



Consultancy Brochure



Centre for Scientific & Industrial Consultancy
Indian Institute of Science

Centre for Scientific and Industrial Consultancy Indian Institute of Science Bangalore

The Indian Institute of Science (IISc) was founded in 1909 by the visionary industrialist, Jamsetji Nusserwanji Tata, "*.. to provide for advanced instruction and to conduct original investigations in all branches of knowledge*". He envisaged that the Institute should work "*.. in particular, in such branches of knowledge as are likely to promote the material and industrial welfare of India*". As IISc has been interacting with industries since its very inception through individual informal contacts of faculty members, this interaction was given an institutional backing with the establishment of the Centre for Scientific and Industrial Consultancy (CSIC) in 1975. The role of CSIC is to strengthen, promote and streamline the interaction between IISc and industry. The goal of CSIC is to promote indigenous technologies to make the nation self-reliant in all aspects, and to nurture fruitful relationships between faculty members of IISc and industries.

CSIC views consultancy projects as technically challenging collaborative efforts between the Institute and the Industry/sponsor. The participation of both sides is adaptive and is often tuned to exploit the strengths and complimentary expertise available. Services undertaken by CSIC can be broadly grouped to

- Design and development of products/ process/ software/ systems
- Technical advice and guidance for Design/Development
- Diagnostics, Proof checking, Feasibility evaluations, System studies
- Manpower development
- Retainership
- Test and evaluation

Design and Development Activities

The second mode of consultancy embarks upon development and delivery of process/ product/ software by the Institute to the specifications of the sponsor. In this mode, inputs from the sponsor, time frame and the deliverables are clearly specified as the project is initiated. The technical specifications are generated after a very detailed and thorough discussion between the Institute and the Industry. The processes /products/ software may be either a complete system or a critical sub-system in a larger framework of technology development. Often, this mode of consultancy has resulted in "Technology Transfers" and has carried the stamp of innovativeness of the Institute faculty. Licensing or Transfer of Technology of knowhow developed through in-house activities at IISc is managed by another office of the Institute (IPTeL).

Advice on Development

In this mode of engagement, consultant from IISc gives advice for the development of a product/ process/software undertaken primarily by the sponsor. However, often a part of the development is carried out at the Institute. These may involve simulation, computer based modeling, analysis and experimentation and hardware development that feed critical design inputs of direct relevance to the industry in achieving technical and economic feasibility focusing on development. Under this mode, the generation of design specifications, vendor evaluation,

sub-product development and structural analysis are carried out.

Diagnostics, Proof checking, Feasibility evaluations, System studies

In this mode of engagement, the consultant from IISc evaluates an design proposal or helps in diagnosis of problems in an existing construction/structure or a new design and suggests remedial measures. The work may involve simulation, computer based modeling, and analysis to provide critical inputs of direct relevance in achieving technical and economic feasibility and appropriate fructification. A large number of consultancy exercises at CSIC fall under this mode of advice.

Manpower Development

CSIC can support manpower development activities of sponsoring agencies, to provide highly specialised training programs in their respective premises, These programs may involve one or more instructors from IISc, on topics of interest to the sponsor and will be limited to attendees selected by the sponsoring agency. No academic credits or grades will be issued to the attendees. Centre for Continuing Education (CCE) in IISc may be contacted for a list of courses that working professionals may register on individual capacity.

Retainerships

Under this form of engagement, consultants from the Institute deliver active and demand-based inputs on the most-current problems that concern the Industry/ sponsor. Consultants provide advice on technology adoption, newer processes of relevance and even deliver lectures that aid the engineers and scientists in the industry to assimilate latest developments in their fields. Consultants perform critical design reviews to ensure new endeavours being considered are economically attractive and technologically superior. This mode of consultancy is often initiated with a fixed duration and contact time.

Test and Evaluation

Because of its existence for about a century as the torch bearer of advanced research in the country, IISc has built up a large base of infrastructural facilities for testing and evaluation of materials, components and systems.

Facilities available at the IISc compare well with the most modern facilities available elsewhere in the world. While these are primarily established to help our scientists perform research in frontier areas of science and arrive at cutting edge technological solutions, some of these may be made available to industries on a payment basis, for intellectually challenging and/or socially relevant uses. Tests that can be undertaken may include the following facilities/equipment:

High resolution transmission and scanning electron microscopes,

Scanning probe microscopes,

Near-field optical microscopes

e-beam writing

Semi-Solid Forming (SSF)

Flow measurement for testing hydrological equipment.

High voltage AC/DC/impulse generators, high current generators, repetitive surge generators, voltage dividers, Reference impulse calibrator

Chemiluminescence NO_x analyzer, Multi-component FTIR gas analyzer and NOIR based CO/CO₂/O₂ analyzer for air pollution studies.

Electron spray mass spectrometers for protein analysis.

Supersonic, hypersonic, intermittent supersonic, Cascade, rotating cascade, low speed, boundary layer and shock tunnels, for model testing

Several flumes of different sizes, including sophisticated tilting flumes for free surface flow studies

computer controlled DARTEC machine for high strain rate deformation studies.

Optical facilities for powders and crystals, second-order nonlinear optical coefficient in solution of two photon Rayleigh scattering and fluorescence lifetime in solution.

Thermal and molecular weight analysis of polymers.

Powder X-ray diffractometer and Electron Spin Resonance Spectroscopes for carrying out TEM, SEM and XRD, ESR investigations.

We have included below a brief outline of research areas of experts available at the Indian Institute of Science

How to use this brochure: Please look up a keyword relevant to your interest. The name and website (where provided) are include above keywords. Email address provided must be suffixed with @iisc.ac.in.

In case you do not find a match based on the keywords, please try to use another that me be broader. In case you are unable to locate anyone, please do write to chair.csic@iisc.ac.in with a brief description of your topic and an outline to your own background.

Request to IISc faculty members: If you wish to update the data provided in this brochure, please do write to office.csic@iisc.ac.in. Please contact us if you require any clarifications regarding your consultancy engagements.

Contact Information about Faculty Members and their Expertise

Aditya Gopalan

aditya

<http://ece.iisc.ac.in/~aditya>

Keywords: Communication networks, Machine learning, Sequential decision making

Outline: Optimization algorithms, Stochastic models, Decision theory, Statistical inference

Attreyee Ghosh

aghosh

<http://ceas.iisc.ernet.in/~aghosh/>

Keywords: Geophysics, Geodynamics, Tectonophysics, Earthquake mechanics, Solid Earth

Outline: Computational techniques

A G Ramakrishnan

agr

<http://mile.ee.iisc.ac.in/AGR/index.htm>

Keywords: Deep Neural Networks for speech recognition and document super-resolution, Machine learning in images, audio and handwriting, Machine Listening, Speech processing, Medical signal processing

Outline: Deep learning, machine learning, Signal Processing, Image processing, Spectral analysis, Pattern recognition, document analysis, segmentation, natural language processing, handwriting recognition, Sparse coding, Enhancement, neurophysiology, yoga, pranayam, meditation, alternate nostril breathing, deep relaxation, attention, image superresolution

Aloke Paul

aloke

<https://sites.google.com/view/alokepaul/>

Keywords: Diffusion in solids, microstructure, multicomponent materials

Outline: Experiments based on diffusion coupled technique in combination with different characterization techniques such as EPMA, TEM, TGA

Aloke Kumar

alokekumar

www.kumarlab.com

Keywords: Fluid mechanics, Soft matter, Optical diagnostic techniques, Complex fluids, Polymeric fluids, Microfluidics, Bacterial Biofilms, Biophysics, Bacteria

