# Department of Computer Science and Engineering Indian Institute of Technology Madras

## Presentation to MS and PhD Candidates
## 11th December 2020

Prof. C. Chandra Sekhar
Head of Department

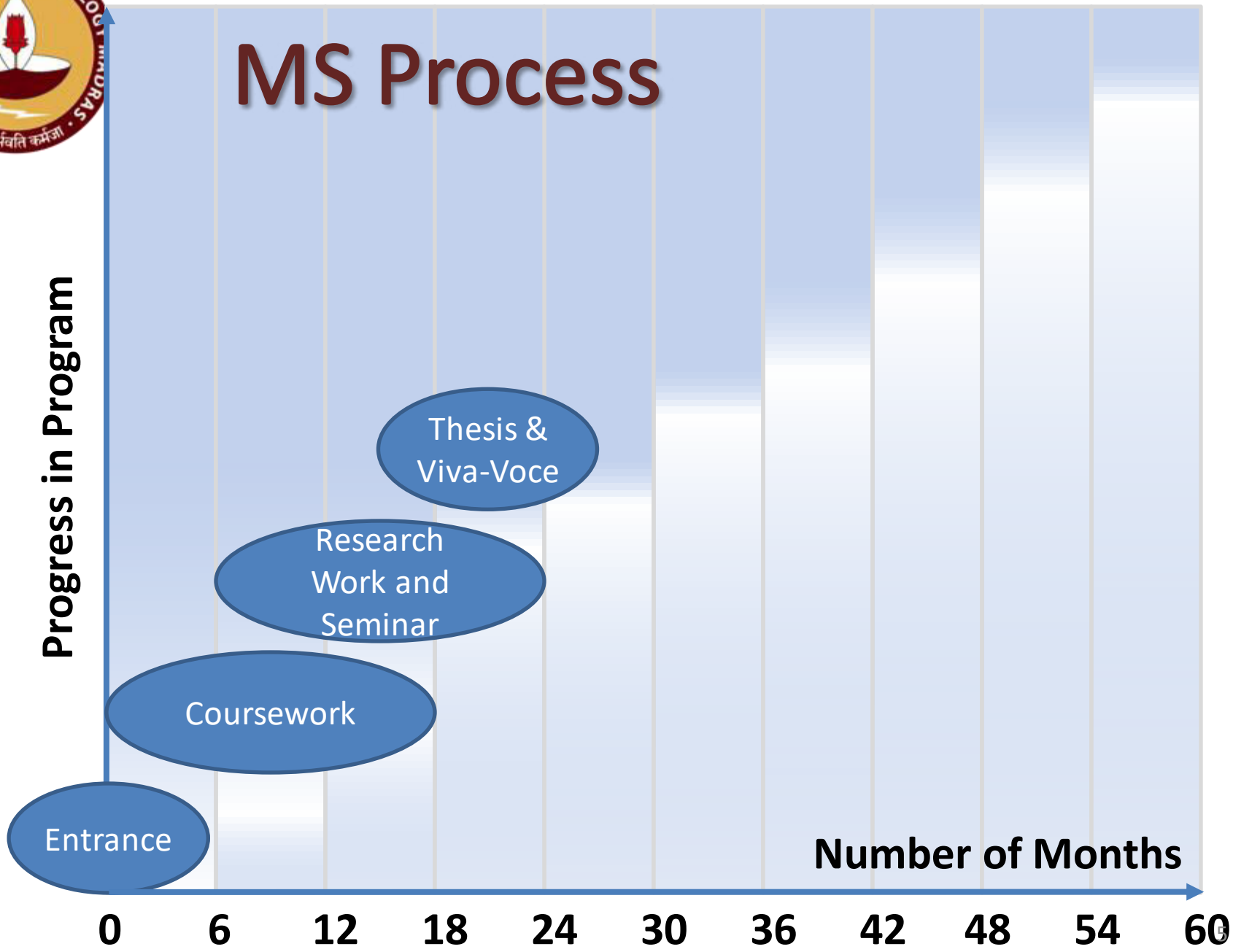
# Department Profile

- **Faculty Members: 35**
  - **All have completed Ph.D. Degree from Premier Institutions in India or abroad**
- **Technical and Administrative Staff Members: 10**
- **Ph.D. Students: 90**
- **M.S. Students: 78**
- **M.Tech. Students: About 135**
- **B.Tech. and Dual Degree Students: About 330**

