

Marc Joiret, PhD

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STANFORD UNIVERSITY (USA) | VISITING POSTDOCTORAL SCHOLAR DEPARTMENT OF CHEMISTRY | BOXER LAB



- **January 2026–present (1-year long-term postdoc)** Stanford, California
Research on ribosomal catalysis, electrostatics at the peptidyl-transferase center, and antisense phosphorodiamidate morpholino oligonucleotides (PMOs) designed to target functional rRNA regions.
- Biophysics & Chemistry wetlab skills and experimental development include cell-free translation assays, ribosome subunits enrichment, isothermal titration calorimetry for the characterization of heteroduplex oligonucleotides interactions (RNA/RNA, PMO/rRNA), hybridization reactions thermodynamics, binding affinity measurements, and preparation strategies for cryo-electron microscopy structural resolution. Computational chemistry work includes predictive modeling of the conformations of oligonucleotide real heteroduplexes and molecular dynamics simulations to understand biological structures. I am developing **MORPHO-ViBE**, a curiosity-driven research program that deliberately ventures beyond mainstream approaches in ribosomal translation and protein synthesis. The project integrates organic chemistry, oligonucleotide modification, functional inhibition assays, structural biology, and vibrational Stark-effect spectroscopy to investigate the pre-organized electrostatic environment of the ribosome's catalytic pocket and its contribution to the remarkable catalytic power of the ribosome.

Work experience 5

KU LEUVEN

- 2025 Oct- 2026 Dec: **Postdoctoral Research Mandate, type I.**
KU LEUVEN UNIVERSITY Leuven, Belgium

- Implementing an autonomous research project to grow as an independent researcher
- Funded through a postdoctoral appointment at KU Leuven University (Belgium) and a long-term mobility grant by Excellence WBI (Wallonia-Brussels International), I have been hosted in the Department of Chemistry at Stanford University, in the Boxer Lab, since January 2026.

PhD | LIÈGE UNIVERSITY | APPLIED SCIENCES AND ENGINEERING | GIGA MOLECULAR & COMPUTATIONAL BIOLOGY, BELGIUM

PHD DEFENSE DATE: APRIL 22TH, 2025

- 2018–2025: *PhD Thesis : Protein synthesis by ribosomes - Agent-based modeling of mRNA translation rates incorporating tRNA modification effects*



Supervisors: Prof. Liesbet Geris (KU Leuven & ULiège) & Prof. Pierre Close (ULiège)
Researcher & **Computational biologist** on Prof. Liesbet Geris FWO and ERC funded programs.

Work experience 4

- 2007–2018: **Consultant**

AQUATION S.A.

Ans, Belgium

Founded AQUATION s.a. and established an independent consultancy specializing in life science engineering and modeling for health, agro-industry, environment, and water treatment, offering knowledge-based services to public and privately owned companies.

- Auditing water source treatment in the brewing industry and designing statistical experiments to measure the effect of the sulfate-to-chloride ratio in water on the bitterness of Trappist beers, as evaluated by a panel of rating judges
- Water treatment engineering projects for general contractors and public tenders in Belgium and abroad (Vietnam, Tunisia, Indonesia, Algeria, Sri Lanka)
- Water Demineralisation engineering projects for the industry
- Sea Water Thermal Desalination research projects for the industry
- Anaerobic water treatment process engineering projects for the industry
- External reviewer for the European Commission to rank applicants calling for FP7 funding under water or circular economy thematic

Third Master (while being employed) HASSELT UNIVERSITY

- 2017–2018: *Master thesis : The impact of correlated genetic markers on large-scale DNA-based gene-gene interaction studies.*

Supervisors: Prof. Kristel Van Steen (KU Leuven & ULiège) & Prof. Ziv Shkedy (UHas-selt).

Genome-wide association simulation study of a pair of interacting functional variants associated to human complex diseases taking into account linkage disequilibrium as confounding.

- 2015–2018: **Master of Biostatistics, specialization Bioinformatics** | Interuniversity Institute for Biostatistics and Bioinformatics, Hasselt, Belgium | *Magna cum Laude*: 2nd Master: **Great Distinction**

1st Master: **Distinction**

Work experience 3

- 1999-2007: **R&D Manager and Senior Project Engineer**
BALTEAU, JOHN COCKERILL GROUP Sprimont, Belgium
- Research program coordinator responsible for public fundraising and serving as a senior project engineer
- Design, engineering, construction oversight, commissioning, and start-up of wastewater treatment plants
- Design of activated sludge processes for municipal wastewater treatment, focusing on applied microbiology processes for carbon, nitrogen, and phosphorus removal
- Hydraulic and sanitary engineering for wastewater treatment processes
- Potabilization processes and water conditioning for industrial applications, including softening and demineralization

Work Experience 2

- 1992-1999: **Project Engineer and business development**
WATCO, TRACTEBEL, SUEZ ENVIRONMENT Welkenraedt, Liège, Brussels, Belgium
- Rehabilitation schemes in Landfill Engineering and Biogas to Energy Sector
- Landfill leachates and waste water treatment process design and operation
- Solid waste anaerobic processes optimization
- Ultrafiltration membrane coupling to nitrification & denitrification bioreactors

