

Supervisor's opinion on the dissertation thesis

" Essential elements towards the development of diamond-based biosensors  
for bacteria detection in water"

**Author:** Ing. Lucie Dubovská

**Study program:** P3921 Biomedical and Clinical  
Technology

**Field of study:** 3901V031 Biomedical and Clinical Technology

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**Supervisor specialist:** Prof. Abdelkrim Talbi, Ph.D.

Following her master's degree internship at the Institute of Physics, Lucie Dubovská, MSc., commenced her full-time Ph.D. program on September 20, 2016. She consistently fulfilled her doctoral program requirements and successfully completed her state examination on February 11, 2020.

Throughout her Ph.D. studies, Ms. Dubovská, MSc., exhibited a remarkable aptitude for scientific research and the ability to tackle research challenges independently, even amidst the challenges posed by the COVID-19 pandemic, pregnancy, and childcare responsibilities. She acquired the essential knowledge for fabricating diamond-based acoustic wave sensors for bacterial detection, starting from fundamental principles. Her exceptional dedication was pivotal in conducting extensive modeling, Surface Acoustic Wave (SAW) device fabrication, characterization, and bioreceptor synthesis, aligning with her Ph.D. objectives.

During her Ph.D. program, Ms. Dubovská, developed her microfabrication and SAW device modeling skills through a five-month participation in the Erasmus plus program at Centrale Lille, France, commencing on September 1, 2017. Additionally, she gained valuable experience in bio-receptor fabrication during a six-month research project at Centro Nacional de Biotecnología CSIC, Madrid, Spain.

Her dissertation reflects her academic dedication and scientific accomplishments. It opens with an extensive review of bacterial detection, acoustic wave sensors, and diamond as a sensing material. In Chapters 2 and 3, Ms. Dubovská, elucidates her research objectives and methodologies. Chapter 4 delves into the discussion of research findings, while Chapter 5 offers conclusions and outlines avenues for future research.

The thesis's primary contributions lie in the modeling of diamond-coated Love-wave surface acoustic wave devices, their successful fabrication, comprehensive characterization, and experimental validation of the hypothesis that diamond coating does not significantly reduce sensor sensitivity, as initially anticipated. These achievements are well-documented in her co-authored publications (4) and conference proceedings (2). She actively participated in seven conferences, presenting her research through both poster and oral presentations during her master's internship and Ph.D. studies.

Given the substantial evidence presented, I wholeheartedly recommend Ms. Lucie Dubovska for the defense of her dissertation thesis. Upon successful defense, I propose conferring upon her the Doctor of Philosophy (Ph.D.) degree, recognizing her remarkable academic and research achievements.

Sincerely,

Prague, October 23<sup>rd</sup>, 2023

Dr. Vincent Mortet, Ph.D.