# Research Programmes

- **MS (by Research)**
  - Full-time MS (HTRA and Project)
  - External MS (for industries certified by IITM/DSIR)
  - Part-time MS (for industry) – within commuting distance of IIT Madras
- **PhD**
  - Direct PhD (after B. Tech) will get both MS and PhD
  - Regular PhD (Master's degree required)
    - Full-time PhD (HTRA and Project)
    - External PhD (for industries certified by IITM/DSIR)
    - Part-Time PhD (for industry) – commuting distance of IITM
    - AICTE/QIP PhD
  - Upgraded PhD (from MS and M Tech programs at IITM)

# MS Process


Progress in Program
Thesis & Viva-Voce
Research Work and Seminar
Coursework
Entrance
Number of Months
0
6
12
18
24
30
36
42
48
54
60

# MS Requirements

- Minimum of 5 courses
- M.S. Thesis:
  - Proposal and Seminar (around 1.5-2 years)
  - Synopsis and Thesis
- Publications (Conference and Journal) from thesis
- Thesis is reviewed by 2 experts outside or within IIT Madras

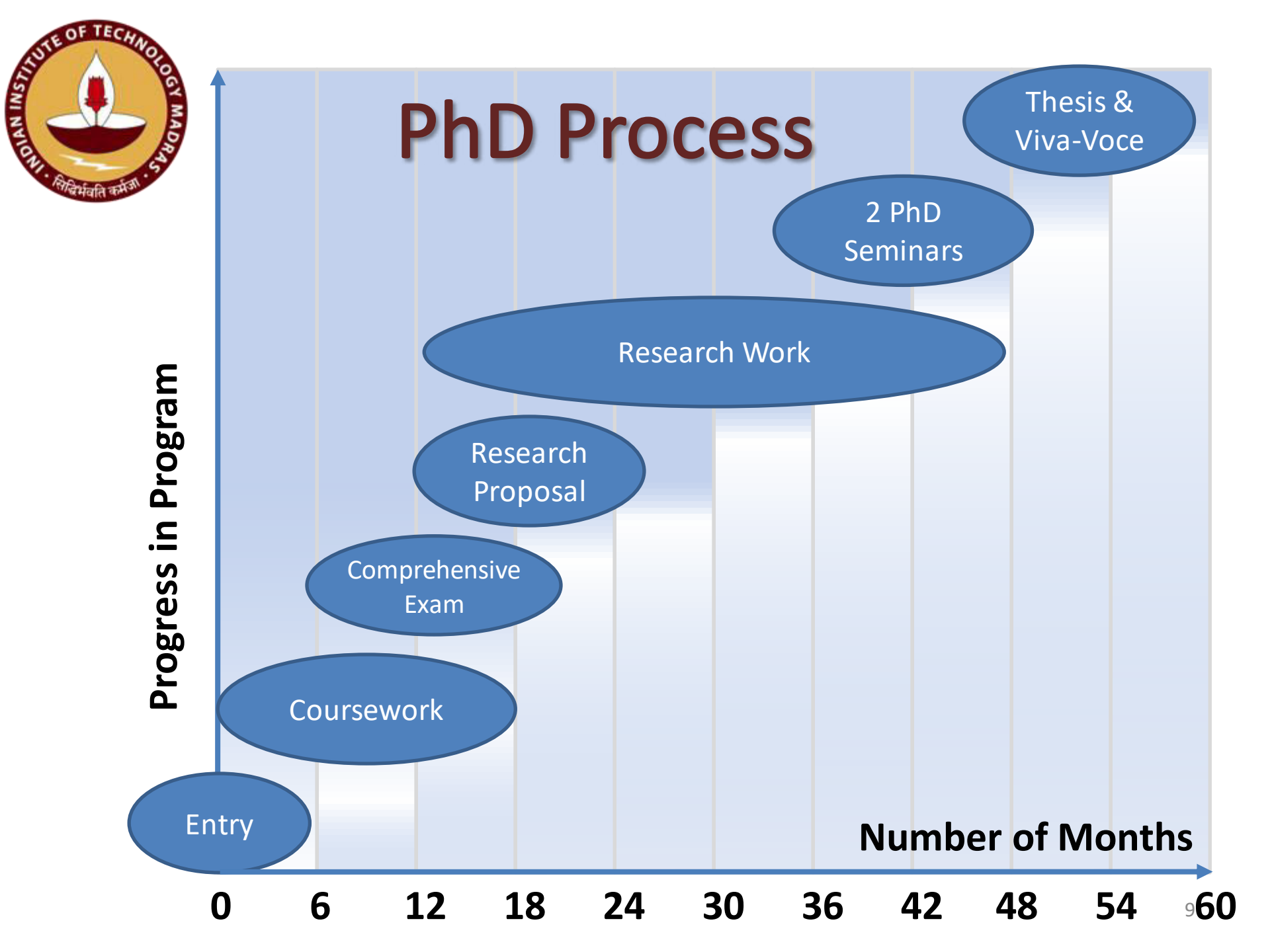
# MS Scholarship Support

- **HTRA Scholarship**
  - Provided by Government of India
  - Initially up to 2 years, based on regular performance review and recommendation by GTC. An additional 6 months of support may be granted by IITM
  - One international conference travel during MS study
  - Two national conferences per year
- **Information Security Education Awareness (ISEA) Fellowship**
  - Same as HTRA, plus additional Rs.40,000 for domestic conference travel
  - Research thesis must be in Information Security area
  - Interested students can opt for both HTRA and ISEA (OR) HTRA-only
  - Department will assign either HTRA or ISEA based on availability
- **Project**
  - Supported on a CSE Faculty Member's Funded Research Project – Government or Industry funded
  - Several faculty have active research projects: Please visit their webpages or email them.

# Upgrading to PhD

- **Students in MS degree program can upgrade to Dual MS+PhD degree program, before end of second year**
  - **Dual Degree (MS/PhD) students will receive 2 International conference travel grants**

- **Students in M.Tech. degree program can upgrade to Dual M.Tech+PhD degree program, after first year in M.Tech. program**


PhD Process
Thesis & Viva-Voce
2 PhD Seminars
Research Work
Research Proposal
Comprehensive Exam
Coursework
Entry
Progress in Program
