Melanie Segado

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Google Scholar
GitHub

RESEARCH EXPERIENCE

FROM JAN 2023 (FT)

Kording Lab, University of Pennsylvania
AI X Science Postdoctoral Research Fellow

I gained expertise in foundation models, deep learning, applied computer vision, and reproducible research. I worked with a team of engineers and clinicians to develop a pipeline for infant movement analysis and cerebral palsy risk detection from 2D video

FEB 2019 – NOV 2022 (FT)

National Research Council Canada
Research Officer

I integrated biosensors into a virtual reality (VR) platform, and managed academic, clinical, industry, and international collaborations. I lead a team of engineers and clinicians to develop a real-time cognitive workload management platform in VR

2015 – 2018 (PT)

NeuroTechX
Co-Founder & Science Director

I co-founded an international non-profit community organization for public outreach and education in neurotechnology. As science director I helped create educational materials, design workshop curricula, and mentor student neurotechnology clubs at various universities around the world

EDUCATION

2014 – FEB 2020 **PhD Neuroscience**
Advisors: Dr. Robert Zatorre & Dr. Virginia Penhune
Integrated Program in Neuroscience
McGill University

2011 – 2014 **MSc (fast-tracked to PhD)**
Integrated Program in Neuroscience
McGill University

2008 – 2011 **BSc Neuroscience**
Advisors (Honor's thesis): Dr. Vincent Gracco & Dr. Shari Baum
Computational Neuroscience
McGill University

PRE-PRINTS & IN-PREPARATION

Segado, M., Prosser, L., Duncan, A., Johnson, M. J., Kording, P. K. (preprint). Data-Driven Early Prediction of Cerebral Palsy Using AutoML and interpretable kinematic features *medRxiv* **doi:10.1101/2025.02.10.25322007**

Segado, M., Prosser, L., Duncan, A., Johnson, M. J., Kording, P. K. (preprint). Assessing infant risk of Cerebral Palsy with video-based motion tracking. *medRxiv* **doi:10.1101/2024.11.06.24316844**

PEER-REVIEWED PUBLICATIONS

Budhachandra, K., **Segado, M.**, Pazdera, J.K., Shaigetz, V.G., Granek, J., Choudhury, N. (2025). An integrated platform combining immersive VR and physiological sensors for systematic and individualized assessment of stress response (bWell): Development Study *JMIR Formative Research* **doi:10.2196/64492**

Hewko, M., Shaigetz, V.G., Smith, M.S.D., Kohlenberg, E., Ahmadi, P., Hernández, M.E.H., Proulx, C., Cabral, A., **Segado, M.**, Chakrabarty, T., Choudhury, N. (in press). Considering theory-based gamification in the co-design and Development of Virtual Reality Cognitive Remediation for Depression (bWell-D). *JMIR Serious Games* **doi:10.2196/59514**

Sabalette, P., Dubé, N., Ménard, P., Labelle, M., Laramée, M.-T., Higgins, J., Barthelemy, D., **Segado, M.**, Proulx, C., Duclos, C. (in press). Immediate effect of alone and combined virtual reality, gait-like muscle vibration and transcranial direct current stimulation on neuropathic pain after spinal cord injury: a pilot study *Spinal Cord Series & Cases*

Kamal, F., **Segado, M.**, Shaigetz, V.G., Perron, M., Lau, B., Alain, C., Choudhury, N. (2023). Effects of virtual reality working memory task difficulty on the passive processing of irrelevant auditory stimuli. *NeuroReport* **doi:10.1097/WNR.0000000000001958**

Shaigetz, V.G., Proulx, C., Cabral, A., Choudhury, N., Hewko M., Kohlenberg, E., **Segado, M.**, Smith, MSD., Debergue, P. (2021). An Immersive and Interactive Platform for Cognitive Assessment and Rehabilitation (bWell): Design and Iterative Development Process *JMIR Rehabilitation & Assistive Technologies* **doi:10.2196/26629**

Segado, M., Zatorre, RJ., Penhune, VB. (2021). Effector-independent brain network for auditory-motor integration: fMRI evidence from singing and cello playing *NeuroImage* **doi:10.1016/j.neuroimage.2021.118128**

