

**„CAROL DAVILA” UNIVERSITY OF MEDICINE AND PHARMACY BUCHAREST
DOCTORAL SCHOOL
MEDICINE**

**MODERN DIAGNOSIS AND TREATMENT OF MAJOR
HEMODYNAMIC DISORDERS IN ANESTHESIA AND
INTENSIVE CARE:
AN INTEGRATIVE APPROACH**

ABSTRACT OF HABILITATION THESIS

PROF. DR. ȘERBAN – ION BUBENEK – TURCONI

“Carol Davila” University of Medicine and Pharmacy

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ABSTRACT

The prevalence of major hemodynamic disorders (MHD)—including shock states (cardiogenic, hypovolemic, obstructive, distributive) and low cardiac output states (acute/decompensated heart failure)—constitutes approximately 30-40% of intensive care unit (ICU) admissions. These conditions are associated with high mortality rates (15-40%) and significant healthcare costs.

My interest in MHD began during my residency in Anesthesia and Intensive Care (AIC) and deepened during a fellowship at the Pitié-Salpêtrière Hospital in Paris (1991-1993), focusing on cardiovascular surgery in both children and adults. This experience laid the groundwork for my subsequent scientific and academic endeavors. Notably, it provided a firsthand opportunity to participate in a paradigm shift within the field. This shift moved away from the traditional cardiocentric view towards a dual approach, equally weighing ventricular performance and venous return in the assessment of cardiac output (CO). This innovative perspective reshaped the methods for diagnosing, monitoring, and treating MHD, marking the beginning of a new era in hemodynamic monitoring. These advanced techniques not only measure CO but can also predict preload dependence.

My subsequent work, including a research thesis titled *"L'analyse des variations de la pression artérielle systolique sous ventilation mécanique chez les patients hypertendus traités au long cours par inhibiteurs de l'enzyme de conversion pendant l'induction anesthésique,"* led to my designation as "Assistant étranger" at the Université de Paris VI. My 2003 doctoral thesis, guided by Prof. Dr. George Litarczek, titled "The study of the systolic arterial pressure variations under mechanical ventilation—a method of evaluating the hemodynamic status," further explored these concepts.

This habilitation thesis summarizes the outcomes of my postdoctoral research in MHD, from clinical studies to research projects, and the development of infrastructure for hemodynamic monitoring in critically ill patients. The thesis is organized into four chapters.

Chapter 1: Personal Achievements in Scientific Research

Subchapter 1.1: Original Research in Critical Patient Hemodynamics and Major Hemodynamic Disorders

This section highlights my role as the lead or co-author of 21 ISI articles on critical patient hemodynamics and MHD for the Web of Science Core Collection. In 2007, I led the

multicentric phase II HORIZON-HF trial across the USA, Poland, Romania, and Greece, aiming to improve outcomes for acute heart failure (AHF) patients with reduced ejection fraction using the new drug istaroxime. The first, in the Journal of the American College of Cardiology, described a study involving 120 AHF/MHD patients, showing istaroxime's dose-dependent effects on pulmonary pressures and systolic blood pressure, with the greatest cardiac index improvement at the highest dose (*109 ISI citations*). The second article, in the American Heart Journal, focused on istaroxime's impact on echocardiographic parameters (*103 ISI citations*), demonstrating enhanced cardiac function and reduced diastolic stiffness. Another publication in the European Journal of Heart Failure detailed a study on strescopine, a new drug tested on AHF patients from several European countries, which notably increased cardiac output and lowered vascular resistance without significant changes in heart rate or blood pressure (*28 ISI citations*).

My extensive research on AHF also includes leading the Romanian Acute Heart Failure Registry (RO-AHFS), which produced three influential papers. One paper detailed the high prevalence of liver cytolysis in AHF patients (*13 ISI citations*), correlating elevated transaminase levels with severe cardiac conditions and more frequent use of inotropic support. Another study, published in the Journal of Cardiovascular Medicine, analyzed the clinical profiles and outcomes of 3224 AHF patients needing ICU care, noting a higher mortality rate among those admitted to the ICU. This research underscores the high risks for ICU patients and the importance of early triage based on clinical parameters (*20 ISI citations*). The third RO-AHFS paper, featured in the Journal of Cardiovascular Medicine, analyzed pulmonary edema patients (*15 ISI citations*).