Outline: Image processing, Particle Image velocimetry, Digital Image Correlation, Nanofabrication, Optical lithography, lab-on-chip, Optical microscopy

Ambarish Ghosh

ambarish

<http://www.cense.iisc.ac.in/ambarish/>

Keywords: Soft matter physics, optics, cryogenics

Outline: Experimental: microscopy, instrumentation, cryogenics, optics, nano-fabrication, nano-characterisation, rheology, thin films, colloids, opto-electronics, Theory: Electromagnetic, thermal simulations

Ambedkar Dukkipati

ambedkar

<http://www.csa.iisc.ernet.in/~ad>

Keywords: Machine Learning, Deep Learning, Network Analysis

Outline: Algorithmic and High performance computing techniques

Akshay Naik

anaik

<http://www.cense.iisc.ac.in/anaik/>

Keywords: Nano electromechanical systems, RF sensors, low noise measurements, nonlinear dynamics,

Outline: <http://nnfc.cense.iisc.ac.in>, <http://mncf.cense.iisc.ac.in>

Anand Srivastava

anand

Keywords: Molecular Simulations of Biomolecular Systems, Statistical Mechanics

Outline: MD Softwares (Mostly in-house codes)

Anandi Giridharan

anandi

<http://ece.iisc.ernet.in/~anandi/>

Keywords: Ubiquitous Learning, Communication Protocols, Network Management, Multimedia Information

Outline: Algorithmic techniques, Experimental tools like Cinderella (Specification Description Language) formal language for design, verification, validation and conformance testing of communication protocols.

Anand Louis

anandl

<http://drona.csa.iisc.ac.in/~anand/>

Keywords: Algorithms, optimization

Outline: Optimization methods, linear programming, semidefinite programming, etc.

Anand Byrappa

anandtb

<http://jrdtml.iisc.ac.in/anand>

Keywords: Information Services, Knowledge Management., Digital Library, Social Media, Content Management, Novelty Assessment for Patent Filings, Copyright and IPR in context of Scholarly Communication, Publishing, Library and Six Sigma

Outline: Twenty plus years of Industry experience. led and executed global projects in the area of Information Services, Knowledge Management, Copyright Compliance, Digital Libraries, Research Support Products and Services. Certified GE Six Sigma Black Belt for leading and executing Global Center of Excellence for IP Services at GE.

Ananth Ramaswamy

ananth

<http://www.civil.iisc.ernet.in/~ananth/>

Keywords: Mechanics of Structural concrete, Design Reinforced and Prestressed Concrete, Fiber reinforced Concrete. Repair and Retrofit of Concrete Structures, Hygro-thermo-mechanical response of concrete

Outline: Experimental and computational methods. Facilities-120T MTS UTM, Walk in Moisture and Temperature control chamber (40 to 98% RH and 20 to 40 deg C), split furnace cum UTM (500kN axial, 1000 deg C temp). Pre and Postensioning facility, Bi-axial testing facility. FE modelling

P. Anbazhagan

anbazhagan

<http://civil.iisc.ac.in/%7Eanbazhagan/>

Keywords: Engineering Seismology, Seismic Hazard and Microzonation, Development of project specific Ground Motion prediction equations and estimation of reliable maximum seismic magnitude for project. , Site Specific Seismic Hazard Analysis (Deterministic and Probabilistic) for Important Structures like Nuclear Power Plants and Dams and also for Cities/ Regions , Seismic/Vibration Measurement, Ø Site characterization, Site response study and Liquefaction , Measuring In-Situ Dynamic Soil Properties using modern sophisticated geophysical testing of MASW, Cross Hole and Down Hole testing. , Development of Shear modulus and Damping Curves for soil specimen from (10-5 %) low to high strain (10%) in the same sample , Site Specific Response analysis and Arrival of Design
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parameters for important building designs in seismically critical area. , Experimental Site Response Analysis ie Estimation of H/V ratio , Liquefaction estimation using in-Situ testing of SPT N with hammer energy and laboratory experiments of Cyclic Triaxial Testing , Ø Soil Mechanics and Foundation Engineering, Subsurface Investigation by integrated approach – Cost and Time saving Method , Bedrock Mapping using integrated geophysical Testing , SPT N values measurement with Hammer energy values , Vibration Measurement and Isolation design for vibrations , Ø Railway Geotechnical and Geophysical Engineering, Inspection of Ballast Penetration, Health assessment of Railway Ballast in the Track , Ø Forensic Geotechnical Engineering- Investigations , Finding out reason for geotechnical failure for restoration and rehabilitation

Outline: Advanced Low strain to High Strain Testing Instrument , State of art resonant column/Torsional cum cyclic triaxial testing equipment with internal instrumentation has been setup from the major sponsored project by Department of Atomic Energy. This equipment is first equipment in India capable of testing the soil specimen from low to high strain without disturbance of soil specimen. , Geophysical Testing Facilities & Integrated Testing, New geophysical testing facilities have been created in department of civil engineering for integrated subsurface testing. Major instruments include Electric Resistivity Instruments, Ground Penetrating Radar (GPR), Multichannel Analysis Surface Wave (MASW) capable of penetrating up to 500 m depth and Downhole and Cross hole seismic Survey with 5 axis Geophones up to depth of 140 m. , Hammer Energy Measuring Apparatus , In order to perform research on measurement of the hammer energy below anvil and above split sampler while SPT Testing and to prepare standard/guideline, a new SPT -Hammer Energy Measuring Apparatus (HEMA) has been designed and prototype model was built jointly with M/s. Syscon Instruments Private Limited, Bangalore India. SPT HEMA consists of two instrumented rods (each with strain gauge transducer and acceleration sensor), hardware and software for data acquisition, data analysis, and display with control system.

P S Anil Kumar

anil

<http://www.physics.iisc.ernet.in/~anil/>

Keywords: Magnetism, Spintronics, Quantum matter

Outline: Thin film deposition, Ultra high vacuum system design, magnetic characterisation, magneto transport, Pulsed laser deposition, MBE, sputter deposition, magnetic domain imaging, electric transport, thermal transport

Anirban Chakraborty
[chakraborty.html](http://visual-computing.in/wp-content/uploads/2017/08/anirban-chakraborty.html)

anirban

<http://visual-computing.in/wp-content/uploads/2017/08/anirban-chakraborty.html>

Keywords: Computer Vision, Machine Learning, Deep learning, Data Association, Data Fusion and Consistency, Applications to Video Surveillance and Bio-medical Image Analysis Problems.

Outline: We seek solutions to computer vision problems arising in numerous application areas involving visual data analytics. These include data association problems over large graphs such as person re-identification in camera networks, video surveillance problems such as face recognition, human activity analysis, abnormality detection etc., to name a few. We are also keen to explore how visual analytics can be utilized in answering some of the most fundamental questions in biology and healthcare. Towards this, we extensively use and develop machine learning/deep learning models, borrow from and contribute to systems theory, probabilistic graphical models, stochastic processes, geometric tessellation and optimization literature. For our research and development, we rely heavily on GPU servers, especially for training deep learning models. In our lab, we currently have deep learning servers consisting of multiple NVIDIA Tesla P100 and GTX 1080Ti GPUs.