Penaloza, CP., **Segado, M.**, Debergue, P. (2020). BMI-VR based Cognitive Training improves Attention Switching Processing Speed *IEEE International Conference on Systems, Man and Cybernetics* **doi:10.1109/SMC42975.2020.9283447**

Segado, M., Zatorre, RJ., Penhune, VB. (2018). Partially Overlapping Brain Networks for Singing and Cello Playing *FrontiersIn Neuroscience* **doi:10.3389/fnins.2018.00351**

Wollman, I., Penhune, VB., **Segado, M.**, Carpentier, T., Zatorre, RJ. (2018). Neural Prerequisites and Predictors of Learning Success Associated with Complex Musical Training. *PNAS* **doi:10.1073/pnas.1721414115**

POSTER PRESENTATIONS

Segado, M., Prosser, L., Duncan, A., Johnson, M. J., Kording, P. K. (accepted). Assessing infant risk of Cerebral Palsy with video-based motion tracking. *European Academy of Childhood Disability Conference*

Gidiuta, I., **Segado, M.**, Sowade, F. O., Prosser, L., Skorup, J., Johnson, M. J., Kording, P. K. (2024). Infant Sentiment Analysis with Pre-Trained Vision Transformers. *Biomedical Engineering Society Annual Meeting*

Kamal, F., **Segado, M.**, Shaigetz, V.G., Perron, M., Lau, B., Alain, C., Choudhury, N. (2023). The influence of auditory change on cognitive processes associated with aging in virtual reality *Alzheimer's & Dementia* **doi:10.1002/alz.083159**

AWARDS & SCHOLARSHIPS

2024	AI x Science Postdoctoral Fellows Program *University of Pennsylvania*	**$5K**
2022	Neuro-AI Postdoctoral Scholarship (declined) *UNIQUE*	**$20K**
2020	Instant Award *National Research Council Canada*	
2013-19	Post-Graduate Research Scholarship *McGill University*	**$168K**
2017	Research Incubator Award *Centre for Research on Brain, Language and Music*	**$5K**
2012-13	Doctoral Research Scholarship *NSERC-CREATE*	**$21K**
2011-12	Post-Graduate Research Scholarship *McGill University*	**$21K**
2011	Undergraduate Student Research Award *NSERC*	**$5K**

FUNDED PROJECTS

2021	Cognitive modelling in virtual reality *National Research Council Canada*	**$75K/year, 2 years**
2021	BMI-VR 3rd arm training *Aging in Place Grant, National Research Council Canada*	**$50K/year, up to 7 years**
2020	BMI-VR 3rd arm pilot project *NRC-ATR Japan collaboration*	**$50K/year, 1 year**

ACADEMIC SERVICE

GRANT REVIEW	Canada Space Agency (Lunar Exploration Accelerator Program)
	Innovation, Science and Economic Development Canada, (Innovation Solutions Canada Challenge Program)
	National Research Council of Canada (Industrial Research Assistance Program)
PEER REVIEW	FrontiersIn Pyschology

SELECTED TALKS

INVITED

2024	Machine Learning in Rehabilitation, Robotics *Rehab Engineering and Design (BE 5140), University of Pennsylvania*
2024	Advancing Movement Neuroscience with Foundation Models, *Montreal AI Neuroscience Conference (Workshop)*
2024	Towards modeling high-level movement, Computational Neuroscience Initiative Seminar, *University of Pennsylvania*
2024	Global Perspectives on Medicine, Rehabilitation, & Robotics Webinar Series , *University of Pennsylvania*
2024	Special Topics in Neuroengineering (BE6100) , *University of Pennsylvania*
2022	Assistive Aging Technologies, *Canada School of Public Service*
2022	Brain Machine Interfaces and Robotics in Virtual Reality, *TechX, National Research Council Canada*
2017	Developing Technologies for Music & Health (2.S992), *MIT*

CONTRIBUTED

2020	BMI-VR Training improves attention switching processing speed, *IEEE Systems, Man, and Cybernetics*
2018	Brain implants & mindreading: risks & counter strategies, *NorthSec Security Conference*

