

**"VICTOR BABEȘ" UNIVERSITY OF  
MEDICINE AND PHARMACY TIMIȘOARA  
DOCTORAL SCHOOL  
MEDICINE**



**CONTEMPORARY PERSPECTIVES IN  
GYNECOLOGY: IMPLICATIONS FOR  
REPRODUCTIVE HEALTH, ONCOLOGY AND  
ADVANCED SURGICAL TECHNIQUES**

**ABSTRACT**

**Lecturer Popa Zoran Laurențiu**

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## ABSTRACT

My name is Popa Zoran Laurențiu and I was born in Timișoara. Upon completing my high school education at the esteemed "Nikolaus Lenau" Theoretical High School in Timișoara in 1996, where I achieved an impressive average of 9.74, I got admitted into the Faculty of Medicine at the University of Medicine and Pharmacy "Victor Babeș" Timișoara in the same year. In 2003, I started my professional journey as a resident physician at the University Clinic of Obstetrics and Gynecology "Bega" based in the County Emergency Hospital. Driven by great passion for this field since my student years, I have committed my professional life to enhancing gynecological procedures, namely in the areas of maternal-fetal medicine, reproductive health, oncology, and advanced surgical techniques.

After finishing my residency program in 2008, I passed the specialty exam with a final score of 9.83, officially becoming a specialist in obstetrics and gynecology. Since 2012, I have been practicing as a primary care physician in this field.

I completed my Doctor of Philosophy degree in 2010, with the doctoral dissertation titled ***"Reproductive Risk in Families with Mucoviscidosis (Cystic Fibrosis), and the Significance of Prenatal Diagnosis."*** The thesis was supervised by Acad. Prof. Univ. Dr. Ioan Muntean and was confirmed by the Order of the Minister of Education 4542/28.07.2010. The doctoral research was a national first in the field of prenatal cystic fibrosis diagnosis.

The habilitation thesis, entitled ***"Contemporary Perspectives in Gynecology: Implications for Reproductive Health, Oncology, and Advanced Surgical Techniques"*** presents my professional, scientific, and academic achievements following my completion of my Doctor of Philosophy in Medical Sciences. The thesis is organized into four primary sections: i) scientific accomplishments, ii) academic work, iii) professional experience, and iv) future development plans.

**Chapter 1** focuses on the significant scientific research accomplishments of postdoctoral researchers in the field of Obstetrics and Gynecology. It presents original studies, books, articles published in internationally recognized journals that are indexed in ISI or BDI, as well as scientific papers presented at national and international congresses. This chapter provides an overview of the current scientific landscape in Obstetrics and Gynecology. Chapter 1 addresses my initial postdoctoral research focus in the field of maternal-fetal medicine and reproductive health. Specifically, it explores preterm delivery,

hypertensive problems during pregnancy, and infertility. The second postdoctoral focus is to secondary research in the field of gynecological oncology and surgery, namely examining cervical, breast, and uterine cancers, along with novel surgical approaches. Additional areas of inquiry encompass cystic fibrosis, ophthalmology, allergies, and the influence of COVID-19 on contraception.

This chapter also encompasses the progression of my scientific growth, accomplishments, and acknowledgment at a national or international level. During my extensive professional, medical, scientific, and academic journey, I have actively participated in numerous national and international congresses. My involvement has included presenting posters, delivering oral presentations, and being invited as a speaker.

In terms of scientific publications, I have authored or co-authored a total of 29 research papers that have been published in reputable scientific journals indexed by Clarivate Web of Science. Additionally, I have published 8 articles in respected scientific journals indexed by BDI, international databases. Furthermore, I have authored and had 16 abstract articles in ISI journals and 9 ISI proceedings papers. The articles in many worldwide ISI journals have made a significant scientific effect and are widely acknowledged, with a total of 107 citations in the ISI Web of Science system and a Hirsch index of 7.

Building upon the knowledge gained while working on my doctorate degree, I pursued further study in the field of maternal-fetal medicine, specifically concentrating on high-risk pregnancies. This included pregnancies that were at risk of preterm birth and those complicated by hypertension diseases. Given that preterm birth remains a significant concern in obstetrics because of its association with increased morbidity and mortality among newborns, my research has focused extensively on identifying predictors and risk factors for preterm birth, with the goal of developing strategies to prevent its occurrence and mitigate its adverse effects.

