

<b>Masaryk University</b>	
<b>Faculty</b>	Faculty of Science
<b>Procedure field</b>	Mathematics - Geometry
<b>Applicant</b>	Mgr. Vojtěch Žádník, Ph.D.
<b>Applicant's home unit, institution</b>	Faculty of Science, Masaryk University
<b>Habilitation thesis</b>	Geometric constructions and correspondences in action
<b>Board members</b>	
<b>Chair</b>	prof. RNDr. Josef Janyška, DSc. <i>Faculty of Science, Masaryk University</i>
<b>Members</b>	prof. Maciej Lukasz Dunajski, Ph.D. <i>University of Cambridge</i> Prof. Peter W Michor <i>Universität Wien</i> prof. RNDr. Vladimír Souček, DrSc. <i>Mathematical Institute of Charles University</i> prof. RNDr. Miroslav Doupovec, CSc. <i>FSI VUT Brno</i>

### Evaluation of the applicant's scholarly/artistic qualifications

Mgr. Vojtěch Žádník, Ph.D., born 28.8.1975 in Kyjov, received his Ph.D. in 2004 in Geometry, topology and global analysis (Faculty of Science, Masaryk University, Brno, supervisor prof. Jan Slovák). His professional experience includes assistant professor at the Faculty of Education, Masaryk University in Brno (since 2005), and at the Faculty of Science, Masaryk University in Brno (since 2017).

The primary area of scientific interest of Dr. Žádník is Cartan geometry, especially parabolic geometry. The main fields of his interest are the geometry of chains, conformal Patterson-Walker metrics, and the conformal theory of curves. These are three quite different directions where Dr. Žádník has contributed new major advances. His main results include the study of "distinguished curves" in parabolic geometry, either in generality or in various special cases of "chains" in parabolic contact geometry. Distinguished curves are absolutely fundamental in parabolic geometry, and his results are foundational and opened this topic of research in the context of parabolic geometries.

Dr. Žádník is the author or co-author of 14 original research articles (10 in journals in WoS, 3 conference proceedings, and 1 in another peer-reviewed journal) and 1 scholarly book publication.

The papers have 24 WoS citations (19 without self-citations), his WoS h-index is 2. The Habilitation Commission explains the relatively low number of citations without self-citations of the applicant by the fact that it corresponds to practice in this field of mathematics. This is also mentioned in the report of the opponent Prof. Gover who wrote: "It should be noted that this area of mathematics is one where both the publication rate and citation rate is low compared to other disciplines. This is in part culture, but also because there is a large degree of learning involved in each different direction pursued".

Dr. Žádník cooperates with mathematicians from many Czech and foreign institutions, such as Masaryk University (J. Šilhan, J. Slovák), Technical University of Ostrava (J. Kotůlek), University of Vienna (A. Cap), University of Greifswald (M. Hammerl), Center for Theoretical Physics of the Polish Academy of Sciences (K. Sagershing), Politecnico di Torino and American University of Beirut (A. Taghavi-Chabert).

He undertook many internships at foreign institutions, for example, the Erwin Schrödinger Institute for Mathematical Physics, Vienna (4 months), Banach Center of Polish Academy of Science, Warsaw, Politecnico di Torino in Italy and the University of Vienna.

Dr. Žádník was a member of the research teams of 5 GACR projects (twice as the principal investigator at MU), one project of the Ministry of Education and Sports, and one project of the Masaryk University.

He lectured on his results at many international conferences and workshops.

The Habilitation Committee states that Dr. Žádník is a mature scientific personality with high-quality scientific results, regular publications, and good international response. This fact is well reflected in the assessment contained in the opinion of one of the opponents – R. Gover: "In summary Dr Zadnik works in broadly applicable area of differential geometry that interacts deeply with several other areas of mathematics. He is very well recognised for his research work, and has excellent qualitative and quantitative (relative to the field norms) indicators of impact and scholarship."

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

### Evaluation of the applicant's pedagogical experience

Dr. Žádník's pedagogical qualification include full-semester lectures on Geometry and Constructive geometry (Faculty of Education of Masaryk University) and Non-Euclidean geometry (Faculty of Science of Masaryk University), and exercises and seminars of geometry, algebra, mathematical analysis (Faculty of Informatics, Faculty of Education, Faculty of Science of Masaryk University).