Anjula Gurtoo

anjula

<http://mgmt.iisc.ac.in/newwordpress/anjula-gurtoo/>

Keywords: Public Policy: equity issues in governance; sectoral reforms; informal economy; entrepreneurship; public participation and empowerment; infrastructure and development; and environment., Behavioural Science: citizen and group behaviour

Outline: Statistics; modeling; systems thinking; data mining

Anshu Pandey

anshup

<http://sscu.iisc.ac.in/faculty/anshu-pandey/>

Keywords: Semiconductor Nanocrystals, Quantum Dots, Spectroscopy

Outline: Colloidal Chemical Synthesis of Nanocrystals, Spectroscopy, Magneto-Optics

Prof. Anu Rangarajan *anu* <http://www.mrdg.iisc.ernet.in/anu-rangarajan/>

Keywords: Cancer Biology, Cancer Stem Cells, Drug resistance, Breast cancer, Oral cancer

Outline: Cell and tissue culture, Cell biological experiments (immunofluorescence, migration, invasion), Molecular Biology expts (western blotting, qRT-PCR, ELISA), Flow cytometry based experiments, mice xenografts.

Arindam Chakraborty *arch* <http://caos.iisc.ac.in/faculty/arch>

Keywords: Climate Modelling, Forecasting, Climate Change Analysis

Outline: Computational techniques are used. We use combinations of mathematical tools and physical insights to interpret the data.

Arpita Patra *arpita* <http://drona.csa.iisc.ernet.in/~arpita/>

Keywords: Cryptography, Fault-tolerant Distributed Computing

Outline: My research requires knowledge of cryptographic background and theory. A few times, we implement our work in LAN and WAN setting to check their performance.

Asha Bhardwaj *asha*

Keywords: Quantum dots, thin films

Outline: Glove box, fume hood, schlenk line, lasers (532 nm CW, Supercontinuum source), Optical Spectrum analyser

Ashish Verma *ashishv* <http://civil.iisc.ernet.in/~ashishv/>

Keywords: Sustainable Transportation Planning,, Public Transport Planning and Management,, Non-Motorized Transport Planning,, Modeling and Optimization of Transportation System,, Application of Geo-informatics (GIS, RS, and GPS) in Transportation Engineering,, Driver Behaviour and Road Safety,, Road Safety Engineering,, Traffic Management.

Outline: Modeling, Optimization, Data Sciences, Geo-informatics, Simulation. , Software: VISSIM, CUBE, TransCAD

Ashoka G. Samuelson *ashoka* <http://ipc.iisc.ac.in/ashoka.php>

Keywords: Organometallic chemistry, coordination chemistry, catalysis, development of anticancer active molecules for targeted delivery.

Outline: NMR, IR, isotopic labeling to study mechanism of reactions, ESI-MS and synthesis of new organometallic molecules.

Ashok Sekhar *ashoksekhar* mbubionmr.weebly.com

Keywords: Nuclear magnetic resonance spectroscopy, Protein dynamics, Circadian clock

Outline: I mainly use Nuclear Magnetic Resonance (NMR) spectroscopy for my research. The NMR facilities in IISc are centralized facilities. In addition I occasionally employ other methods of protein characterization such as circular dichroism, steady state fluorescence and mass spectrometry. All these data are also collected on instruments belonging to a centralized facility.

Atanu Bhattacharya

atanub

<https://atanulab.weebly.com/>

Keywords: Surface Science, Ultrafast Science, Physical Chemistry

Outline: Surface Science, Ultrafast Laser

Aveek Bid

aveek

http://www.physics.iisc.ernet.in/~aveek_bid/

Keywords: Semiconductor physics, electrical transport, superconductivity, high performance sensors

Outline: Precision electrical resistance measurement facility over a wide temperature range, electrical noise measurement system - both systems in my lab.

M H Bala Subrahmanya

bala

<http://www.mgmt.iisc.ac.in/bala/>

Keywords: Industrial Economics: SMEs, Start-Ups, Innovation, Entrepreneurship

Outline: Basic econometric techniques are used by me in my analysis of economic issues.

Gaurab Banerjee

banerjee

<http://www.ece.iisc.ernet.in/~banerjee/>

Keywords: Analog, Mixed-signal and RF Integrated Circuits, mm-wave design

Outline: Cadence, Mentor Graphics, ADS: circuit design, simulation, layout and tapeout.

Siddharth Barman

barman

<http://drona.csa.iisc.ac.in/~barman/index.html>

Keywords: Algorithms, Algorithmic Game Theory, and Optimization

Outline: I apply and extend algorithmic techniques to address theoretical problems that capture real-world applications. Using tools from various fields---such as optimization and probability---my current is directed towards developing algorithms in game-theoretic contexts. Broadly, my research spans multiple areas in theoretical computer science including algorithmic game theory, approximation algorithms, optimization, and online algorithms.

Jaydeep K Basu

basu

<http://www.physics.iisc.ernet.in/~basu>

Keywords: Soft condensed matter physics, biological physics, superresolution microscopy, nanophotonics and plasmonics, light-matter interactions at the nanoscale, optical metamaterials, synchrotron x-ray and neutron scattering and spectroscopy

Outline: Superresolution microscopy, synchrotron x-ray and neutron scattering and spectroscopy, atomic force microscopy, small angle x-ray and neutron scattering, diffusing wave spectroscopy and micro-rheology

Upendra Behera

behera

<http://ccf.iisc.ernet.in/faculty>

Keywords: Cryogenic systems and components, Thermal properties of materials down to 4.5 K, Design and development of cryogenic transfer lines, Helium transfer coupling for Superconducting motors and generators, Oxygen separation from air.

Outline: In Lab: Liquid helium and Cryocooler based experimental setup for studies on thermal properties of materials down to 4.5 K, Vortex tube air separator, Design and analysis tool for cryogenic transfer lines., Centralized facility: Machine Shop, TIG welding, MSLD helium leak detector, Liquid helium plant, Helium purifier, Liquid nitrogen.

Balan Gurumoorthy

bgm

<http://cpdm.iisc.ac.in/cpdm/facultyprofile.php?name=3>

Keywords: CAD, Product Design, Computational Metrology

Outline: CAD, Scanners, Additive Manufacturing machines

B Gopal

bgopal

<http://mbu.iisc.ac.in/~bggrp>

Keywords: Structural Biology, Molecular Microbiology, Macromolecular Crystallography

Outline: Macromolecular Crystallography, Calorimetry, Dynamic Light Scattering. Facilities in Laboratory funded by the Department of Science and Technology, Government of India (IRHPA scheme)

Bhushan Toley

bhushan

<https://toleylab.weebly.com/>

Keywords: Point-of-care diagnostics, microfluidics, paper analytical devices, tuberculosis diagnosis, lateral flow assay, isothermal nucleic acid amplification, immunoassays

Outline: CO2 laser cutter (own lab); Quant Studio 3 real time PCR machine (own lab)

M.S. Bobji

bobji

<http://www.mecheng.iisc.ac.in/users/bobji>

Keywords: Nanomechanics, Surface microtexturing, Precision Agriculture

Outline: In situ experimental techniques that combine quantitative point measurements with various electron and optics based imaging techniques

Bratati Kahali

bratati

<Cbr.iisc.ac.in>

Keywords: Human genetics

Outline: Computational and statistical genomics, genome wide association studies, human disease, next generation sequencing

Rohini Balakrishnan

brohini

<http://ces.iisc.ac.in/new/?q=user/23>

Keywords: Bioacoustics, animal behaviour

Outline: Sound recording, playback and measuring devices

Balaram Sahoo

bsahoo

http://mrc.iisc.ernet.in/Faculty/Regular/BSAH/BSAH_Profile.htm

Keywords: , Research Interests on nanomaterials synthesis, properties and devices:, Nanoparticles, thin films, multilayers and hybrid structures., Structural, magnetic, electronic, electrical transport, optical, vibrational, thermal, Contact information: CSIC, IISc, Bangalore 560012 || csic.iisc.ac.in || chair.csic@iisc.ac.in || +91(80) 2293 2516/ 2446

mechanical and the coupled properties., Data storage devices, sensors, magnetic sensors, piezoelectric sensors and actuators, Thermoelectric and magnetoelectric devices., Surface and interface science, nanomagnetism., Photon Science.

