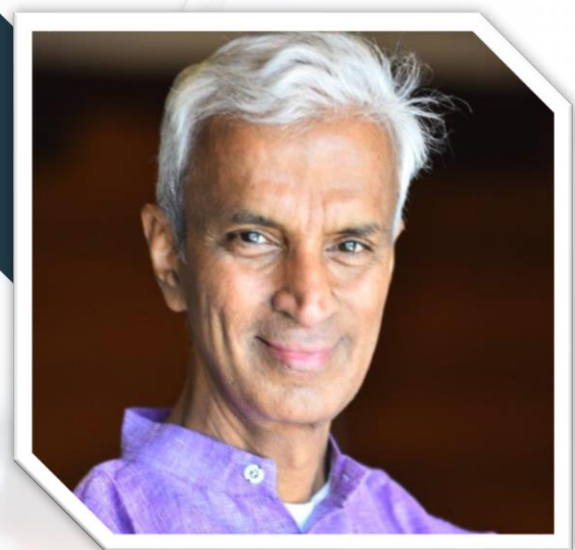




IIT MADRAS

Celebrating Generosity
Annual report
2021-2022

Mr. Subramonian Shankar



Indian Institute of Technology Madras

Department of Computer Science and Engineering

Annual Report 2021-2022

The Department has a vibrant student body numbering around 770 and a faculty strength of 35. The full-time faculty members currently consists of 16 Professors, 7 Associate Professors, and 12 Assistant Professors. The current faculty members include 2 IEEE Fellows, 1 JC Bose Fellow, 3 Indian National Academy of Engineering Fellows, 1 Indian National Science Academy Fellow, 1 National Academy of Sciences Fellow, 1 International Speech Communication Association Fellow, 1 Fellow of the World Academy of Sciences for the Advancement of Science in Developing Countries, and 1 Fellow of Computer Society of India. The current faculty members also include 1 awardee of the Swarnajayanthi fellowship, 3 awardees of the Srimathi Marti Annapurna Gurunath Award for Excellence in Teaching, 1 Institute Research and Development Mid-Career Awardee, and 5 Young Faculty Recognition Awardees. The current faculty also includes 2 Institute Chairs.

The Department has Prof. Mriganka Sur from MIT, USA, and Prof. Partha P. Mitra from Cold Spring Harbor Laboratory, USA, as Distinguished Chair Professors in Computational Brain Research instituted by an alumnus, Mr. Kris Gopalakrishnan, a Founder of Infosys. The Department has Prof. David Peleg from Weizmann Institute of Science, Israel, and Prof. Vyas Sekar from CMU, USA, as Visiting Chair Professors instituted by two alumni, Venky Harinarayan and Anand Rajaraman.

The Department presently offers B.Tech., dual-degree B.Tech.-M.Tech., M.Tech. M.S., Ph.D., dual degree M.Tech.-Ph.D., and dual degree M.S.-Ph.D. programmes. There are about 334 B.Tech. students, 33 dual-degree B.Tech.-M.Tech. students, 141 M.Tech. students, 86 M.S. students, and 103 Ph.D. students. The Department also offers a web-based M.Tech. in Computer Science and Engineering with a specialization in Information Security for employees of companies. There are 81 students currently enrolled in this programme.

The total number of graduands for the academic year 2021-22 is 186. The number of graduands in different degree programmes is as follows: 4 dual-degree M.S.-Ph.D. graduands, 5 Ph.D. graduands, 12 M.S. graduands, 58 M.Tech. graduands, 28 web-based M.Tech. graduands, 18 dual-degree B.Tech.-M.Tech. graduands, and 61 B.Tech. graduands.

Out of about 167 Ph.D.s graduated from the Department so far, 100 are in Indian academia, 33 in Indian industries, 26 in academia abroad, and 8 in industries abroad. Several alumni of the Department hold important positions in academia and industry worldwide.

The faculty and research scholars of the Department are actively engaged in research activities in several areas of current research topics in Computer Science and Engineering. During the academic year 2021-22, 74 research papers have been published. These include 19 in International Journals and 55 in International Conferences. During the academic year 2021-22, 1 international patent and 1 national patent were granted, and 1 international patent and 1 national patent have been filed.

During the academic year 2021-22, the faculty and the students of the department have won several awards and distinctions:

1. Prof. Hema Murthy has been elected a Fellow of the International Speech Communication Association.
2. Dr. Shweta Agrawal has been elected as a member of the IARCS Council and the ACM India Cybersecurity task force.
3. Three of our PhD scholars have been awarded the prestigious Prime Minister's Research Fellowship.
4. Our students received Institute-level awards such as Dr. Shankar Dayal Sharma Prize, Sri V. Srinivasan Memorial Prize, Institute Research Award, Prof. C.S. Krishnamoorthy Prize, and Sri Prakash Arora Prize.
5. Two of our alumni, Prof. Vyas Sekar and Dr. Nikhil Handigo, have been chosen for the Young Alumni Achiever Award.

During the financial year of 2021-22, 7 sponsored projects with a total budget of 98.99 Crores have been sanctioned. The major funded research projects that have been newly sanctioned areas follows:

1. Speech Technologies in Indian Languages with Prof. Hema Murthy as the Principal Investigator. This project is a consortium project across 23 Institutions.
2. Collecting Datasets and Benchmarks for Building Indian Language Technology with Dr. Mitesh Khapra as the Principal Investigator.

