Indian Institute of Technology Madras
Office of Alumni and Corporate Relations

CELEBRATING THE GENEROSITY OF MR. PRATAP SUBRAHMANYAM

Impact Of Your Giving In 2024

DIRECTOR'S MESSAGE

PROF. KAMAKOTI VEEZHINATHAN
DIRECTOR, IIT MADRAS

Greetings! IIT Madras continues to retain her top position for the eighth consecutive year, in the National Institute Ranking Framework, thanks to the world-class research, unwavering dedication and creative mindset of its faculty and students. The contribution and support of Alumni and well-wishers like you have crucially helped this standing and stature. Our achievements in research, education, innovation, and entrepreneurship have also earned us the recognition of an 'Institute of Eminence' as well as the top position in the Atal Innovation Ranking from the Government of India.

IIT Madras is making an indelible mark in promoting and providing education to students from the length and breadth of India to areas beyond Indian territory, through her initiatives in rural developmental educational programs, international, interdisciplinary M.Tech courses, and online diploma courses. The popularity and reach of our online courses can be gauged by the fact that around 25000 students in ages ranging from 17 to 82, have enrolled for these courses across national boundaries, and about 30% are from rural India. The institute, in a first-ever initiative by an IIT, has consolidated its position on the world map by establishing her international campus in Zanzibar, Africa where about 45 students have been admitted to different programs.

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Innovation and entrepreneurship are ingrained in all our endeavours – our ambitious ventures in rocket and space explorations, the development of lab-grown diamonds, hyperloop, the Brain Research Centre etc, are a testimony to this. The start-up ecosphere is also a reflection of this spirit, wherein last year, 70 startups came to fruition, successfully nurtured by our centres of excellence, the Centre for Innovation, Nirmaan – the pre-incubator, the Incubation Cell, technology centres such as 'IITM-Pravartak' at the IIT Madras Research Park and others. This year, our target is to incubate at least a 100 Start-ups in various sectors. It is expected that at least 20% of the passing out students will be proud CXOs of their own ventures! The year 2023 also saw 221 national and 105 international patents from our Institute and we are looking to closing this current financial year with 366 patents, to account for 'a patent a day'.

Towards promoting inter-disciplinary research and exploring new frontiers, a Department of Medical Sciences and Technology was launched in May 2023, a School of Sustainability in Oct 2023, a Department of Data Science and Artificial Intelligence in Nov 2023 and a new Interdisciplinary Dual Degree program on Quantitative Finance in Dec 2023 through the synergy of the departments of Management Studies, Computer Science and Engineering and Mathematics. Our School of Sustainability has signed MoUs for collaborations with Tel Aviv University, Israel and Technische Universität Dresden, Germany, with the aim of being recognized as a leader for sustainability teaching and research in the global south.

Lofty ambitions and achievements are impossible without the deep-rooted faith and support of alumni and well-wishers like yourself. We are indebted to you for your bountiful, impactful contributions and the faith reposed on us. On behalf of IIT Madras, I express my deepest gratitude for continuing to strengthen the Institute. Together with your support, we are confident of building an IIT Madras that is more inclusive, diverse, and seized of tomorrow's needs to be nationally and globally relevant.

Thank you!

DEAN'S MESSAGE

PROF. MAHESH PANCHAGNULA
DEAN, ALUMNI & CORPORATE RELATIONS, IIT MADRAS

Greetings from the Office of Alumni and Corporate Relations!

Please accept my sincere appreciation for the unwavering support you continue to provide to IIT Madras. Your generosity is the cornerstone of our success, and we are truly grateful for your commitment to the causes that are important to the students and faculty of IIT Madras. This report is a testament to the profound impact your contributions have had –by transforming the lives of students, supporting research, augmenting Institute infrastructure, enhancing learning or through supporting other myriad causes. Your trust in us propels our ambitions, and we are committed to ensuring that your donations are utilized to their fullest potential.

In a world evolving rapidly in science and technology, we have set ambitious goals for ourselves. Your enduring enthusiasm and support provide fillip to our efforts. IIT Madras stands as a beacon of diversity, sustainability, innovation and research excellence. While we have transformed over the years, our commitment to being a premier institute in the country and abroad, remains steadfast, attracting the brightest minds from across the globe. I cordially invite you to visit the campus, witness first-hand the salutary impact of your contributions, and observe the Institute's growth and evolution over the years.

Your generous gifts have made an incredible difference in our Institute's aspirations – Thank you!

Your continued partnership is invaluable as we navigate the exciting journey ahead, shaping the future of India and the world together.

