

KIOS Distinguished Lecture Series



Prof. Youmin Zhang

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Tuesday, **7 June 2022**, at **11:00** | Amphitheatre **LRC012**

Or via zoom: [https://ucy.zoom.us/meeting/register/tJEodO2rrjojG9QctPYkcJIBn3TO07fE9gLI](https://ucy.zoom.us/join/https://ucy.zoom.us/meeting/register/tJEodO2rrjojG9QctPYkcJIBn3TO07fE9gLI)

Making Autonomous Systems Smarter, Safer, More Reliable and More Resilient

LECTURE ABSTRACT

Although the concepts on Fault Detection and Diagnosis (FDD) and Fault-Tolerant Control (FTC) have been extensively investigated worldwide since the 1970's, the two recent catastrophic crashes of Boeing 737 MAX8 airplanes have highlighted the necessity and urgency for FDD and FTC research & development. On the other hand, Unmanned Aerial Vehicles (UAVs), Autonomous Cars (AVs), and other transportation vehicles on the land, on/under the water are gaining more and more attention and rapid development over the last few years due to their easy and cost-effective uses in various applications.

In this talk, a brief overview of the challenges and latest developments on making these unmanned/autonomous systems smarter, safer, more reliable and more resilient in terms of Guidance, Navigation, and Control (GNC) integrating with Remote Sensing (RS) techniques for autonomous and reliable applications will be presented first, then recent developments carried out at our group will be introduced as case studies. In particular, new developments on autonomous control, FDD, FTC, and Fault-Tolerant Cooperative Control (FTCC) techniques towards autonomous, safe and secure operation and applications of unmanned systems to the forest fire monitoring tasks and smart grids in the presence of physical-faults and cyber-attacks will be presented.

BRIEF BIO

Dr. Youmin Zhang is currently a Professor at the Department of Mechanical, Industrial and Aerospace Engineering and the Concordia Institute of Aerospace Design and Innovation (CIADI) at Concordia University in Canada. His main research interests and experience are in condition monitoring, health management, fault diagnosis and fault-tolerant control, cooperative guidance, navigation and control of unmanned aerial/space/ground/marine vehicles with applications to forest fires, smart grids, smart cities monitoring, detection, and protection by combining with remote sensing techniques under the framework of cyber-physical systems. He has published 8 books, over 550 journal and conference papers. He was awarded as a Concordia University Research Fellow in the Strategic Research Cluster 'Technology, Industry and the Environment' in 2018 in recognition of his outstanding research works and contributions. Dr. Zhang is a Fellow of CSME, a Senior Member of AIAA and IEEE, President of International Society of Intelligent Unmanned Systems, and a member of the Technical Committee for several scientific societies. He has been an Editor-in-Chief, an Editor-at-Large, an Editorial Board Member, and Associate Editor of several international journals, and has served as General Chair, Program Chair of several unmanned systems and renewable energy relevant international conferences. More detailed information can be found at <http://users.encs.concordia.ca/~ymzhang/>.