Another key focus of my research involves cardiac patients undergoing non-cardiac surgery, particularly examining pre-existing hemodynamic disorders and perioperative complications related to liver transplantation. In 2012, I published the inaugural national guidelines for screening liver transplant candidates in "Chirurgia" which received 5 ISI citations.

My portfolio also includes 15 ISI-indexed articles primarily on MHD within cardiovascular surgery. A significant contribution was a 2008 study in The Texas Heart Institute Journal, (*10 ISI citations*) highlighted the need for national protocols for aortic dissections, a policy our team at the CC Iliescu Cardiovascular Disease Emergency Institute advocates. Another notable contribution was published in "Anesthesia & Analgesia" in 2013, garnering *90 ISI citations*, where we compared a new non-invasive hemodynamic monitoring technique with traditional pulmonary thermodilution via PAC. Additionally, I contributed to a

meta-analysis in "Anaesthesia, Critical Care and Pain Medicine," which reviewed ten studies and analyzed non-invasive photoplethysmography's accuracy, including ClearSight technology, against thermodilution (*13 ISI citations*). These studies highlight my dedication to enhancing medical knowledge and clinical practices in cardiovascular surgery and hemodynamic monitoring.

One of my most significant research papers as the lead author was featured in "Anesthesia & Analgesia" (*6 ISI citations*), investigating the efficacy of repeated fluid administration to enhance stroke volume under "goal-directed therapy" (GDT) protocols. This study underscores that while continuous non-invasive monitoring of hemoglobine can't substitute for direct blood measurements, it remains a valuable indicator of acute hemodilution following substantial fluid infusion.

My 2020 publication in the Journal of Clinical Monitoring and Computing, which has garnered *6 ISI citations*, showcases my innovative approach to assessing and monitoring MHD. In this article, I introduced a novel technique to measure the collapsibility index of the superior vena cava (SVC-CI) in an area not previously studied—the mid-esophageal ascending aorta in short axis (ME-AA-SAX). This research validated SVC-CI measured in the short axis as a dynamic, easily measurable dynamic parameter for predicting fluid responsiveness, marking the first validation of SVV as a dynamic parameter in vascular surgery patients.

MHD therapy requires attention to both macro and micro hemodynamic parameters to enhance tissue perfusion and oxygen consumption. Our research, still in early stages, led to a significant publication in Microcirculation in 2022, receiving *15 ISI citations*. Additionally, a 2023 article in Frontiers in Cardiovascular Medicine, which has already earned *3 ISI citations*, explored the prognostic value of right heart ventricular-arterial coupling in patients undergoing Transcatheter Aortic Valve Implantation (TAVI).

These investigations complement my prior work, leading to the publication of two reviews: one in The Journal of Critical Care Medicine (2016) on the diagnosis and hemodynamic monitoring of shock, and another in Diagnostics (2021), which discusses a conceptual framework for hemodynamic monitoring in sepsis at both macro and microcirculatory levels, each garnering significant attention in the field (*15 ISI citations*). These publications demonstrate the depth of my experience and ongoing contributions to advancing MHD therapy and monitoring.

In addition to my work in MHD, I have extensively contributed to the field of anesthesia and cardiovascular surgery through the publication of original articles on unique clinical cases and surgical interventions. These include the diagnosis and management of a quadricuspid

mitral valve published in *Chirurgia* (2012), multiple fibroelastomas of the left heart in *Medical Ultrasonography* (2017), traumatic rupture of the aortic isthmus in the *Romanian Journal of Legal Medicine* (2018), a complex thoracic endovascular aortic repair (TEVAR) in *The Heart Surgery Forum* (2019), and the placement of a mitral prosthesis in a patient with dextrocardia and situs inversus.

Beyond these 22 ISI-cited articles specifically addressing MHD, I have also authored and presented 19 additional scientific abstracts on the diagnosis and advanced treatment of MHD at major international medical congresses, including those of the European Society of Anesthesia and Intensive Care (ESAIC), the European Society of Cardiology (ESC), and the European Society of Cardiovascular Surgery (ESCVS). These contributions underscore my active engagement and ongoing efforts to enhance clinical practices and patient outcomes in the realm of cardiovascular surgery and anesthesia.

