



## **Prof. Nabil Derbel**

**Affiliation :** University of Sfax,  
National Engineering School of Sfax (Ecole Nationale d'Ingénieurs de Sfax : ENIS)  
Control and Energy Management Laboratory

### **Biography :**

Nabil Derbel was born in Sfax (Tunisia) in April 1962. He received his engineering Diploma from the Ecole Nationale d'Ingénieurs de Sfax in 1986, the Diplôme d'Etudes Approfondies in Automatic control from the Institut National des Sciences Appliquées de Toulouse in 1986, the Doctorat d'Université degree from the Laboratoire d'Automatique et d'Analyse des Systèmes de Toulouse in 1989, and the Doctorat d'Etat degree from the Ecole Nationale d'Ingénieurs de Tunis. He joined the Tunisian University in 1989, where he held different position involved in research and education. Currently, he is a **full Professor** (First Class) of Automatic Control at the Ecole Nationale d'Ingénieurs de Sfax. He is an IEEE Senior member. His current interests include: Optimal Control, Complex Systems, Fuzzy Logic, Neural Networks, Genetic Algorithm. He is the author and the co-author of more than 300 papers published in international Journals and of more than 500 papers published in international conferences. He was the Head of the Research Unit «Intelligent Control, design and Optimisation of complex Systems», from 2001 to 2006. He has been the **Director** of Study and the **Vice Director** of the National Engineering School of Sfax from 2011 to 2014.

He has been the **chairman of the Doctoral committee** in «Electrical Engineering"at the «Ecole Nationale d'Ingénieurs de Sfax" from 2001 to 2003, from 2008 to 2012, and from 2014 to 2020. He has been invited as Professor visitor at the Ecole Normale Supérieure de Cachan in France in 2002, as invited Professor in the Universität der Bundeswehr Muenchen in Germany in 2006, and as Professor visitor at the IBISC-Evry France, and twice (2009 and 2011) at the PRISME Laboratory, IUT of Bourges, University of Orléans, France (2011). He has been proposed as a member of the exam commission for recruiting new assistant professors in the Ministry of Higher Education in Tunisia twice for two years each one (2001-2002 and 2012-2013), and a member of the exam commission for recruiting professors in the Ministry of Higher Education in Tunisia also for two years (2006-2007). He was a member of the committee of the LMD (License-Master-Doctorat regime) programs in the same Ministry (2006-2012). He has supervised 65 doctoral Thesis which has been completed (2001-2014). He is supervising than 5 doctoral Thesis.

He was the General Chairman of the International Conferences on, Systems, Signals & Devices: SSD'03, SSD'05, SSD'07, SSD'09, SSD'10, SSD'11, SSD'12. Since 2013, he was the Honorary chair of this conference. He is the Co-Guest Editor of 5 special issues of international Journals. He was associate editor of 3 International Journals until 2021. He was the founder and the editor of the International Journal of Digital Signals and Smart Systems (IJDSSS) until 2021.

He has edited and co-edited 9 books for Springer and 12 books for De Gruyter (Germany).

**Talk n.1 (30/01/2024 11:00-11.45) – BUILDING 14 – ROOM D31**

***Advancements in novel measurement systems, materials, and wireless power transfer designed for biomedical applications***

**Abstract:** In the first step of this talk, I will present the University of Sfax, then the National Engineering School of Sfax, and then the Control and Energy Management Laboratory. The second step consists to present our project TIRAM which is entitled « Teleassistance for people with respiratory difficulties using ventilation adapted to thoracic tomographic bioimpedance measurements ». The aim of this project is to develop a system to assist people suffering from acute or chronic respiratory insufficiency. The system consists of an artificial respirator, a non-invasive system for tomographic measurement of the electrical impedance of the lungs and a digital platform that will provide real-time remote diagnosis and collaborative remote expertise. The third part is dedicated to the wireless power transfer. In fact, over the last decades, the use of wireless power transfer technology has grown dramatically, in several applications, such as electric cars, medical implants, drones, Internet of things and smart phones which are examples of the main applications employing this very convenient powering alternative. I will focus on the design and the optimization of a planar circular coil in order to reach the maximum of its quality factor. The fourth part discusses the control of resorbable bioactive glass (BaG) dissolution to suit different patient age groups. This consists to develop new Biocompatible and Bioresorbable bioactive Glass (BaG) adaptable to different medical requirements from a controlled chemical composition according to the age, sex and patient health statement. This product is dedicated to several applications, such as the repairing of bone fractures.

**Talk n.2 (30/01/2024 12:00-12.45) – BUILDING 14 – ROOM D31**

***On the Control of Robotic Systems for Rehabilitation***

**Abstract:** Rehabilitation plays a crucial role in the holistic care and development of children with cerebral palsy (CP) which is a neurological disorder that affects movement and posture, often leading to challenges in daily activities and overall functionality. Early intervention through rehabilitation services is imperative for children with CP to maximize their potential and enhance their quality of life. Rehabilitative therapies, such as physical therapy, occupational therapy, and speech therapy, are tailored to address specific motor, cognitive, and communication difficulties associated with CP. These interventions aim to improve muscle strength, coordination, and flexibility, allowing children to gain better control over their movements. Our objective is the control of robotic systems for rehabilitation of children with cerebral palsy aiming to enhance motor function, improve coordination, and promote overall well-being. Robotic rehabilitation systems offer the advantage of providing repetitive and tailored exercises, ensuring targeted therapy and individualized progress tracking. Here are key aspects of the control strategies for robotic systems used in the rehabilitation of kids with cerebral palsy. We focus on a robust control approach. The use of an adaptive procedure in order to apply this controllers for kids aged from 18 months to 13 years. Then we consider adaptive PID controllers and adaptive sliding mode controllers.

**FOR ONLINE PARTICIPANTS:**

<https://bit.ly/talkDerbel>

For details:

[carlo.trigona@dieei.unict.it](mailto:carlo.trigona@dieei.unict.it)

