

Research Project Internship Form

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Faculty Supervisor Name: Mainak Basu, Ph.D.(Tech.), M.Sc.(Instrumentation)

Faculty Co-Supervisor Name: *(if any)*

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Department / School: Dept. of Physics / School of Engineering and Sciences

Internship Project Name: A Quadrature Amplitude Modulation based frequency mathematical operations for next generation computing devices

Duration of Internship: 3-6 Months

Number of Students Needed: 01

Location of Internship (Lab/Company/Office): Laboratory / Theoretical / Practical

Prerequisites: N/A

Project Details: *(At least 150 words)*

The next generation of computing devices are being devised to be significantly different that of previous generations. Our overdependence on digital logic based on a Boolean primitive, have led to the development of extremely powerful computing hardware. However, circa 2010, the same techniques reached their limits, which led to development of hardware based parallel computation and Heterogenous computing solutions, which are still used today. This unique problem has not yet been solved, as our only course of action is to develop a smaller fabrication node. However, the limitations posed by the quantum effects which are prevalent at such fabrication nodes and the nascent development of quantum computing leads to the fact that there is a derth of computing power, for the foreseeable future, as such devices would require massive servers. Another alternative is the development of Analog and Hybrid computation devices, which shows promise, to overcome this disadvantage and pave the way for quantum computing. However, such logic has yet to be developed and is the core premise of this project.

Comments/Notes: This project will utilize MATLAB for simulation purposes and can even lead to hardware fabrication at the component level. The necessary software and components will be provided from the host Institute.