Ira A. Fulton Schools of Engineering
Arizona State University

SCAI Graduate Course Permission Request

Faculty email approvals may be attached to this form in lieu of signature.
Submit form to https://fultonapps.asu.edu/override/ for processing.

STUDENT INFORMATION

ASU ID No.	Last Name, First Name	Date
1219515409	Sathya Kumar, Rajesh	03/24/2022

Student Signature	ASU Email Address
J. Raj.	rsathyak@asu.edu

All thesis students (CEN, CSE, IE, RAS, SER) must have an approved iPOS before you can register for your final 3 credit hours of 599.
Computer Science M.S. Students must have a THESIS PROPOSAL on file with the Advising Office before you can register for your final 3 credit hours of CSE 599.

REGISTRATION INFORMATION

Term/Year:	Assistantship:	Program:	Course(s): Check all that apply
☐ Fall ☒ Spring ☐ Summer 2022	☒ RA ☐ TA ☐ None	☐ Computer Engineering ☒ Computer Science ☐ Industrial Engineering ☐ Data Sciences, Analytics & Engineering ☐ Software Engineering ☐ Robotics and Autonomous Systems ☐ Master Thesis ☐ Master Non-Thesis ☐ PhD Program	☐ 580 Practicum ☐ 595 Continuing Registration ☒ 599 Thesis Credit Hours (1-6) __3___ ☐ 784 Teaching Internship ☐ 792 Research Request (1-12) _____ ☐ 795 Continuing Registration ☐ 799 Dissertation Credit Hours (1-12) _____

Semester/year started degree program:	Semester/year you plan to complete degree program:
Spring 2021	Fall 2022

Faculty supervising your assistantship:
Dr. Andreas Spanias

School of Computing and Augmented Intelligence
P.O. Box 878809 Tempe, AZ 85287-8809
p: 480-965-3190 f: 480-965-2751 web: scai.engineering.asu.edu

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MS Thesis students: Must provide a detailed progress update and timeline for degree completion.
PhD students: Must also include an estimated timeline for the comprehensive exam, dissertation prospectus or dissertation defense. *Provide updated* progress information on what *you will be working on and the deliverables for the upcoming semester.* Use a separate page if needed.

Course List: ☐ - Current / Future Courses.

Term	Session	Course	Description	Hours	Grade
Spring 2021	C	CSE 471	Intro to Artificial Intelligence	3	A
Spring 2021	C	CSE 575	Statistical Machine Learning	3	B+
Spring 2021	C	CSE 551	Foundations of Algorithms	3	B
Summer 2021	A	MAT 421	Applied Computational Methods	3	B+
Fall 2021	C	CSE 598	Computing for Data Driven Optimization	3	A
Fall 2021	C	CSE 598	Introduction to Deep Learning	3	A+
Fall 2021	C	CSE 535	Mobile Computing	3	A
Fall 2021	B	EEE 517	Sensors and Machine Learning	1	A
Spring 2022	C	CSE 598	Statistical Learning Theory	3	NA
Spring 2022	C	EEE 598	Intro to Quantum Information and Quantum Computing	3	NA
Spring 2022	C	CSE 590	Reading and Conference	3	NA
Spring 2022	B	CSE 599	Thesis	3	NA
Fall 2022	C	CSE 599	Thesis	3	NA
Fall 2022	C	EEE 606	Adaptive Signal Processing	3	NA

Thesis Abstract:

There has been a surge of advancements in the field of Quantum Computing ever since Shor's Factoring algorithm kickstarted it in the year 1994. With Google's announcement of their 54-qubit sycamore processor in 2019, which is said to have achieved "Quantum Supremacy", the race to build a fast, scalable, and fault-tolerant quantum computer capable of executing useful algorithms faster than classical computers, is heating up across several tech giants, corporations, and governments.

With several companies building quantum computers that are based on largely different physical processes such as trapped-ion, superconducting, photonic, silicon- based, and topological quantum computers, it becomes extremely important in defining metrics to determine the speed and scalability of Quantum programs, irrespective of the platforms they are executed.

While the metrics of volumetric benchmarking and CLOPS, introduced by IBM, give us a platform-agnostic way of comparing Quantum Hardware, there is no standard way to express the scalability of the hardware as well as the programs that are run in these platforms. This thesis is to study and explore other benchmarking techniques and validate the effect of quantum noise and error correction on these metrics. We will also discuss the performance and scalability of Quantum Machine Learning algorithms using these metrics and error correction techniques.

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SCAI FACULTY APPROVAL

Faculty Name (please print)	Signature	Date
Dr. Andreas Spanias		
Dr. Arunabha Sen		

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