

# Christopher D. McMurrough

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## OBJECTIVE

To gain further experience with autonomous robotic systems while applying leadership skills and technical knowledge to educate others in engineering disciplines.

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## PROFILE

Christopher D. McMurrough is a Computer Science Engineering graduate student focused on a career in autonomous robotic systems and engineering education. He has developed fundamental skills in robotics through scholastic achievement, research experience, and participation in related extracurricular projects. His primary research interests include heterogeneous multi-agent systems, UAV/UGVs, swarm intelligence, localization, and wireless sensor networks.

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## EDUCATION

**The University of Texas at Arlington**, Arlington, TX 2008-Present

*M.S. in Computer Science Engineering*

- Developing thesis on cooperative control of heterogeneous UAV/UGV/UGS systems under supervision of Dr. Frank Lewis, Fellow IEEE.
- Course emphasis on robotics and embedded systems.
- Serving as GTA for Mike O'Dell, CSE Senior Design.

**The University of Texas at Arlington**, Arlington, TX 2003-2008

*Honors B.S. in Computer Science Engineering*

- Honors degree earned for GPA and completion of extra projects in courses.
- Course emphasis on robotics and embedded systems.
- GPA 3.397/4.0

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## EMPLOYMENT

**Automation and Robotics Research Institute**, Fort Worth, TX 2006-Present

*Research Assistant, Advanced Controls and Sensors Group*

- Currently developing test bed for cooperative UAV/UGV/UGS control as part of MS thesis under supervision of Dr. Frank Lewis.
- Served as lead undergraduate research assistant to Dr. Frank Lewis.
- Developed UAV/UGV systems.
- Designed chassis for autonomous littoral vehicle.
- Designed and fabricated wireless sensor boards for indoor electric helicopters and ground vehicles.
- Trained peers in embedded and robotic systems.
- Managed NSF funded summer outreach program for outstanding high school students.
- Managed research internship program for outstanding high school students.

**The University of Texas at Arlington**, Arlington, TX 2008-Present

*Graduate Teaching Assistant, Department of Computer Science Engineering*

- Serving as teaching assistant for 2 semester senior design program.
- Providing technical consulting for team based hardware and software projects.
- Developed microcontroller based circuit boards with accompanying set of narrated videos to teach students about embedded design and circuit fabrication.
- Regularly holding training sessions on hot-air soldering and PCB assembly.

**Air Force Research Laboratory**, Dayton, OH 2008 - Present

*Wright-Patterson AFB Summer Research Internship*

- Worked with Air Force scientists in the Air Vehicle Directorate.
- Developed architecture and real-time software for new MAV testing laboratory.
- Successfully demonstrated laboratory capabilities with multiple flight tests of fully autonomous indoor rotorcraft.
- Received competitive award twice: Summer 2008 and Summer 2009

**FloodSource Corporation**, Euless, TX

2005-2006

*Software Development Internship*

- Worked on a team with 8 professional software designers.
- Developed customer web interface for on-demand FEMA flood map access.
- Extensively debugged many in house software applications.
- Translated obsolete Perl scripts to Python scripting language for easier use.
- Obtained valuable project experience by working with the team and attending weekly developer meetings.
- Worked extensively with Java in both web and desktop applications.
- Gained excellent experience in system operations and various types of hardware and software.

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PROJECTS

**Automation and Robotics Research Institute**, Fort Worth, TX

2006-Present

*Indoor UAV/UGV Systems Testbed*

- Converted toy electric helicopters to autonomous agents.
- Developed light-weight wireless sensor circuit board and PC interface.
- Designed and coded 3D command and control application supporting multiple vehicles and user touch screen commands
- Designed PC interface to stock helicopter radio control, allowing control application to manipulate the helicopter using received data from wireless sensor suite.
- Designed and coded real-time localization system using ultrasonic wireless sensor nodes

**The University of Texas at Arlington**, Arlington, TX

2007-Present

*AUVSI Underwater Autonomous Vehicle*

- Served as project lead for team of 5 engineering students.
- Developed software behaviors for control of robotic submarine.
- Added sensors and manipulators to existing system.
- Created library of documentation, user manuals, and design specifications for use of future teams.

**The University of Texas at Arlington**, Arlington, TX

2005-Present

*IEEE Region 5 Student Robotics Competition Robots*

- Assumed leadership roles for 3 years of competition.
- Developed autonomous ground robot for student robotics competition at regional IEEE conference.
- Developed entire mechanical platform, electrical system, and software system with teammates.
- Established first ever UTA team with 2 other engineering students from different departments.
- Won 3<sup>rd</sup> place out of 30+ teams first year of competition.

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AWARDS

**National Instruments Graphical Design Achievement Multicore Award**

2009

- Submitted technical paper titled "Real-time micro air vehicle flight control testbed" was selected as one of two finalists in the Mechatronics/Robotics/Control category at the annual NI Week conference.
- Received "Multicore Award" for best utilization of multicore technology.

**Honors College Bridge to Graduate School Scholarship**

2008-2010

- Received yearly scholarship for graduate studies

**RoPro Student Robotics Scholarship** 2007-2008

- Twice received scholarship for yearly volunteer work in CSE department high school robotics competition.

**ARRI Robotics Scholarship** 2006

- Received scholarship for work on autonomous littoral vehicle.

**Honors College Presidential Scholarship** 2005-2007

- Received yearly scholarship for merit and completion of honors degree criteria.

**National Society of Collegiate Scholars Induction** 2004

- Inducted into national honor society for scholastic achievement.

#### PUBLICATIONS

- C. McMurrough, M. Middleton, and F.L. Lewis, "Indoor UAV/UGV real-time localization testbed," submitted to National Instruments Conference, Austin, 2009.
- C. McMurrough, M. Middleton, P. Stingu, and F.L. Lewis, "Human Interfaces and Control for Networked Teams of Autonomous Air and Ground Vehicles," poster presented to World's Best Technologies Conference, Arlington, 2009.
- C. McMurrough, K. French, and D.B. Doman, "Real-time micro air vehicle flight control testbed," submitted to National Instruments Conference, Austin, 2009. (Work done under AF Summer Fellowship 2008 at Wright Patterson AFB)  
*Finalist, 2009 NI Graphical System Design Achievement Awards Robotics/Mechatronics/Control Category*  
*Multicore Award, 2009 NI Graphical System Design Achievement Awards*
- F.L. Lewis, G. Hudas, C.K. Pang, M.B. Middleton, and C. McMurrough, "Discrete event command & control for networked teams with multiple missions," Proc. Conf. Unmanned Systems Technology XI, paper 7332-28, SPIE Defense Symposium, Orlando, April 2009.
- P. Ballal, A. Ramani, M. Middleton, C. McMurrough, A. Athamneh, W. Lee, C. Kwan, and F. Lewis, "Mechanical Fault Diagnosis using Wireless Sensor Networks and a Two-Stage Neural Network Classifier," Proc. IEEE Aerospace Conference, Big Sky, Montana, March 2009.