



Marek Brzeziński

ASSOCIATE PROFESSOR – CMMS PAS · DEPUTY DIRECTOR FOR SCIENTIFIC AFFAIRS – CMMS PAS

✉ marek.brzezinski@cbmm.lodz.pl | 🌐 <https://www.cbmm.lodz.pl/pracownicy/marek-brzezinski/> |

🆔 0000-0001-7620-4438 | Scopus bibliometric data: citations 1185 · documents 57 · h-index 18 |

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Currently held positions

Centre of Molecular and Macromolecular Studies of the Polish Academy of Sciences

Łódź

DEPUTY DIRECTOR FOR SCIENTIFIC AFFAIRS

Centre of Molecular and Macromolecular Studies of the Polish Academy of Sciences

Łódź

ASSOCIATE PROFESSOR

Scientific profile and collaborations

My scientific research focuses on polymer and supramolecular chemistry, emphasising particle preparation for drug delivery. My research focuses on modifying various polymers to introduce supramolecular motifs that induce the stimuli-responsiveness to the resulting macromolecules. These polymers are then used to construct drug delivery systems (DDS) with anticancer, antiviral, or antimicrobial properties. A variety of techniques are employed in the preparation of these DDS, including **nanoprecipitation, solution self-assembly, spray-drying, and microfluidics**. Microfluidics, in particular, is being actively developed due to its potential for scalability. My primary research collaborations include the University of Lodz, the Medical University of Lodz, and Polymat San Sebastián, where we design DDS targeting *Helicobacter pylori* and gastric cancer. Additionally, DDS for anti-HIV therapy is being developed in collaboration with research groups from Sastra University, the University of Duisburg-Essen, and the Technical University of Lodz. A key focus of my research is **the development of supramolecular materials capable of overcoming the intrinsic or acquired resistance mechanisms of cancer and microbial cells**.

Selected publications

- 2019 *Stereocomplexed PLA microspheres: Control over morphology, drug encapsulation and anticancer activity* [\[link\]](#)
- 2021 *Microfluidic-assisted nanoprecipitation of biodegradable nanoparticles composed of PTMC/PCL (co)polymers, tannic acid and doxorubicin for cancer treatment* [\[link\]](#)
- 2023 *Supramolecular poly(vinyl alcohol)-based hydrogels containing quercetin for bacterial and fungal elimination* [\[link\]](#)

Research grants

Principal Investigator: 4 grants: NCN, Humboldt Foundation

Project Supervisor: 2 grants: NAWA Ulaam

Co-Investigator: 2 grants: NCN, POIG

Obtained patents

1 patent given by Polish Patent Office

International research stays

Germany, Berlin, Free University of Berlin, team of Prof. Sebastian Seiffert

Germany, Berlin, Free University of Berlin/Helmholtz Centrum Berlin, team of Prof. Sebastian Seiffert/Marcelo Calderón