In addition, apart from the articles published in extenso or in abstract, I have coordinated or edited a series of books, monographs, and book chapters on the topic of monitoring and management of MDH in the critical patient in anesthesia and intensive care, as follows: a single author monograph: "Evaluation and hemodynamic monitoring of the critical patient" (2005) Romanian Academy Publishing House (295 pages) awarded with the "Carol Davila" award of the Romanian Academy of Scientists for the year 2005; a monograph coordinator and co-author: "Mechanical assistance of the heart with intra-aortic balloon pump in cardiac surgery" published at the Carol Davila University Publishing House in 2006 (100 pages) awarded with the "University Book Fair DIPLOMA" of U.M.F. "Carol Davila" Bucharest in 2006; 22 book chapters in some of the most important national Anesthesia and ICM. specialty books. but also, treatises of related specialties (10 sole author, 12 co-author); 2 book chapters in international books (single author).

Subchapter 1.2: Additional Research Contributions in the Anesthesia and ICM Specialty

In *The Journal of Vascular Access* (2010), we showcased that for patients requiring hemodialysis without superficial venous access in the upper limb, the brachio-brachial fistula serves as an effective alternative. Another significant contribution was my first-author publication in the *Canadian Journal of Cardiology* in 2012 (*13 ISI citations*), which focused on identifying gene profiles potentially responsible for the development and progression of peripheral arterial occlusive disease (PAOD).

Our team has extensively researched new anesthesia and analgesia techniques in cardiac surgery, resulting in two original articles published in *Medicine*. These articles highlighted the advantages of the erector spinae muscle block (ESPB), particularly when its effectiveness is monitored using NOL (nociception level index) technology, garnering *17 ISI citations* since a 2021 review. Research topics such as patient blood management (PBM) in cardiac surgery and patient safety have led to two additional ISI-cited papers and an observational study on the relationship between obesity and robotically assisted minimally invasive surgery, published in 2017 in the *Journal of Clinical Monitoring and Computing*, which has been *cited 24* times.

In a review published in *Minerva Anestesiologica*, we demonstrated that applying goal-directed therapy (GDT) protocols could theoretically reduce perioperative bleeding and transfusion requirements. A 2023 publication in *The International Journal of Artificial Organs* detailed the case of a 41-year-old man with severe burns and ARDS, who was successfully treated with ECMO-VV; this case study has already received *4 ISI citations*. Additionally, I have contributed to two articles discussing the development of the AIC specialty in Europe and an analysis of ATI training, published in the *European Journal of Anaesthesiology*.

During the COVID-19 pandemic, SRATI supported the creation of a National Registry of COVID-19 Patients in Intensive Care in Romania, an electronic database that compiled data from all COVID-19 patients admitted to ICU units. This initiative resulted in three articles published in ISI journals. The first, appearing in 2022 in the *Journal of Clinical Medicine* (*7 ISI citations*), described the clinical characteristics and outcomes of elderly patients (aged ≥ 80) with COVID-19, noting a high mortality rate among those requiring invasive mechanical ventilation. The second study, published in 2023 in the *European Journal of Anaesthesiology* (*4 ISI citations*), analyzed 9,058 ICU patients to identify mortality-associated factors, highlighting the role of existing health conditions and treatment methods. The third article, also in the *Journal of Clinical Medicine*, focused on the impact of low vaccination coverage in Romania on ICU admissions and mortality among 2,222 patients with confirmed vaccination status, finding that fully vaccinated patients had lower ICU admission rates and mortality compared to the unvaccinated.

These endeavors exemplify my extensive contributions to advancing clinical practice and research in the field of anesthesia and intensive care, particularly within the context of evolving medical challenges.

Subchapter 1.3: Contributions to International Consortium Research

This subchapter outlines my role in significant research through international consortia as a national or local coordinator at IUBCV "Prof. Dr. C. C. Iliescu". Notably, I contributed to the FENICE Study (2015), which has received 611 citations, reflecting its substantial impact. I also coordinated three studies on infection prevalence in anesthesia and intensive care units: the ASPIRE-SSI-Study, COVID-Surg-Collaborative-GlobalSurg, and the EUROBACT-2 study.

Further, I participated in the Global Anesthesia Workforce Survey, assessing the global distribution of anesthesia professionals. My involvement extended to the METREPAIR 1 study and the METREPAIR NTproBNP Study, focusing on metabolic repair mechanisms in cardiovascular disease. Additionally, I contributed to research aligned with the updated 2022 European Society of Cardiology guidelines, enhancing our understanding of advanced cardiac care and infection control in healthcare settings.

