

# Mark Hardmeier

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## RESEARCH EXPERIENCE

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### PhD Research

2019 – 2023

*Supervised by: Gemma-Louise Davies & Gareth Williams*

*UCL, London, UK*

- The [Davies Lab](#) works on bio-functional nanomaterial focusing on the development of MRI contrast agents.
- I was involved in the development of glycodendritic fluorescent nanoparticles for early detection of mucinous adenocarcinoma. This involved:
  - Synthesis of nanomaterials, organic molecules and their characterization.
  - Surface functionalization of nanoparticles and monitoring of the reactions.
  - Characterization and validation of functionalized nanoparticles on cancer and healthy cells using cytotoxicity, adherence assays and SPR.

### MSc Research

2017 – 2019

*Supervised by: Michal Shoshan & Elisabeth Engelsberger*

*ETH Zürich, CH*

*Wennemers Lab*

- The [Wennemers lab](#) is interested in peptide-based chemistry with an emphasis on peptide catalysts and supramolecular collagen structures.
- My project was to use SPPS to synthesize different peptide additives that act as stabilizers for platinum nanoparticles for liver cancer targeting.

*Supervised by: Bartosz Lewandowski & Matthew Aronoff*

*ETH Zürich, CH*

*Wennemers Lab*

- This project revolved around native chemical ligation and the development of a peptide catalyst for peptide couplings.
- My project aim was the synthesis of a plausible peptide-based catalyst through SPPS and testing in different conditions with different reagents to prove its activity via HPLC.

## SKILLS, LANGUAGES & INTERESTS

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- **Synthetic Skills:** Flow chemistry, synthesis of organic and inorganic materials, synthesis of small organic molecules, Schenck line chemistry, purification of organic molecules and nanomaterials, solid phase peptide synthesis.
- **Analytical methods:** DLS/Zeta, GC, GC-MS, HS-GC, HPLC, IC, LC-MS, MS, IR, NMR, NTA, fluorescence/UV-Vis Spectroscopy, SPR, TEM, TGA, XPS.
- **Cell Culture:** Brightfield and fluorescence microscopy, cell counting; freezing and thawing of cells, passaging of cells, working with human colon cancer cells (CaCo-2) and mouse epithelial cells (L929).
- **Skills:** Cost-effective planning; drug targeting, drug delivery, ImageJ, literature research, Microsoft Office, data analysis (Origin), planning of experiments, total synthesis.
- **Languages:** English (IELTS: 7.5), German (fluent), Spanish (native), Swiss-German (fluent) and French (limited).
- **Interests** Playing drums and guitar, jazz, rap, composing, cooking & drinks, fermenting, crafting: guitar pedals & 3D printing, painting, dungeons and dragons, Magic the Gathering.

## PUBLICATIONS

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- M. M. I. Rizk and M. Hardmeier, in *Biomedical Applications of Inorganic Materials*, ed. G. R. Williams, The Royal Society of Chemistry, 2021, ch. 1, pp. 1-13.

## TEACHING EXPERIENCE

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### University College London

*UPCSE – Undergraduate preparatory certificate*

2022 – 2023, London, UK

- Teaching pre-undergraduate students and their preparation for University through lab tutorials and demonstrations. My responsibility was focused on practical lab skills and planning experiments.

*Synthesis and Characterization Techniques*

2022, London, UK

- Supervising weekly organic chemistry laboratory practicals for third-year students and instructing in synthesis and analysis of the assigned tasks.

*Analysis and Quality Control*

2021, London, UK

- Supervising weekly pharmaceutical laboratory for masters students. Teaching FT-IR and marking assignments.

*Third-year undergraduate chemistry boot camp*

2021, London, UK

- Supervising in the inorganic third-year boot camps, overseeing students during practical work to refamiliarize them after the pandemic.

### Swiss Federal Institute of Technology Zürich

*Teaching assistant for Organic Chemistry I & II*

2015 - 2016, Zürich, CH

- Teaching tutorials to first-year biologists, pharmacists and health technologists in preparation for the first-year exams in organic chemistry. These classes varied between 5 to 50 students.

## EDUCATION

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### University College London

*PhD, Biofunctional inorganic nanomaterials*

Sept. 2019 – Mai 2024

London, UK

- Planning and executing experiments towards the synthesis and functionalization of silica and PLGA nanoparticles for the targeting of mucinous colonic adenocarcinoma.

### Swiss Federal Institute of Technology Zürich

*MSc, Chemical Biology*

Jan. 2017 - Mai. 2019

Zürich, CH

- Highly focused on peptide chemistry and NMR with interest in supramolecular chemistry, glycochemistry and protein modifications.
- Average mark: 5 out of 6 (Good, 76%)

### Swiss Federal Institute of Technology Zürich

*BSc, Biology*

Sept. 2013 - Mar. 2018

Zürich, CH

- Highly focused on Organic chemistry and biological chemistry.
- Widely interested in several biological disciplines like directed evolution, mycology, and veterinary medicine.
- Average mark: 4.8 out of 6 (Good, 72%)

## REFEREES

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Prof. Gareth Williams

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