# Introducing FAU Ambassador Prof. Dr. Enrique Zuazua

Prof. Dr. Enrique Zuazua is one of the leading minds in the field of applied mathematics, currently Professor of Applied Mathematics at Universidad Autónoma de Madrid. He has garnered numerous important national and international awards and has a broad network of scientific contacts and collaborators around the world. This year, he also joined Academia Europaea. On November 4, 2015, he was formally appointed as FAU Ambassador - the first in a series of visiting international researchers who will take on this voluntary position in the coming years.

FAU Ambassadors represent the University in their home country and communicate about their experiences at FAU in their scientific community. They can advise students and researchers who are interested in a stay in Erlangen-Nürnberg and foster relations between universities at home and FAU.

As a visiting professor, Zuazua has taught and conducted research in, among others, the USA, Brazil and Cambridge and at various French universities. One of his most proud achievements is to have mentored 23 PhD students that now run fruitful academic careers all around the world.

**Prof. Dr. Zuazua, why did you decide to take on the role of FAU Ambassador and what do you see as your main objectives in this role?**
I have been collaborating scientifically with Professor Günter Leugering for many years. When he joined FAU this led naturally to collaboration with his team, Department and FAU University. I had the honour to be a Humboldt Research Awardee at FAU in the academic year 2014-2015. This was a fruitful academic period and a very rewarding one for my family and me. It is now an honour to become an Ambassador for FAU, an institution with which I share values, vision and projects, an their projection into the international scientific community.

**What made you choose FAU as your host university for a research stay?**
As I said, I have been collaborating with Professor Günter Leugering and his team for many years. FAU was the most natural choice.

**What was your main research activity at FAU and what was the most important finding you made during this period?**
Our joint research was focused on the Optimal Control of Partial Differential Equations. Our research efforts produced several interesting results. The one I like the most is our analysis of the turnpike property for control problems for wave phenomena. We showed that, despite the oscillatory nature of solutions, optimal control problems for waves enjoy the so-called turnpike property, which allows us to simplify control problems in long-time horizons making them to be steady. This enables a significant reduction of computational costs.

**You are a specialist in partial differential equations, control theory, and the numerical analysis of control processes. What caused you to be interested in this field?**

I was trained as an undergraduate student at the University of the Basque Country (UPV/EHU). Mathematical and Numerical Analysis have always been strong areas at our University. Then, during my PhD at Université Pierre et Marie Curie I got intensively involved in the numerical and control theoretical aspects of Partial Differential Equations too. These areas play a key role in most engineering and scientific applications.

**Could you briefly describe the focus of your current research?**
We just finished our Advanced Grant of the European Research Council "NUMERIWAVES" devoted to the numerical aspects of wave propagation phenomena. Our current interests cover a variety of novel topics including the robust control of parameter dependent problems. Indeed, in practical applications the various sources of uncertainty mean that the classical paradigm, where the models are completely determined, is not realistic.

**What do you think are the main differences between your home university in Madrid and FAU?**
FAU is organised in Chairs, with well-structured teams. Typically, Departments in Spain are rather the union of individuals.

**What, in your opinion, are particular strengths of FAU in an international context?**
From the mathematical perspective the involvement in challenging multidisciplinary projects (new materials, gas networks,…), as FAU does, is a very significant plus. Form our mathematical perspective this helps excellence and innovative research in applied mathematics to emerge.

**What were your first and later impressions of the Erlangen-Nuremberg region?**
The region is well structured and organised, friendly, with good infrastructure, efficient. In particular, FAU is the perfect place to develop an academic career. I particularly appreciate the will of the University to reinforce its role of a leading international player, focusing special attention and care on individuals.

**How would you describe Bavaria and Germany in just a few words?**
It's a place where, as foreigners, my family and I were received warmly, where we found peace and optimal conditions to live and work.

**What would you say to students or young researchers who are considering whether they should choose FAU for a stay abroad?**
Do not hesitate. Join!

**Is there anything that a visiting researcher should definitely remember to bring for their stay?**
If possible, bring a bike. Otherwise, get one when you arrive.

**Can you tell us some of your favourite places at FAU and in the region?**
I enjoyed the variety of restaurants in the evenings in the old quarter of Erlangen, the warm, calm, and rewarding atmosphere, and the quality of the food.

**Do you have a particular highlight, an experience or a moment during your stay that you'll remember for a long time?**
The Humboldt annual meeting in Bamberg was memorable. My family and I will never forget that unique atmosphere combining friendliness with high scientific and academic standards.

**Is there anything else you'd like to add?**
*Eskerrik asko* = Thank you. It will be an honour to contribute to the growth of FAU in my role of Ambassador.


**Background information:**
Born in Eibar in 1961, the native Basque Zuazua began his academic career at Universidad del País Vasco-Euskal Herriko Unibertsitatea (UPV-EHU), where he obtained his PhD in 1987 and initially worked as an Associate Professor. He also obtained a PhD at Université Pierre et Marie Curie in 1988 before moving to Universidad Autónoma de Madrid (Autonomous University of Madrid) as Senior Lecturer in Mathematical Analysis. In 1990, he was appointed Professor of Applied Mathematics at the Universidad Complutense de Madrid (Complutense University, Madrid), where he was Head of the Applied Mathematics Section at the Faculty of Chemistry and of the Applied Mathematics Department. He returned to Universidad Autónoma de Madrid as Professor of Applied Mathematics in 2001.

From 2008 to 2012 Zuazua was the Founding Scientific Director of the BCAM - Basque Center for Applied Mathematics, in Bilbao, created by the Basque Government, with the aim of promoting interdisciplinary research in mathematics - with a focus on computational, applied and multi-disciplinary aspects of mathematics. At BCAM, during the period 2008-2015, he was the leader of the research line "Partial Differential Equations, Control and Numerics", as a Distinguished Research Professor of Ikerbasque, the Basque Foundation for Science.

For more information, visit www.uam.es/matematicas/ezuazua, www.enzuazua.net.