

**UNIVERSITY OF MEDICINE AND PHARMACY**  
**"CAROL DAVILA" BUCURESTI**  
**DOCTORAL SCHOOL**  
**MEDICINE**

**HABILITATION THESIS**

**CANDIDATE:**

**Assoc. Prof. Valentin Calu, MD, PhD**  
**Faculty of Medicine**  
**UMF "Carol Davila" Bucharest**

**YEAR**

**2023**

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**IMPROVING THE RESULTS OF THE SCIENTIFIC RESEARCH BY  
IMPLEMENTING THE NEW TECHNOLOGIES AND THE MODERN  
EDUCATIONAL CONCEPTS**

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**Motto**

*"To teach someone is to change a life forever"*

The present PhD supervisor habilitation thesis, entitled "*Improving the results of the scientific research by implementing the new technologies and the modern educational concepts*", presents the work of the candidate, Associate Professor PhD Valentin Calu, on the academic, scientific, and teaching levels, and highlights a number of his achievements in all three aspects. The second half of the thesis details and presents the principles, development plans and research projects that the candidate wishes to implement.

**The introduction** includes the motivation for the present thesis and a review of the elements that currently constitute the pillars of scientific research in the medical field. The inclusion of new technologies and virtual reality simulators, as well as mentoring and proctoring processes are mandatory to improve this process and to encourage PhD students to study surgical pathologies.

**Chapter III** details the professional pathway from the beginning of the general surgery residency, to becoming a specialist, then a consultant surgeon, and the second specialty, thoracic surgery, to complete the necessary knowledge and the optimal surgical skills and techniques to perform complex surgical procedures. In the same spirit I also mentioned the additional skills certificates obtained, which include oncologic surgery, hepato-biliary-pancreatic surgery, liver transplantation and, of course, laparoscopic surgery. All of these have allowed a holistic development and adequate treatment of the pathologies that I have addressed over time and which have included major surgeries, both in emergency pathology and for elective procedures for benign and malignant diseases. Throughout this period I have attended numerous courses and training courses, 99 in number, the details of which would go beyond the scope of this thesis, but among the most important and renowned centres I have visited as a trainee were IRCAD - Strasbourg, Medical University of Graz - Austria, NKI - Amsterdam, Netherlands, or Bordeaux.

I have also listed the societies, both in Romania and abroad, of which I am a member: the Romanian Society of Surgery, the Romanian Association for Endoscopic Surgery and Other Interventional Techniques - ARCE, the Romanian Society of Thoracic Surgery 1994 since 2011, the Romanian Association of Hepatobiliopancreatic Surgery and Liver Transplantation - ARCHBPTH since 2014, and the Romanian Society of Emergency Surgery and Trauma - SRCUT.

For some of them I had the honour of holding various official positions, which made me content and also aware of my responsibilities: since 2014 I have been a member of the EHS - European Hernia Society (2014), and I was National Delegate for the Romanian Chapter in 2015, and subsequently Member of the Advisory Committee for Web, and in 2015, together

with other fellow surgeons with interest in abdominal wall surgery, I founded the Romanian Hernia Club - RHC (National Chapter of the European Hernia Society) - founding member and Secretary General. Since 2002 I am a board member in the External Relations Committee in the Romanian Association for Endoscopic Surgery and Other Interventional Techniques - ARCE, where I later also became a member of the Steering Committee (2017), and then Vice President, in 2019. I am a member of EAES (European Association of Endoscopic Surgery) since 2006, EDS (European Digestive Surgery) since 2009, ESCP - European Society for Coloproctology since 2012, WSES - World Society for Emergency Surgery since 2013, and IASGO - International Association of Surgeons, Gastroenterologists and Oncologists since 2013, as well as ESSO (European Society for Surgical Oncology) and AFC (Association Francais de Chirurgie).

My attitude and consistent efforts have been rewarded with the titles of FACS (Fellow of the American College of Surgeons) and Fellow of the Royal Society of Medicine in the UK, as well as a number of professional awards and honours.

Throughout my career I have served as a member of six examination boards for obtaining a tenure in hospitals in the national network.