Outline: Most of the characterization techniques. I have Moessbauer spectrometer and Electrochemical characterization set-up in my lab.

Binod Sreenivasan

bsreeni

<http://www.ceas.iisc.ernet.in/~bsreeni/>

Keywords: Dynamo theory, vortex dynamics, MHD, planetary magnetism

Outline: Spectral methods in computing, Particle Image Velocimetry (PIV) for flow visualization

Chandni U.

chandni

<https://sites.google.com/view/chandni>

Keywords: Nanoelectronics, 2D materials, nanowires, low dimensional systems, electron transport, electron tunneling

Outline: 1.5K cryo-free 9T superconducting magnet system, optical microscope BX53M, electrical sourcing and measuring apparatus

Chandramani Singh

chandra

<http://chandramani.dese.iisc.ac.in/>

Keywords: Communication Networks, Data Centres, Social Networks, Cyber Physical Systems

Outline: Random Processes, Stochastic control, Game Theory, Machine Learning, Simulation tools, e.g., NS3, Qualnet

Chandra Sekhar Seelamantula

Chandrasekhar

<http://www.ee.iisc.ac.in/faculty/chandra.sekhar/index.php>

Keywords: Signal Processing, Image Processing, Speech Processing, Deep Learning, Biomedical Imaging, Sparse Signal Processing

Outline: State-of-the-art programming tools, Fundus imaging devices, Ultrasound scanners

Chiranjib Bhattacharyya

chiru

drona.csa.iisc.ernet.in/~chiru

Keywords: Machine Learning, Autonomous systems

Outline: Convex Optimization, Unsupervised Learning,

Chandra R. Murthy

cmurthy

<http://www.ece.iisc.ernet.in/~cmurthy>

Keywords: Wireless communications, signal processing. In particular, physical layer communications, 5G, sparse signal recovery.

Outline: Matlab, optimization, statistical analysis, performance benchmarking, USRP based testbeds.

charlie oommen

coommen

Keywords: Energetic materials, fuels, combustion chemistry,

Outline: Analytical tools for characterizing fuels, polymers and energetic materials decomposition are available. Some of them are thermal analysis (DTA, TG, DSC), FTIR, GCMS, EGA, Bomb calorimeter, flash point

Chandan Srivastava *cstrivastava* <https://sites.google.com/site/chandantem1/home/>

Keywords: Electron Microscopy, Corrosion Science and Engineering

Outline: Electron Microscopes and Electrochemical workstations

Chetan Singh Thakur *csthakur* <http://neuronics.dese.iisc.ac.in/>

Keywords: Brain-inspired computing, Digital/Analogue Integrated Circuit Design, FPGA/ASIC design, Machine learning

Outline: Integrated circuit design lab with all the IC and PCB design tools.

Subho Dasgupta *dasgupta* <http://materials.iisc.ac.in/~dasgupta/>

Keywords: Printed Electronics, Semiconductor physics, Oxide electronics, Electrochemistry, Nanomagnetism

Outline: The facilities in my own lab includes Dimatix digital inkjet printer for printing of functional inks, Dispermat (a dissolver/ mixer that can be used to prepare high quality, heavily loaded nanodispersions), Inert gas glove box, Probe station & parameter analyzer for electrical characterization, high vacuum thermal evaporators etc.

Dipankar Banerjee *dbanerjee* <http://materials.iisc.ac.in/~dbanerjee/>

Keywords: Physical metallurgy, Structural Materials, Titanium Alloys

Outline: Advanced electron microscopy techniques

Deepak Nair *deepak* <http://www.cns.iisc.ac.in/home/people/deepak-nair/>

Keywords: Ultrahigh resolution Microscopy, Cellular Neuroscience

Outline: <http://www.cns.iisc.ac.in/home/people/deepak-nair/>

Deepak D'Souza *deepakd* www.csa.ac.in/~deepakd

Keywords: Formal verification, static analysis

Outline: My expertise is in formal verification. One of the techniques here is program logic based deductive techniques (using for example tools like VCC from Microsoft, for the C language), which I have used for verifying functional correctness of small real-time operating systems or separation kernels. I also employ model-checking based techniques (for example using the Spin model-checker) and data-flow analysis techniques (for example using CIL for C, or Soot for Java), in particular for checking dataraces and deadlocks in concurrent software.

Deepak K Saini *deepaksaini* <http://mrdg.iisc.ernet.in/dsaini/>

Keywords: Cellular signaling, Aging, inflammation, infection, diagnosis, therapy

Outline: Cell signaling toolbox; live cell imaging; gene knockdowns; small molecule inhibitors; network analysis; animal models; BSL pathogens; protein expression purification and characterization; MS/MS; protein -protein

interaction approaches; high throughput platform; multiwell plate measurements; assay development and optimization.

Devanita Ghosh

devanita

<https://sites.google.com/site/biogeochemmystery/>

Keywords: Biogeochemistry

Outline: Microbial metagenomics, sequencing DNA, C and O stable isotope analysis, trace element analysis, Petroleum biomarker analysis

Debraj Ghosh

dghosh

<http://civil.iisc.ac.in/~dghosh/>

Keywords: Finite element method, multiscale mechanics, risk and reliability, high performance computing.

Outline: We develop and implement numerical methods for solving large scale problems in probabilistic engineering mechanics. Some of these codes are parallelized. We have a 96-core computer cluster, with another one arriving soon.

Prof. Dineshkumar Harursampath *dineshkumar*

<http://www.aero.iisc.ernet.in/~dinesh/web/>

Keywords: Nonlinear Mechanics of Smart Composite Beams, Plates, Shells, Sandwich & Inflatable Structures, Concurrent Multi-scale Probabilistic Constitutive Modeling of Multifunctional Materials, Analysis, Design & Structural Health Monitoring of Composites for Aerospace Vehicles, Multi-Flexible-Body Dynamics using Symbolic Manipulators, Flight vehicle Design including fixed and flapping wing Micro Air Vehicles

Outline: RESEARCH VISION, "Enable getting as close to the truth as one intends with the least effort!", RESEARCH MISSION, Better understand non-classical phenomenon in conventional and multifunctional composites -->, Simultaneous high-fidelity and high-efficiency mathematical models -->, Improved analysis and design techniques for current and futuristic application, STRATEGY, Model geometric and physical nonlinearities as well as their evolutionary interaction, ENABLERS: State-of-the-art mathematical approaches:, Variational Asymptotic Method, Non-Deterministic Techniques, Concurrent Multi-scale Modeling, Nonlinear Domain Decomposition, Symbolic Simulators

Dipshikha Chakravorty

dipa

<http://mcbi.iisc.ac.in/dclab/>

Keywords: Vaccine development, new alternative to antibiotics, immunomodulators

Outline: Genetic engineering, animal model, immunological techniques, cell culture

Dipanjana Gope

dipanjana

<http://ece.iisc.ernet.in/~dipanjana/>

Keywords: Computational Electromagnetics; Signal Integrity; Power Integrity; EMI/EMC; High performance computing; RF imaging

Outline: Full wave Electromagnetic Solvers; Many core hardware; VR-based data visualization

Dipankar Chatterji

dipankar

Keywords: Stress induced gene regulation in bacteria

Outline: experiments, microbial growth, phenotype microarray, Mass spectrometry

Debnath Pal

dpal

<http://cds.iisc.ac.in/faculty/dpal/>

Keywords: Computational Biology, Bioinformatics, Genomics, Proteomics, Metabolomics, Drug Discovery, Structural Biology, Method Development, Algorithms

Outline: Computational Biology algorithms and techniques covering the areas of linear algebra, differential equations, probability and statistics are routinely used in our lab as per the need of the biological questions at hand. Pattern recognition, clustering methods, signal processing techniques are used as and when necessary for the work at hand. Molecular Dynamics simulations, Monte Carlo and other sampling techniques are used as applicable. We also have wet lab where we attempt to test some of our computational work.