Subchapter 1.4: Grants and Competitive Research Projects

This subchapter highlights the 14 key research projects and grants I've secured through national and international competitive processes, out of which the most important are:

a) Complex Informatic System - Patient Data Management System: As project manager, I led the introduction of Romania's first digital system for Anesthesia and Intensive Care units, funded by the EU with €1.65 million, enhancing patient management in three major hospitals (2012-2015).

b) EXTRAVITAL: Responsible for this educational initiative, funded by POCU 2014-2020, which integrated advanced life support techniques in Romanian medical facilities, training 900 professionals.

c) Development of Competences in Transplantation: Funded by FSE POSDRU 2007-2013, this project trained around 2000 healthcare providers in transplantation techniques.

Additionally, I have served as the principal investigator in seven other international multicenter studies, including two on istaroxime (HORIZON and IGNITE studies), two on Beriplex, a study on strescopine (JNJ-39588146), the FENICE study, and a study analyzing hospital mortality in adults admitted to Intensive Care.

Subchapter 1.5: Recognition of Scientific Research Achievements

My scientific contributions have been recognized and honored by various prestigious bodies: awarded Fellow (FESAIC) and Honorary Member Ad Vitam by the European Society of Anesthesia-Intensive Therapy (ESAIC), received the "Ștefan S. Nicolau" Award from the Romanian Academy in 2022 for my work on COVID-19 treatments in intensive care, published

in a Romanian Academy monograph, honored with the "Carol Davila" award in 2005 for my monograph on hemodynamic monitoring, and the "University Book Fair Diploma" in 2006 for my work on mechanical cardiac assistance, both from the Romanian Academy of Scientists, won first prizes from the Romanian Society of Anesthesia and Intensive Care (SRATI) in 1996 and 2002.

With over 220 presentations, I frequently speak at national (140) and international conferences (80) (in 16 countries, and have editorial roles with several journals, including the Journal of Anesthesia - JARSS (Turkey).

My research includes 42 published ISI papers—17 as first author—contributing to a cumulative FI of 48.281 and a Hirsh index of 13, supporting my habilitation thesis.

Chapter 2: Academic Activity

Subchapter 2.1: Professional Academic Career

My academic career began in 1991 both in Romania and internationally when I became a University Assistant at the AIC Fundeni under Prof. Dr. George Litarczek. During a super-specialization internship in Paris, France, I earned the title of Assistant étranger at Université de Paris VI (Pierre et Marie Curie) - Département d'Anesthésie et Réanimation, L'Hôpital Pitié-Salpêtrière, by defending a thesis.

In Paris, I advanced my expertise and engaged in significant research studies. Through successive competitive selections, I progressed to Head of Works in 2003, University Lecturer in 2007, and University Professor in 2015 at the same ATI Clinic Fundeni, which was designated as the AIC Discipline in 2019. This unification brought together clinics from IUBCV "Prof. Dr. C. C. Iliescu", IC Fundeni, SUUB, and INBI Prof. Dr. Matei Balș. A key achievement was transforming the AIC. education for students from a discontinuous afternoon schedule for one week to a continuous two-week morning schedule.

As a university Professor, I have held various management roles at U.M.F. "Carol Davila" Bucharest since 2012, being re-elected in 2016, 2020, and 2024 as Head of Discipline A.T.I. Fundeni. Since 2016, I have served on the Department Council (Clinical Department 14 – Orthopedics and ATI), the Faculty of Medicine Council since 2012, and the U.M.F. Senate since 2024.

When I first became Head of the AIC Discipline in 2012, our team consisted of 2 university Lecturers, 3 heads of works, and 3 university assistants, totaling 8 teaching staff. Today, the ATI-I Discipline boasts 21 faculty members, including 5 University Professors, 2 University Lecturers, 5 head of works, and 9 university assistants.

Subchapter 2.2: Development of Education in ATI

This subchapter highlights the advancements in AIC education, characterized by numerous didactic materials for students, resident doctors, and both specialist and primary AIC doctors. Notably, the unique AIC course for medical students at U.M.F. "Carol Davila" introduced in 2010 the Examination for the European Diploma in Anesthesia and Intensive Care Part I (E.D.A.I.C.) as the sole mandatory written exam for the AIC specialty, aligning with international standards of standardization and transparency. Since 2019, Bucharest hosts an examination center for EDAIC part II, and from June 2024, the exam will be available in Romanian. Recognizing my academic and professional qualities, I have been an international examiner for EDAIC part II since 2008, examining candidates in Portugal, Israel, and Hungary. A major national educational milestone was the development of the Center of Simulation in Anesthesia and Intensive Care Bucharest (CESIMAB) in 2019 as part of the SIMLAB project, which established 5 simulation centers across Romania.

