**ΕΘΝΙΚΟ ΜΕΤΣΟΒΙΟ ΠΟΛΥΤΕΧΝΕΙΟ**
**ΣΧΟΛΗ ΜΗΧΑΝΟΛΟΓΩΝ ΜΗΧΑΝΙΚΩΝ**

N.T.U.A.

E.M.Π.

**ΔΙΑΛΕΞΗ**

# John S. Baras

Professor & Lockheed Martin Chair in Systems Engineering
Institute for Systems Research
University of Maryland College Park

με θέμα :

## *"Trusted Autonomy and Safe Learning"*

### Περίληψη

Autonomous systems (robots, cars, UAVs) are becoming ubiquitous rapidly. They are also increasingly interacting with humans. Safety is a critical requirement for autonomous systems and for their interactions with humans. Trusted autonomy is essential for autonomy. It encompasses self-monitoring, self-adjustment and learning to accomplish safe and high-performance autonomy. I will describe our approach to these challenging problems via a methodology that utilizes dynamical systems, optimization, artificial potential functions, formal models (timed automata, model checking and contracts), and novel approaches to learning and monitoring. I will illustrate the results in applications to teach robots manipulation tasks, human-robot collaboration, and collaborative UAVs. A key ingredient of the methodology is the development of efficient formal models of tasks and missions and associated safety monitoring methods that combine timed automata and reachability analysis. I will also illustrate why such formal task models are indispensable in executing tasks by different robots, learned in different environments. I will close with describing future research directions and challenges

**Short Bio: John S. Baras is** a Distinguished University Professor and holds the endowed Lockheed Martin Chair in Systems Engineering at the Institute for Systems Research and the Department of Electrical and Computer Engineering of the University of Maryland College Park. He received his Ph.D. degree in Applied Mathematics from Harvard University in 1973. From 1985 to 1991, he was the Founding Director of the Institute for Systems Research and since 1992 he has been the Director of the Maryland Center for Hybrid Networks, which he co-founded. He is a Fellow of IEEE (Life Fellow), SIAM, AAAS, NAI, IFAC, AIAA, AMS, Member of the National Academy of Inventors and a Foreign Member of the Royal Swedish Academy of Engineering Sciences. Major awards include the 1980 George Axelby Award from the IEEE Control Systems Society, the 2006 Leonard Abraham Prize from the IEEE Communications Society, the 2017 IEEE Simon Ramo Medal, the 2017 AACC Richard E. Bellman Control Heritage Award, the 2018 AIAA Aerospace Communications Award. In 2016 he was inducted in the University of Maryland Clark School of Engineering Innovation Hall of Fame. In 2018 he was awarded a Doctorate Honoris Causa from the National Technical University of Athens. He has been awarded twenty patents and has been honored worldwide with many awards as innovator and leader of economic development.

Η διάλεξη θα γίνει την **Πέμπτη 23 Ιανουαρίου 2020, ώρα 11:00**, στην Αίθουσα Τηλεκπαίδευσης, Βιβλιοθήκη, Ισόγειο

**Πληροφορίες** : Καθ. Κ.Ι. Κυριακόπουλος τηλ.: 210 – 772 -3595  e-mail : kkyria@mail.ntua.gr