Merve Tomečková Öztoprak

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Professional Summary

Bioanalytical scientist with 7+ years of experience in **LC-MS method development, quantitative analysis, and workflow optimization** for complex biological and environmental samples. Skilled in **Orbitrap MS, GC-MS, IRMS, and microbiology,** with a strong track record of designing, validating, and troubleshooting novel analytical workflows under **GLP/ISO** frameworks. Experienced in **large-scale bioanalytical data processing (R/Python)**, biomarker characterization, and cross-disciplinary collaborations with academic, governmental, and industrial partners. Passionate about translating analytical innovations into real-world applications in health, food, and biotechnology, with a proven ability to **present complex scientific concepts** to specialist researchers, technology stakeholders, and broader audiences.

Key Skills

- **Bioanalytical Techniques:** ESI/APCI-LC/GC-Orbitrap-MS, GC-MS, Prep-HPLC, IRMS.
- **Data Analytics:** Large-scale mass spectrometric data analysis using advanced statistical methods, network analysis and predictive modeling for structural characterization (R, Python)
- **Sample Processing:** SPE, derivatization, lipid/protein extraction, microbial culturing.
- **Quality & Compliance:** GLP familiarity, SOP development, technical documentation.
- **Collaboration & Leadership:** Project management, developed industrial partnerships, student/intern supervision in chemical laboratory.

Professional experience

Ph.D. Researcher – Analytical Chemistry & Instrumental Analytics

Royal Netherlands Institute for Sea Research (NIOZ), Netherlands | Jan 2020 – Oct 2025

- Developed **LC-Orbitrap MS assays** for site-specific isotopic and structural analysis of biomolecules, enabling precise source assignment of lipids and potential biomarker applications.
- Designed custom **bioanalytical data pipelines** (R/Python) for high-throughput LC-MS datasets, including predictive modeling, multivariate statistics, and classification of biomolecules.
- Worked with industry partners (Thermo Fisher Scientific) to test and validate Isotopomic data processing applications
- Maintained, calibrated, and troubleshot MS instrumentation to guarantee reliable bioanalytical performance.
- Supervised and trained HBO/PhD students in LC-MS workflows, sample preparation, and data interpretation.

Independent Researcher

California Institute of Technology, USA | May 2018 – Sep 2019

- Pioneered a GC-Orbitrap MS method for direct measurement of isotopic signatures in isoprenoids, demonstrating proof-of-concept for new bioanalytical workflows

Independent Researcher

The Australian National University, Australia | Oct 2018 – Apr 2019

- Applied high-sensitivity **GC-MS, XRF, IRMS** analyses to complex organic matrices, supporting biomarker discovery in drill core samples of Precambrian material.

Trainee Environmental Safety Division (Ecotoxicology Department)

BayerCropScience, Monheim, Germany | Jun 2017 – Sep 2017

- Executed **GLP-compliant acute and chronic toxicity bioassays** on soil model organisms.
- Developed and presented an **automated image-based evaluation system** for toxicity assessments, increasing analytical throughput and data quality.

Education

Ph.D. in Organic Geochemistry (expected August 2025)
Royal Netherlands Institute for Sea Research (NIOZ) / Utrecht University, Netherlands

M.Sc. in Evolutionary Biology (Double Degree)
University of Uppsala (Sweden) & Ludwig-Maximilian University Munich (Germany) | Oct 2019

B.Sc. in Molecular Ecosystem Sciences
Georg-August University Göttingen, Germany | Aug 2017

- Erasmus+ Semester: University Centre in Svalbard (UNIS), Norway | Arctic Biology and Environmental Management
- DAAD RISE Research Internship: Chinese University of Hong Kong | Field surveys on earthworm species composition across Hong Kong ecosystems

Selected Leadership and Outreach experiences

- Organizing Chair, Gordon Research Seminar in Organic Geochemistry (2026)
- Invited Speaker, 'Orbitrap Isotope Applications', TU Munich (Apr 2024)
- Invited speaker, 'Nature's Fingerprints: New Ways to Measure Stable Isotopes', Bremen (Nov. 2021)
- Guest Lecturer, University of Bristol (Dec 2021)
- Founding Member, Inclusion, Diversity, Equity, Accessibility (IDEA) Group, NIOZ

Publications

Zeman-Kuhnert, S., Heim, C., **Öztoprak, M.,** & Thiel, V. (2023). Reconstructing eutrophication trends of a shallow lake environment using biomarker dynamics and sedimentary sterols. Organic Geochemistry, 177, 104555. Doi: https://doi.org/10.1016/j.orggeochem.2023.104555

Neubauer, C., Kantnerová, K., Lamothe, A., Savarino, J., Hilkert, A., Juchelka, D., **Öztoprak, M.,** et al. (2023). Discovering nature's fingerprints: isotope ratio analysis on bioanalytical mass spectrometers. Journal of the American Society for Mass Spectrometry, 34(4), 525-537. Doi: https://doi.org/10.1021/jasms.2c00363

Öztoprak, M., van der Meer, M., Schouten, S., Villanueva, L., Eiler, J. Measuring carbon isotopic signatures of mass spectrometric fragment ions of phytane using ultra high resolution orbitrap mass spectrometry. (in preparation)

Öztoprak, M., van der Meer, M., Hopmans, E., Villanueva, L., Schouten, S. Methodological development and theoretical framework for the isotopic analysis of mass spectral fragments of phytol using Orbitrap Mass Spectrometry. (in preparation)