**Introduction to Research Themes in Department of Information Systems**

We are living in the age of big data with the fourth paradigm of scientific research, defined by data-intensive computing, dawning upon us. Data Science is the multidisciplinary effort to make sense of this big data, to extract value from the voluminous, velocities, varied, and volatile data. Data science affects applied research in almost every domain in natural, applied or social sciences including, but not limited to, computer science, engineering, education, healthcare, biological sciences, humanities, economics, business, and finance. The research area of Data Science can be categorized into three subareas:

**1. Big Data and Knowledge Engineering**

With the passage of time, data is becoming bigger and bigger (big data) and value of using data is increasing in all sectors, e.g. e-health, e-government, e-business, etc. New research trends and concepts like semantic web, social network, Linked Open Data (LOD), Web 2.0, mashups, etc. have introduced more challenges in extracting, producing, storing, managing and effectively utilizing data that is understandable and processable both for a human being and machines.

*Topics of interest include (but not limited to):*

* Big data storage, processing, sharing and visualization
* Big data systems, tools, theory, and applications
* Knowledge engineering and information processing including (but not limited to):
  + Data mining
  + Natural Language Processing (NLP)
  + Information retrieval
  + Knowledge extraction and representation
  + Social semantic web
  + Social network analysis and web research
  + Linked Open Data
  + Ontology modeling and development
* Machine learning and optimization
* Business analytics and intelligence
* Distributed high performance computing

**2. Information Assurance and Security**

It refers to the measures that protect and defend information and information systems by confirming their availability, integrity, authentication, confidentiality, and non-repudiation. These measures include provision for restoration of information systems by incorporating protection, detection, and reaction capabilities. It also includes protection of information and information systems from unauthorized access, use, disclosure, disruption, modification, or destruction in order to provide confidentiality, integrity, and availability.

*Topics of interest include (but not limited to):*

* Cyber and network security
* Ethical hacking and digital forensic
* Biometric security
* Steganography, information hiding, and digital watermarks
* Cloud security

**3. Information Systems Applications**

Rapid developments in ICT including internet technology, smart devices, wireless communication, mobile computing, embedded systems, sensors, software agents, web technology and the like, have led to evolution of e-systems and mobile computing systems, which promise anytime, anywhere quick access to the desired information. This paradigm shift has penetrated almost all sectors thereby giving birth to new solutions to domain-specific problems, addressing areas of social science, business studies, engineering, computer science, communications, geo-systems and many other academic and vocational subject areas. Information Systems Applications are ubiquitous nowadays with applications spanning e-business, WLANs, healthcare, e-learning, government organizations and pervasive computing.

*Topics of interest include (but not limited to):*

* Telemedicine and e-Healthcare Information System (e-HIS)
* E-Learning Systems
* E-Government Systems
* E-Library
* E-Business
* Mobile computing systems and services
* Ambient, invisible, implicit, and adaptive computing
* Mobile grid and peer-to-peer computing
* Smart spaces and intelligent environments
* Embedded systems and wearable computers
* Middleware and agent technologies