From 2017 to 2023, I led the EXTRAVITAL project at I.U.B.C.V. "Prof. Dr. C. C. Iliescu", an educational program in extracorporeal replacement techniques that benefited over 300 medical specialists and 600 AIC nurses. During 2015-2016, I also served as an expert trainer for a POSDRU-financed intensive care training course for liver failure.

I have actively participated in many national and international scientific events, serving on the organizing and scientific committees of the annual SRATI Congresses since 1994, among other significant forums.

Subchapter 2.3: Academic Recognition within Professional Societies

My academic and professional merits have led to elections to management positions in national and international professional societies and receiving several international awards. Nationally, I have been a successive member, Vice-President, and currently President of S.R.A.T.I. Internationally, I have held various roles within the European Society of Anesthesia and Intensive Care (ESAIC), including Elected Representative of Romania and President of the Council of National Societies (NASC).

These roles and recognitions underscore my commitment to promoting high-quality medical practices in anesthesia and intensive care and my involvement in significant legislative and health policy developments.

CHAPTER 3: Medical Activity

Subchapter 3.1: Professional Journey

With 34 years of experience in Anesthesia and Intensive Care (AIC), including 31 years specializing in cardiovascular surgery, I have administered around 10,000 anesthesia cases and cared for over 100,000 intensive care patients. My medical career began at the Bucharest Central Military Hospital after graduating in 1984 from the "Carol Davila" Institute of Medicine and Pharmacy. In 1985 when I refused to become a member of the Romanian Communist Party I was kicked out of the army for political reasons. In 1988 I secured a research position in AIC after ranking second in a national competition. I became a certified anaesthesia & intensive care specialist in 1991 and furthered my training with professional courses in Paris and a seven-month course in Milan at the Università degli Studi di Milano - San Donato Milanese. I currently lead the 1-st AIC Department at IUBCV "Prof. Dr. C. C. Iliescu" and serve as chief physician, a role I've held since 1996. My dedication to ongoing education includes over 40 training courses globally and a European ECMO Diploma, highlighting my expertise in critical care.

Subchapter 3.2: Medical Activities and Their Impact

Throughout my career, I have been a steadfast advocate for advancing the AIC specialty at IUBCV "Prof. Dr. C. C. Iliescu". Under my leadership, our team has achieved numerous firsts nationally and in South Europe, including: the first Novacor type artificial heart implant in 2001, pioneering laser transmyocardial revascularization and right heart assistance with the A-Med system in 2001, Heart auto-transplantation using the Batista technique in 2001, early adoption of treatments like activated drotrecogin-alfa for septic shock post-cardiac surgery in 2002, introduction of anesthesia in mini-invasive cardiac surgery in 2003, first use of postoperative percutaneous cardiopulmonary assistance with arterio-venous ECMO in Romania in 2012, the initial implantation of the Heart Ware type artificial heart in 2014, implementing percutaneous ECMO-VV cardio-pulmonary assistance in 2015 for a victim of the Colectiv fire, marking global milestones in ARDS treatment by veno-venous ECMO, in 2016, facilitating the entire process for the first transcatheter mini-invasive aortic prosthesis (TAVI) procedure, the first implantation of the Impella left ventricle assistance system in Romania in 2018, in 2024, leading pre-operative preparation, anesthesia, and post-operative care for the first mini-invasive transcatheter mitral valve repair (TMVR) in Romania's public health system.

We have been pioneers in introducing advanced echocardiography since 2003, and starting from 2024, I lead the certification of perioperative cardio-pulmonary and vascular ultrasonography. Our early adoption of ultrasound techniques since 2001 for vascular access and pleuro-pulmonary assessments has further established our department as a leader in anesthesia and intensive cardio-pulmonary therapy both nationally and across Europe.

Our department is a crucial hub for cardiovascular emergencies in Southeast Romania, managing complex cardiovascular surgery cases. In 2014, we were the first in Romania to digitize AIC departments, enhancing our operational efficiency. I served as Medical Director from 2005 to 2010 and as General Manager from 2010 to 2019 at IUBCV, during which time we ranked at the top in Romanian medical performance indices and initiated a significant infrastructure upgrade included in the National Recovery and Resilience Plan (PNRR) - Health Component C12.

Additionally, I have held prominent positions such as President of the National Health Insurance House and Director at the Ministry of Health, where I contributed to national health strategies and introduced the "vice tax." My leadership philosophy has always emphasized ethical treatment, clear communication, and unwavering support for both patients and staff, encapsulated in the "Decalogue of IUBCV Employees Prof.dr.C.C. Iliescu.