The first study, titled *"Evaluating the Effectiveness of Hemoglobin, HALP Score, FAR Ratio, and Coagulation Parameters as Predictors for Preterm Birth"*, seeks to establish the predictive significance of hemoglobin levels, the correlation between hemoglobin, albumin, lymphocyte, and platelet (HALP) score, and coagulation parameters including prothrombin time (PT), activated partial thromboplastin clotting time (aPTT), D-dimer, and fibrinogen/albumin ratio (FAR) in predicting the risk of preterm birth. This study noticed that in the third trimester of pregnancy, levels of hemoglobin, the HALP score, and specific coagulation parameters such as PT, aPTT, D-dimers, and FAR were all important factors in

determining the likelihood of preterm birth. Furthermore, I examine the vaginal microbiome of pregnant women and link it to preterm birth outcomes in the second ISI publication on preterm birth. The research *"Analysis of Vaginal Microbiota Variations in the Third Trimester of Pregnancy and Their Correlation with Preterm Birth: A Case-Control Study"* tried to find microbial composition variations that increase preterm birth risk. This study identified strong links between the vaginal microbiome and preterm delivery, suggesting infections and microbial imbalances may trigger premature labor. In order to further investigate this topic, I conducted a study entitled *"Impact of Genital Infections and Antibiotic Use on Incidence of Preterm Birth: A Retrospective Observational Study"*. The objective of this research was to examine the complex relationship between genital infections, antibiotic usage, and preterm birth. This study elucidates the intricate correlation between genital infections, the administration of antibiotics, and the probability of preterm birth. Our research findings emphasize the significance of various critical factors that influence pregnancy outcomes. Notably, the presence of sexually transmitted illnesses, notably Chlamydia trachomatis and Mycoplasma hominis, were found to be important factors that raise the likelihood of giving birth prematurely. I subsequently conducted additional research on this topic, which was published in a journal with an impact factor and indexed by Clarivate Web of Science. The objective of this study, *"Comparative Analysis of Microbial Species and Multidrug Resistance Patterns Associated with Lower Urinary Tract Infections in Preterm and Full-Term Births"* is to compare these differences, identify the bacterial species that are significantly associated with preterm birth, and describe the antibiotic resistance patterns among pregnant women with urinary tract infections. This research identified notable disparities in microbial species and patterns of multidrug resistance between urinary tract infections occurring in preterm and full-term deliveries. Moreover, the study found a significant increase in bacteria that are resistant to multiple drugs, specifically extended-spectrum beta-lactamases producing organisms and carbapenem-resistant Enterobacteriaceae, in the group of women who gave birth prematurely.

In addition to the aforementioned studies published in high-impact journals indexed by Clarivate Web of Science, I have actively contributed to various research projects on preterm birth as part of my first post-doctoral research direction. The results of these projects have been published in proceedings volumes of scientific events, which are also indexed by Web of Science.

The selection of hypertension as a study focus within the maternal-fetal research direction was based on the fact that it complicates five to ten percent of all medical

disorders that can arise during pregnancy. My research in this area has focused on identifying predictors and biomarkers for hypertensive disorders, understanding their pathophysiology, and evaluating the effectiveness of various interventions.

The initial investigation, named *"Impairment of mitochondrial respiration in platelets and placentas: a pilot study in preeclamptic pregnancies"* aimed to examine changes in mitochondrial respiratory function in peripheral platelets and placental mitochondria obtained from preeclamptic pregnancies with those from healthy pregnancies without preeclampsia and non-pregnant women of similar age. The study concluded that preeclampsia elicited mitochondrial respiratory dysfunction in both platelets and placental tissue.

The second ISI publication on the topic of preeclampsia is titled *"Placental oxidative stress and monoamine oxidase expression are increased in severe preeclampsia: a pilot study."* The objective of this study is to measure placental oxidative stress by comparing samples from different sources (peripheral vs central) and to evaluate the gene and protein expression of placental monoamine oxidase (MAOs) in pregnancies with preeclampsia compared to healthy pregnancies. Severe preeclampsia increases placental oxidative stress, with no significant regional differences observed in normal and pathological conditions. Central areas of the placenta are primarily affected. Elevated MAO-A and B gene transcripts are found in preeclamptic placentas, and both isoforms of the MAO protein are present in affected tissue, regardless of the harvested location.

Additionally, considering the well-established association between hypertensive diseases during pregnancy and impaired placental function, which significantly contributes to the development of fetal growth restriction, I have decided to investigate this area as well. The study titled *"Appropriate Delivery Timing in Fetuses with Fetal Growth Restriction to Reduce Neonatal Complications: A Case-Control Study in Romania"*, aims to ascertain the likelihood of neonatal complications depending on the time of birth in fetuses with early onset FGR based on Doppler parameters, taking into account that in early onset FGR, the time of delivery is primarily chosen based on Doppler parameters, weighing the risks and benefits to the infant.

