ACADEMIA ROMANA
SCOSAAR

SUMMARY OF THE HABILITATION THESIS

CARDIOVASCULAR DISEASES – KALEIDOSCOPIC PERSPECTIVES. FROM CLINICAL RESEARCH TO LABORATORY STUDIES

Field of Habilitation: *MEDICINE*

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The habilitation thesis, entitled "Cardiovascular Diseases—Kaleidoscopic Perspectives: From Clinical Research to Laboratory Studies," provides a comprehensive synthesis of my entire scientific, academic, and professional activity, as well as future directions for academic and clinical development. The guiding principle of this habilitation work is based on my strong belief in the boundless nature of knowledge, and my duty is to explore, share, and advance it. The three cardinal values of a habilitated doctor are the exploration of knowledge, mentorship, and contribution to scientific progress.

The structure of the thesis consists of three chapters that outline my professional evolution, starting with my cardiology residency training, continuing with doctoral and postdoctoral studies, research activities, teaching, and clinical expertise.

The first chapter, “Distinct Contributions to Professional, Scientific, and Academic Development”, briefly presents bibliographical data in chronological order, from my early residency years at the Emergency Clinical Hospital in Bucharest to the present. It includes three subchapters highlighting the key achievements that have shaped my professional, academic,, scientific and research career.

The second chapter describes my scientific evolution in seven subsections, materialized through full-length publications and abstracts presented at international and national conferences, covering topics such as: atherosclerosis and ischemic heart disease, inflammatory biomarkers in acute coronary syndromes, multimodal cardiac imaging, cardiomyopathies, cardio-genetics, heart failure: causes and treatment, artificial intelligence and predictive modeling of cardiovascular risk

The third chapter is dedicated to my current projects and future projections for professional, academic, and research development.

A doctoral and advanced research supervisor must possess deep expertise in their field, demonstrated through an in-depth understanding of the specialization, published research, and solid clinical experience. Additionally, methodological research skills are essential, including knowledge of scientific investigation methods, study conceptualization, statistical analysis, and validation of experimental results. These competencies have materialized in a scientific portfolio of 29 ISI-indexed articles (18 as the first author, 11 as a co-author), with a Hirsch index (ISI Web of Science, Core Collection, Thomson Reuters, 2020-2025) of 7 and a cumulative impact factor of 62.15 for first-author ISI publications. My research findings have been actively disseminated at major international conferences, such as the European Society of Cardiology Congress, EuroEcho, ESC-Frontiers in Cardiovascular Biology, and EuroPCR, as well as national congresses, including the Romanian National Cardiology Congress, the “Carol

Davila" University of Medicine and Pharmacy Congress, and the Romanian Academy of Scientists Congress.

The key research directions that I have investigated include:

1. Cardiovascular diseases and advanced imaging for coronary lesion assessment (use of optical coherence tomography and fractional flow reserve for evaluating lesion severity; invasive and non-invasive methods for diagnosing and guiding coronary interventions; identification of risk factors for in-stent restenosis and other post-PCI complications).
2. Acute coronary syndromes (study of mortality rates in STEMI patients during the COVID-19 pandemic; the role of parenteral anticoagulation and its benefits on infarct-related artery patency in STEMI; left atrial strain as a prognostic tool for post-myocardial infarction patients).
3. Cardiomyopathies and Cardio-genetics (hypertrophic cardiomyopathy: genetic mutations in Romanian patients and their impact on atrial remodeling and sudden cardiac death risk; effect of genetic variants on atrial remodeling in hypertrophic cardiomyopathy patients with atrial fibrillation).
4. Inflammation and biomarkers in cardiovascular diseases (the role of inflammatory markers in acute coronary syndromes for predicting lesion severity; the impact of interleukins and other biomarkers on ventricular remodeling and the risk of major adverse cardiovascular events; molecular and cellular mechanisms in atherosclerosis).
5. Circulating progenitor stem cells (multiparametric assessment of circulating progenitor stem cells using flow cytometry; stem cell therapy for severe systolic heart failure; identifying relevant criteria for evaluating the safety and efficacy of stem cell therapy in ischemic heart disease).
6. Artificial intelligence and computational modeling in cardiology (AI-based and cloud-computing platforms for guiding coronary interventions; machine learning for assessing lesion severity and risk stratification in acute coronary syndrome patients).

As recognition of my continuous research and clinical practice, I was awarded the Fellow of the European Society of Cardiology (FESC) title for Scientific Excellence by the European Society of Cardiology.

Beyond demonstrated excellence in research and innovation, a habilitated professor must mentor doctoral students, helping them define and refine their research objectives, select optimal study methods, and systematically structure their findings. Doctoral supervision requires advanced mentorship and leadership skills that foster creative research and academic excellence.

In my university teaching career, I have supervised undergraduate medical theses that have led to published articles, significantly contributing to the critical thinking development of young physicians. Additionally, I have been actively involved in teaching and mentoring medical students, residents, and specialists, essential elements in the development of an accredited academic instructor.

Effective doctoral guidance is closely linked to advanced pedagogical skills, ensuring the efficient teaching of complex medical concepts through evidence-based medicine approaches tailored to students' needs. Currently, I teach lectures and seminars in Cardiology at the Emergency Clinical Hospital Bucharest, coordinate student groups in the university's cardiology curriculum, and promote interventional cardiology among students and residents through workshops using a cardiac simulator at the Innovation and e-Health Center of the "Carol Davila" University of Medicine and Pharmacy, Bucharest.

Interdisciplinary and international collaboration is essential for establishing partnerships with other universities and research teams, offering doctoral students academic exchange opportunities. Over the years, I have participated in international clinical and research fellowships, including: Telashomer Hospital, Ramat Gan, Israel (Interventional Cardiology Fellowship), Universitätsklinikum Hamburg-Eppendorf, Germany (Cardio-genetics Fellowship, Deutscher Akademischer Austausch Dienst/DAAD)Cambridge Research Institute, UK, Department of Centrosome Biology Study (Fundamental Research Fellowship) and ERIBA—European Research Institute for Healthy Aging, Groningen, Netherlands