**Chapter IV** covers the academic development, from the beginning of the informal teaching activity in the Caritas Clinic, under the direction of Prof. Dr. Brătucu, to the title of Senior Lecturer, in 2013, and that of University Lecturer, in 2021. My activity in the University of Medicine and Pharmacy evolved with the Surgery Clinic at Elias Hospital, and included the elaboration of theoretical materials and lectures, practical activity both with the series of 4th year students and with resident doctors and specialists of the clinic or those in a training rotation of a related specialty. Throughout my teaching career, I have had the pleasure of guiding 15 students in their undergraduate work, five of whom subsequently chose General Surgery as their specialty following the residency entrance examination.

**Chapter V** contains the achievements in the field of research, since the completion of doctoral studies and the defense of the thesis entitled "Therapeutic problems in lithiasic sclerosing cholecystitis", elaborated under the supervision of Prof. Dr. Eugen Brătucu (thesis defended on 29.01.2010; doctoral degree with no. 8/7.07.2010 granted on the basis of M.E.C.I. Order no. 3492/23.03.2010), until today.

At the time of writing this thesis, my scientific and research activity can be summarised as follows:

- National/international books/book chapters - 10
- ISI full-text articles with impact factor published as lead author - 11
- ISI full-text articles without impact factor published as lead author - 4
- ISI full-text articles with impact factor published as co-author - 33
- ISI full-text articles without impact factor published as co-author - 6
- BDI full-text articles published as author/co-author - 9
- Studies published in abstract in ISI journals - 54
- Studies published in abstract in BDI/ISSN journals - 74

These articles have been cited, in turn, in other ISI or BDI indexed journals, 739 times according to Google Scholar, 635 times in Web of Science indexed articles, and 383 times in Scopus - Elsevier.

Following the assessment of the studies I have participated in as an author or co-author, currently the Hirsch index is 12 in Web of Science - Core Collection, 11 in Scopus - Elsevier, and 13 in Google Scholar. Research activity according to Research Gate, Research Interest Score, is 1,367.2, with 27,501 hits of articles indexed in the website database.

The books and book chapters I have co-authored are aimed at the entire spectrum of medical readers, including surgical textbooks and practical workbooks for students, a textbook for residents, as well as treatises on general surgery and hepato-biliary-pancreatic surgery designed to supplement or update the knowledge of residents, specialists and primary care physicians. Together with other colleagues from different specialties, we have developed such materials that have presented the surgical perspective in various other instances, given that today it is mandatory to discuss the integrated, multidisciplinary approach to patients and their pathologies.

I have detailed my publication activity according to the research area we have studied and divided it into four subchapters: surgery of benign pathologies, oncological surgery, bariatric surgery, and international multicenter studies.

The most recent articles published as lead author in ISI journals with Web of Science impact factor are "Multivariate Risk Analysis of RAS, BRAF and EGFR Mutations Allelic Frequency and Coexistence as Colorectal Cancer Predictive Biomarkers" Ionescu, A.; Bilteanu, L.; Geicu, O.I.; Iordache, F.; Stanca, L.; Pisoschi, A.M.; Miron, A.; Serban, A.I.; Calu, V. *Cancers* 2022, 14, 2792 (IF 6.639 - last author) and "Laparoscopic vs. open resection for colon cancer-quality of oncologic resection evaluation in a medium volume center", Enciu, O.,

Avino, A., Calu, V., Toma, E. A., Tulin, A., Tulin, R., Slavu, I., Răducu, L., Balcangiu-Stroescu, A., Gheoca Mutu, D., Tomescu, L. F., Miron, A. *Experimental and Therapeutic Medicine* 24, no. 1 (2022): 455 (IF 2.447 - corresponding author). The most recent co-authored paper published as a result of an international multicentre effort was "Effect of the COVID-19 pandemic on surgery for indeterminate thyroid nodules (THYCOVID): a retrospective, international, multicentre, cross-sectional study" Fabio Medas, ..., the THYCOVID Collaboration Group\* *The Lancet Diabetes&Endocrinology* Published Online April 28, 2023 [https://doi.org/10.1016/S2213-8587\(23\)00094-3](https://doi.org/10.1016/S2213-8587(23)00094-3) (IF 44.867).

The full list of articles is attached to this thesis.