My professional and administrative contributions have been recognized with numerous awards and honors, such as: the "National Order of Merit", Knight rank, bestowed by the President of Romania in 2009, the "Great Patriarchal Cross" from P.F. Patriarch Daniel of the B.O.R. in 2015, the "Diploma of Excellence in Romanian Medicine", awarded under the "Made in Romania for Health" program sponsored by the Prime Minister of Romania in 2001 for pioneering the first artificial heart implant in Central and South-Eastern Europe.

Furthermore, I am affiliated with several professional societies both nationally and internationally, including being an Honorary Member - ad Vitam and Fellow of the European Society of Anesthesia and Intensive Care (ESAIC), an Honorary member of the Israeli Society of Anesthesia, an Honorary member of the Serbian Society of Anesthesia and Intensive Care, a member of Honor of the Romanian Society of Orthopedics and Traumatology (SOROT), a member of the Romanian Society of Anesthesia and Intensive Care (SRATI), a member of the Romanian Society of Transfusion Medicine, a member of the European Association of Cardiothoracic Anesthetists (EACTA), a member of the European Society of Intensive Care (ESICM), and a member of the Romanian Society for Enteral and Parenteral Nutrition (ROSPEN).

Chapter 4. Professional Career Development and Evolution

Subchapter 4.1. Enhancing Didactic Activities at UMF Carol Davila

Over the past three years, significant changes have been made to the AIC program at UMF Carol Davila, transitioning it into a continuous two-week morning format, which I aim to extend to three weeks. The construction of the new IUBCV Prof. Dr. C.C.Iliescu headquarters, funded by PNRR, will address spatial constraints and include an 800 sqm simulation platform. Furthermore, the Student Course, introduced in 2018, requires updates and an English version to better integrate students into research projects and support them in clinical and research internships through inter-university exchange programs. Following the new Education Law, the post-graduate training of resident doctors has moved from the Ministry of Health to Medical Universities, necessitating the implementation of a new competency-based UEMS curriculum to align with high-standard programs in Western Europe. I advocate enhancing residency skills assessment by incorporating the EDAIC Exam (On-line Assessment - OLA) simulation as an interim verification method before the mandatory written exam, promoting faculty based on objective criteria, and supporting the professional growth of young doctors.

Subchapter 4.2. Development of the Anesthesia and Intensive Care Specialty

The ATI discipline at Fundeni is a benchmark center in Romania, incorporating elite medical teams across various specialties. Upholding the high standards set by my predecessors, such as Prof. Dr. George Litarczek and Prof. Dr. Dan Tulbure, is a significant responsibility. The principles of non-discrimination, equal opportunities, humanity, and dedication guide the medical practice within the AIC specialty. As President of S.R.A.T.I. and Vice President of the MS Specialty Commission, my objectives include further standardizing and enhancing the transparency of the AIC specialist title examination process, incorporating simulation tests, modernizing the examination system for AIC doctor positions and department head roles in public hospitals, considering alignment of EDAIC part II with the AIC primary doctor qualification, adapting legislative frameworks concerning salaries, and continuing the digitalization of AIC departments. Another goal is to eliminate the unfair competition between the private and public health sectors and to recognize the advanced specialization of AIC nurses through a significant educational project proposed to the Ministry of European Funds by SRATI and OAMMR.

Subchapter 4.3. Academic Research Initiatives

My leadership roles in international societies have facilitated the development of a substantial research network, which I plan to expand as a PhD supervisor, enabling doctoral candidates to participate in impactful multicenter studies. I aim to establish a national research network linking major university centers to enable collaborative academic projects. The research focus will include anesthesia in minimally invasive cardiac surgery, modulation of systemic inflammation in cardiac surgery, advanced perioperative hemodynamic monitoring, perioperative fluid therapy, loco-regional analgesia in cardiac and vascular surgery, intensive care monitoring of critical patients, sepsis and septic shock treatment, management of fluid-coagulant balance disorders in critical patients, ARDS management, mechanical circulatory support, and the evaluation of new hemodynamic and rheological parameters in shock patients.

Commitment

My commitment to fairness, responsibility, excellence, and performance guides my professional, academic, and teaching endeavors. I aim to instill these values in future generations of students, doctors, and PhD candidates, providing them with the necessary support for their professional and scientific development.