Alexander Kvist

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Education

KTH Royal Institute of Technology **Stockholm, Sweden**
MSc in Medical Engineering *2016–2018*
Further specialization with courses in medical imaging systems, electronics, implants, informatics, patient safety.

EPFL École Polytechnique Fédérale de Lausanne **Lausanne, Switzerland**
Exchange Studies *Sep 2016–Jul 2017*
One year of exchange studies at master level. Specialized in data analysis, machine learning, simulation methods and neuroscience.

KTH Royal Institute of Technology **Stockholm, Sweden**
BSc in Medical Engineering *2013–2016*
Broad engineering base with courses in mathematics, statistics, physics, programming, anatomy and medical imaging systems.

Doctoral education

Karolinska Institutet **Stockholm, Sweden**
PhD in Medical Science *2021–present*
My thesis is focused on researching gait and balance in neurodegenerative populations, from behavior to neurophysiology. More specifically, the project tries to better understand motor behavior during complex walking, cognitive-motor interference and neural correlates of these, in order to support evaluating and targeting interventions for these abilities.

Work Experience

uMOVE core facility, Karolinska Institutet **Stockholm, Sweden**
Lab Manager *Jan 2022–present*
Part-time position during the PhD. Research support, running experiments and analysing data for internal and external clients of the core facility.

Franzén Group, Karolinska Institutet **Stockholm, Sweden**
PhD Student *Sep 2021–present*
PhD Student in the area of human movement neuroscience.

Sectra Imaging IT **Linköping, Sweden**
Software Engineer *Aug 2018–Aug 2021*
Software development work on a large PACS server platform for hospital radiology departments.
- Developed high-performance .NET server components for a large PACS platform in C# and C++
- Had a role as agile coach and scrum master

Science for Life Laboratory **Stockholm, Sweden**
MSc Degree Project *Jan 2018–Jun 2018*
Developed a method for classifying pathogenic mutations in proteins.
- Built a machine learning model based on Deep Learning techniques with state-of-the-art performance in benchmarks
- Worked with large amounts of data, including parallel processing at an HPC2N cluster, and developed an end-to-end pipeline from raw data to results

Center for Molecular Medicine, Karolinska Institutet **Stockholm, Sweden**
BSc Degree Project *Mar 2016–May 2016*
Developed a visualization tool for structural variants in DNA.
- Created an easy-to-use platform independent GUI in Qt
- Worked with data from whole genome sequencing

Publications

Peer-reviewed articles

[1] Albrecht, F., **Kvist, A.**, and Franzén, E. Jan. 2025. "Resting-State Functional near-Infrared Spectroscopy in Neurodegenerative Diseases – A Systematic Review". In: *NeuroImage: Clinical* 45, p. 103733. DOI: 10.1016/j.nicl.2025.103733.

[2] **Kvist, A.**, Bezuidenhout, L., Johansson, H., Albrecht, F., Moulaee Conradsson, D., and Franzén, E. Jan. 2024. "Validation of fNIRS Measurement of Executive Demand during Walking with and without Dual-Task in Younger and Older Adults and People with Parkinson's Disease". In: *NeuroImage: Clinical* 43, p. 103637. DOI: 10.1016/j.nicl.2024.103637.

[3] **Kvist, A.**, Tinmark, F., Bezuidenhout, L., Reimeringer, M., Conradsson, D. M., and Franzén, E. Jan. 2024. "Validation of Algorithms for Calculating Spatiotemporal Gait Parameters during Continuous Turning Using Lumbar and Foot Mounted Inertial Measurement Units". In: *Journal of Biomechanics* 162, p. 111907. DOI: 10.1016/j.jbiomech.2023.111907.

[4] **Kvist, A.**, Bezuidenhout, L., Johansson, H., Albrecht, F., Ekman, U., Conradsson, D. M., and Franzén, E. 2023. "Using Functional Near-Infrared Spectroscopy to Measure Prefrontal Cortex Activity during Dual-Task Walking and Navigated Walking: A Feasibility Study". In: *Brain and Behavior* 13.4, e2948. DOI: 10.1002/brb3.2948.

Preprints and pre-registrations

[5] **Kvist, A.** and Wallin, A. Jan. 2025. *AS-RTS - Comparison between Auditory Stroop with Pre-Defined Intervals and Auditory Stroop with Response Triggered Stimuli*. DOI: 10.17605/OSF.IO/85HT3.

[6] Yücel, M. A., [. . .], **Kvist, A.**, et al. Sept. 2024. *The fNIRS Reproducibility Study Hub (FRESH): Exploring Variability and Enhancing Transparency in fNIRS Neuroimaging Research*. DOI: 10.31222/osf.io/pc6x8.

MSc thesis

[7] **Kvist, A.** 2018. "Identifying Pathogenic Amino Acid Substitutions in Human Proteins Using Deep Learning". MA thesis. KTH, School of Engineering Sciences in Chemistry, Biotechnology, Health (CBH) / KTH, School of Engineering Sciences in Chemistry, Biotechnology, and Health (CBH), p. 33.

Awards

Society for functional near-infrared spectroscopy (SfNIRS) **Birmingham, England**
Poster award *2024*
Poster award for poster "Prefrontal cortex activity during navigated walking in older adults and people with Parkinson's disease" during fNIRS 2024

Funding

Norrbacka-Eugenia foundation **Stockholm, Sweden**
PhD funding *2023-2025*

Funding for PhD project, around 1 million SEK or 100 000 USD

Teaching

uMOVE core facility **Stockholm, Sweden**

Movement analysis workshops *2022-2025*

Teaching and demonstration of analysis of spatiotemporal gait parameters using inertial-based movement sensors in a laboratory environment, as well as with a pressure-sensitive mat. Also demonstration of functional near-infrared spectroscopy (fNIRS) measurements. Leading of students at basic and advanced level in performing their own data collection and interpretation.

Seminars, presentations, posters

Karolinska Institutet **Stockholm, Sweden**

Presentation: Tissue & Motion conference *2024*

"Understanding complex walking in Parkinson's disease, from gait analysis to neuroimaging"

Umeå University **Umeå, Sweden**

Presentation: Psychology department Friday seminar series *2024*

"Neuroimaging complex walking using functional near-infrared spectroscopy - experimental design, methodology and analysis"

Karolinska Institutet **Stockholm, Sweden**

Presentation: Imaging seminar series *2023*

"Understanding complex walking in Parkinson's disease, from gait analysis to neuroimaging" (with Rodrigo Vitorio)

Karolinska Institutet **Stockholm, Sweden**

Presentation: Neurocenter seminar series *2023*

"Movement analysis and brain activity in Parkinson's Disease and Multiple Sclerosis" (with Andreas Wallin)

Society for functional near-infrared spectroscopy (SfNIRS) **Birmingham, England**

Poster: fNIRS 2024 *2024*

"Prefrontal cortex activity during navigated walking in older adults and people with Parkinson's disease"

International Society for Posture and Gait Research **Brisbane, Australia**

Poster: ISPGR World Congress 2023 *2023*

Poster: "Validation of fNIRS measurement of cognitive load during complex walking tasks"

International Society for Posture and Gait Research **Montreal, Canada**

Poster: ISPGR World Congress 2022 *2022*

Poster: "Validation of algorithm for calculating spatiotemporal gait parameters during continuous turning using a wearable lumbar accelerometer"