**SMART MANUFACTURING**

**SPRING 2021**

**2021 Research Review Topics of Interest:**

* 5G and Beyond within Future Factories
* Cybersecurity within Manufacturing
* Quality Inspection within Smart Factories through AI/Statistical Learning
* Five Disruptive Technology Directions for Smart Manufacturing: Prospects and Challenges
* Smart Manufacturing within the Supply Chain
* Enabling AI Technologies within Smart Factories: A Technology Primer
* Cybermanufacturing : Delivering Manufacturing Services Over the Web
* Smart Manufacturing in the Regulated Manufacturing Sector (Medical, Pharmaceutical, Aerospace/Industry
* Future of Work for Humans in Factories
* Data-Sharing Technologies and Challenges in a Supply Chain
* Smart Manufacturing Practices by Specific Companies (3M, Lockheed Martin, Ford, BASF, Dow, Merck, Boeing) – minimum 5. Can be replaced as long as there is one representative company from one industry sector –
* A Smart Manufacturing / Industry 4.0 Roadmap for Small Manufacturers (less than 100 employees)

**2021 Technology Project Topics of Interest**

* Person Detection Algorithm in the Advanced Manufacturing Lab using RPI + Camera
* Use of TinyML with Raspberry PI as an Edge Computing Device
* Utilizing the 270 Visualization Space in ISE to build a Data-Dashboard from ISE Mfg Lab
* Use Case of Low-Cost Smart Cameras with RPI for In Factory
* Use of Federated Learning with Private Manufacturing Data
* Large Scale Classification of Images Related to Mechanical Assemblies (Dataset Available)
* Quality Inspection with General Image Base Processing/Analysis Tools
* Quality Inspection in a specific Industrial Setting using Deep Learning Technologies
* Digital Twin of a Physical Robot, specifically the UR5e robot (Machine Available)
* Distributed Data Computing within a Smart Factory (ISE Manufacturing Innov. Labs)
* Teaching a Robot to perform a task using Deep Reinforcement Learning
* Building a Chat-Bot that can assist in the Product Development Lifecycle
* Build a Video/Speech Indexer to Classify Content Shown in Manufacturing Trade Show Videos