Job Description

Job Title:	GAIA Research Technologist
Department:	Waterloo Centre for Automotive Research (WatCAR)
Reports To:	Executive Director, WatCAR
Jobs Reporting:	none
Salary Grade:	USG 8/9
Effective Date:	1 September 2017

Primary Purpose

In partnership with the Powertrain Research Technologist, undertakes day-to-day operation of the Green and Intelligent Automotive (GAIA) research facility, particularly to support testing of intelligent vehicle systems and components. Performs and supports data collection/synchronization and instrumentation of test setups with vehicle communication devices, on-board sensing and measurement equipment, hardware/software/simulation package integration, along with rapid control prototyping, hardware-in-the-loop and component-in-the-loop (HIL/CIL) experiments, reverse engineering of automotive controllers and controller area network (CAN bus) communication networks, especially for connected and autonomous vehicle systems. Activities will support research projects led by Engineering faculty and involving graduate students as well as external industry clients. Performs other tasks as related to the above-mentioned data collection, instrumentation, integration, HIL/CIL experiments and fault diagnosis.

Key Accountabilities

List the major responsibilities of the job, divided into 3 to 5 broad categories. These should reflect 80 - 90% of "what" the job does not the "how". Insert a category heading and in bullet form below, state specific responsibilities.

Set-up, preparation and safe operation of all GAIA equipment in collaboration with GAIA powertrain research technologist, to be maintained as a showcase facility:

- Vehicle test cell: Rolling chassis dynamometer (2 x 200kW), wave form generator, oscilloscope
- Powertrain test cell: Permanent magnet dynamometers (3 x 300kW), battery pack cycler
- Battery test cell: AC/DC converter, DC/DC converter, potentiostat/ galvanostat, battery cell cycler
- Wireless Sensor Network: Throughout facility, across all three test cells
- Ongoing: Plan, organize and implement policies and procedures; facility safety and equipment maintenance

Testing and evaluation of stock and supplied products for research projects in collaboration with GAIA powertrain research technologist:

- Vehicles: Various including hybrid, electric and internal combustion
- Powertrains: Various electric motors, engines, transmissions, and hybrid systems
- Batteries: Various configurations, as well as AC/DC and DC/DC converters

Supports HIL/CIL testing, rapid control prototyping, and CAN communications decoding:

- Performs HIL/CIL testing of new control algorithms
- Performs rapid control prototyping for engines, electric motors, batteries, and cars
- Performs reverse engineering of automotive controllers and CAN bus communication networks

Supports intelligent vehicle systems testing activities:

- Performs instrumentation of test setups with vehicular communication devices, radar, camera and other electronic sensors
- Performs integration of driving simulators, traffic simulators and other hardware/software/simulation packages for experiments

Required Qualifications

If hiring today, what would be the required education, experience, knowledge, skills and abilities?

Education

- A degree/diploma in an engineering or engineering technology program is required, ideally with a focus on electronics and software.

Experience

- Relevant experience with and knowledge of automotive systems, with an electronics focus preferred
- 2-3 years of relevant experience with HIL/CIL setups, CAN bus communication systems, vehicle communication systems & on-board sensors, traffic simulators, driving simulators and automotive systems test equipment is preferred

Knowledge/Skills/Abilities

- Proven ability and knowledge in mechatronic system integration and testing, preferably in automotive applications
- Proven ability to diagnose and troubleshoot automotive test equipment
- Proficiency with hand tools, equipment and instrumentation for set-ups and testing
- Proven ability to deal with and effectively communicate with faculty, staff, students and industry partners
- Ability to work both independently with limited supervision at times and also in a team environment
- Well organized, self-motivated, strong problem solving and proven multi-tasking skills
- Ability to prioritize work with timely delivery, meeting varying deadlines for simultaneous research projects

Nature and Scope

Contacts: The position deals with faculty, teaching and research assistants, graduate students, staff and industry partners to troubleshoot problems, answer questions and provide information.

Level of Responsibility: The position performs specialized work with minimal supervision at times and provides guidance to others. Independently advise faculty and graduate students. Supports the proper operational capacity and maintenance of complex equipment following appropriate safety procedures.

Decision-Making Authority: Undertakes and supports the proper and safe operation of existing and new equipment in GAIA. Must consistently maintain safety standards in the research facility, as well as advise faculty and the Executive Director of WatCAR regarding any issues. Maintain an overall eye on the functioning of equipment and activities in the facility. Will also be contributing to specific research initiatives, lending support and advice.

PHYSICAL AND SENSORY DEMANDS: Requires exertion of physical and sensory effort resulting in moderate fatigue and strain from performing vehicle systems integration, equipment preparations and installations for experiments. Requires long periods of standing. Some lifting and transporting of heavy and/or awkward equipment will be required.

WORKING ENVIRONMENT: Involves moderate physical risk resulting from unavoidable exposure to hazardous, disagreeable or uncomfortable environmental conditions (e.g. high voltage levels, electro-mechanical apparatuses, etc.). Consequently, safety procedures must be strictly enforced. Incumbent will work within an open concept laboratory and work is subject to several interruptions. Working outside of normal hours might be occasionally required to deal with emergencies, maintenance, or extended run experiments.