The study shows the benefit of delivering fetuses before the onset of absent/reversed DV-a wave, the risk of early neonatal complications being higher among infants with GA < 30 WG whose delivery was delayed after the onset of UA-AEDF/REDF. Newborns with GA < 30 WG delivered when UA-AEDF/REDF is present, before the onset

of absent/reversed DV a-wave, are less likely to develop grades III/IV intraventricular hemorrhage and bronchopulmonary dysplasia.

The latest study published in the ISI journal indexed Clarivate Web of Science, related to the topic of hypertensive disease in pregnancy, sheds light on the link of these diseases to the recent COVID-19 pandemic. The manuscript that presents the study findings entitled *“Prospective Analysis of Vitamin D Levels in Pregnant Women Diagnosed with Gestational Hypertension after SARS-CoV-2 Infection”*. The study found that vitamin D deficiency and vitamin D insufficiency among pregnant women with COVID-19 may be an independent risk factor for the development of gestational hypertension.

Furthermore, my research in this particular area emphasizes reproductive health, encompassing the examination of factors and measures that impact fertility, pregnancy results, and the general welfare of mothers.

First of all, in this topic which is part of my first direction of postdoctoral research, I discussed infertility. The study entitled *“Impact of Stress and Financials on Romanian Infertile Women Accessing Assisted Reproductive Treatment”* sought to address the stress and financial factors that are most prevalent in Romania, and represent a susceptible reason for impeding access of infertile couples to assisted reproductive treatment in our country. The study finds that there are significant disparities between couples that utilize assisted reproductive procedures, particularly in terms of stress levels, family income, and government financial assistance.

In continuation to this subject, I participated as coauthor at the study titled *“Socio-economical, Legal and Ethical Issues Raised by Infertility and Assisted Reproductive Techniques in Romania”*. This report asserts that there has been a noticeable enhancement in Romania's assisted human reproduction sector in recent years.

In addition to studies on preterm birth and hypertensive diseases of pregnancy, my scientific career brings together various studies that address different aspects of the complexities of maternal-fetal medicine, shedding light on specific high-risk conditions and their implications for maternal and fetal health.

First of all, in view of the national premiere on the study of prenatal diagnosis of cystic fibrosis, which I did during my doctoral studies, I decided to continue this topic. The first study, *“Early Amniocentesis for Cystic Fibrosis Prenatal Diagnosis”*, aims to detect CFTR mutations in foetal genomic DNA isolated from amniotic fluid. The study concludes that an accurate prenatal diagnosis in cystic fibrosis requires a correct sampling technique for the amniotic fluid to prevent its contamination with blood or maternal cells, and a precise

technique for DNA isolation. Mutation detection by ARMS-PCR CF29 is applicable only to those couples in which at least one of the parents is a carrier of one of the included alleles.

The second study, “A Cross-Sectional Study of the Marital Attitudes of Pregnant Women at Risk for Cystic Fibrosis and Psychological Impact of Prenatal Screening”, aimed to examine the marital attitudes of pregnant women at risk for CF and the psychological effect of screening for CF among pregnant women.

The current study determined a series of interesting findings in regards to the marital attitudes of pregnant women at risk for giving birth to a child with CF in correlation with the psychological impact of expecting the prenatal screening that will elucidate the diagnosis of the fetus. It was observed that CFTR-carrier mothers are likely to be more affectionate to the fetus, with better maternal–fetal quality and intensity of attachment.

Finally, the last study in my primary direction of postdoctoral research, concerns the maternal-fetal implications of SARS-CoV-2 infection in the context of the recent pandemic.

The study *“Prompt Placental Histopathological and Immunohistochemical Assessment after SARS-CoV-2 Infection during Pregnancy—Our Perspective of a Small Group”*, aimed to compare both histopathological and immunohistochemical observations of placentas from mothers who have tested positive for SARS-CoV-2 during their pregnancy with those who tested negative for infection throughout the gestational period. Through meticulous research, we have uncovered the impact of SARS-CoV-2 on coagulation, which manifests through fetal thrombotic vasculopathy and the deposition of fibrin.

In addition to my primary research direction, I have also engaged in secondary research in the field of gynecological oncology and surgery. This includes the study of cervical, breast, and uterine cancers, as well as advancements in surgical techniques.