D. Sivakumar

dskumar

<http://aero.iisc.ac.in/people/d-sivakumar/>

Keywords: Fuel sprays, airblast atomizers, spray characterization, engine spray dynamics, fuel injectors, rocket injectors, spray/droplet interaction with solid surfaces

Outline: The current laboratory is well equipped to characterize sprays under atmospheric and high ambient pressures. Some of the experimental apparatus are: spray test facility, fuel spray booth, imaging tools to visualize sprays, Spraytec equipment to measure spray droplet size distribution, phase Doppler interferometry (3D) to measure spray droplet size and velocity (3-components) distributions, mechanical patterner systems for the measurement of fuel spray patterning, spray chamber, facility to investigate sprays under high ambient pressures, etc.

E N Prabhakaran

eprabhak

<http://www.orgchem.iisc.ac.in/erode-n-prabhakaran/>

Keywords: Chemical Biology, Artificial Transcription Factors, Imaging, Amyloid Breakers, Protein Disallowed Conformations, Proline cis/trans Isomerism, Secondary Structural Mimics - helices, sheets and turns, Molecular Self-Assembly.

Outline: 1D, 2D NMR, Circular Dichroism, Crystallography, Microscopy, Fluorescence, UV-vis, FT-IR, Mass, Calorimetry, Dynamic Light Scattering, Electrophoresis, HPLC, Flash chromatography, Synthetic Organic Chemistry, Molecular Dynamics Simulations, Natural Bond Order (NBO-DFT) analyses, Atoms in Molecules (QT-AIMS) analyses, Gaussian Energy Minimizations.

Siddhartha Gadgil

gadgil

<http://math.iisc.ac.in/~gadgil/>

Keywords: Automated Theorem Proving, Topology and Geometry

Outline: I develop code in the scala programming for automated theorem proving, including use of machine learning and related to formal methods.

Ranjan Ganguli

ganguli

<http://www.aero.iisc.ernet.in/people/ranjan-ganguli/>

Keywords: Structural Dynamics, Rotorcraft, Smart Structures, Composite Structures, Aeroelasticity, Finite Element Method, Uncertainty Quantification, Structural Health Monitoring, Gas Turbine Diagnostics, Optimal Design, Bio-inspired Computing, Bio-inspired Design, Machine Learning, Dynamics and Control, Aerial and Underwater Robots

Outline: Finite element method, optimization, computational science, applied mathematics, modeling and simulation

R. Ganesan

gans

Keywords: semiconducting materials, chalcogenide glasses, solar energy materials, topological insulators

Outline: Basically we are working in the area of the semiconducting chalcogenide glasses, chalcogenide based solar materials and topological insulators. We are preparing the materials like bulk as well as thin films based on these. Then we can carry out optical, electrical and structural properties by using some of the techniques like, XRD, XPS

Contact information: CSIC, IISc, Bangalore 560012 || csic.iisc.ac.in || chair.csic@iisc.ac.in || +91(80) 2293 2516/ 2446

and FTIR spectrometer. We have furnaces, thermal evaporation unit and DC/RF Sputtering systems for sample preparation.

K. Geetharani

geetharani

<http://ipc.iisc.ac.in/~geetharani/>

Keywords: Organometallics, Catalysis, main group chemistry, Inorganic Chemistry, Organic transformations

Outline: Our current research mainly focuses on the synthesis of organoboranes using base metal catalysts. Synthesis of ligands, metal complexes is the first step for our catalytic reaction. Some of the catalytic systems and the ligands are very sensitive to air and moisture. So we carry out such reactions in Glove box (mBruan Glove box is available in our lab). The synthesized ligand and metal complexes will be characterized using multi nuclear NMR spectroscopy, HRMS mass spectroscopy, IR spectroscopy and XRD analysis (these facilities are available in our department). Next step will be using the catalyst for various organic transformations, particularly for C-B bond formation reactions. The organic products will be purified by column chromatography and characterized by multi nuclear NMR spectroscopy, HRMS mass spectroscopy, IR spectroscopy and XRD analysis. Our laboratory is fully equipped with items like Schlenk line techniques, solvent distillation set up, UV photoreactor, high vacuum pump, rota vapor etc...needed for wet chemistry lab.

Giridhar Madras

giridhar

Keywords: Catalysis, chemical engineering

Outline: Nanomaterials

Prof. G L Sivakumar Babu

gls

<http://civil.iisc.ac.in/~gls/>

Keywords: Geotechnical Engineering, Ground improvement and geosynthetics, landfills, Geoenvironmental Engineering, risk and reliability in foundation and soil investigations

Outline: Soil testing results, numerical analysis using finite elements

Gadadhar Misra

gm

<http://math.iisc.ernet.in/~gm>

Keywords: Functional Analysis

Outline: Spectral theory for Hilbert space operators, Representation theory of Lie groups, Complex geometry

Narayanan G

gnar

<http://www.ee.iisc.ac.in/faculty/gnar/index.php>

Keywords: Power Electronics, Motor Drives, Pulse Width Modulation, Electric Machines, High Power Converters, Multilevel Converters, Power Semiconductor Devices

Outline: The work is largely experimental. Good experimental facilities are available in the EE department. Most parts of these experimental platforms have been developed (and are being continuously upgraded) in-house through extensive design and development efforts. These design and development activities provide opportunity for advanced technical training of Masters and PhD students to excel in industrial R&D. , , Computer Aided Design (CAD) tools and simulation tools (equation solvers and circuit solvers) are typically used for verification prior to actual experimentation.

G NARAYANA NAIK

gnn

<http://www.aero.iisc.ernet.in/people/g-narayana-naik/>

Keywords: Composite Structures, Finite Element Analysis, Damage Mechanics, Fracture Mechanics, Solid Mechanics.

Outline: Finite Element Software

K. Gopinath

gopi

<http://drona.csa.iisc.ernet.in/~gopi/>

Keywords: Operating Systems, Storage Systems, Systems Security, Verification

Outline: kernel code modification/development, research prototyping of computer subsystems at fs, storage and appl. level.

