

Dear All,

We are happy to invite you all to join for an Expert Talk on **8th March 2024, Friday, at 10:30 AM**. Information about the Expert Talk is provided below:

Speaker: **Desineni Subbaram Naidu, PhD, Life Fellow IEEE**, Minnesota Power Jack Rowe Endowed Chair-Emeritus, University of Minnesota Duluth, Minnesota, USA

Topic: **Fusion of Hard and Soft (AI) Control Strategies for a Smart Prosthetic/Robotic Hand**

Venue: **EED, Committee Room**

Abstract of the Talk:

There are now over 20 million people in the world with missing limbs resulting from combat and non-combat operations and by 2050 there will be 50 million amputees all over the world. The availability of artificial limbs will help these people to lead a better normal life. Recent and emerging research focuses on the themes of Convergence and Integration, and Igniting Innovation between **Physical and Life** (and biomedical) Sciences, **Arts** (and humanities), **Natural Sciences**, and **Engineering and Technology (PLANET)**. The overall goal of the research on Prosthetic Hand Technology is to develop a smart prosthetic hand using intelligent or Artificial Intelligence (AI) strategies for electromyographic (EMG) signal extraction, analysis, identification, kinematic synthesis, and embedded hierarchical real-time systems and control by fusion of soft (AI) computing and hard computing techniques. The presentation is based on Professor Naidu's TED Talk (<http://www.ted.com>) on **3-D Printed Prosthetic Hand for the World** (<https://www.youtube.com/watch?v=rXyy5XN2oY0>) and his research book published in October 2017 by the IEEE Press - Wiley (Series on Systems Science and Engineering) titled, "**Fusion of Hard and Soft Control Strategies for a Robotic Hand**".

<http://www.wiley.com/WileyCDA/WileyTitle/productCd-1119273595,subjectCd-EE30.html>

Short Biography:

Desineni "Subbaram" Naidu received M.Tech. and Ph.D. degrees in Electrical Engineering (with specialization in Control Systems Engineering), from the Indian Institute of Technology (IIT), Kharagpur, **INDIA**. Dr. Naidu taught, visited and/or conducted research at: IIT; National Research Council (NRC) Senior Research Associate at Guidance and Control Division, **NASA** Langley Research Center, Hampton, VA, **USA** (1985-90); Old Domain University, Norfolk, VA, **USA** (1987-90); Professor, Associate Dean and Director, School of Engineering at Idaho State University and Measurement and Control Engineering Research Center, Pocatello, Idaho, **USA** (1990-2014); National Research Council (NRC) Senior Research Associate at Center of Excellence in Advanced Flight Research at United States (US) Air Force Research Laboratory, Wright Patterson Air Force Base (WPAFB), Ohio, **USA** (1998-99); Visiting Research Fellow at Center of Excellence for Ships and Ocean Structures at Norwegian University of Science and Technology, Trondheim, **NORWAY** (2014); Academic Guest at Measurement and Control Laboratory at Swiss Federal Institute of Technology, Zurich, **SWITZERLAND** (2015); Visiting Professor at Nantong University, Nantong; Jiangsu College of Information Technology, Jiangsu, East China Normal University, Shanghai, Chinese Academy of Sciences, Beijing **CHINA** (2007,2-09,2011); Visiting Research Professor at the University of Western Australia in Perth, and the

Center for Industrial and Applied Mathematics at the University of South Australia, Adelaide, **AUSTRALIA** (2008); Satish Dhawan Endowed Visiting Professor, Indian Inst. of Science (IISc), Bengaluru, **INDIA**(2017), Nizhny Novgorod and Moscow State University, Moscow; Novosibirsk State Technical University, Novosibirsk (New Siberia); Institute of Control Sciences (ICS), Russian Academy of Sciences, Moscow, **RUSSIA** (2012, 2018) and Minnesota Power Jack Rowe Endowed Chair, University of Minnesota, Duluth, **USA** (2014-2023).

Professor Naidu received twice the Senior National Research Council (NRC) Associateship award from the US National Academy of Engineering (NAE) and is an elected (1995) (now Life) Fellow of the Institute of Electrical and Electronic Engineers (IEEE) and an elected (2003) Fellow of the World Innovation Foundation, UK. Professor Naidu's teaching and research interests are Electrical Engineering (Power and Energy), Control Systems, Optimal Control: Theory and Applications, Biomedical Sciences and Engineering (Prosthetics and Infectious Diseases), and Singular Perturbations and Time Scales (SPaTS): Control Theory and Applications, Guidance and Control of Aerospace Systems: Aeroassisted Orbital Transfer for Mars mission and Uninhabited Aerial Vehicles (UAVs), Advanced Control Strategies for Heating, Ventilation, & Air-Conditioning (HVAC), Modeling, Sensing and Control of Gas Metal Arc Welding (GMAW) and has over 200 journal and conference publications including 9 books. He has been on several journal editorial boards, including the IEEE Transactions on Automatic Control, Mechatronics: The Science of Intelligent Machines, An International Journal, ELSEVIER, and Optimal Control: Applications and Methods (Wiley). More details at <http://www.d.umn.edu/~dsnaidu/>

All interested are welcome!

Mukesh K Pathak

Head
Department of Electrical Engineering
Indian Institute of Technology Roorkee
INDIA

<https://iitr.ac.in/Departments/Electrical%20Engineering%20Department/Home.html>