

SUMMARY OF THE HABILITATION THESIS

Complex Statistical Models Applied in Clinical Research

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The Habilitation thesis entitled „Complex Statistical Models Applied to Clinical Research" focuses on my concerns about testing advanced statistical models in the context of clinical research, explanatory models that use clinical data in the most robust and useful way in understanding the complex relationships between clinical characteristics.

This habilitation thesis is structured in two parts.

In the first part of the thesis, I presented the corresponding scientific, academic and professional achievements related to the period between the moment of obtaining the doctorate in Medicine (2015) and until now. Among the main research directions presented in the paper, the following can be listed:

1. **Development and testing of a structural equation model** applied on data from gynecological oncology, a model based on the **latent variables**: doctor-patient communication, treatment approach and the need for information of patients with ovarian cancer.
2. **Development and testing of a path model** based on directly measurable variables in complex dependent relationships, a model that includes maternal socio-demographic and clinical characteristics, obstetric characteristics, the presence of maternal and neonatal genetic polymorphisms, the mother's weight gain during pregnancy and the birth weight of the newborn.
3. **Development and testing of a path model** linking lipid indicators, severity of ischemic stroke, and extended-term functional status in patients.
4. **Development and testing of a path model** with **exogenous** (25-hydroxyvitamin D) and **endogenous factors** (body mass index, insulin resistance index, total oxidative status) in overweight or obese individuals with type 2 diabetes.
5. **Identification of the factorial structure** of a survey meant to assess medical information and decision needs related to treatment as well as psychological and socio-familial needs, in young breast cancer patients who have undergone treatment.
6. **Identification of a joinpoint regression model** for tracking the trend of syphilis and gonorrhoea incidence in adolescents aged 15 to 19 years.
7. **Identification of generalized explanatory linear models with main effects of genotypes and haplotypes** that explain the risk of various diseases by examining genotypes and haplotypes linked to different genetic variations.
8. Study on the **variability of biventricular myocardial strain deformation through mixed linear models**, measures assessed through speckle-track echocardiography in infants diagnosed with severe and critical pulmonary stenosis.

Thus, after obtaining the **title of Doctor of Medicine (2015)**, I had a prolific scientific activity proven by a number of **62 scientific articles published in ISI indexed journals (Clarivate)**. For a number of **54 ISI scientific articles**, I contributed as the **principal author**. For the same period, if we consider the

distribution of journals by quartiles, I had a number of **40 (64.52%) scientific articles published in journals from quartiles Q1 and Q2** (of which 3 articles published in **journals from the Nature group**, the quartile being calculated according to the impact factor). **The Cumulative Impact Factor as principal author (FCIAP) is equal to 154.218**. The quantification of the research activity is as follows: i) using **Hirsch in the bibliographic databases Clarivate Analytics (Web of Science): h-index = 15**, in **Scopus: h-index = 15** and in **Google Scholar: h-index = 19**; and ii) using the **number of citations** received for the articles published in **Clarivate Analytics: 671**, in **Scopus: 706**, **Google Scholar: 1114**. The recognition and impact of the research activity can also be highlighted by the **26 UEFISCDI awards - Research results award - scientific articles** that I obtained together with the collaborators in the period 2015 - 2023. **After obtaining my doctorate in Medicine (2015)**, I was a member of the research team of the project PN III-P4-ID-PCE conducted within the UMFST "George Emil Palade" from Târgu Mureş.

Over time, I guided and **coordinated students and master's students** in the development of theses (I coordinated a **bachelor's thesis and three dissertation theses**) and I was member in the doctoral studies guidance committee of **five doctoral students (three with the scientific title of doctor at the time of writing this thesis)**.

Regarding the **didactic contribution**, I held courses in Biostatistics and Medical Informatics (the French section of the Faculty of Medicine of UMFIIH, the French section of the Faculty of Dental Medicine of UMFIIH, the General Medical Assistance study program), courses in Computer Systems in dental medicine (French section of the Faculty of Dental Medicine of UMFIIH), Methodology of medical scientific research (French section of the Faculty of Dental Medicine of UMFIIH). At the level of the second cycle of studies, within the Biostatistics and Bioinformatics master's program, I held courses and practical works in Medical Biostatistics and Modeling of Biological Phenomena.

I was the **principal author of three book chapters** and **co-author of three book chapters** and had numerous contributions to development of practical activities in online format in the previously mentioned disciplines.

In the second part of the thesis, the **career development** plans are presented. On a **scientific level**, I aim to explore new research topics, strengthening interdisciplinary collaborations at local, national and international levels, and publishing research findings in ISI journals. On the **academic level**, I will focus on improving the quality of the didactic process, creating course materials centered on scenarios based on scientific articles published in the literature, the real-time use of online interactive learning platforms but also taking over constant feedback from students regarding their expectations and their ability to assimilate course concepts.