Govindarajan Ramaswamy

govind

www.csa.iisc.ac.in/~govind

Keywords: Computer Architecture, Compiler Design, High Performance Computing

Outline: Compiler design, runtime techniques, architecture simulation, performance modeling/analysis

GOVINDA RAJ

govindaraj

<http://sscu.iisc.ac.in/faculty/agovindaraj/>

Keywords: Chemistry of nanomaterials and carbon nanotubes and fullerenes and inorganic nanostructures

Outline: arc discharge facility

Govind Sharan Gupta

govindg

<http://materials.iisc.ac.in/~govind/>

Keywords: Ironmaking and Steelmaking; Silicon and Boron Carbide production, Heat treatment

Outline: Our research group focuses on problems (both industrial and fundamental in nature) pertaining to field of PROCESS METALLURGY. We are actively engaged in various inter-disciplinary areas of research like fluid flow modeling in packed beds, flow of granular materials, Ironmaking and Steelmaking, CO₂ sequestration, spray deposition of molten metal, gas carburising, manufacturing of Boron Carbide and Silicon Carbide, etc. We are engaged in both computational and experimental work. We have developed a few commercial software for the Acheson process, carburising and boron carbide processes. For facilities and other research please visit our home page: <http://materials.iisc.ac.in/~govind/>

Priya Gambhire

gpriya

<http://www.be.iisc.ac.in/~priya/>

Keywords: Biofluids, microfluidics

Outline: We use electrical impedance measurement within microfluidic channels.

Dr.G.S.Avadhani

gsa

<http://materials.iisc.ac.in/faculty/g-s-avadhani/>

Keywords: Hot Deformation Processing and Materials Characterization

Outline: Optimization of hot working parameters (Temperature and Strain rate) using Processing Map approach; Characterization of Materials using Electron Microscopy(SEM & TEM)

Gaurav Tomar

gtom

www.mecheng.iisc.ernet.in/~gtom

Keywords: Fluid Mechanics, Two Phase Flows, Multiphase, multiscale simulations

Outline: In-house numerical codes and some open source codes.

Thirupathi Gudi

gudi

<http://math.iisc.ac.in/~gudi/>

Keywords: Numerical Analysis, Partial Differential Equations, Applied Mathematics

Outline: We develop numerical methods to solve partial differential equations and test these methods on computer. The model PDEs we deal varies from solid mechanics and fluid mechanics to optimal control problems.

T. N. Guru Row

gururow

<http://guru.sscu.iisc.ernet.in>

Keywords: X-ray crystallography, Pharmaceutical characterization, Polymorphism

Outline: PXRD, TGA/DSC, SEM , Single crystal XRD and other cognate techniques

K V S HARI

hari

ece.iisc.ac.in/~hari

Keywords: Signal Processing, Wireless Communications, Neuroscience, Sensor platforms, Indoor Positioning, Assistive Technologies for Elderly,

Outline: Development of signal processing algorithms for applications to wireless communication systems, indoor positioning using inertial sensors, autonomous navigation systems using sensor platforms, spectrum analysis, MRI systems

Harish Seshadri

harish

math.iisc.ac.in/~harish/

Keywords: Differential Geometry

Outline: Geometric analysis and topology

Jayant R Haritsa

haritsa

dsl.cds.iisc.ac.in/~haritsa

Keywords: Database Engine Design and Testing

Outline: Mathematical and empirical evaluations on benchmark environments.

Hardik Jeetendra Pandya

hjpandya

<http://beeslab.dese.iisc.ac.in>

Keywords: Electronic Systems Design and Engineering, Biomedical Devices, Sensors and Transducers, Clinical Research (Devices and Systems), Devices for Drug Testing, Micro- and Nanotechnology, Cancer Diagnosis integrated with Artificial Intelligence, MEMS and Bio-MEMS, Analog Circuit Design, Electronic Modules, Lithography, Physical Vapor Deposition, Chemical Vapor Deposition, Dry and Wet Etching, E-Beam Lithography, Mask Design, Bacterial Antibiotic Resistance, Device Simulation, E-Nose (Non-invasive techniques to analyze breath for diagnosing diseases)

Outline: WEBSITE:, , <http://beeslab.dese.iisc.ac.in>, , My Lab Facilities: , Advanced Microsystems and Biomedical Devices Facility for Clinical Research and Biomedical and Electronic ($10^{\wedge}6$ - $10^{\wedge}9$) Engineering Systems Laboratory. Both Labs are Class 1000/10000., , NI cDAQ-9189 CompactDAQ Chassis (8-Slot Ethernet), NI 9219 4 Ch-Ch Isolated, 24-bit, $\pm 60V$, 100S/s Universal AI Module, NI 9207 Spring, 16-Ch voltage/current,, 24-bit, 500 S/s AI module, Clean Room Facility (Physical Vapor Deposition, Wet Etching, Photolithography, Incubator, Peristaltic Pump, Ultrasonic Bath, Microscopes (Metallurgical, inverted, stereo), Pumps, PDMS-based Microfluidic Chips Fabrication Facility, Bio-safety hood, etc.), Micro-manipulator (MP285), Servers and Systems, AI for Clinical Applications and others, 3D printing, Impedance Analyzer, Analog Circuit Design Lab Facilities, Packaging Facilities), etc., , Central Facility: Access to CeNSE facilities and expertise in using most of those facilities.

Santosh Hemchandra

hsantosh

Keywords: Turbulent reacting flow simulations, Hydrodynamic stability, physics based modelling of flows, combustion, multiphase flow

Outline: We are one of the primary users of the SahasraT supercomputer at SERC. We routinely perform flow computations of Tera/Petascale class using a flow solver developed by my group. This solver uses the state of the art explicit filtering method for performing reacting flow LES simulations. We have also developed hydrodynamic stability analysis tools for reacting flows. These tools provide insight into the mechanisms driving unsteady coherent motions in industrial reacting flows. Adjoint mode solvers have been developed that reveal the regions of receptivity of the flow that can aid in actuator placement for active flow control applications. We also have expertise in understanding and modelling thermoacoustic instabilities in practical systems such as liquid rockets and gas turbine engines. All of the above tools are currently being used within the framework of various projects with Pratt & Whitney, USA, Siemens, LPSC and GTRE. Expertise for modelling the breakup of liquid jets and sheets is currently under development using our solvers and the Ghost fluid method.

Hanudatta S. Atreya

hsatreya

<http://nrc.iisc.ernet.in/hsa>

Keywords: NMR Spectroscopy, Biophysics, Analytical Chemistry

Outline: NMR Spectroscopy

Himanshu Tyagi

htyagi

ece.iisc.ac.in/~htyagi/

Keywords: Privacy preserving data mining, physical layer security, black-box compression, edge intelligence algorithms, distributed machine learning and optimization, communication for IoT

Outline: We are conversant in the use of cryptographic primitives such as hash families, digital signatures, secret key agreement protocols and zero-knowledge proofs, which are of interest also for blockchain implementation. Along with this, we have an expertise in information theoretic and statistical techniques used in machine learning.

Jayanta Chatterjee

jayanta

<http://mbu.iisc.ernet.in/~jclab/index.html>

Keywords: Peptide Chemistry, Peptide Design, Peptide based Chemical Tools, Cell Penetrating Peptides, Drug Design, Cyclic Peptides, Peptide Stability, Peptide Conformation, Solid Phase Peptide Synthesis

Outline: Own Laboratory: Peptide synthesis, Peptide conformation using Discovery Studio, Central Facility: NMR spectroscopy, Mass spectrometry

G. R. Jayanth

jayanth

<https://jayanthresearchgroup.weebly.com/>

Keywords: Precision motion measurement and control, micro- and nano-robotics, nanometrology, scanning probe microscopy

Outline: We have developed two atomic force microscopes in-house, capable of 3-D nanometrology and high-speed imaging. A magnetic tweezers system is under development.