Number of Months
0
6
12
18
24
30
36
42
48
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60

# Ph.D. Requirements

- Minimum of 4 courses for PhD
- Minimum of 8 courses for Direct PhD
- Ph.D. Thesis:
  - Proposal and Two Seminars
  - Synopsis and Thesis
  - Viva Voce Exam
- Publications (Conferences and Journals) from Thesis
- Thesis is reviewed by 2 experts outside IIT Madras
- IIT Madras has signed 17+ Joint Doctorate programs with foreign institutions
  - Australia, Germany, NUS, US, France, Finland

# PhD Scholarship Support

- **HTRA**
  - Provided by Government of India
  - Maximum of 5 years, based on regular performance review and recommendation by Doctoral Committee
  - One international conference travel during PhD study
  - 2 national conferences per year
- **Project**
  - Supported on a CSE Faculty Member's Funded Research Project
  - Several faculty have active research projects: Please visit their webpages or email them.
- **External Fellowships (after joining program)**
  - TCS, IBM, Google India, Prime Minister's Research Fellowship

# Research Areas

- **Hardware Systems** (Computer Architecture, Embedded Systems, Secure Systems)
- **Human-Computer Interaction** (Computer Vision, Image Processing, Speech Processing)
- **Intelligent Systems and Knowledge Engineering** (Artificial Intelligence, Machine Learning, Deep Learning)
- **Networks and Distributed Systems**
- **Programming Languages, Compilers and Software Engineering**
- **Theoretical Computer Science and Algorithms** (including Cryptography)
- **Computational Brain Research** (CBR)
- **Bioinformatics**

# Research Labs

- ACT Lab (Algorithms and Complexity Theory)
- AIDB Lab (Artificial Intelligence and Databases)
- BIRDS Lab (Bioinformatics and Integrative Data Science)
- DAWN Lab (Distributed and Adaptive Wired/Wireless Networks)
- SMT Lab (Speech and Music Technologies)
- PACE Lab (Programming, Architecture and Compilers Engineering)
- RISE Lab (Reconfigurable and Intelligent Systems Engineering)

# Research Labs

- DOS Lab (Software Systems Research)
- Speech and Vision Lab
- Theoretical Computer Science (TCS) Group
- Cryptography, Cybersecurity and Distributed Trust (CCD) Group
- HPCN Lab (High Performance Computing and Networking)
- Computer Vision Lab
- VP Lab (Visualisation and Perception)

