



APPLICATION FORM (JOINT RESEARCH) HIGH POTENTIAL INDIVIDUALS GLOBAL TRAINING PROGRAM)

AGREEMENT

As stated above, I submit this application form to IITP that conducts “High Potential Individuals Global Training Program” supported by Ministry of Science, ICT in South Korea. IITP may disclose the information below to the public for the purpose of providing information and matching a research partnership between your institute and a Korean university.

* IITP : Institute for Information & communications Technology Planning & Evaluation

Printed Name of
Chief of Research

Eun-Suk Seo

Date(mm-dd-yyyy)

01/30/2020

Signature of
Chief of Research

(Note) This application is to identify the willingness to participate in this research and to find a research partnership for research institutes in Korea. Therefore, in its sole discretion, it is acceptable to contain only minimal information. (max. 3 pages)

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|---|---|------------------------|---|--------------------|---|---------------------------|----------------------|
| 1. Research Title | Cloud-based Scientific Big-Data Analysis System | | | | | | |
| 2. Research Area | A.I. | Big Data | Cloud Computing | Block Chain | AR/VR | ICT/SW Convergence | Other ICT /SW |
| | X | X | X | | | | X |
| 3. Chief of research | Title | Professor | | Contact | E-mail : seo@umd.edu | | |
| | Name | Eun-Suk Seo | | | Tel : +1-301-405-4855 | | |
| 4. Affiliation | Name | University Maryland | of | Classifi cation | (X) University () Research Institute () Industry () ETC. | | |
| 5. Capacity for students (5 or less) | 5 | | Support for students (all necessary) | | (X) Visa support (X) Research Mentoring (X) Research Space (X) Accessibility to Research equipment | | |
| 6. Research Objective | <ul style="list-style-type: none"> - Development of an IoT system for the data acquisition device interfaced with the cloud-based scientific big-data analysis system - Development of visualization tools for the cloud-based scientific big-data web interface - Development of scientific big-data analysis tools using unsupervised learning and pattern recognition | | | | | | |



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| | <p>- Development of a Monte Carlo simulation model to train classifiers with significant statistics</p> |
| <p>7. Research Summary</p> | <p>Building on the cloud-based scientific big-data analysis system with a basic web interface and an application programming interface (API) in C++, we plan to:</p> <p>(1) develop an IoT system including a user control interface and M2M (machine to machine) communication for data acquisition devices in scientific experiments. This system is an extension of the existing SCADA (supervisory control and data acquisition). It should be compatible with our cloud-based scientific big-data analysis system, and fault tolerant. We can develop procedures and guidelines to minimize interruptions of a continuous operation of IoT devices due to radiation effect.</p> <p>(2) develop visualization tools for object data, data relationship among variables, data distribution, basic statistics etc. These visualization tools for both the web interface and C++ API need to be developed as a unified version to maximize adaptability of the developed modules.</p> <p>(3) continue to develop machine learning techniques to identify unknown particles in cosmic rays. Unsupervised learning and pattern recognition will be used in addition to the Monte Carlo based supervised learning.</p> <p>(4) develop a simulation model using Monte Carlo methods to train classifiers with significant statistics.</p> |
| <p>8. Need for funding from Korean government</p> | <p>This collaborative research project will advance a cloud-based scientific big-data analysis system. It will provide a great opportunity to train future leaders in AI, big data, cloud computing, and IoT, essential to the fourth Industrial revolution. Participating students can gain hands-on experience in cloud computing system development, scientific big data handling and analysis, and development of devices that can operate continuously in the radiation environment. They will be able to apply the acquired skills to broad applications of international interests including but not limited to wireless radiation monitoring, medical data analysis, image processing, and autonomous driving technology.</p> |
| <p>9. Request for Korean Universities</p> | <p>- The UMD group including Munhwa Kim, Jayoung Wu, and Eun-Suk Seo can support up to 5 students per year.</p> <p>- Students should be selected by the mutual agreement between the UMD group and Korean applicants. Students to carry out the proposed research should provide their background information including resume, transcript, research statement and recommendation letters.</p> <p>- Once the research grant is awarded, UMD can support visa applications for the selected students to be able to conduct the proposed research at UMD. Necessary work space and access to computing facility and data can also be provided for students to conduct the proposed research.</p> <p>- Students are expected to work full time and will be responsible for deliverables. They will have to be compliant with all the laws and regulations of the United States, the State of Maryland and UMD for them to conduct the research at UMD. The UMD participation is purely scientific, and UMD will comply with all United States export control laws and regulations in carrying out this project.</p> |