

PhD. Position In Advanced Manufacturing Robotic
Processes.
University of Alberta

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Posted May 13, 2024, set to expire Sep. 11, 2024

Job Title	PhD. Position In Advanced Manufacturing Robotic Processes.
Department	Mechanical Engineering https://apps.ualberta.ca/directory/person/ajquresh
Institution	University of Alberta Edmonton, Alberta
Date Posted	May 13, 2024
Application Deadline	Open Until Filled
Position Start Date	Available Immediately
Job Categories	Graduate Student
Academic Field(s)	Robotics Mechatronics Mechanical Engineering Manufacturing & Quality Engineering Industrial & Systems Engineering Engineering Physics Electrical and/or Electronics Computer Engineering Computer Science Engineering - Other
Job Website	https://apps.ualberta.ca/directory/person/ajquresh
Apply Online Here	https://forms.gle/1otGxqc9WGBqKzZD7
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Job Description

PhD. Position In Advanced Manufacturing Robotic Processes.

The Position

Additive Design and Manufacturing Systems Laboratory has an immediate vacancy for a **PhD student in advanced manufacturing robotic processes** with a focus on industrial robotic additive and hybrid manufacturing technologies. Candidates with experience in the Robot Operating System (ROS) and ROS 2 or PLC based control of robotic arms will be preferred.

This position will be open to candidates with an undergraduate degree in Electrical Engineering, Computer Engineering, Mechatronics Engineering, Computer Science, or a relevant discipline and an MSc in serial robotics, advanced robotic manufacturing automation, or additive manufacturing.

The position is currently being filled for Fall 2024, or Winter 2025 admission. The applications will be reviewed in the order received, and the position will remain open until filled.

Required Qualifications

The candidate will possess expertise and experience in the following areas demonstrated through research or thesis work or professional experience:

1. Minimum CGPA of 3.5 or above
2. Experience in automation, specifically with respect to serial robotic arms through robotics software framework Robot Operating System (ROS) and ROS 2, PLC-based automation, or a similar robotic process automation environment.
3. Experience in system integration (software and hardware) of robotic systems and various system components and sensing systems
4. Proven experience (projects) in C/C++. and Python programming languages, software, and build environments
5. Can follow robot controller and other manuals and implement required configurations and steps.

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Preferred Qualifications

In addition to the above requirements, candidates with experience in the following areas will be given priority:

1. Experience with automation-related work with any welding power source and feeders system, especially Lincoln, Miller is preferred.
2. Understanding of basic networking protocols such as Modbus, or Ethernet/IP, or OPCUA.
3. Experience in working with additive manufacturing systems (in particular robotic WAAM or laser DED)
4. Experience with programming Motoman and Fanuc robots, including interfacing with ROS
5. Experience in industrial sensor fusion projects
6. Experience with Cmake and Catkin
7. Experience with structured light scanning and 3d point cloud acquisition and data transformation

The candidate will also demonstrate excellent verbal and written English communication skills and the capability to work independently and within a diverse team.

Responsibilities

The candidate's primary responsibility will be to conduct high-quality research in the domain of additive manufacturing with a focus on robotics automation. The scope of the project includes the following tasks for the design and manufacturing of components:

- Conducting the literature review of the state of the art of Robotics automation in Additive Manufacturing.
- Understanding communication protocols for welding power source and integration of welding power source with the rest of the Additive Manufacturing system, such as PLC, Robot Controller, or a Computer (Linux).

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- Developing the Linux-based state machine and interface program (in C++ or Python) to communicate with the welding power source and feeder system. Carry out PLC-related development, welding power source, and wire feeder integration with the rest of the additive manufacturing digital toolchain.
- Write PLC programs and occasionally write teach pendant programs for robot motion and welding process, carrying out experimental work for testing robot motion and welding process.
- Develop, implement, and carry out experimental work with the manufacturing systems.
- Draft technical reports and other scientific communication such as conference proceedings, journal papers, and thesis.
- Selection purchase and procurement of required hardware for systems integration
- Keep the lab documentation up to date.

The Project

ADAMS Lab has several large-scale robotic additive and hybrid manufacturing platforms for carrying out cutting-edge research in large-scale Metal, Polymer, Polymer composite, and hybrid additive subtractive manufacturing systems. The candidate's primary responsibility will be to continue the research and development of these large-scale industrial robotic automation platforms and automated robotic manufacturing cells for industry 4.0 automation solutions for the energy, mining, space, and automotive industries.

The scope of the project includes the following tasks for the design and manufacturing of components:

- Robotic arm trajectory control for advanced manufacturing processes
- Integration of various sensing technologies with the robot software toolchain for data collection, analysis, and real-time control
- Process planning and tool path planning for experimental builds, including software development for process planning and build execution
- Development, design, and implementation of software feature extensions to facilitate the testing of novel process optimization, estimation, and control strategies

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Application Procedure

The applications will be accepted only through an online submission process by accessing the link given below:

<https://forms.gle/1otGxqc9WGBqKzZD7>

The candidates will be asked to fill an online form and upload the following PDF files:

- A cover letter explaining how your experience and expertise in robotics is a good fit for fulfilling the primary job responsibilities.
- A detailed curriculum vitae highlighting areas of research, a list of publications, awards, and honors, and a list of three professional references

The review of applications will begin immediately, and applications will be accepted until the position has been filled.

Interested candidates should use ADAMS88240511PHD as the job competition number in the online form. For more information about the position, you may contact Ahmed Qureshi at ajquresh@ualberta.ca

We thank all applicants for their interest; however, only those short-listed will be contacted.

The University of Alberta is committed to an equitable, diverse, and inclusive workforce. We welcome applications from all qualified persons. We encourage women; First Nations, Métis and Inuit; members of visible minority groups; persons with disabilities; persons of any sexual orientation or gender identity and expression; and all those who may contribute to the further diversification of ideas and the University to apply.

Contact Information

Please reference Academickeys in your cover letter when applying for or inquiring about this job announcement.

Contact Dr. Ahmed Qureshi

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