MR. PRATAP SUBRAHMANYAM
1985 / BT / ME

Mr. Pratap Subrahmanyam joined VMware in 2000 and has been a pivotal player in the company's virtual machine monitor group. He was recognized for his technical leadership and significant contributions to the company in 2013 when he was appointed a VMware Fellow.

Previously a principal engineer at VMware, he contributed to the design of the MMU virtualization. He also added to performance improvements, paravirtual interfaces design principles and more recently the symmetric multiprocessor fault tolerance for virtual machines.

Prior to VMware, Subrahmanyam was part of the California Language Lab at HP. There he worked on code generation and optimization techniques for the PA-RISC and the IA-64 processor architectures.

Mr. Pratap Subrahmanyam has earned 26 issued patents, 21 of which he obtained while at VMware. He received his Bachelor of Technology from IIT Madras and holds a Master's in Computer Science from the State University of New York at Buffalo.

VEENA AND PRATAP SUBRAHMANYAM CENTRE FOR DIGITAL INTELLIGENCE, SECURITY HARDWARE AND ARCHITECTURE (V & PS - CDISHA)

This document outlines the activities carried out in the V & PS - CDISHA lab, with a particular focus on the technical advancements made in the SHAKTI processor engineering efforts.

I-Class

The Shakti I-Class Processor is an RV64IMAFDC+ general-purpose, out-of-order, 4-wide superscalar processor. In the last academic year, we worked on adding enhancements to core v1.5 targeting completion of core v2.0 features in the next few months. We have implemented several features including improved branch predictors, better integer and FP schedulers, TLB enhancements, renaming optimizations and pipeline back-end optimizations. We have made fixes for RISC-V specification conformance, enhanced the FPGA log support, booted I-Class on Debian Linux and fixed tricky microarchitectural bugs seen in long running SPEC '17 benchmarks on the FPGA. During the year, we have also been working on timing and performance optimizations. Current work includes cache enhancements, pipeline optimizations, pmp and trigger support.

Multicore

The MultiCore Processor is a Quad core RV64IMAFDC C-Class in order Processor. It integrates 4 instances of c-class cores with 2 levels of coherent caches (L1 cache and L2 cache). Each core has 16kB instruction memory and 16kB data memory as L1 cache. The L2 cache is 256kB and shared by all the cores. The cache coherence is taken care of by using MESI coherence protocol. All the cores have support for inter processor interrupts for synchronization among cores. The Atomic extension is very much needed for multicore as multiple cores may try to access shared resources. The core is tested in an FPGA environment. Nuttx RTOS has been ported successfully in a multicore environment. The SDK has been extended for running applications in multicore. Currently linux booting is in progress.

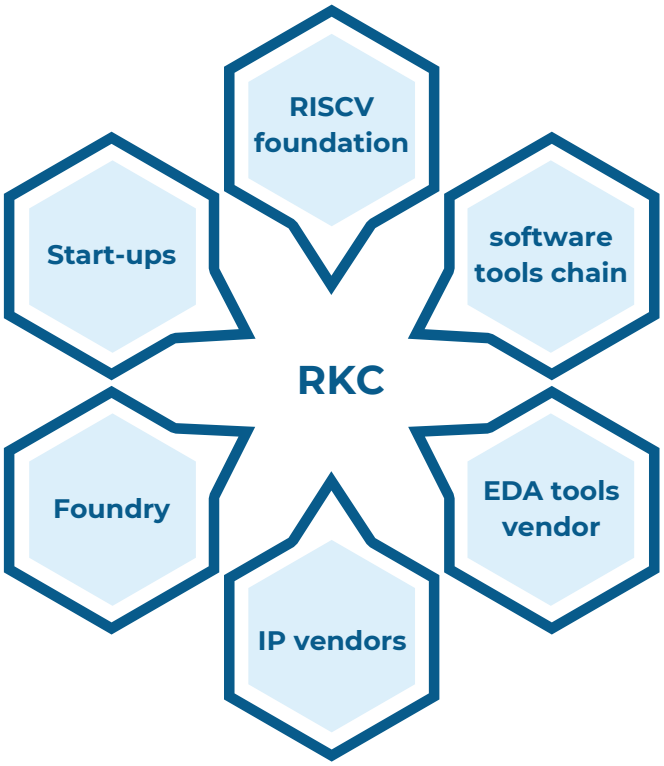
C-Class

The Shakti C-Class Processor is an RV64IMAFHDC+ general purpose, in-order processor. In the last academic year, we worked on FPU optimization, adding PSIMD extension, updated C-Class to 6 stage pipeline, and integrated newer versions of Cache memory. We also added peripheral IP for custom SPI, QEP, VFC, CORDIC, External Memory Interface (Parallel), GPT, Watchdog. We also added I2S transmitter IP. We are working on IPs like ethernet MAC, USB2.0 Host, MIPI CSI & Tamper detection. The C Class SoC has been ported to 10+ FPGA boards.