Work experience 1

- 1992: **Analyst Programmer, IT Dept.**
MORGAN GUARANTY TRUST COMPANY OF NEW YORK Brussels, Belgium
- Database queries programming on the Eurobonds clearing organization (EUROCLEAR) for the Information Management
- IBM 3090 Mainframe application programming (RDBMS, SQL, DB2 and PL1)
- English speaking environment

Second Master (while being employed) LIÈGE UNIVERSITY

- 2004: *Master thesis : The speed of gravity in General Relativity*
Supervisors: Prof. Jean Surdej & Yves De Rop & Jean-René Cudell & André Burnel.
The M. Sc. thesis in Physics focused on Relativistic Gravitation and investigated the gravitomagnetic effects of matter currents on the time delay of electromagnetic signals.
- 2002-2004: **Master of Science in Physics** *specialization in Theoretical Physics*, Université de Liège, ULiège | Liège, Belgium.
Great Distinction
- 1996-1998: **Bachelor of Science in Physics**, Université de Liège, ULiège | Liège, Belgium

Military Duty | Second Lieutenant reservist officer (matricule 046028)

- 1990–1991: Completed 5 months of military instruction and officer training in Leopoldsburg (Belgium), followed by 8 months of service in the 3rd Lancers Tank Battalion, in Spich (Germany).

Liaison Officer for the Belgian Armed forces at the 7th US Army training command base in Grafenwoehr, Germany 1991

Served for eight months between March and October 1991 in the 3rd Lancers Tank Battalion, stationed in Spich, Germany, as part of the Belgian Armed Forces. During this period, volunteered as a liaison officer to the US Army at Grafenwoehr, the largest American combat maneuver and simulation training center in Europe at the time. The role specifically involved coordinating and facilitating shared use of live-fire ranges during fire training sessions with Leopard tanks as part of **NATO's 1991 military maneuvers**.

First Master

GEMBOUX AGRO BIO TECH

- 1990: *Bioengineer Thesis : Modeling and Production of Poly- β -hydroxybutyric Acid (PHB) by *Alcaligenes eutrophus* in a pilot fermentor* **SOLVAY RESEARCH CENTER**
Supervisors: Prof. Philippe Thonnart & Raphaëlle Rikir & Eric de Buyl.
The thesis focused on developing indirect (software) sensors for monitoring microbiological processes. PHB was utilized as a source of enantiomerically pure monomers, which are employed in pharmacology as a cardiotonic molecule when esterified to the arginine amino acid.
- 1987–1990: **ir., Dipl. in Chemistry and Biomolecular Engineering** | Faculté universitaire des Sciences agronomiques, FUSAGx, Gembloux, Belgium | **Great Distinction**
- 1985–1987: **Bachelor of Agriculture and Life Sciences** | Faculté universitaire des Sciences agronomiques, FUSAGx, Gembloux, Belgium | **Distinction**
- July 1985: **Entrance Admission test to Civil Engineering** | Faculté polytechnique de Mons, FPMS, Belgium | **Ranked 4th among 260 candidates**

Computer and software skills

- **Advanced** UNIX/Linux scripts, SLURM jobs for HPC, **Python**, C++, **R**, Mathematica, Matlab, HTML5, CSS, JavaScript, L^AT_EX, DBMS MS Access, SQL, Excel, Visual Basic, FORTRAN, PASCAL, SAS Statistical Analysis (SAS Certified Base Programmer), OpenBUGS and JAGS (Bayesian methods), PLINK, simuPOP, MB-MDR (GWAS), Ingenuity Pathway Analysis, Netlogo, **Python libraries** (BioPython SeqIO, regular expression, Scikit-Learn, Numpy, Pandas, PyTorch, TensorFlow, Database querying API, Matplotlib).
- **Artificial Intelligence, Deep Learning and data mining** General knowledge and projects experience in ML/AI methods, e.g., neural networks, computer vision, CNN, auto-encoders, GAN.
- **Classical Biostatistics advanced knowledge** of classical statistical inference methods and tools.
- **Bioinformatics and Computational Biology** QC | alignment | mapping tools | genomic repositories | downstream analysis of NGS repositories SRA, ENA, fastqc, trimmomatic, cutadapt, bowtie2, STAR, RNA-Seq (single cell and bulk), RiboProfiling tools, Snakemake data analysis workflows, PyMol for X-Ray crystallography or EM biomolecular structural analysis, Alphafold.
- **Computational Chemistry** Molecular Dynamics Modeling | Gromacs, Amber, Gaussian (DFT)

First author publication record in reviewed journals

The scientific seniority is relatively recent, having begun only seven years ago, with contributions that span across **interdisciplinary** research in Biophysics, Bioinformatics and Computational biology:

