

Curriculum Vitae

Personal



Name	Marco Wilhelmus Fraaije
Date of birth	7 december 1968
Nationality	Dutch
Title	Prof. Dr. Ir.
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Degrees

Highschool (1981 – 1987)

VWO Jacob Roelandslyceum, Bostel

University (1987 – 1993)

Molecular Sciences (Biochemistry), University of Wageningen

PhD project (1993-1998)

Department of Biochemistry (Prof. Dr. W.J.H. van Berkel/Prof. dr. N.C.M. Laane)
University of Wageningen

Academic employment

Post-doctoral research (1998 – 2000) EMBO research-fellow

Protein crystallography group (Prof. Dr. A. Mattevi), University of Pavia, IT

Assistant professor (2000 – 2007)

Biotechnology group (Prof. Dr. D.B. Janssen), University of Groningen

Associate professor (2007 – 2012)

Molecular Enzymology group, University of Groningen, NL

Full professor (2012 – now)

Molecular Enzymology group, University of Groningen, NL

Research

My research focuses on discovery, engineering and application of redox enzymes. Besides exploring the biocatalytic potential of these biocatalysts, I also aim at a thorough understanding of these oxidative enzymes.

For more details: www.rug.nl/staff/m.w.fraaije/research and www.fraaije.info

Awards

- ‘Unilever research prize’ (1993), Long-term EMBO-fellowship (1998), COIMBRA personal grant (1999), VICI-NWO research grant (2016), international BioCat award (2018) for scientific excellence.

Scientific output

>250 peer-reviewed papers, 20 book chapters, 7 patents, *h*-index=74, 20,000 citations (Google Scholar, 9 April 2024)

Selection of recent papers

- Bailleul G, Yang G, Nicoll CR, Mattevi A, **Fraaije MW**, Mascotti ML (2023) Evolution of enzyme functionality in the flavin-containing monooxygenases. *Nature Commun.* 14, 1042
- Guo Y, Alvigini L, ... **Fraaije MW** (2022) Structure- and computational-aided engineering of an oxidase to produce isoeugenol from a lignin-derived compound. *Nature Commun.* 13, 7195.
- Drenth J, Yang G, Paul CE, **Fraaije MW** (2022) A tailor-made deazaflavin-mediated recycling system for artificial nicotinamide cofactor biomimetics. *ACS Catal.* 11, 11561
- Lee M, Drenth J, Trajkovic M, de Jong RM, **Fraaije MW** (2022) Introducing an artificial deazaflavin cofactor in *Escherichia coli* and *Saccharomyces cerevisiae*. *ACS Synth Biol.* 11, 938
- Tong Y, Lee M, Drenth J, **Fraaije MW** (2021) Flavin-tag: a facile method for site-specific labeling of proteins with a flavin fluorophore. *Bioconjug Chem.* 32, 1559
- Aalbers FS, Fürst MJLJ, ... **Fraaije MW** (2020) Approaching boiling point stability of an alcohol dehydrogenase through computationally-guided enzyme engineering. *Elife* 9, e54639
- Martin C, Trajkovic M, **Fraaije MW** (2020) production of hydroxy acids through selective double oxidation of diols by a flavoprotein alcohol oxidase. *Angew Chem Int Ed Engl* 59, 4869
- Nicoll CR, Bailleul G, Fiorentini F, Mascotti ML, **Fraaije MW**, Mattevi A. (2020) Ancestral-sequence reconstruction unveils the structural basis of function in mammalian FMOs. *Nat. Struct. Mol. Biol.* 27, 14
- J Drenth, M Trajkovic, **MW Fraaije** (2019) Chemoenzymatic synthesis of an unnatural deazaflavin cofactor that can fuel F₄₂₀-dependent enzymes. *ACS Catal.* 9, 6435
- Nguyen QT, Romero E, ... **Fraaije MW** (2019) Structure-based engineering of *Phanerochaete chrysosporium* alcohol oxidase for enhanced oxidative power toward glycerol. *Biochemistry* 57, 6209
- Romero E, Gómez Castellanos JR, Gadda G, **Fraaije MW**, Mattevi A. (2018) Same substrate, many reactions: oxygen activation in flavoenzymes. *Chem Rev* 118, 1742
- Romero E, Castellanos J, Mattevi A **Fraaije MW** (2016) Characterization and crystal structure of a robust cyclohexanone monooxygenase. *Angew Chem Int Ed* 128, 16084
- Dijkman WP, Binda C, **Fraaije MW**, Mattevi A (2015) Structure-based enzyme tailoring of 5-hydroxymethylfurfural oxidase. *ACS Catalysis* 5, 1833

Management

- Programme Director MSc Biomolecular Sciences, University of Groningen
- Member of programme council Chemistry of Life, ChemistryNL
- Coordinator of COST Action COZYME network (>100 members, 2022-2026)
- Coordinator of EU-H2020 ROBOX research project (19 partners, 2015-2019)
- Coordinator of EU-H2020 OXYTRAIN training network (10 partners, 2017-2020)
- Coordinator of EU-FP7 OXYGREEN research project (12 partners, 2008-2013)
- Main organiser of major international conferences: Enzyme Mechanisms EMBO conference (2012, Groningen), Novel Enzymes (2016, Groningen), 19th Flavins and Flavoprotein symposium (2017, Groningen), BioTrans2019 (2019, Groningen)
- Chair of task group 'Applied Biocatalysis' of the dutch biotechnology society (NBV)
- Board member of the geological society 'oertijdmuseum' (www.oertijdmuseum.nl)
- Co-founder (2019) of start-up company GECCO-Biotech (www.gecco-biotech.com)