Dr. Žádník also demonstrated his good teaching skills during the public lecture on „*Geometric constructions old and new: from local coordinate manipulation to general extension functor and back again*“ presented on September 16, 2020 (detailed review of the public lecture is attached). All members of the committee evaluated the public lecture. Formatting of the slides as well as the oral presentation was presented in a clear way, which was understandable not only by the experts in the field but all broad audience. During the follow-up discussion after the lecture, Dr. Žádník responded to all comments and questions.

Dr. Žádník is a co-author of one popular educational article on the classical differential geometry of curves (written in Czech) and a monograph on the life of Václav Hlavatý (written in Czech).

Dr. Žádník is the author of 5 teaching texts. He supervised 8 BSc students and 2 MSc students (successfully defended theses).

As an independent assessment of the pedagogical skills of Dr. Žádník we can state the evaluation from the report by Prof. Eastwood: „Regarding the style of this thesis, the writing in the extended introduction is absolutely superb and a joy to read. There are very few misprints and the grammar is almost perfect. Indeed, it is written with a certain amount of wit that carries the reader along. It is clear from this part of the thesis that the author has a firm grasp on the detail and generalities concerning the Cartan/parabolic geometries that are the subject of this thesis. I would have no hesitation in recommending this part of the thesis to a student wanting to enter this fascinating and internationally thriving field. I would also be comfortable if Vojtěch Žádník were supervising such a student. He clearly has the overview and insight that such a task requires“.

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

### Habilitation thesis evaluation

The habilitation thesis of Dr. Žádník titled „*Geometric constructions and correspondences in action*“ includes four original research papers supplemented by a common introduction. The Habilitation Committee addressed three internationally recognized experts in the field of differential geometry as opponents who have no connection with the applicant. The fact that they accepted the invitations and worked out the assessments is to be seen as a very positive response to the topic of research, both by the candidate and Brno geometrical group in general. They are Michel Eastwood (the University of Adelaide, 87 articles on WoS, 1 374 WoS citations, h-index 19), Rod Gover (the University of Auckland, 86 articles on WoS, 1 354 WoS citations, h-index 19) and Pawel Nurowski (the Polish Academy of Sciences, 72 articles on WoS, 777 WoS citations, h-index 16). All opponents highly appreciate the scientific level and novelty of Dr. Žádník's work and achieved results. All papers included in the thesis are published in the top rate journals - Prof. Gover wrote in his report: „Dr Zadnik is regularly publishing in journals that range from very good to really excellent, including the *Journal of Differential Geometry*, *Bull. Lond. Math. Soc.*, *J. Math. Anal. Appl.*, and *Geom. Dedicata*. These journals have a very high rejection rate and only accept articles that are original, accurate, deep, and of significant interest. Thus the fact that the applicant has a number of such articles may be regarded as immediate evidence of very strong research. For example, the *Journal of Differential Geometry* is not only the absolutely top pure differential geometry journal but is among the top of all mathematics journals according to impact“. Prof. Eastwood wrote in his report: „... the original extended introduction to this Habilitation thesis is truly excellent. ... I would have no hesitation in recommending this part of the thesis to a student wanting to enter this fascinating and internationally thriving field“. Prof. Nurowski wrote in his report: „Summarizing I want to say that the mathematics used and developed by Dr. Žádník is of high quality. All of his four papers and his original results described in Chapter II of his habilitation thesis are important contributions to (a) parabolic geometries, (b) Feferman-Graham ambient theory and (c) conformal geometry“.

Both the text's quality and formatting the thesis clearly document good pedagogical skills of the candidate, i.e., to present the knowledge to readers in an exact but concise way.

**Conclusion:** The applicant's habilitation thesis **meet** the requirements expected of habilitation theses in the field of Mathematics - Geometry.

**Secret vote results**

Voting took place: electronically

Number of board members		5
Number of votes cast		5
of which	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 Faculty of Science of Masaryk University to **appoint the applicant associate professor** of Mathematics - Geometry.

In Brno on 16.09.2020

prof. RNDr. Josef Janyška, DSc.