- **Joiret, M.**, Rapino, F., Close, P., Geris, L. Reversing the relative time courses of the peptide bond reaction with oligopeptide of different lengths and charged amino acid distributions in the ribosome exit tunnel, *Comput Struct Biotechnol J*. 2024 May. <https://doi.org/10.1016/j.csbj.2024.05.045>
- **Joiret, M.**, Rapino, F., Close, P., Geris, L. A simple geometrical model of the electrostatic environment around the catalytic center of the ribosome and its significance for the elongation cycle kinetics, *Comput Struct Biotechnol J*. 2023 Jul 26;21:3768-3795. <https://doi.org/10.1016/j.csbj.2023.07.016>
- **Joiret, M.**, Leclercq, M., Lambrechts, G., Rapino, F., Close, P., Louppe, G., Geris, L. Cracking the genetic code with neural networks, *Frontiers in Artificial Intelligence*, 6, 2023. <https://doi.org/10.3389/frai.2023.1128153>
- **Joiret, M.**, Kerff, F., Rapino, F., Close, P., Geris, L. Ribosome Exit Tunnel Electrostatics, *Physical Review E*, 105, 2022. <https://journals.aps.org/pre/abstract/10.1103/PhysRevE.105.014409>
- **Joiret, M.**, Mahachie John, J.M., Gusareva, E.S, Van Steen, K. Confounding of linkage disequilibrium patterns in large scale DNA based gene-gene interaction studies. *BioData Mining*, 2019

Articles in scientific journals as co-author

The scientific seniority is relatively recent, having begun only five years ago, with contributions that span across **interdisciplinary** research:

- Gallez, A., Blacher, S., Maquoi, E., Konradowski, E., **Joiret, M.**, Primac, I., Gérard, C., Taziaux, M., Houtman, R., Geris, L., Lenfant, F., Marangoni, E., Sounni, N. E., Foidart, J.-M., Noël, A., Pequeux, C. Estetrol combined to progestogen for menopause or contraception indication is neutral on breast cancer. *Cancers*, 2021. doi:10.3390/cancers13102486
- Rapino, F. , ZHOU, Z. , RONCERO SANCHEZ, A. M. , **Joiret, M.**, Seca, C., El Hachem, N., Valenti, G., Latini, S., Shostak, K., Geris, L., Li, P., Huang, G., Mazzucchelli, G., Baiwir, D., Desmet, C., Chariot, A., Georges, M., Close, P. Wobble tRNA modification and hydrophilic amino acid patterns dictate protein fate. *Nature Communications*, 12 (1), 2170, 2021. doi:10.1038/s41467-021-22254-5
- Van de Velde, M., Ebroin, M., Durré, T., **Joiret, M.**, Gillot, L., Blacher, S., Geris, L., Kridelka, F., Noël, A. Tumor exposed-lymphatic endothelial cells promote primary tumor growth via IL6. *Cancer Letters*, 497, 154-164, 2021. doi:10.1016/j.canlet.2020.10.020
- Zappia, J., **Joiret, M.**, Sanchez, C., Lambert, C., Geris, L., Muller, M., Henrotin, Y. From translation to protein degradation as mechanisms for regulating biological functions: A review on the SLRP family in skeletal tissues. *Biomolecules*, 10, 80, 2020. doi:10.3390/biom10010080
- Google Scholar: <https://scholar.google.com/marc/joiret>
- Orcid ID: <https://orcid.org/0000-0001-5381-4196>

Mentoring and Teaching Experience

- 2022-2023: Graduate student master thesis mentor in Biomedical Engineering, KUL Leuven university.
- 2021-2024: Teaching Assistant of Prof. Liesbet Geris at ULiege in Biophysics: lecture on the application of PyMol and Alphafold for the study of biomolecules and biological structures (4 hours/year)
- 2020-2021: Teaching Assistant of Prof. Liesbet Geris at ULiege in Biophysics: lecture on optical tweezers and applications to the study of biomolecules and biological structures (4 hours/year)
- 2017-2022: Invited lecturer for Energy course at HEC ULG Liege in the Master in Environmental Management (18 hours/year)
- 2007–2025: Invited lecturer for water treatment and environmental sciences at the Polygone de l'Eau, Verviers & Mons & Namur (SWDE) (60 hours/year)

Societies and professional membership or ambassadorship

- Belgian Biophysical Society (BBS)
- American Physical Society (APS)
- **Master Brewers Association of the Americas (MBAA)**
Actively engaged in fostering connections and collaborations with fellow MBAA members to exchange brewing techniques and recipes, with a particular focus on mastering the art of brewing in the tradition of Belgian Trappist monks. Enthusiastic about contributing to folkloric brewing competitions in the U.S., which aim to replicate the unique characteristics of Trappist-style beers. Currently working on a manuscript and contributing as an author to the MBAA's Technical Quarterly journal.
- **Excellence Wallonia-Brussels International Ambassador** Grantee, sponsored by Stanford University's Bechtel International Center, fostering international academic connections and strengthening research networks between Stanford, Leuven University and Wallonia-Brussels.

Languages

- French: Mothertongue
- English: Professional proficiency |CEFR C2
- German: Elementary | A2 | Zertificat Deutsch als Fremdsprache, Goethe-Institut
- Dutch: Elementary | A2

Interests

- Reading | Learning | Writing | Science outreach | Epistemology
Swimming | Mountain hiking with teammates | Sailing