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Habilitation Board Decision on the Nomination for Appointment to Associate Professor

Masaryk University	
Faculty	Faculty of Science
Procedure field	Mathematics - Mathematical Analysis
Applicant	Phuoc Tai Nguyen
Applicant's home unit, institution	Faculty of Science, Masaryk University
Habilitation thesis	Boundary value problems for nonlinear elliptic equations with a Hardy potential
<u>**Board members**</u>	
Chair	prof. RNDr. Pavol Quittner, DrSc.
	Comenius University in Bratislava
Members	prof. RNDr. Zuzana Došlá, DSc.
	Faculty of Science, Masaryk University
	doc. RNDr. Martin Kolář, Ph.D.
	Faculty of Science, Masaryk University
	prof. RNDr. Eduard Feireisl, DrSc.
	Institute of Mathematics of the Czech Academy of Sciences
	Prof. Philippe Souplet
	Sorbonne Paris North University, France

Evaluation of the applicant's scholarly/artistic qualifications

Dr. Phuoc Tai Nguyen received his PhD in Mathematics at the University of Tours, France (supervisors Laurent Véron and Michèle Grillot-Mousny). His professional experience includes positions of teaching assistant (Université de Tours 2011-2012), postdoc (Technion, Haifa 2012-2014 and Pontificia Universidad Católica de Chile 2015-2017), lecturer (Hochiminh City University of Education 2014-2015) and assistant professor (Masaryk University, since 2017).

The primary area of scientific interest of Dr. Nguyen is the qualitative theory of nonlinear elliptic and parabolic partial differential equations (PDEs). More precisely, he is mainly interested in qualitative properties of solutions of problems involving measures and/or singular potentials. His contributions to this field are very significant. For example, his existence and nonexistence results for elliptic Hamilton-Jacobi equations with measure data were utmost novel and influenced many related studies.

Dr. Nguyen is the author or co-author of 20 original research articles published in high-quality journals (all of them covered by WoS). Those articles had 35 citations without self-citations in 2020 (23 citations without self-citations in WoS) and these numbers are rapidly increasing. The long list of his co-authors includes famous mathematicians (Moshe Marcus, Laurent Véron); this fact has also been stressed by one of the referees of his habilitation thesis (P. Drábek).

In addition to his long-term stays mentioned above, Dr. Nguyen also visited other top universities and institutes (for example Scuola Normale Superiore in Pisa, Ludwig Maximillian University in Munich or Hausdorff Research Institute for Mathematics in Bonn). He delivered 8 invited lectures at foreign universities and 13 conference talks.

The Habilitation Board is of the opinion that Phuoc Tai Nguyen is a mature researcher with hiqh-quality scientific results and good international response. This opinion is also expressed in the referees' reports.

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

Evaluation of the applicant's pedagogical experience

Dr. Nguyen's pedagogical qualification includes regular teaching at Université de Tours (3 courses on algebra, analysis and PDEs in the academic year 2011–2012), Hochiminh City University of Education (1 course on probability and statistics in 2014–2015) and Masaryk University (6 courses on PDEs since 2018). He also successfully supervised one bachelor's and one master's thesis, wrote one textbook and 2 educational texts on PDEs, function spaces and reduced measures.

The teaching skills of Dr. Nguyen were demonstrated during his public lecture "Semilinear elliptic equations with a singular potential". After the lecture, he answered the questions raised by the referees of his habilitation thesis.

The papers and the habilitation thesis of Dr. Nguyen are written in a very pedagogical way. This is also mentioned in the referees' reports, for example "…the efforts of the author to unify the theory parallel the quality of the writing of his memoir" (L. Dupaigne).

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

Habilitation thesis evaluation

Dr. Nguyen submitted the habilitation thesis entitled "Boundary value problems for nonlinear elliptic equations with a Hardy potential". The thesis consists of five chapters. The introductory first chapter describes the state of the art and the main topics of the thesis. The next four chapters consist of four recent papers of Dr. Nguyen (one of them co-authored by Moshe Marcus and two by Konstantinos T. Gkikas), complemented by short introductions. The thesis mainly deals with the existence, uniqueness, classification and representation of solutions of elliptic boundary value problems with a Hardy potential and measure data. The results significantly extend known results and the thesis also introduces important new concepts, for example, the notion of normalized boundary trace.

The reviewers of the thesis were Prof. Pavel Drábek, University of West Bohemia, Prof. Louis Dupaigne, Université Claude Bernard Lyon 1, and Prof. Yehuda Pinchover, Technion – Israel Institute of Technology. All of them are top experts in the field. In particular, all of them are authors of influential monographs and textbooks in the theory of PDEs published by renowned publishing houses (Springer, Birkhäuser, Chapman & Hall/CRC, Cambridge University Press).

All referees' reports are very favourable. In particular, they contain the following assessments: "Habilitation Thesis of Phuoc Tai Nguyen fulfils the high standards of research in the field of nonlinear PDEs. These results will be certainly appreciated by other mathematicians and … will serve as a basis for further achievement" (P. Drábek); "Reading this manuscript has convinced me that he is now a leading expert in the nonlinear analytic and potential theoretic tools used in this field and that he has obviously achieved the maturity to become a PhD advisor on these subjects" (L. Dupaigne); "The results of the thesis are nice and significant contributions to the theory of positive solutions of important linear, semilinear and quasilinear partial differential equations" (Y. Pinchover).

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

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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 Science of Masaryk University to **appoint the applicant associate professor** of Mathematics - Mathematical Analysis.

In Brno on 16.09.2021

prof. RNDr. Pavol Quittner, DrSc.   ....