MIT Industrial Liaison Program Faculty Knowledgebase Report

Continuous Digital Transformation – From IoT and ML to Cloud and Cyber Security

April 20, 2020 11:00 am - 1:00 pm

11:00am - 11:45am

Digital Transformation Strategies – From Data First to Cloud
John Williams
Professor of Information Engineering, MIT Department of Civil and Environmental Engineering

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Professor of Information Engineering
MIT Department of Civil and Environmental Engineering

John Williams holds a BA in Physics from Oxford University, a MS in Physics from UCLA, and a Ph.D. in Numerical Methods from University of Wales, Swansea. His research focuses on the application of large-scale computation to problems in cyber-physical security and energy. He is director of MIT's Geospatial Data Center and from 2006-2012, was Director of the MIT Auto-ID Laboratory, where the Internet of Things was invented. He is author or co-author of over 250 journal and conference papers, as well as the books on Rock Mechanics and RFID Technology. He contributed to the 2013 report for the UK Office for Science Foresight Project- The Future of Manufacturing. Alongside Bill Gates and Larry Ellison, he was named as one of the 50 most powerful people in Computer Networks. He consults to companies including Accenture, Schlumberger, Shell, Total, Exxon, SAP Research, Microsoft Research, Kajima Corp, US Lincoln Laboratory, Sandia National Laboratories, US Intelligence Advanced Research Projects Activity, Motorola, Phillip-Morris Inc., Ford Motor Company, Exxon-Mobil, Shell, Total, and ARAMCO. His international collaborations include Oxford and Cambridge Universities, HKUST, KACST, Alfaisal University, PolyU Hong Kong, Imperial College of Science and Technology UK, Malaysia University of Science and Technology (MUST), and Masdar Institute of Science and Technology Abu Dhabi. He organized the first Cyber-Physical Security Conference in the UK (2011), and along with Dr. Sanchez, he runs the MIT Applied Cyber Security Professional Education summer course. At MIT, he teaches courses Architecting Software Systems (MIT 1.125) and Engineering Computation and Data Science (MIT 1.00/1.001). .

In data engineering and data science, early work included simulation of Ford's global network, and analysis of SAP smart grid billing system. For Altria, he analyzed the performance of item level tagging and also their implementation of an anti-counterfeiting system using the Electronic Product Code (EPC)

In password security, Dr. Williams was a PI that developed the algorithms for a negative password authentication system for the Intelligence Advanced Research Projects Activity (IARPA) agency.

Dr. Williams advises companies in the Americas, Europe, the Middle East, and Asia.

Dr. Williams affiliations include:

- MIT Department of Civil and Environmental Engineering
- MIT Center for Computational Science and Engineering (CCSE)
- MIT Geospatial Data Center (GDC)
- MIT Auto-ID Laboratory
- MIT Center for Complex Engineering Systems (CCES)
- MIT Consortium for Improving Critical Infrastructure Cybersecurity (IC3)

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11:45am - 12:30pm

Cybersecurity for Leaders/Executives
Abel Sanchez
Executive Director, MIT Geospatial Data Center (GDC)

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Executive Director
MIT Geospatial Data Center (GDC)

Dr. Abel Sanchez holds a Ph.D. from the Massachusetts Institute of Technology (MIT). He is the Executive Director of MIT's Geospatial Data Center, architect of "The Internet of Things" global network, and architect of data analytics platforms for SAP, Ford, Johnson & Johnson, Accenture, Shell, Exxon Mobil, and Altria. In cyber security, Dr. Sanchez architected impact analysis of large-scale cyber attacks designing Cyber Ranges for the Department of Defense (DOD). In password security, Dr. Sanchez led the design of a password firewall (negative authentication) for the Intelligence Advanced Research Projects Activity (IARPA) agency. In machine learning, addressing fraud detection, Dr. Sanchez designed a situational awareness framework that exploits different perspectives of the same data and assigns risk scores to entities for Accenture. He led the design of a global data infrastructure simulator, modeling follow-the-sun engineering, to evaluate the impact of competing architectures on the performance, availability and reliability of the system for Ford Motor Company. He has been involved in developing E-Educational software for Microsoft via their I- Campus Program and with establishing the Accenture Technology Academy, an online resource for over 200,000 employees. He has 10 years of experience with learning management systems and has made deployments in America, Asia, and Europe. He teaches MIT courses on cybersecurity, engineering computation, and data science and has produced over 150 educational videos.

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12:30pm - 1:00pm

Panel Discussion on Corporate Agility and Situational Awareness
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