

**SUBMITTED BY: STEPHEN M. LANIER, VICE PRESIDENT FOR RESEARCH**

**RESEARCH AGREEMENT WITH IC, LLC,  
A COMPANY WHICH IS PARTIALLY OWNED BY A WSU EMPLOYEE**

**RECOMMENDATION**

The Administration recommends that the Board of Governors authorize the President or his designee to enter into a contract for research from IC, LLC, a start-up company organized as a limited liability company. This contract will be to perform services for a project funded by IC, LLC entitled “Ion Current for Engine Control.”

**BACKGROUND**

Advanced internal combustion engines are required to operate under different steady and transient modes, on fuels of different physical and chemical properties while meeting production targets in power, fuel economy and emissions. OEMs develop control strategies that require time consuming and costly calibration efforts to produce numerous tables to control engine operation. In many cases the calibration tables do not respond to changes in fuel properties which vary in different countries all over the world, in addition to the seasonal variations in weather of each country.

IC, LLC is a company founded by Detroit Engineered Products, Dr. Naeim Henein, distinguished professor of Mechanical Engineering in the College of Engineering, and Dr. Tamer Badawy, a former WSU graduate student. The founders of IC, LLC are recognized experts in combustion engines.

WSU’s College of Engineering seeks to enter into an agreement on a project totaling \$63,493 with IC, LLC, to investigate the detailed characteristics of combustion produced ion current signals for use in the electronic closed loop control of internal combustion engines. The experiments will take place in 1355 Engineering Building by Dr. Henein and student assistants.

Michigan Conflict of Interest law requires specific sunshine procedures in order for a University employee, or a company owned by a University employee, to contract directly or indirectly with the University:

(A) The employee must disclose any pecuniary interest in the contract to the Board and the disclosure must be made a matter of record in the Board’s proceedings.

(B) The contract must be approved by a vote of not less than two-thirds of the full membership of the Board in open session.

(C) The Board’s minutes must report:

(i) The name of each party involved in the contract.

(ii) The terms of the contract, including duration, financial consideration between the parties, facilities or services of the public entity included in the contract, and the nature and degree of assignment of employees of the public entity for fulfillment of the contract.

(iii) The nature of any pecuniary interest.

If the Board approves this Recommendation, the minutes will report as follows:

The Board of Governors authorized the President, or his designee, to enter into an agreement with IC, LLC totaling \$63,493 with Wayne State University.

- i. The parties involved in the contract are Wayne State University and IC, LLC.
- ii. The contract, in the amount of \$63,493, is in support of project that will investigate the detailed characteristics of combustion produced ion current signals for use in the electronic closed loop control of internal combustion engines. WSU will conduct experiments to identify the current signal produced during combustion in the John Deere four-cylinder, turbo-charged diesel engine equipped with an electronically controlled high pressure common rail injection system. The investigations will examine the use of a modified glow plug that acts as an ion current sensor in addition to its basic functions of warming up the combustion chamber. Dr. Nabil Chahoub, chair of WSU's Department of Mechanical Engineering, will offer direction on the project to WSU employees and students.
  - The contract will have a term of 12 months, with an estimated start date of April 1, 2015.
  - The Wayne State University College of Engineering facilities will be used to execute these experiments.
  - The research will be conducted by Dr. Henein and two student assistants.

iii. Dr. Henein's pecuniary interest consists of an ownership interest, holding 37.5% equity interest in IC, LLC, and will therefore have the potential to financially benefit from the commercial success of the company, including the commercialization of the University's technology known as "Ion Current Sensing for Control of Internal Combustion Engines."