Marie Verdonck

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Portfolio

Education

Harvard Medical School — Boston, MA
Master of Medical Sciences in Immunology (Expected Graduation May 2026) — *Sep 2024 - Present*

KU Leuven University — Leuven, BE
Master of Cellular and Genetic Engineering & Bioinformatics (Summa Cum Laude, First of Class) — *2022 - 2024*

University of Wisconsin-Madison — Madison, WI
GE3 Global Engineering Education Exchange — *Fall 2022*

KU Leuven University — Leuven, BE
Bachelor of Bioscience Engineering (Magna Cum Laude, Class Rank: Top 6%) — *2019 – 2022*

Norwegian University of Science & Technology — Trondheim, NO
Erasmus+ Study Abroad Program — *Fall 2021*

Research Experience

Ragon Institute (Garcia-Beltran Lab) — Cambridge, MA
AI-enabled discovery of synthetic protein binders for targeted immunotherapy. — *Aug 2025 – Present*
I am spearheading the development of a high-throughput computational pipeline to expand the reach of immunotherapy with precise targeting of tumor antigens. I leverage generative deep learning and large-scale structure prediction to create synthetic binders with high specificity and affinity, overcoming the limitations of current discovery methods. After assisting with the development of an institutional cluster computing platform, I am now optimizing protein designs for subsequent experimental testing and integration into synthetic receptors for CAR-T and CAR-NK cell therapies.

Dana Farber Cancer Institute (Wucherpfennig Lab) — Boston, MA
Engineering CAR T cells to engage the endogenous immune system in solid tumors. — *Jan 2025 – Aug 2025*
I designed adeno-associated virus vectors to achieve efficient and targeted knock-in of large transgenes into murine T cells to promote synergistic interactions between engineered T cells and the host immune system. Our aim was to use precise genome-editing to enhance CAR T-cell therapy by modulating the tumor microenvironment. Using these vectors, we generated CAR T cells capable of delivering immunomodulatory payloads in tumors. I performed lymphodepletion studies with the goal of evaluating the therapeutic effect of the modified CAR T cells in immunocompetent mouse models.

Flanders Institute for Biotechnology (Vonesch Lab) — Leuven, BE
Characterizing the fitness landscape of adaptation using high-throughput genome editing. — *Sep 2023 – May 2024*
I developed a high-throughput genome engineering platform to generate and phenotype combinatorial mutant libraries in *Saccharomyces cerevisiae*. This project aimed to understand how yeast navigates complex fitness landscapes during adaptation, particularly following gene loss. By reproducing adaptive evolution experiments through the generation of combinatorial mutants in deletion strains, I analyzed how specific mutations and their sequential acquisition influence fitness and shape compensatory evolutionary trajectories.

KU Leuven University (Michiels Lab) — Leuven, BE
Antimicrobial production in nontoxigenic Clostridium botulinum. — *Feb 2022 – May 2022*
I performed whole-genome sequence analysis of nontoxigenic *Clostridium botulinum* strains to identify biosynthetic gene clusters responsible for bacteriocin production and uncover novel antimicrobial molecules. By experimentally characterizing their antimicrobial activity and mechanism of action, I evaluated the potency of these bacteriocins and their potential as alternatives to conventional antibiotics.

Posters

From Bytes to Binders: AI-Designed pHLA Binders for Tumor Immunotherapy — Lincoln, NH
- Harvard Immunology Retreat — *October 2025*

Antimicrobial production in nontoxigenic *Clostridium botulinum* — Leuven, BE
- Poster Symposium Bachelor in Bioscience Engineering (KU Leuven) — *May 2022*

Awards & Fellowships

Fayat Scholarship: Merit-based scholarship fully funding master's studies at Harvard Medical School.

Belgian American Educational Foundation Honorary Fellowship: Awarded to Belgian scholars pursuing research/studies in the United States.

IIE Global E3 Scholarship: Selected through the IEE GE3 international exchange program to study abroad at the University of Wisconsin–Madison for a semester during my master's at KU Leuven.

KU Leuven Grant: Merit-based scholarship partly funding my exchange semester studies at UW Madison.

Volunteering & Leadership

Harvard University Belgian Student Society Board Member — Boston, MA
- Promoting interdisciplinary exchange and professional development. — *Sep 2024 - Present*

Chief Marketing at IAESTE — Leuven, BE
- Led outreach efforts, increasing student engagement in global research internships. — *Jul 2023 – Aug 2024*

Student Tutor — Brussels, BE
- Provided tutoring services in math, chemistry, and physics, up to high school level. — *Sep 2021 – June 2022*

Action Senegal — Saint-Louis, SN
- Collaborated with local communities to administer care to 500+ child slaves in need. — *July 2018*

Technical Skills

Computational: Protein structure prediction, AI-based protein design, HPC cluster computing, version control (GitHub), Cytoscape network analysis

Wet-Lab / Experimental: Mammalian and microbial cell culture, molecular cloning, flow cytometry, CRISPR/Cas9 genome engineering, large-scale yeast screens, mouse work, immuno-oncology functional assays

Languages

Native: Dutch, French, English