**Chapter VI** describes my plans for the evolution and development of my academic and scientific career, as well as the main research topics I wish to develop as a member of the Doctoral School of the Carol Davila University of Medicine and Pharmacy.

The field of medicine is constantly evolving and with each passing day, new discoveries, techniques and treatments emerge, requiring a continuous updating of knowledge and skills among medical professionals. In Romania, as in many other countries, the education and training of medical students and surgical residents plays a vital role in preparing them for the challenges and responsibilities they will face in their future careers. However, there is an urgent need to improve the educational process to ensure that these health professionals receive comprehensive, high-quality training.

Surgery is an art that is passed down by rules very similar to the old craft guilds. Young apprentices, residents and students must learn the secrets of the art, starting from a solid theoretical base, coupled with a very consistent practical activity. Establishing mentoring programmes can provide medical students and surgical residents with guidance and support from experienced doctors. Mentoring can help shape their career path, encourage professional growth and instil a sense of responsibility and ethical practice.

Curriculum modernisation is an ongoing necessity in this age of constant scientific progress. Regular review and updating of the medical curriculum is essential to incorporate the latest advances in medical science, technology and patient care. The introduction of interactive teaching methods, such as problem-based learning, case discussions and simulation exercises, can facilitate a deeper understanding of medical concepts and improve clinical reasoning skills.

Collaborations between medical schools and university hospitals should be strengthened to provide medical students and surgical residents with extensive practical

experience. Clinical rotations, apprenticeships and supervised surgical procedures can help bridge the gap between theoretical knowledge and practical application.

Investing in faculty development programs can ensure that educators possess the expertise and teaching skills necessary to effectively guide and mentor medical students and surgical residents. Encouraging research and providing incentives for continuing education can also promote a culture of lifelong learning among faculty members.

The adoption of technology, such as virtual reality simulations, anatomical models and telemedicine platforms, can improve the educational process. These tools provide immersive learning experiences, enhance procedural skills and facilitate distance learning and collaboration between healthcare professionals.

Key areas to which doctoral studies can make a major contribution include minimally invasive surgery, including laparoscopic and robotic-assisted approaches, which have gained prominence in general surgery. Doctoral students can actively participate in research studies comparing the outcomes of minimally invasive techniques with those of traditional open surgery. They can help collect data, analyse patient outcomes and compare benefits such as reduced postoperative pain, shorter hospital stays and faster recovery. Doctoral students can contribute by participating in research projects evaluating the implementation and outcomes of ERAS protocols. They can help follow up patients and analyse the impact of ERAS on length of stay, postoperative complications and patient satisfaction. Advances in surgical techniques and multimodal treatment approaches have improved oncologic outcomes in cancer patients. Researchers can actively participate in studies focusing on cancer surgery, including evaluating the impact of neoadjuvant therapy, assessing surgical techniques and investigating novel approaches such as organ preservation or local excision for early stage tumours. Advances in molecular biology, genetics and immunology have provided new insights into the pathogenesis and treatment of colorectal diseases. Translational and basic science research, investigation of biomarkers, genetic mutations or immunotherapeutic approaches in cancer can contribute to laboratory experiments, data analysis and can materialise in the presentation of results at scientific conferences and in articles of high scientific and surgical significance. PhD students can conduct health economic studies and cost-effectiveness analyses in surgery. This involves assessing the economic burden of oncological as well as benign diseases, evaluating the cost-effectiveness of different treatment strategies and conducting economic evaluations of new technologies and interventions. Such research helps inform health decision-making and resource allocation.



It is important to note that the specific research interests of PhD students may vary, and they should have the freedom to explore areas that align with their passion and expertise. Encouraging interdisciplinary collaborations, offering mentoring from experienced researchers and fostering an environment that supports research and academic activities are essential for PhD students to thrive in their chosen fields of study.

In all these aspects, young PhD students bring fresh perspectives, enthusiasm and dedication to research in general surgery. Their active involvement in data collection, literature reviews, statistical analysis and manuscript preparation contributes to generating scientific evidence and advancing the field. In addition, their exposure to surgical research fuels their interest in academic pursuits, encourages critical thinking and problem-solving skills, and fosters a deeper understanding of the field.