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### **Highlights**

- Ph.D. Robotics, Carnegie Mellon University
- Assistant Professor of Physics & Engineering
- Decades of experience engineering complex opto-electro-mechanical systems

### **Experience**

#### **Taylor University**

**August 2019 - Present**

*Assistant Professor of Physics & Engineering*

Responsible for teaching, mentoring and developing undergraduate students. Tasks include:

- Teaching classes and labs in Physics, Materials, Engineering and Design
- Encouraging and challenging students in their learning and spiritual development
- Providing learning experiences through guided research and development

#### **Aurora Innovation**

**April 2018 – July 2019**

*Technical Program Manager*

Responsible for overseeing the design and manufacture of hardware systems for self-driving vehicles. Tasks include program and project management, including:

- Coordination with customers, contributors and stakeholders
- Deployment of engineering management tools (including Jira)
- Planning / scheduling / budgeting

#### **Association of Baptists**

**November 2015 – April 2018**

*Project Manager*

Responsible for the management of the construction of a \$7.6M hospital facility in a rural part of Bangladesh. Tasks include program and project management work, including:

- Design of hospital systems
- Coordination with contributors and stakeholders
- Personnel management
- Quality control
- Planning / scheduling / budgeting

Part of what made this job challenging was bridging the large language and cultural divide between the expatriates and nationals. Understanding and leading in this culturally complex team required sensitivity to different cultural norms and balancing expectations with program needs. As part of this work I spent considerable time learning the language and details of my host culture.

#### **Lockheed Martin – Advanced Technology Laboratories (ATL)**

**July 2013 – October 2015**

*Acting Director, Intelligent Robotics Lab*

Responsible for the operation of Lockheed Martin's corporate robotics laboratory with an annual budget of \$10M. Tasks included:

- Casting the vision for the lab and planning future research in conjunction with a team of engineers and researchers

- Managing 3 area managers and 22 employees - including the setting of SMART goals, evaluation of performance, management of training goals, and personnel management (tasking, conflict resolution, etc.)
- Developing proposals, including the identification of next-generation technical goals, development of coherent and compelling motivations and justifications, identification of and negotiation with potential partners, schedule & budget development, creation of accurate and concise proposal content and review and integration of contributor's inputs
- Reviewing of program status and performance, including evaluation of performance against technical goals, budget and schedule
- Managing interactions with the four other labs at ATL and with the upper management - including coordination of effort, balancing constraints and goals between the different labs, and contributing to the overall direction of the organization
- Presenting the work of our laboratory to potential teammates, customers, government and stakeholders through clear and concise presentations

*Principal Investigator, Collaborative Operations in Denied Environments (CODE)* DARPA's (Defense Advanced Research Projects Agency) CODE program focused on the development of a team of heterogeneous unmanned aerial vehicles (UAVs) that could operate in a GPS and communications jammed environment. Responsible for:

- Managing the program's technical vision and ensuring the program's technical success
- Collaborating with the program manager to oversee the budgetary and schedule performance
- Researching the mission environment and understanding customer's needs
- Developing the technical foundation and concepts of operation

#### *Engineering Program Development*

Worked with technical staff at LM, teammates and DARPA to help develop strong opportunities and winning proposals. Responsibilities included:

- Strategy development - worked with the lab leadership to identify a strategic path that would meet both our goals and the customer's aspirations
- Development of technical concepts - worked with the technical team to plan future technical research to meet our corporate goals
- Customer interaction - worked with the customer to identify, understand and guide their interests to meet our capabilities
- Development of concepts of operation - developed technical research concepts into coherent and compelling operational scenarios
- Business development - identified new opportunities and new customers
- Proposal management - oversaw and contributed to the writing of many winning proposals

#### **General Dynamics Robotic Systems (GDRS)**

**July 2003 – July 2013**

*Principal Investigator / Project Manager / Senior Engineer*

#### **Principal Investigator / Project Manager – microLIDAR**

Responsible for the development of a family of scanning LIDAR (Laser Ranging) systems.

At the time, the state of the art in scanning LIDAR systems were physically large, heavy, and power hungry. My team's goal was to develop a next-generation LIDAR capable of high performance scanning in a small, lightweight and low power package. A total of 10 units

were manufactured and provided to stakeholders before the program ended. The primary system measured approximately 4 in. x 4 in. x 6 in. and was very power efficient. Other versions of the design had different scan patterns fine-tuned to specific applications.

Responsibilities included:

- Management of the technical team
- Mechanical design (structural, dynamic, thermal, scan simulation)
- Optical systems co-design and integration (assembly, calibration)
- Electrical system co-design and integration (board layout, thermal, EMI)

### **Principal Investigator / Project Manager - GDRS UAV Research Group**

Researched the coordination of UAVs and Unmanned Ground Vehicles (UGVs) for battlefield dominance. Responsibilities included:

- Management of the technical team
- Design of UAV architectures (power, actuation, communications, computation and sensing)
- Electro-mechanical design of custom payloads
- Integration of third party payloads

### *Test/Demonstration Manager*

Responsible for the field demonstration and testing of multiple robotic systems. These tests varied in complexity, duration of deployment, location and team composition. In all, I led over 30 deployments, ranging from simple (local locations, 2 to 3 day duration, fair infrastructure, team of four) to complex (distant locations, 6 week duration, limited infrastructure, team of 15).

The most complex of these deployments was a multi-robot integration located at Ft. Benning's McKenna MOUT site. The robotic team consisted of five completely different robotic systems. Through a combination of extensive testing, careful planning and hard work my team, from multiple companies, was able to converge at McKenna and finalize the integration of a team of robots that had never all been in the same place at the same time. The on-site final integration was accomplished in less than 5 weeks. The demonstration highlighted the key characteristics of each system and was a great success. As part of that deployment I was integrated with the Army platoon that conducted the demonstration and commanded the robots as a platoon member.

### *Proposal Preparation*

During this time I was author of and contributor to many winning proposals. (RCTA 2010, Common Launch and Recovery, DARPA TEMP, Very Low Cost LIDAR, etc.)

### **Graduate Student (CMU)**

**September 1998 – June 2003**

#### *Doctoral dissertation: Force Guided Assembly Under Bias*

Developed the algorithms and methodology to perform force guided assembly of fragile structures while components experienced significant biasing forces from external sources. Examples of biases included cables, hoses and oscillating masses.

### **Computer Skills**

Microsoft Products (Word, Excel, PowerPoint, Project)

Autodesk Fusion 360, Inventor & AutoCAD (Solid Modelling and Design)

ProEngineer

Matlab (Mathematical Analysis Software)  
C/C++ Programming Language  
Cyberlink PowerDirector (Video Editing)

### **Activities**

Student of Taekwondo  
Student of German  
Model aircraft pilot (fixed wing, helicopter, quadcopter)  
Homeschool Cooperative Teacher (Chemistry, Physical Science, Intro to C++)

### **Education**

Ph.D. Robotics: May 2003  
Carnegie Mellon University  
Thesis Topic: Force Guided Assembly Under Bias  
GPA – 3.72/4.00

B.E. Mechanical Engineering: May 1998  
State University of NY at Stony Brook  
GPA - 3.88/4.00 - Summa Cum Laude

### **Awards**

2010 General Dynamics Land Systems (GDLS) Innovation Excellence Award – Recognition for the technical achievements and innovations associated with the microLIDAR. GDLS is the parent company of GDRS and issues the award annually to one or two engineers across all of GDLS.