the BenchNIRS Python framework; Cedalion: […] fNIRS & DOT Data Analysis with Machine Learning Approaches*, fNIRS2024 Conference
2024	*Machine Learning for Health Data*, University of Zurich
2022	*Deaf Awareness Training; Mental Health First Aid; Foundations of Supervision*, Macquarie University

TEACHING

ETH Zurich

The Cutting Edge of Social Brain Imaging	all 2025, Fall 2024
Mind Meets Machine	Spring 2025
Learning With and From Robots	Spring 2024, Fall 2023

Macquarie University

Delusions and Disorders of the Mind and Brain (COGS1010)	Fall 2020, Spring 2020, Fall 2019
Introductory Phonetics and Phonology (LING2217)	Spring 2020
Introduction to Psycholinguistics (LING2214)	Fall 2020
Phonological Analysis (LING3390)	Fall 2020, Fall 2019
Language as Evidence (SPHL3300)	Fall 2020

Guest lecture given as part of

Psychophysiological Methods in Psychology and Neuroscience, New Bulgarian University	Nov 2024

SUPERVISION & MENTORSHIP

PhD Dissertations	*Bachelor/Master's Theses*	*Interns*
ETH Zurich:	**ETH Zurich (BSc):**	**ETH Zurich:**
Tessa Portier [Nov 2024-present]	Greta Bramow [Jul 2024–May 2025]	Chantal Nagel [Jul-Oct 2025]
Courtney Casale [Sep 2024–present]		CJ Abeshaus [Jun-Aug 2025]
Tanja Ulrich [Sep 2024–present]	**ETH Zurich (MSc):**	Alistair Gadola [Feb-March 2024]
Fenella Symes [Sep 2023–Dec 2024]	Filiz Kanele [Oct 2025-present]	Leonie Roos [Jul–Sep 2023]
	Ahmed Eldably [Sep 2025-present]	
	Luca Naudszus [May 2024–May 2025]	**Macquarie University:**
	Medea Häuselmann [Feb–Aug 2024]	Jonathon Clare [Apr–Jun 2023]
	Tessa Portier [Oct 2023–Apr 2024]	Annika Richter [Jul–Sep 2022]
		Sabrina Diep [Feb–May 2022]
	Macquarie University (MRes):	
	Hannah Cahill [Oct 2022-2024]	
	Abigayle Peterson [Oct 2022–2023]	
	Courtney Casale [Sep 2022–2023]	

RESEARCH POSITIONS

2018	**Laboratory for Oral Language Acquisition (Dr. Aude Noiray) & BabyLAB (Prof Barbara Höhle)**
	Research Assistant, University of Potsdam
	Topics: Developmental language disorders; Ultrasound tongue imaging; fNIRS
2016	**Section for Clinical Cognition Sciences (Prof Ferdinand Binkofski) & Department of Neurology, Stroke/Aphasia Units (Dr. Miriam Abel)**
	Research Assistant, RWTH Aachen University Hospital
	Topics: TMS; EEG; Language production; Electrical pharyngeal stimulation
2015	**School of Rehabilitation Sciences (Dr. Patricia Roberts)**
	Research Assistant, University of Ottawa
	Topics: Bilingualism; Verbal fluency; Language production

PROFESSIONAL SERVICE

COMMUNITY OUTREACH

2025	**A Popularity Contest at the Robotic Petting Zoo**, Bits n Bolts Festival, Zurich
	Mediated an interactive public art performance, where participants observed robotic vacuums with different personalities and voted for their favorite robots by feeding them colored beads.
2024	**Apero: Brain activity during social interaction**, ETH Zurich
	Hosted an event for participants (122) from longitudinal intergenerational study, where I presented study results and recorded participants' feedback on the study.
2022	**Crestwood Secondary School**, Canada I **Camp Aspire**, Macquarie University
	Held workshops, for indigenous Australian [Jan 2022] and Canadian [Oct 2022] high school students, about measuring and maximizing the social benefits of motor synchrony.
2021, 2022	**LEAP UP University Experience Day** I **Widening Participation**, Maquarie University
	Introduced refugee [May 2021] and indigenous Australian [Apr 2022] highschool students to robotic reading companions and scientific practices used to study child–robot interaction.

SERVICE TO SCIENTIFIC COMMUNITY

2025–present	Expert affiliate of Women's Brain Foundation (WBF) Academy
2025–present	Member of Swiss Society for Gender Health
2024–present	Vice President of Departmental Scientific Staff Association (ASST)
2024–present	Member of Education Committee; Society for functional Near-Infrared Spectroscopy (sfNIRS)
Nov 2024	**R Ladies Zurich Workshop:** Visualising data with ggplot2 – Preparing figures for publication and outreach.

Nov 2024	**External Thesis Examination:** Masters of Clinical Audiology, Macquarie University
2023–present	**Ad-Hoc Manuscript Review:** Reviewer for *Brain & Behavior, CHI 2025; International Journal of Social Robotics; Imaging Neuroscience; NeuroImage; Neuropsychologica; Oxford Open Neuroscience; PLOS One; PNAS; Quarterly Journal of Experimental Science; Review of General Psychology; Scientific Reports; Social Cognitive & Affective Neuroscience; Strategic Entrepreneurship Journal*
2023, 2025	**Federal Grant Review:** Reviewer for *National Science Foundation (NSF) Perception, Action, and Cognition Grant; Austrian Science Fund (FWF) ASTRA Awards*
2022–present	**Commitment to Open Science:** Preregistered all studies and shared all materials, data, and code for manuscripts archived on OSF

CONSULTING SERVICES (VOLUNTARY)

2025	**DigeHealth:** Consulted on scientific writing in white paper on mobile acoustic monitoring of gut sounds.
2024	**Connectome:** Consulted on feasibility of using fNIRS as the core technology for a healthtech startup.