

# SVEN DEGROEVE

PhD, Artificial Intelligence Expert

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With over two decades of experience in Artificial Intelligence, I have successfully navigated the intersection of research and industry, leveraging AI to address complex, real-world challenges. My expertise spans statistics, data analysis, machine learning and deep learning, with a proven ability to translate AI innovations into impactful natural language processing, biotechnological and biomedical predictive modeling solutions. I quickly absorb and apply new concepts, and I excel at articulating complex ideas in a clear and accessible way. As a team player, I thrive in dynamic environments, effectively bridging the gap between technical expertise and application. With the rapid advances in AI, I'm now eager to apply my expertise, problem-solving skills, and communication strengths in an industry-driven role, where I can drive innovation, product development, and business growth.

## PROFESSIONAL CAREER

### **Associate Professor in Machine Learning for Biomedical Data, Senior Lecturer**

**Oct 2019 – Present | Faculty of Medicine and Health Sciences, Ghent University**

In acknowledgment of my significant contributions to the integration of machine learning and AI in both education and research within the Faculty of Medicine and Health Sciences, I was awarded a 10% Associate Professorship to further advance my educational initiatives. These initiatives have been highly regarded by both the faculty and master's students. Additionally, I serve as (co-)promoter for two postdoctoral and three predoctoral researchers, and I have previously (co-)supervised four predoctoral researchers.

Since 2021, I have served as a member of the Educational Committee for Biomedical Sciences and the IT Committee, supporting the faculty in its strategic preparation for the AI-driven future. I'm a member of the [Health Intelligence Network Ghent](#), a multidisciplinary initiative that brings together expertise in AI and healthcare.

### **Senior Staff Scientist, AI Expert (AI biotechnology, high-throughput proteomics)**

**Mar 2017 – Present | CompOmics, VIB-UGent Center for Medical Biotechnology, Zwijnaarde**

I lead and promote machine and deep learning research and development within the Computational Omics and Systems Biology Group (CompOmics) of the Flemish Institute for Biotechnology (VIB). My research findings are currently being integrated into Bruker Corporation's commercial software to enhance the analysis of mass spectrometry data. Bruker, a global leader in scientific instruments and analytical solutions, is leveraging these advancements to improve the accuracy and efficiency of its analytical tools. In parallel I lead the development of a SaaS called [ionbot™](#) funded by an Industrial Research Fund (IOF) grant of Ghent University. I'm currently involved in EU-funded projects BEXERNA and PROTrEIN.

As a Staff Scientist I also apply my expertise to advance AI-based data analysis for other groups with the VIB centre as well as the Ghent University Hospital. This includes the application of Large Language Models for protein analysis, plant gene regulation understanding and bacterial resistance prediction.

### **Machine Learning Expert (AI biotechnology, computational biology)**

**Jul 2009 – Feb 2017 | CompOmics, Medical Biotechnology Center, VIB, Ghent University**

As an early member of a small bioinformatics group, I was responsible for data analysis in a wide range of proteomics experiments within the center. Over time, this group expanded into CompOmics, now a thriving research team of over twenty members with a strong reputation for developing cutting-edge research tools and producing high-impact publications.

I played a pivotal role in securing high-budget grant funding and attracting top talent to the group by integrating machine learning and AI into the Master's program in Biomedical Sciences. I applied my AI expertise to several EU-funded international projects PRIME-XS, METASPACE and EPIC-XS.

### **Senior Knowledge Systems Engineer (clinical trial optimization AI software)**

**Oct 2008 – Mar 2009 | MDCPartners, Antwerp**

MDCPartners was a small start-up that provided business intelligence solutions for clinical trial optimization, medical expert identification and competitive intelligence. I investigated the application of machine learning methods to further improve on the optimization software in development.

### **Data Analyst, Senior Scientist (biomarker discovery, statistics)**

**Oct 2005 – Aug 2008 | Pronota, Technologiepark Zwijnaarde (now part of Biocartis, Mechelen)**

Pronota was a spin-off company of the Flemish Institute for Biotechnology (VIB) that aimed to build a portfolio of diagnostic products that work by analyzing protein biomarkers in body fluid using high-throughput proteomics experiments. I was responsible for the experimental design and analysis of the proteomics studies for both discovery platform development and biomarker discovery. My task was to evaluate and communicate key issues, derived from data analysis, affecting biomarker discovery and data quality.

### **Post-doctoral Fellow (audio signal AI)**

**Jan 2005- Sep 2005 | KERMIT, Ghent University**

As part of an FWO funded academic research project I applied my machine learning expertise to improve the annotation of drums and snares in raw audio signals (very early WAV to MIDI conversion). My successful implementation was published and presented at the International Conference on Music Information Retrieval (ISMIR).

