

Benjamin Filtjens

Academic curriculum vitae

Assistant Professor | Delft University of Technology
Engineering Systems and Services

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Research profile

I am an Assistant Professor at TU Delft developing machine learning methods to understand and improve human movement across clinical sensing, rehabilitation and assistive robotics. During my PhD at KU Leuven, I initiated a collaboration between machine learning and movement-disorder neuroscience to develop objective methods for assessing pathological gait. A KU Leuven postdoctoral fellowship expanded this work towards multimodal sensing and adaptive assistive robotics.

A subsequent Data Sciences Institute fellowship at the University of Toronto supported my project, "Towards foundation models for gait analysis". Working with KITE and the Vector Institute shifted my focus towards movement representations that generalise across datasets, populations and tasks. In 2025, I received the International Society of Posture and Gait Research Emerging Scientist Award.

I have built an interdisciplinary research programme connecting machine learning, neuroscience, physiotherapy and rehabilitation robotics. I co-wrote AID-FOG, RevalExo, AI@WZC, AidWear and JustHealth and am a co-investigator, generally leading or co-leading their machine learning research. Across these collaborations, I am the daily scientific advisor to five PhD candidates.

My ambition is to establish new principles for foundation learning from heterogeneous, partially connected data and translate them into AI for clinical assessment and adaptive rehabilitation, with the goal of improving patients' quality of life.

Academic appointments

Assistant Professor

Jun 2025 - present | Delft University of Technology

Department of Engineering Systems and Services, Faculty of Technology, Policy and Management.

Research Fellow, voluntary appointment

Oct 2024 - present | KU Leuven, Department of Electrical Engineering (ESAT)

10% unpaid scientific affiliation to coordinate ongoing collaborations.

Postdoctoral Fellow

Oct 2024 - Jun 2025 | KITE Research Institute, University Health Network, and Vector Institute, Canada

Data Sciences Institute fellowship, University of Toronto. Mentor: Prof. Babak Taati.

Postdoctoral Researcher

Oct 2023 - Sep 2024 | KU Leuven, Department of Electrical Engineering (ESAT)

Research with Prof. Bart Vanrumste.

Postdoctoral Fellow

Oct 2022 - Sep 2023 | KU Leuven, Department of Electrical Engineering (ESAT)

KU Leuven Research Council Postdoctoral Mandate. Mentor: Prof. Bart Vanrumste.

Doctoral Researcher

Sep 2017 - Sep 2022 | KU Leuven, Department of Electrical Engineering (ESAT)

Deep learning for automated analysis of pathological gait.

Education

PhD in Electrical Engineering

2022 | KU Leuven

Awarded 9 September 2022. Thesis: Deep learning for automated movement analysis using motion capture: case studies on detecting and assessing gait impairments in people with Parkinson's disease and freezing of gait. Promotor: Prof. Bart Vanrumste; co-promotors: Prof. Alice Nieuwboer and Prof. Peter Slaets.

MSc in Engineering Technology, Automation

2017 | Hasselt University and KU Leuven

Double degree. Thesis: Detection of Lint by Using Machine Vision.

Personal grants and fellowships

Data Sciences Institute Postdoctoral Fellowship

2024 - 2025 | University of Toronto

Towards foundation models for gait analysis. Fellowship DSI-PDFY3R1P13.

Research Council Postdoctoral Mandate

2022 - 2023 | KU Leuven

Towards at-home mobility assessment with deep learning technology. Fellowship PDMT2/22/046.

Awards and recognition

Emerging Scientist Award

2025 | International Society of Posture and Gait Research

Recognised for early-career contributions to posture and gait research; delivered the Emerging Scientist plenary lecture at the 2025 World Congress.

Collaborative research projects

AID-FOG

2024 | Michael J. Fox Foundation for Parkinson's Research

Co-investigator; machine learning research. Artificial intelligence-driven freezing of gait detection in the home.

RevalExo

2023 | Research Foundation - Flanders (FWO), Strategic Basic Research

Co-investigator; machine learning research. A wearable lower-limb exoskeleton for daily activities and data-driven remote rehabilitation.

AI@WZC

2023 | Province of Flemish Brabant, Smart Region

Project conception, proposal writing, and scientific coordination. Supporting and motivating care-home residents to exercise using artificial intelligence.

AidWear

2023 | Belgian Federal Public Service Policy and Support (BOSA)

Co-investigator; machine learning research. AI-driven wearable robotics for healthcare.