To view the website

RISC-V Knowledge Centre (RKC)

IIT Madras is proposing setting up of a RISC-V Knowledge Centre (RKC) - a nodal house for a quick acceleration of RISC-V adoption across the country by start-ups and end-users. It is to facilitate interactions and best-practices among the different contributors



Some of the activities that will be done over the next few years as part of this initiative are as follows:

a) Contribution by participating in the design and freezing of various extensions being proposed in RISC-V community which will give India an early mover advantage of what is going to be subsequently getting released in the community

b) Establishment of RISC-V Products lab with various products/solutions released globally for the RISC-V vendors and engineering companies to make use of for testing the interoperability of their products with other global products

c) Customize the software being developed by other members of RISC-V community to specific reference normative models of our RISC-V processor

d) Contribute in trying to be owners of more architecture compatibility tests of RISC-V extensions

The knowledge gained through the association with RISC-V group in the above-mentioned representative sample set of activities would be shared periodically with other stakeholders of RKC for their benefit of reducing the product engineering duration

InCore is an early-stage startup headquartered in India (Chennai) that is focused on providing class-leading RISC-V cores and solutions. It was founded in 2018 by the creators of the SHAKTI Processor Program at IIT-Madras and is backed by Peak XV. InCore's key strength lies in its highly configurable core generators, which tailor-make and optimize cores to meet specific client needs, setting it apart from competitors with limited core offerings.

To view the website CLICK HERE

Vyoma Systems

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To view the website CLICK HERE

SECURWEAVE

SecurWeave is a cyber security startup building platforms that can protect Operating Systems against Kernel mode threats. We received 2.8 Cr funding from Indian Angel Networks on October 2023 and have were also featured in Intel Coffee Table book on March 2024 as one of the 10 promising deep tech startups. Currently we are working on enhancing our security hypervisor to cater to next generation embedded systems on the IoT edge and automotive sector. We are expecting our first sales revenue to happen within the next 6 months, with the Indian Navy as our first customer.

To view the website CLICK HERE

Mindgrove Technologies designs state-of-the-art scalable and reliable System-on-Chips (SoCS) in India under the brand name Mindgrove Silicon based on IITM developed Shakti microprocessor. These SoCs are built to be power-efficient and cost-effective for use in IoT, vision, automobiles, and more.

Mindgrove developed India's first commercial high-performance SoC (System on Chip) named Secure IoT. The RISC-V-based chip will allow Indian Original Equipment Manufacturers (OEMs) to use an Indian SoC in their products and help reduce the cost of their feature-rich devices, without compromising on high-end features. The chip is estimated to cost 30 percent less than other chips in the similar segment.

Mindgrove was founded by T. R. Shashwath and Sharan Srinivas J. and is backed by Peak XV Partners, Speciale Invest, and Whiteboard Capital.

To view the website CLICK HERE

Shakra Innovations, incubated at IITM-Pravartak, is spearheaded by three engineering enthusiasts dedicated to crafting comprehensive solutions for Aatmanirbhar Bharat. Specializing in RISC-V based SoC using Shakti Cores, our expertise ranges from custom peripheral integration and physical design to operating system customization. The founding team's notable achievement includes multiple tape-outs with the Shakti team. Our focus lies in offering end-to-end solutions in embedded systems, catering to national self-reliance in technology.

We specialise in SoC integration, FPGA Verification, Physical Design, Board bringup and software.

To view the website CLICK HERE

WE ARE GRATEUL TO YOU AND YOUR FAMILY

Thank you for your sustained generosity to IIT Madras over the years. Contributors such as yourself enable our students and Professors to dream big and work towards a better and brighter future. We hope you are proud of your relations with IIT Madras and how it has remained steadfastly committed to academic and research excellence. You and your family have been instrumental in facilitating this significant growth.

Our efforts to nurture the culture of academic excellence that is the hallmark of IIT Madras - quality education, cutting-edge research, and unfettered creativity shall continue. We are privileged and humbled to have you and your family walking with us along this trail. We wish you and your family the best always in all walks of life!

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