# Faculty Ph.D. Degree Institutions


















# Faculty

**Shweta Agrawal**
Cryptography, Information Theory

**John Augustine**
Distributed Algorithms, Randomized Algorithms

**Sutanu Chakraborti**
Machine learning, Case Based Reasoning

**Sukhendu Das**
Visual perception, Image Intelligence , Graphics, Visualization

**Kartik Nagar**
Automated Formal Verification, Program Analysis, Programming Languages

**Harish Guruprasad**
Machine Learning
Learning Theory
Optimization

# Faculty

**D. Janakiram**
Large Scale Distributed Systems, Cloud and Grid Computing, Big Data Systems

**V. Kamakoti**
Software for VLSI Design, High-Performance Computing

**Mitesh Khapra**
Statistical Machine Translation, Text Analytics, Deep Learning, Crowd-Sourcing

**Deepak Khemani**
Artificial Intelligence, Case-based reasoning, Knowledge Representation, Planning, Logic

**P. Sreenivasa Kumar**
Semi-Structured Data , Semantic Web Technologies, Ontologies

**Manikandan Narayanan**
Bioinformatics, Computational network biology, Data science.

# Faculty

**Anurag Mittal**
Computer Vision, Multi-Camera Vision, Sensor Planning, Surveillance

**Hema A. Murthy**
Speech Technology, Music Analysis, Computational Brain Research

**V. Krishna Nandivada**
Compilers, Program Analysis, Programming Languages, Multicore Systems

**C. Siva Ram Murthy**
Ad hoc Wireless Networks, Real-Time Systems, Parallel and Distributed Computing

**Madhu Mutyam**
Computer Architecture, Network-on-Chip Architectures

**N.S. Narayanaswamy**
Analysis of algorithms Parameterized Complexity theory, Artificial Intelligence

# Faculty

**Meghana Nasre**
Graph Theory, Algorithms, Matching with Preferences

**Rupesh Nasre**
Compilers, Parallelization, Program Analysis

**L. A. Prashanth**
Reinforcement Learning, Stochastic Optimization, Multi-armed Bandits

**C. Pandu Rangan**
Cryptography and Security Protocols, Graph theory, Randomized and Parallel Algorithms

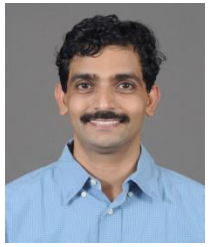
**Pratyush Kumar**
Cyber Physical Systems, Machine Learning

**B. V. Raghavendra Rao**
Computational Complexity Theory, Algebraic Complexity, Combinatorial Commutative Algebra

# Faculty

**B. Ravindran**
Machine learning, Deep Networks, Reinforcement Learning, Social Network Analysis, Data and Text Mining

**Jayalal Sarma M.N.**
Computational Complexity Theory, Circuit Complexity, Algebra and Computation



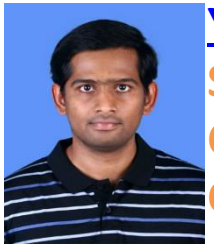
**Krishna Moorthy Sivalingam**
Wireless Networks, Sensor Networks, Optical Networks

**Chester Rebeiro**
Hardware Security, Operating System Security, Side-Channel Analysis, Cryptography

**C. Chandra Sekhar**
Speech Recognition, Machine Learning, Deep Learning, Kernel Methods

**Arun Rajkumar**
Machine Learning, Rank Aggregation, Statistical Learning

# Faculty



**Yadu Vasudev**
Sub-linear Algorithms, Computational Complexity Theory,

**Nishad Bharat Kothari**
Graph Theory, Matching Theory, Combinatorial Optimization

**Akanksha Agrawal**
Parameterized complexity, Computational geometry, Graph algorithms

**K.C.Sivaramakrishnan**
Programming models, Compilers, Static Analysis, Schedulers, Threading Systems, and Memory Management

**Ayon Chakraborty**
Mobile systems, Wireless sensing

# Adjunct Faculty

**Manikantan Srinivasan**
**Veryx Technologies**
Data communication networks, Network virtualization and softwarized cellular mobile communication networks, Wireless LANs, Cybersecurity

**Ravishankar Krishnaswamy**
**Microsoft Research India, Bangalore**
Approximation Algorithms, Online Algorithms

**Sriraam Natarajan**
**The University of Texas at Dallas, USA**
Artificial Intelligence, Machine learning, Graphical Models, Relational Learning

**Deepak Padmanabhan**
**Queen's University Belfast, UK**
Data Analytics, Machine learning, Similarity Search, Fairness in Machine Learning

# Invitation

Department of Computer Science and Engineering
IIT Madras

Invites

YOU

to be part of the
Academic Expedition in the Department
to LEARN, EXPLORE and ACHIEVE

# Wish You all the Best

***THANK YOU***