

Masaryk University	
Faculty	Faculty of Science
Procedure field	Microbiology
Applicant	Mag.biol. Mag.biol. Dr.techn. Simon Karl-Maria Rasso Rittmann, Bakk.biol.
Applicant's home unit, institution	Senior Scientist, Department of Functional and Evolutionary Ecology, University of Vienna
Habilitation thesis	Physiology and biotechnology of archaea
Board members	
Chair	prof. RNDr. Luděk Bláha, Ph.D. <i>Faculty of Science, Masaryk University</i>
Members	prof. RNDr. Jiří Doškař, CSc. <i>Faculty of Science, Masaryk University</i> prof. Ing. Stanislav Obruča, Ph.D. <i>Department of Food Chemistry and Biotechnology, Faculty of Chemistry, VUT</i> prof. RNDr. Leona Buňková, Ph.D. <i>Faculty of Technology, UTB in Zlín</i> Prof. Christine Moissl-Eichinger, Dr. rer. nat. <i>Diagnostic and Research Center for Molecular Biomedicine, Medical University Graz, Austria</i>

Evaluation of the applicant's scholarly/artistic qualifications

Dr. Simon Karl-Maria Rasso Rittmann is recognized microbiologist and biotechnologist with a strong academic background and extensive research experience. He obtained his doctoral degree from the Vienna University of Technology, where his dissertation focused on bioprocess development for biomethane and biohydrogen production. He later completed his habilitation in Microbiology and Biotechnology at the University of Vienna. His career included positions of Senior Scientist at the University of Vienna and co-founder of the biotechnology company Arkeon GmbH. He also was visiting scientist at Masaryk University in Brno.

Dr. Rittmann leads the Archaea Physiology & Biotechnology Group at the University of Vienna. His research is centered on the physiology and biotechnological applications of archaea, particularly methanogenic archaea, with relevance to sustainable energy and industrial biotechnology. His work has advanced the understanding of archaeal metabolism and their use in high-pressure bioreactors.

As principal investigator, Dr. Rittmann successfully led three projects funded by the Austrian Research Promotion Agency between 2016 and 2022. He also collaborated with Masaryk University on bilateral project funded by the Ministry of Education, Youth and Sports (CZ) and OeAD (AT), focusing on synthetic anaerobic consortia for kitchen waste degradation.

Dr. Rittmann has published over 79 peer-reviewed scientific papers, including articles in high-impact journals including Nature, Nature Communications, Communications Biology, and Applied Energy. His work has been cited more than 1,800 times (WoS, excluding self-citations), and he is the author of three book chapters. He also holds eight international patents, primarily in the fields of amino acid production and biomethane technologies.

Conclusion: The applicant's scholarly/artistic capabilities **meet** the requirements expected of applicants participating in a habilitation appointment procedure in the field of Microbiology.

Evaluation of the applicant's pedagogical experience

In the field of education, Dr. Rittmann has demonstrated a long-standing and diverse commitment to teaching and academic mentorship. At the University of Vienna, he has taught a wide range of courses across both Bachelor's and Master's programs, including Research Topics in Molecular Microbiology, Microbial Ecology and Immunobiology, Ökophysiologie und Genetik von Mikroorganismen, Archaea Biology, Introduction to Environmental Sciences, and Biology and Evolution of Archaea. His teaching spans over a decade, with many courses taught for multiple semesters, reflecting his sustained involvement in shaping the curriculum.

In addition to lectures, Dr. Rittmann has led numerous practical and laboratory courses. He has also conducted advanced seminars including Advanced Topics in Molecular Biology and Physiology of Bacteria and Archaea, New Concepts in Archaeal and Bacterial Biology, and Functional and Evolutionary Ecology.

Dr. Rittmann has supervised five successfully defended Bachelor's theses and fourteen Master's theses. Furthermore, he has supervised three (and co-supervised other two) doctoral candidates to completion of PhD.

At Masaryk University, in the spring semester of 2019 Dr. Rittmann has lectured on Bi7032en Physiology of Archaea and is preparing to teach a new course titled Physiology and Biotechnology of Archaea as part of the Master's program in Microbiology

Conclusion: The applicant's pedagogical capabilities **meet** the requirements expected of applicants participating in a habilitation appointment procedure in the field of Microbiology.

Habilitation thesis evaluation

Dr. Simon Rittmann's habilitation thesis presents a comprehensive exploration of archaeal physiology and biotechnology, with a particular focus on anaerobic and extremophilic microorganisms and their potential for industrial application. The thesis is structured around twelve peer-reviewed scientific publications. Each publication includes a detailed breakdown of the author's contributions to experimental design, supervision, manuscript preparation, and strategic direction. Full-text versions of the articles are provided in the appendices. Notably, Dr. Rittmann is listed as the senior author on six papers, indicating his primary role in guiding and overseeing the research.

The accompanying documentation highlights Dr. Rittmann's strong record in securing research funding, leading collaborative projects both nationally and internationally, and mentoring early-career scientists. His thesis sets the stage for future investigations into the interplay between environmental conditions, microbial growth dynamics, genetic traits, and physiological characteristics. It offers a dense and well-structured synthesis of current knowledge on extremophiles, anaerobes, and archaea, with a particular emphasis on methanogenic species. The work also addresses the broader context of biotechnology development and the integration of archaeal systems within it. It discusses the availability and importance of genetic tools for manipulating archaeal genomes, which are crucial for advancing archaeal-based production platforms. Specific applications include the biosynthesis of polyhydroxyalkanoates (PHAs), lipid production and utilization, and gaseous biofuels, such as CO₂ conversion via carbonic anhydrases.

Two chapters address experimental studies on amino acid excretion and comparative lipidomics in thermophilic and hyperthermophilic methanogens, as well as amino acid excretion by *Methanothermobacter marburgensis* under fed-batch cultivation. These investigations identify key knowledge gaps and propose directions for future research.

In summary, the thesis represents an exceptional body of original scientific work that bridges fundamental microbiological processes—such as growth kinetics and substrate utilization—with the practical requirements for scaling up biotechnological applications.

The members of the habilitation board appreciated the quality of the thesis in agreement with the written reviews received by all three international opponents, i.e. Professor Sonia Heaven from University of Southampton, United Kingdom, Professor Petra Patáková from University of Chemistry and Technology Prague, Czech Republic, and Dr. Guillaume Borrel from Institut Pasteur, Paris, France. The comments received from the three reviewers were properly properly and completely addressed by Dr. Rittmann during his public scientific lecture and also in his written replies shared with the reviewers.

Conclusion: The applicant's habilitation thesis **meets** the requirements expected of habilitation theses in the field of Microbiology.

Secret vote results

Voting took place: electronically

Number of board members	5
Number of votes cast	5
of which	5
in favour	5
against	0

Board decision

Based on the outcome of the secret vote and following an evaluation of the applicant's scholarly or artistic qualifications, pedagogical experience and habilitation thesis, the board hereby submits a proposal to the Scientific Board of the Faculty of Science of Masaryk University to **appoint the applicant associate professor** of Microbiology.

In Brno on 10.11.2025

prof. RNDr. Luděk Bláha, Ph.D.