### **PhD (genomics AI revolution)**

**Jan 2001 –Dec 2004 | Ghent University, Flemish Institute for Biotechnology (VIB)**

As part of a large CNRS International Research Network program, I implemented support vector machine based learning algorithms for the automatic annotation of newly sequenced genomes. My

work resulted in the first accurate gene annotation of several genomes with the results of this work published in top journals such as Science and PNAS.

### **Machine Learning Researcher (HIV virus mutations)**

Jan 2001 – Dec 2001 | Tibotec Virco, Mechelen

As part of a newly initiated data analysis department, I introduced machine learning methods for the analysis of complex virus mutation patterns of protease resistance in HIV data. My successful proof-of-concept resulted in significant funding for the company.

### **Machine Learning Research Assistant (chatbots, AI dialogue systems)**

Sep 1999 – Dec 2000 | Centre for Evolutionary Language Engineering (CELE), L&H, Ieper

In these early days of AI for Natural Language Processing, our blue-sky research group headed by burggraaf and astronaut Dirk Frimout investigated the application of state-of-the-art machine learning algorithms for solving Language Modeling tasks to further improve the AI dialogue systems commercialized by the company Lernout&Hauspie (L&H).

## **EDUCATION**

### **Doctorate (Ph.D.) in Sciences: Computer Science**

Ghent University | 2001 – 2004

Title of thesis: “Design and evaluation of a linear classification strategy for gene structural element recognition”

### **Licentiate (Master in Sciences) in Computer Science**

Ghent University | 1997 - 1999

Title of thesis: “Classification of skin lesions with neural networks”

## **SKILLS**

**Programming:** Python, Pandas, C, Cython, R, Visual Studio Code, SQL, PostgreSQL

**Machine Learning:** Scikit-learn, Auto-sklearn, Scikit-multilearn, Hyperopt, Kaggle

**Deep Learning:** PyTorch (Lightning), Tensorflow, Keras, HuggingFace API, Weights&Biases, MLFlow, AutoKeras, Google AutoML Vision

**Generative AI:** LangGraph

**Data exploration:** Seaborn, Plotly, Tableau Software

**Cloud:** Google Compute Engine (Vertex AI), Microsoft Azure, Kubernetes, GitHub

**Other:** Docker, Flask, Streamlit

## **TEACHING**

### **Machine Learning methods for Biomedical Data (D012554)**

Ghent University | yearly since 2016 | 55 hours

### **Large scale analysis of Biomedical Data (D013628)**

Ghent University | yearly since 2015 | 10 hours

## Machine Learning & Deep Learning Workshop

Flemish Institute for Biotechnology (VIB) | twice a year since 2018 | 32 hours

## SCIENTIFIC PUBLICATIONS

### ALL PUBLICATIONS

UGent Biblio: <https://biblio.ugent.be/publication?text=sven+degroeve>

Google Scholar: <https://scholar.google.nl/citations?user=pzwt3NYAAAAJ&hl=en>

### MOST RELEVANT PUBLICATIONS

M. Palmblad, S. Boecker, **S. Degroeve**, O. Kohlbacher, L. Kall, W. S. Noble, M. Wilhelm, [Interpretation of the DOME Recommendations for Machine Learning in Proteomics and Metabolomics](#). J. Proteome Res. 21, 1204–1207 (2022).

R. Bouwmeester, R. Gabriels, N. Hulstaert, L. Martens, **S. Degroeve**, [DeepLC can predict retention times for peptides that carry as-yet unseen modifications](#). Nat. Methods. 18, 1363+ (2021).

R. Bouwmeester, R. Gabriels, T. Van Den Bossche, L. Martens, **S. Degroeve**, [The Age of Data-Driven Proteomics: How Machine Learning Enables Novel Workflows](#). Proteomics. 20 (2020).

R. Gabriels, L. Martens, **S. Degroeve**, [Updated MS2PIP web server delivers fast and accurate MS2 peak intensity prediction for multiple fragmentation methods, instruments and labelling techniques](#). Nucleic Acids Res. 47, W295–W299 (2019).

A. S. C. Silva, R. Bouwmeester, L. Martens, **S. Degroeve**, [Accurate peptide fragmentation predictions allow data driven approaches to replace and improve upon proteomics search engine scoring functions](#). Bioinformatics. 35, 5243–5248 (2019).

## PATENTS

Kas, K., Vanpoucke, G., Degroeve, S., & Huijben, K. (2010). Biomarkers and Methods for Diagnosing, Predicting and/or Prognosing Sepsis and Uses Thereof. *U.S. Patent Application No. 20100292131*.

## CERTIFICATES

[Neural Networks and Deep Learning](#) (Coursera), issued Nov 2019

[Structuring Machine Learning Projects](#) (Coursera), issued Jan 2020

[Improving Deep Neural Networks: Hyperparameter tuning, Regularization and Optimization](#) (Coursera), issued Jan 2020