In the study entitled *“HPV Cervical Cancer Screening. An Analysis Over HPV Markers Between Worldwide Statistics and Romanian Reality”*, we aim to present our results on HPV types among adult women diagnosed with invasive cervical cancer and HPV types among adult women diagnosed with CIN 2+. This study concludes that the Papanicolau test is the routine cytology test for screening, but PCR HPV DNA test wins territory as an additional test, together or replacing the cytology one.

Regarding to the surgical treatment of cervical cancer, I co-authored the proceedings paper study entitled *“Cervical Cancer - The Wertheim-Meigs Surgery: Intraoperative Complications”*. This study presents the Wertheim-Meigs surgery technique used in case of an intraoperative incident due to insufficient sealing of the left uterine artery. Regarding to breast cancer, I co-authored the proceedings paper study entitled *“False Positive Results in*

*Breast Elastography. A Retrospective Analysis*". The study results generated a elastography sensitivity of the method of 82.99%, with a specificity of 96.31%, accuracy of 90.56%.

Within the secondary research direction, we also addressed the topic of endometrial cancer by co-authoring the study: *"Predictive Role of Pre-Operative Anemia in Early Recurrence of Endometrial Cancer: A Single-Center Study in Romania"*. This study establishes pre-operative anemia as a significant predictor for both early recurrence and reduced overall survival in endometrial cancer patients.

On the subject of gynecological surgery I have addressed the subject of malpractice in laparoscopic surgery, through the proceedings publication entitled *"Aspects Regarding Malpractice in Laparoscopic Gynecologic Surgery"*. In this paper we discussed some of the most important complications, their incidence, ways of prevention and medico-legal aspects, in order to improve their management in our daily practice.

In addition, I have also addressed the topic of uro-gynecological surgery through the study called *"Transvaginal Cystocele Repair Using Tension-free Polypropylene Mesh (Tension-free Vaginal Tape)"*.

Beyond the core areas of obstetrics and gynecology, my postdoctoral research has encompassed a broad spectrum of topics, reflecting my diverse scientific interests, including cystic fibrosis, ophthalmology, allergies, and the impact of COVID-19 on contraception.

**Chapter 2** outlines my academic career, detailing my teaching responsibilities, development of teaching materials, and mentorship of students. My contributions to various academic committees and my role in modernizing educational activities to meet European and international standards are highlighted.

Consequently, we have proceeded through each phase of the academic hierarchy. I was appointed as an assistant professor in the Department of Obstetrics and Gynecology at the University of Medicine and Pharmacy "Victor Babes" in Timisoara in 2003. In 2007, I was appointed as a Assistant Professor in the same field, and in 2017, I was awarded the title of Lecturer. I have been involved in the adaptation and modernization of teaching activities in accordance with the most recent European and international requirements and models. I have created new courses and instructional materials. I also coordinated the presentation of papers by students and resident physicians at a variety of scientific events, as well as numerous diploma papers. I have served on committees for licensing examinations, primary examinations, and specialist examinations.



**Chapter 3** includes the development and main post-doctoral professional achievements. In 2008 I became a specialist in obstetrics and gynecology, and since 2012 I have been a primary care physician in this specialty.

**Chapter 4** presents my future plans for teaching, mentoring, and research. My commitment to continuous personal and professional development to maintain high teaching quality is underscored. I aim to stimulate and guide new doctoral students, fostering interdisciplinary and innovative research to enhance the university's visibility and scientific contributions.

Teaching is an honorable occupation that necessitates unwavering commitment and enthusiasm. The quality of a teacher can only be sustained, enhanced, and developed through personal development that is rooted in a strong inner desire for continuous improvement and a fiery motivation. Consequently, it is imperative that I continue to conduct research in the field of obstetrics and gynecology, as well as the advancement of current and future clinical and scientific practices.

The university's activities have achieved a significant accomplishment in the integration of graduates into the medical labor market by utilizing the skills they have obtained during their studies. Consequently, it is crucial to adjust the educational program to the performance and quality standards of contemporary medicine. For me, this entails receiving advanced professional instruction. The method of training students in the field of obstetrics and gynecology must be perpetually improved to ensure that it is in accordance with European and international standards for the teaching and learning of specialist concepts.

I am confident that I will be able to inspire the work of new doctoral students through the future coordination of doctoral theses, thereby facilitating the dissemination of the results of doctoral research in the scientific community on a national and international scale. Last but not least, this opportunity will also contribute to the University's increased visibility. I am motivated by a desire to provide guidance and assistance to future PhD students through interdisciplinary collaboration, multidisciplinary, and innovative evidence-based research.