During the financial year of 2021-22, 19 new industrial consultancy projects with a total budget of 44.44 Crores have been sanctioned. The major consultancy projects are as follows:

1. Centre for AI4Bharat with Dr. Mitesh Khapra as the Principal Investigator.
2. Federated Machine Learning for Network Elements using Programmable Data Plane Environments with Prof. Krishna Moorthy Sivalingam as the Principal Investigator.
3. Multicore Support for Tezos Blockchain with Dr. KC Sivaramakrishnan as the Principal Investigator.

4. Operating System Vulnerability Assessment and Open Source Information Collation for Security of Systems and Applications with Prof. Narayanaswamy as the Principal Investigator and Dr. Chester Rebeiro as the Co-Principal Investigator.
5. Design and Development of SHAKTHI IP Core-based CPU card for Embedded Systems with Prof. Kamakoti as the Principal Investigator.

The faculty of the Department have been involved in the organization of several national and international events. Dr. Arun Rajkumar organized the Second Conference on Deployable AI and a 6-day Deployable AI bootcamp. Prof. Krishna Nandivada has been chosen to be the workshop chair of HiPC 2022. Dr. Ayon Chakraborty has been chosen to be the tutorials chair of ICDCN 2023. Dr. Shweta Agarwal has been elected to serve as the Program Co-Chair of Asiacrypt 2022. Dr. Rupesh Nasre ran several workshops under the NSM Nodal Centre for Training in HPC and AI: (i) Computer Architecture Winter School (ii) HPC Symposium on AI and Biology. Online courses on (i) Applied Accelerated AI (ii) GPU Programming with CUDA (iii) GPU Programming with OpenACC. Prof. Hema Murthy is one of the General Chairs of the International Society for Music Information Retrieval 2022. Dr. Akanksha Agrawal organized the ACM-India Winter School on Algorithms and Lower Bounds.

The international engagements by the faculty of the Department during the academic year 2021-22 include visits by the faculty to universities abroad for research collaborations. Dr. John Augustine visited Prof. Gopal Pandurangan at the University of Houston in May 2022 and Prof. David Peleg at the Weizmann Institute of Science in June 2022. Dr. Akanksha Agarwal visited the University of Trier and the Weizmann Institute of Science for research collaborations. Prof. Joseph Davis from the University of Sydney visited the Institute to collaborate with Dr. Ayon Chakraborty. Dr. Nishad Kothari has ongoing collaborations with co-authors in Brazil and China. Dr. Shweta Agrawal has ongoing collaborations with co-authors in France, Japan, USA and Israel. Prof. Paul Manger from the Univ of Wits in South Africa visited us in May 2022 to collaborate with Profs. Sukhendu Das, P. Sreenivasa Kumar, Sutanu Chakraborti, and Manikandan Narayanan. Prof. Manger has established the first major brain bank in the southern hemisphere, and has collected the most well prepared specimens of mammal brains from over 250 species, allowing for the use of modern neuroanatomical methods. The data generated from this collaboration would foster new methods to map the inner space of our brain to study brain evolution and development of new computational methods for imaging/molecular data analytics.

The faculty of the Department have been engaged in editorial activities of international journals and top international conferences. Dr. John Augustine is an Associate Editor of the Journal of Parallel and Distributed Computing. Dr. Rupesh Nasre is an Associate Editor of Concurrency and Computation: Practice and Experience. Dr. KC Sivaramakrishnan was the guest editor for the Journal of Functional Programming special issue on the Theory and Practice of Effect Handlers. Prof. Hema Murthy is an associate editor of the IEEE Transactions on Acoustics Speech and Language Processing. Prof. Madhu Mutyam is an Associate Editor of the IEEE Transactions on

Computer-Aided Design of Integrated Circuits and Systems. Prof. Ravindran is a member of the Editorial Board of the Journal of Artificial Intelligence Research, an Academic Editor of PLOS ONE journal and an Associate Editor of Frontiers in AI and Machine Learning journal. Prof. Krishna Moorthy Sivalingam is a member of Editorial Board of IEEE Networking Letters. Dr. Shweta Agrawal served on the program committees of Crypto and CCS, and as the co-chair of Asiacrypt.

The faculty of the Department have made contributions to the national science and technology education beyond the work at the Institute level. Dr. Rupesh Nasre created a portal for free online education of core Computer Science courses. The portal has received 3 lakh views and the corresponding youtube channel has over 15 thousand subscribers. Prof. Hema Murthy developed the technology for the trans-creation of UG/PG Lecture Videos in Indian Languages. Dr. Krishna Nandivada conducted AICTE sponsored short-term course on compiler design and ran the ACM Summer School on Compiler Design. Dr. Ayon Chakraborty was the coordinator for the NPTEL GATE Computer Science and Engineering Portal.

The faculty members of the department have also been actively involved in the translation of research into practice by establishing industry relationships. Dr. Rupesh Nasre collaborates with KLA Advanced Computing Lab located in the IITM Research Park. Prof. Hema Murthy is an advisor to Uniphore Software Systems. Segfault Systems, a spin-out from Dr. KC Sivaramakrishnan's research group at the department has been acquired by Tarides, France, a leader in secure systems development based on the OCaml programming language.

The academic year 2021-22 has been highly rewarding in terms of research publications and projects. The Department will strive to grow further and reach higher levels of accomplishment in the coming years.

To know more about what was discussed in the recent HOD's meeting [Click here](#)

WE ARE GRATEFUL TO YOU!
Mr. Subramonian Shankar & 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 alma mater and how it has remained steadfastly committed to academic and research excellence since your time here. 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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