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**Certificate of Mr. Yutaro Umehara's Research Visit to The University of Michigan**

To Whom It May Concern:

This is to certify that Mr. Yutaro Umehara (DOB: October 22, 1994) of the Department of Mechanical Engineering and Intelligent Systems at the University of Electric-Communication in Japan was a Visiting Scholar (Graduate Student) from August to October 2018 (three months) with good standing in the Department of Nuclear Engineering and Radiological Sciences (NERS) at the University of Michigan (UM). Mr. Umehara worked with my research team in the Thermal Hydraulics Laboratory and participated in a graduate-level course that I am teaching this semester.

My research interests are in reactor thermal hydraulics and safety as well as two-phase flow and heat transfer. As such, my research interests overlap strongly with the research interests of Professor Tomio Okawa at the University of Electric-Communication, who is the research advisor for Mr. Umehara. In what follows, a brief summary of the work that Mr. Umehara engaged in during his research visit to UM.

**Research:** Mr. Umehara actively participated in a research project related to post-CHF (critical heat flux) heat transfer experiments being supported by the US Nuclear Regulatory Commission due to his interest and prior experience in CHF research at the University of Electric-Communication. During his stay at UM, Mr. Umehara worked daily with a graduate student in my group to perform shake-down tests of this high-pressure, high-flow test facility. When issues appeared during tests, he often was able to carry out some detailed diagnosis analyses to identify the causes. I was impressed by his imitative and technical skills.

**Classroom Training:** Mr. Umehara attended regularly a graduate-level course that I am offering this semester: NERS 546 "Thermal Fluids for Nuclear Reactor Safety Analysis." He turned in homework solutions and took the midterm exam. He performed very well (above average of the class) till his return to Japan.

**Research group weekly meetings:** Mr. Umehara regularly attended the weekly meetings of my research group. He also presented a root-cause analysis for a test section failure incident.

In summary, Mr. Umehara had an active and successful visit to UM and to work with my research team. I am most pleased that he was able to fully engage in this very interesting and quite fruitful research visit to UM even though my research lab was not fully set up and functioning due to our recent move to UM.

Sincerely,

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