



# Post Graduate Programs at CDS



- > Ph.D. Doctoral program in Engineering
- > M.Tech. (Research)-Masters program with thesis
- M. Tech (2 years): Masters program in Computational and Data Science





# M.Tech. (Computational Science) - existing program



- Placements ٠
  - Google
  - IBM
  - Yahoo
  - Nvidia
  - GE
  - Samsung
  - Financial firms like Mckinsey

• Further Studies

- IISc Ph.D.
- Ph.D. in top tier universities

2015: 2 Alumni as PhD students @ CDS 2016: 3 Alumni as New PhD students @ CDS

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# **Research Students**

- Received Microsoft, TCS, and IBM Ph.D. fellowships
- Received international fellowships like SPIE Education Fellowships
- Numerous best paper awards
- Numerous travel fellowships from IBM, Google, and Yahoo
- Won many challenges, including recent GE Edison challenge
- Won prestigious fellowships line Humboldt fellowship after graduating





# Research Areas @ CDS

# Computer&Data Systems Computational Science

- CAD for VLSI
- Grid Application Research
- Cloud and Distributed Computing
- Machine Learning
- Database Systems
- Video Analytics
- Computer Vision

- Computational Electromagnetics
- Computational Photonics
- Medical Imaging
- Scientific Computing and Mathematical Libraries
- Computational Fluid Dynamics
- Computational Biology and Bioinformatics
- Numerical Linear Algebra











# Comp. & Stat. Physics Group



Recent / Current work:

Numerics / Math:

- · Periodic matrices, Matrix analysis & decompositions
- Error estimation in iterative solution of Ax=b problems i.e. estimate error (x - x<sub>k</sub>) from residue (b - Ax<sub>k</sub>)
- Computational methods for stochastic simulations : Algebra of random variables
- Numerical contour integration for special integrals : Sommerfeld integrals of the surface-radiator problem

#### Physics:

- Theory and computation for *N*-body problems in photon emission
- Some insights into classical electromagnetic theory and its application in developing nanoscale-composite optical materials



# **Structural Biology and Bio-computing**



#### K. Sekar

http://www.physics.iisc.ernet.in/~dichome/sekhome/index.html

### • Structural Biology

- Solving three-dimensional protein structures, in particular enzymes, using X-ray crystallography.
- > Designing suitable inhibitors for these enzymes.

### Molecular Dynamics Simulations

Molecular dynamics simulations studies are carried out to further understand and substantiate the crystallographic findings (structural and functional) of the solved three-dimensional protein structures.

### • Datamining in Protein Structures

Extraction of interesting, non-trivial, implicit, previously unknown and potentially useful information from the three-dimensional protein structures available in its archive, Protein Data Bank.



Ansuman Biswas, Arpit Shukla, R. S. K. Vijayan, Jeyaraman Jeyakanthan and **K. Sekar** J. STRUCT BIOL. 2017. 197(3):236-249. doi: 10.1016/j.jsb.2016.12.0







- mgn unnensional statistics & data
- $\bullet$  Material homogenization
- $\bullet$  Reactive simulations of multicomponent fuels

## Fellowships



**MHRD Fellowship:** Default for every research student (Rs. 12,400 per month for M.Tech. (Research) and Rs. 25,000 – Rs. 28,000 per month for PhD students)

**External Ph.D. fellowships**: Give a minimum of Rs. 32,000 per month TCS Research Scholar Program: 4 winners among CDS students IBM Ph.D. Fellowship Google Ph.D. Fellowship Program Google Women Techmakers Scholars Program Facebook Fellowship Program

#### **Departmental Fellowships:**

- Specific to students admitted in CD-CS program
  - Narayana Nethrayala Ph.D. Fellowship, 2017 Ph.D. Students for those students who will be working in area of computational methods for eye.

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