# IEEE AESS Summer School on

# "Engineering enhancing Quality of life"

## Castellaneta Marina, Puglia, Italy
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The aim of this summer school is to provide a vision for information technology's role and its state of art in helping to drive progress in the 21st century in order to improve the quality of life for the World Citizen.

The Information Society through *Biomedical Technology*, *Renewable Energy*, *Earth Observation and Earth Science Applications*, *Intelligent Transport Systems*, *Cyber Securit*y could allow to realise a shift from an energy intensive, highly polluting and goods-intensive economy to a more dematerialised, knowledge-based economy.

1. ***Earth Observation Satellite*** has a vital role in providing the information needed by governments and policymakers to make well-informed decisions for a sustainable future. The Earth observation industry is already addressing - at a global level – important environmental, social, and economic challenges. It is focusing its research and development programs on innovative capabilities and services which will improve the quality of life of citizens as well as the efficiency of economic actors. Better information on weather, natural hazards and climate forecasting, as well as on resource management, can mean the difference between life and death. The challenges we are facing were illustrated all too clearly by the devastating tsunami of December 2004. Better coordination and harmonisation of Earth Observation on a global level will be of vital importance in reducing the impact of such natural disasters on human life and property. Observations and knowledge of the Earth System are harnessed to deliver an improved predictive capability in fields such as energy usage forecasting, agricultural competitiveness, disaster relief, carbon management, water resource management, invasive species management, and air quality management.
2. Advances in ***biomedical materials*** are delivering products that promote human tissue repair, renewed growth and ability to monitor patient well-being. It is increasingly important to deliver health solutions that allow people to remain active and participate in their communities. Hence, new attention has been recently focused on biomaterials sciences to address key challenges in human health and biomedical applications. Health and wellbeing could be improved through innovative technologies such as:
    - the synthesis of bioactive molecules;
    - biomedical adhesives;
    - tissue scaffolds;
    - medical devices;

- sensor technologies incorporated into fabrics.

3. **Sustainable development** is critical to quality of life of each citizen. The Information Society will play an important role: reducing the environmental impact of industry and society, and helping us understand our environment so that we can better protect it for future generations. **Renewable Energy** can reduce CO2 emissions in order to minimize air pollution and to improve the quality of life of citizens.
4. So around the globe we are seeing rapid city urbanization, increasing populations and new mega cities popping up. Some of the results of this mass citification are increased stress on the existing transportation infrastructures, increased congestion, a decrease in the citizen's quality of life and well-being and most significantly, a profound effect on the city's economic competitiveness. The use of ***Intelligent Transport Systems (ITS)*** can help to reduce injuries and save lives, time and money by making transport safer, help the driver of trucks, busses, and cars avoid getting into crashes and help keep them from running off the road, maintain safe distance between vehicles and safe speeds approaching danger spots, improving visibility for driver, especially at night and in bad weather and also providing information about the work zones, traffic congestion, road conditions, pedestrian crossings and other potential hazards. ITS have been defined as: 'the application of advanced sensor, computer, electronics, and communication technologies and management strategies—in an integrated manner—to improve the safety and efficiency of the surface transportation system'. Building new transportation infrastructure is expensive and can be detrimental to the environment. In most urban areas where more capacity is needed, it is becoming physically impossible to build enough new roads or new lanes to meet transportation demand. By applying the latest technological advances to our transportation system, ITS can help meet increasing demand for transportation by improving the quality, safety, and effective capacity of our existing infrastructure.
5. The asymmetrical threat posed by cyber attacks and the inherent vulnerabilities of cyberspace constitute a serious security risk for every citizen. ***Cyber Security*** is another important aspect to enhance the quality of life of citizen. Hence, it is imperative that the comprehensive use of information technology solutions need to be supported by a high level of security measures and be embedded also in a broad and sophisticated cyber security culture.

   Many of the essential and emergency services of each citizen, as well as Europe and U.S. critical infrastructure, rely on the uninterrupted use of the Internet and the communications systems, data, monitoring, and control systems that comprise our cyber infrastructure. A cyber attack could be debilitating to Europe and U.S. Critical Infrastructure and Key Resources (CKIR) and ultimately to our economy and national security. With the pervasiveness of IT and cyber networks systems in nearly every aspect of society, effectively securing the Nation’s critical infrastructure requires investments in network resiliency as well as cyber infrastructure protection. As all levels of government now rely on cyber networks and assets to provide national security, public safety, and economic prosperity, their operations depend on information systems that are maintained, protected, and secured from exploitation and attack. The increasing frequency and sophistication of cyber attacks on CKIR requires planning across all State, local, Tribal, and Territorial homeland security governmental components to develop robust strategies in order to get ready for and respond to events that can degrade or destroy abilities to

deliver essential services to citizens and prepare for the impact of terrorist activity or natural disaster.

**This course will focus on systems, technologies and relative services associated to Earth Observation and Earth Science Applications, Biomedical Technology and Materials, Renewable Energy, Intelligent Transport Systems and Cyber Security which can significantly improve the quality of life of World Citizen.**