TEACHING EXPERIENCE

TEACHING ASSISTANT

2024	Special Topics in Neuroengineering (BE6100) *University of Pennsylvania*
2024	Modern Approaches to Behavior Analysis *Cajal Advanced Neuroscience Training*

2012-14 Neuroethics (NSCI300) *McGill University*
2012-14 Anatomy of the Human Brain (ANAT321) *McGill University*

COURSE COORDINATOR
2017 Neuroethics (NSCI300) *McGill University*

GRADUATE TEACHING FELLOW
2014-16 Tomlinson Project in University Level Science Education *McGill University*

GRADUATE WORKSHOPS
Writing reproducible research software
Introduction to computer architecture & design
Introduction to Linux & the command line

SUPERVISION & MENTORING

UNIVERSITY OF PENNSYLVANIA
UNDERGRADUATE RESEARCH PROJECTS
2024 Ioana Gidiuta (Bioengineering) *Rachleff Scholar*
2024 Cassidy Schuman (Bioengineering) *NSF Louis Stokes Alliances for Minority Participation*
2024 Yarden Guez (Computer science) *Academic Bridge Fellowship*

NATIONAL RESEARCH COUNCIL CANADA
2021-22 Farooq Kamal, PhD *Postdoctoral Research Fellow*
2022 Hugo Laflamme (University of Montreal) *NSERC-CREATE PhD Internship*
2021 Jesse Pazdera (McMaster University) *NSERC-CREATE PhD Internship*
2021 Maxime Perron (University of Toronto) *NSERC-CREATE PhD Internship*
2020 Marcel Farres-Franch (McGill University) *NSERC-CREATE PhD Internship*
2019-20 Alex Chorel Campanozzi (University of Sherbrooke) *Undergraduate co-op rotation*

MCGILL UNIVERSITY
2019 Yilin Zhang (McGill University) *Undergraduate Student Research Project*
2015-18 Sonia Israel, Kelly Perlman, Jessica Wang *McGill Neurotechnology Student Club*

MISCELLANEOUS
2023 Abstract writing mentor *COSYNE Conference*
2015-17 Project mentor *McGill Building21*
2015-18 Community mentor *NeuroTechMTL, NeuroTechBOS, NeuroTechTO*
2015-17 Peer mentor *McGill Office for Students with Disabilities*

COMMUNITY ENGAGEMENT

CO-ORGANIZER
2018 Biohacking village, *DEFCON Security Conference*
2015-17 Weekly public neurotechnolgy workshops, *NeuroTechMTL*
2016 Emotion detection technology hackathon *Emotion Hack Day*
2016 NeuroTechX International Hackathon

VOLUNTEER
2022 Montreal AI-Neuroscience Conference
2013-15 Touching Brains (public neuroanatomy workshop using preserved human brains)
2015 Montreal Science Center Eureka Festival (Intro to neurotechnology for kids)

TECHNICAL SKILLS

ARTIFICIAL INTELLIGENCE
Foundation Models: Dataset curation, tokenization, fine-tuning
Applied Computer Vision: Object detection and recognition, 2D/3D human pose estimation, action recognition, facial keypoint analysis
Machine Learning: Automated Machine Learning (AutoML), deep neural networks, model evaluation and optimization

NEUROSCIENCE
Neuroimaging and Biosignals: Functional MRI (fMRI), Electroencephalography (EEG), Electromyography (EMG), Eye Tracking, Galvanic Skin Response (GSR), Electrocardiography (ECG), Pulse Oximetry
Neurotechnology: Real-time signal processing, Kalman filtering, real-time classification algorithms, virtual reality integration
Experimental Design: Behavioral & neuroimaging experiments, computational modeling

COMPUTING
Development Tools and Environments: Bash scripting, Linux, remote development (SSH, VSCode Remote), high-performance compute clusters, SLURM workload manager
Reproducible Research: Docker, GitHub, Google Colab notebooks, Pre-registration
Visualization and Figure Creation: Blender, Maya, Unity, Inkscape, GIMP
Tech Support: Hardware/software integration, troubleshooting, system optimization

COMMUNICATION
Languages: English, Spanish, French (fluent)