JustHealth

2026 | European Union, Horizon Europe, Marie Skłodowska-Curie Actions

Co-investigator and daily scientific advisor. A doctoral network on just and trustworthy artificial intelligence in healthcare.

FOG-IT

2021 | KU Leuven Industrial Research Fund

Research contributor. An integrated software platform for tagging freezing of gait in Parkinson's disease.

Doctoral supervision

Daily scientific advisor

Current | KU Leuven collaborations

Juha Carlon, Diwas Lamsal, Vayalet Stefanova, Maxim Yudayev, and Y. Haghbin (started September 2026). Research spans pathological gait, multimodal sensing, rehabilitation, and assistive technology.

Academic service

Academic Editor

2025 - present | PLOS Digital Health

Editorial service in digital health research.

Program Committee member

2026 | ECCV MoCha Workshop

Human Motion Challenges in Real-World and Clinical Settings.

Inaugural member, Measurement Group

International Consortium for Freezing of Gait (ICFOG)

Contributed to international recommendations on technology-assisted freezing-of-gait measurement and machine learning evaluation.

Scientific advisory committee

N-AI-tingale, FWO-funded project

Expertise in audio-visual fusion for identifying clinical decline in hospitalised patients.

Ambassador

TU Delft Institute for Health Systems Science

Connecting methodological and clinical research.

Technical Committee member

IEEE EMBS Benelux, BioRobotics

Interdisciplinary community service in rehabilitation and assistive robotics.

Open research resources

CARE-PD

2025 | Multisite clinical gait dataset

Contribution to data sharing, harmonisation, pretraining, and release.

RevalExo

2026 | Multimodal locomotion benchmark and dataset

Co-design of a temporal, cross-population benchmark for locomotion mode recognition.

HERMES

2026 | Open-source sensing and AI framework

Co-design and scientific supervision of synchronised multimodal sensing, real-time inference, and intervention.

Patent applications

System for assessment of freezing of gait

2026 | Pending patent application PCT/EP2026/065548

Co-inventor with P.-K. Yang, B. Vanrumste, M. Gilat, and P. Ginis. Inventor order is not final.

Selected publications

Five selected publications. See the full publication list for all publications and research outputs.

2026

CARE-PD: A multi-site anonymized clinical dataset for parkinson's disease gait assessment

Adeli V, Klabučar I, Rajabi J, **Filtjens B**, Mehraban S, Wang D, Hoang TH, Do M, Seo H, Muller C, Coelho D, de Oliveira C, Ginis P, Gilat M, Nieuwboer A, Spildooren J, McKay J, Kwon H, Clifford G, Esper C, Factor S, Genias I, Dadashzadeh A, Shum L, Whone A, Mirmehdi M, laboni A, Taati B

Advances in Neural Information Processing Systems 38, 2026.

Conference paper | DOI: 10.52202/085713-4391

Deep learning for freezing of gait assessment using inertial measurement units: a multicentre validation study

Yang PK, Carlon J, Goris M, Klaver E, Nonnekes J, van Wezel RJA, Alcock L, Yarnall AJ, Rochester L, Hansen C, Schlenstedt C, Maetzler W, Buzaglo D, Brozgol M, Hausdorff JM, Nieuwboer A, Gilat M, Ginis P, Vanrumste B, **Filtjens B**

npj Parkinson's Disease, 2026.

Journal article | DOI: 10.1038/s41531-026-01407-7

RevalExo: A Functional Daily-Activity Benchmark for Inertial and Visual Locomotion Mode Recognition in Older Adults and Clinical Cohorts

Lamsal D, Carlon J, Claeys R, Yudayev M, Flynn L, Verstraten T, Beckwée D, Swinnen E, Bâce M, Vanrumste B, **Filtjens B**

arXiv preprint arXiv:2609.08090, 2026.

Preprint | DOI: 10.48550/ARXIV.2609.08090

BMVC 2026, oral presentation, in press; linked version is a preprint.

Assessment of change in drug-induced parkinsonism in daily-life gait using vision-based machine learning

Filtjens B, Adeli V, Mehraban S, Sabo A, Taati B, laboni A

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PLOS Digital Health.

Journal article | DOI: 10.1371/journal.pdig.0001780

In press.

2022

Skeleton-based action segmentation with multi-stage spatial-temporal graph convolutional neural networks

Filtjens B, Vanrumste B, Slaets P

IEEE Transactions on Emerging Topics in Computing 12 (1), 202-212, 2022.

Journal article | DOI: 10.1109/TETC.2022.3230912