Balaji Jayaprakash

jbalaji

<http://www.cns.iisc.ac.in/balaji/>

Keywords: Learning and Memory, Optics, Spectroscopy and Microscopy

Outline: Multi-photon excitation based in vivo imaging, small animal behavior for testing learning and memory in mice.

Eluvathingal D. Jemmis

jemmis

<http://ipc.iisc.ac.in/jemmis.php>

Keywords: Computational Chemistry, Quantum Chemistry, Molecular Modelling, Boron-rich Materials, 3-D Aromaticity, Borophene, Condensed polyhedral boranes, mno Rule, H-Bonds and other weak interactions, Catalysis, Reaction Mechanisms.

Outline: Electronic Structure Calculations, Empirical Forcefield Calculations, Molecular Orbital Theory, Density Functional Theory, Correlation and Interaction Diagrams, Symmetry and Overlap of Orbitals, Perturbation Theory, Heuristic Ideas from experiments,

J. Lakshmi

jlakshmi

<http://www.serc.iisc.in/facilities/j-lakshmi/>

Keywords: System Virtualization; Distributed systems; Operating systems; Quality of Service, Performance, Fault-tolerance, Availability, Resilient systems and services.

Outline: Objective: Cloud systems lab explores that aspect of distributed systems research that is relevant to computing Clouds., , Current Focus: Quality of Service in Clouds – Defining and meeting user expectation from compute Clouds., , Clouds are emerging as computing platforms that use dynamic configuration of software and hardware. The motivation for adopting clouds is being able to use a service without owning it, and paying by usage rather than for ownership and maintenance. Enabling architectures for clouds are service oriented architectures including both the software and hardware. SaaS is coined to represent software as a service and deals with exposing software as a service utility that can be managed and monitored based on its usage. Similarly, PaaS refers to platform projected as a service. Application frameworks enable the PaaS model. And, IaaS refers to infrastructure as a service wherein the system hardware is projected as a service. Virtualization technologies give impetus to this kind of usage since they seamlessly support on-demand enabling of services with the required applications and their requisite platforms and hardware. Cloud models support multi-tenancy of applications so as to reuse the hardware and/or software across multiple clients. This improves resource utilization for the cloud provider and enables pay-for-use for the customer. Since clouds allow for multi-tenancy of applications over the same hardware, guaranteeing application performance will govern, to a large extent, the usage models of clouds. As clouds gain greater acceptance, user expectations from the clouds will start moving from best-effort service to guaranteed service. Hence, it is foreseen that quality of service (QoS) will be a dominant consideration for cloud adaptation. QoS has many facets and will depend on the aspect that is crucial for the user. Application specific performance, as response time or throughput, application security varying from data integration and consistency to privacy, service availability, etc., are some of the QoS considerations that clouds need to address. Here we explore the QoS features of different cloud architectures with a view to rationalize user expectation from them.

Joseph Mathew

joseph

<http://www.aero.iisc.ernet.in/people/joseph-mathew/>

Keywords: Fluid mechanics, turbulence, CFD

Outline: Computational fluid dynamics. We develop and assess methods, specially for large eddy simulation of turbulent flows. Focus on compressible flow, gas dynamics, applied to turbomachinery aerodynamics., e.g., compressor cascade at off-design conditions involving transition.

Kamanio Chattopadhyay

kamanio

<http://materials.iisc.ac.in/~kamanio/>

Keywords: Alloy development, high temperature alloys, Light Alloys, nanmaterials , Materials issue in energy system, Physical materials Science

Outline: All advanced characterisation tool, in particular tools for microstructural characterisation at all levels (from 3D Atom Probe, atomic resolution TEM to optical microscope) and tools for physical property measurements.

Prof. K. A. Natarajan

kan

materials.iisc.ac.in

Keywords: Corrosion Engineering, Environmental Control, Extractive metallurgy, Mineral beneficiation

Outline: Expertise Advice on the above areas

Contact information: CSIC, IISc, Bangalore 560012 || csic.iisc.ac.in || chair.csic@iisc.ac.in || +91(80) 2293 2516/ 2446

Prof. S. Karthikeyan

karthik

<http://materials.iisc.ac.in/~karthik/>

Keywords: Mechanical behavior and physical metallurgy of metals and alloys, with specific interest in high temperature deformation (creep, creep-fatigue interactions) and high strain rate deformation (impact and dynamic deformation). Current materials of interest include high strain rate deformation of austenitic stainless steels and titanium alloys at high strain rates, creep behavior of Ni- and Co-base superalloys, grain boundary sliding in aluminium, etc.

Outline: We use both experimental tools and modeling methods for our work., Mechanical testing:, - Creep testing (creep frames capable of testing in tension/compression up to 1000 deg C), - High strain rate testing (via split Hopkinson pressure bar which can operate up to a strain rate of 1000 /s and 700 deg C, and Charpy impact tests)., , Microstructural characterization:, - SEM-EBSD, TEM, XRD, , Computational tools:, - Ab-initio first principles methods (for estimating bulk and defect properties of metals and alloys), - Molecular dynamics and Monte Carlo methods (for studying phenomena such as grain boundary sliding, radiation damage, phase separation), - FEM based tools (for simulating high strain rate deformation)

Kartik Venkatraman

Kartik

<http://www.aero.iisc.ernet.in/people/kartik-venkatraman/>

Keywords: Fluid-structure interactions, Aeroelasticity, Vibration, Acoustics

Outline: Computational methods. Open source and commercial software.

R Karunanithi

karun

Keywords: cryogenics

Outline: Development of cryocoolers, cryogenic instruments, sensors for proximity, electrical conductivity, angular displacement, cryogenic liquid level, temperature, etc.

Kausik Majumdar

kausikm

<http://www.ece.iisc.ernet.in/~kausikm>

Keywords: Electronic and optoelectronic devices

Outline: Electrical and optical characterization tools

Kaushik Basu

kbasu

<http://www.ee.iisc.ac.in/faculty/kbasu/index.php>

Keywords: Power Electronics, DC-DC converters, Switched mode power supplies, Inverter, Renewable energy, Electronics for grid integration of Solar, Fuel Cell, Wind and Battery Storage, Power factor correction, Power quality, Rectifiers, Motor Drives, Embedded Systems for Power converters- DSP, FPGA etc.

Outline: All aspects of Power Electronic converter design from few hundreds of watts to few hundreds of kilo watts-including: power circuit, gate driver circuit, thermal, passive filter inductor, capacitor and high frequency transformer, embedded systems etc.

Kaushik Chatterjee

kchatterjee

<https://sites.google.com/site/iiscbiomaterials/>

Keywords: biomaterials; tissue engineering; additive manufacturing; surface engineering

Outline: Material processing including metals, polymers and polymer nanocomposites and subsequent characterization of the physical, chemical and mechanical properties as well study of the biological response to the materials.

KJ Vinoy

kjvinoy

<http://ece.iisc.ac.in/~kjvinoy/>

Keywords: Radio frequency systems, microwave antennas, computational electromagnetics

Outline: We have developed antennas and circuits for harvesting RF energy. We have demonstrated that it is possible to build a low power communication terminal operating on such harvested energy. Several extensions of this work is underway. A related area is design of multifrequency and wideband antennas for various applications. Apart from antennas, we design passive and active planar RF circuits. Our research on computational electromagnetics cover finite element and finite difference time domain based codes. We also have experimental facilities for RF and microwave characterization including a microwave anechoic chamber.

K P J Reddy

kpjreddy

www.aero.iisc.ernet.in/lhsr

Keywords: hypersonics, shock waves, shock tubes, lasers, applications of shock waves

Outline: My research is purely experimental. I use shock tubes and shock tunnel facilities for my research. We have built wide range of these facilities for our research and are available in our own laboratory. In addition we specialize in building shock tubes and shock tunnels, particularly named Reddy Tubes and Reddy Tunnels for commercial purpose and educational purpose. We also have technologies for medical, agricultural and industrial applications.

Prof. K.P. Ramesh

kpramesh

www.iisc.ac.in

Keywords: a) Nuclear Magnetic Resonance (NMR), Nuclear Quadrupole Resonance (NQR), , Optical studies , b) Instrumentation, c) Solid State Physics at low temperatures and high pressures., Molecular motions/ Quantum rotational tunnelling and Phase Transitions, , Study of FE+AFE mixed proton glasses, Study of Canonical Glasses, , Conducting Polymers and their composites., d) Zero Field NMR on magnetic materials

Outline: NMR, NQR (Home built), UV-Vis, FT-IR, DSc, TGA, SQID magnetometer etc

K RAMESH

kramesh

<http://www.physics.iisc.ernet.in/~kramesh/>

Keywords: Electrical phase change in Amorphous semiconductors

Outline: XRD, DSC, FTIR, NMR, XPS, High Pressure

K R Gunasekhar

krguna

Keywords: Material processing under high vacuum conditions/PVD-PAPVD/sputtering/e.b evaporation and etc.

Outline: PVD coatings for decorative, holorological, tribological, optical, electronic device applications by thermal, sputtering, ion plating techniques under high vacuum conditions.

S B Kandagal

ksb

Keywords: Vibration diagnosis and Noise control, structural design optimization

Outline: Vibration and noise control experimental tools

Kartik Sunagar

ksunagar

www.venomicslab.com

Keywords: Venomics, Antivenomics, Drug Discovery, Snakebite diagnostics

Outline: Transcriptomics, proteomics, genomics, phylogenetics, toxicity tests

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V. Kumaran

kumaran http://chemeng.iisc.ac.in/chemeweb/faculty_kumaran.htm

Keywords: Fluid mechanics, Statistical mechanics, Complex fluids

Outline: Multiscale modeling from molecular to continuum scale, flow simulations, stability analysis, turbulence and turbulent particle simulations, experimental techniques including rheometry, flow visualisation using velocimetry, microfluidics, measurements of particles suspended in turbulent flows.

Kunal N. Chaudhury

kunal

<https://sites.google.com/site/kunalnchaudhury/>

Keywords: Image Processing, Computer Vision, Convex Optimization.

Outline: Mainly algorithmic and computational techniques.

Kuruville Varghese

kuru

kuruville.dese.iisc.ernet.in

Keywords: High Performance Accelerators for Machine Learning, Bio-informatics, Networking

Outline: FPGa Design Tools, FPGA Boards

Umanand L

lums

surya.dese.iisc.ac.in/lu/

Keywords: Power conversion, induction motor drives, electric vehicles, photovoltaic systems, grid connected systems, digital controller design,

Outline: Space vector pwm method, inverters with frontend converters, induction motor drive platform

Gali Madhavi Latha

madhavi

<http://civil.iisc.ac.in/~madhavi>

Keywords: Reinforced soil structures, Geosynthetics, Rock engineering, Slope stability

Outline: Slope stability analysis using RocScience suite of programs DIPS, SWEDGE, Phase and SLIDE. Numerical analysis using FLAC, GEOSTUDIO.

S. Mahadevan

mahi

<http://www.mrdg.iisc.ernet.in/mahadevan/home.html>

Keywords: Microbial genetics, physiology and evolution

Outline: Standard microbiological and molecular biological methodologies

Prabal Kumar Maiti

maiti

<http://www.physics.iisc.ernet.in/~maiti/>

Keywords: molecular simulation, surfactant and colloids, DNA/RNA/protein biophysics, multi-scale modelling of Polymer, computational nanotechnology, drug design,

Outline: atomistic molecular dynamics and Monte Carlo simulations, Density functional theory, Bornian dynamics simulation.

Uday Maitra

maitra

<http://www.orgchem.iisc.ac.in/uday-maitra/>

Keywords: [supramolecular chemistry; soft materials; bile acids; hydrogels; sensors; biosensors](#)

Outline: [Spectroscopy, specially fluorescence spectroscopy; Microscopy - AFM, SEM and TEM; Rheology](#)

Manish Arora

marora

<http://cpdm.iisc.ac.in/utsaah/>

Keywords: [Medical Device, Ultrasound, Collaborative Design](#)

Outline: [UTSAAH Lab which I lead is focused on complete medical device innovation ecosystem: need identification, concept design, prototyping to clinical validation and manufacturing. We work collaboratively with industry and healthcare delivery institutions on helping take context relevant medical innovation to society and market.](#)

Mrinmoy De

md

<http://orgchem.iisc.ernet.in/faculty/md/>

Keywords: [Nanomaterials, Surface fabrication, antibacterial study, molecular assembly, Photochemistry.](#)

Outline: [We are interested in synthesis of laterally size controlled 2D single/thin-layer molecular assemblies by chemical synthesis/possessing \(top-down/bottom-up method\) from their corresponding precursors such as single molecular unit, single crystals etc. Followed by, we will explore the supramolecular application of these assemblies. Our developed method is very economical and highly salable for many industrial applications. Those applications are including, but not limited to, disinfectants, sensing and catalytic applications.](#)

K.Srinivasan

mecks

Keywords: [Energy conservation, refrigeration and air conditioning](#)

Outline: [Refprop for properties of fluids](#)

Manish Jain

mjain

<http://www.physics.iisc.ernet.in/~mjain>

Keywords: [Condensed Matter Theory, Computational Materials Science, 2D Materials, oxides, Electronic properties, Optical properties, Dynamical properties, Structural properties](#)

Outline: [Density Functional Theory, GW/Bethe-Salpeter Equation](#)

Mrinal K. Ghosh

mkg

math.iisc.ac.in/~mkg

Keywords: [Stochastic Control, Markov Decision Processes, Stochastic Dynamic Games, Mathematical Finance](#)

Outline: [Dynamic Programming, Partial Differential Equations, Stochastic Calculus](#)

Abhishake Mondal

mondal

<http://sscu.iisc.ac.in/uncategorized/abhishake-mondal/>

Keywords: [, Electron transfer systems, Spin-crossover systems, Single-Molecule, Magnets, Hybrid Materials](#)

Outline: [Single Crystal and Powder X-Ray Diffraction \(under irradiation\), EPR, Mössbauer, Electron Microscopy, SQUID Magnetometer \(under irradiation\) and PPMS Susceptometer](#)

M R Bhat

mrb

<http://www.aero.iisc.ernet.in/people/m-ramachandra-bhat/>

Keywords: [Non-Destructive Testing & Evaluation ; Testing & Evaluation of Metallic & Composite Materials ; Fatigue & Fracture ; Mechanical Behaviour of Metallic & Composite Materials ; Structural Health Monitoring](#)

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Outline: Ultrasonics, Infra-Red Thermography, Acoustic Emission Technique, Static & Dynamic Testing (tensile, compression, fatigue, impact loading)

Mathirajan Muthu

msdmathi

<http://mgmt.iisc.ac.in/newwordpress/m-mathirajan/>

Keywords: Optimization, Business Analytics, Decision Making for Managerial/industrial problems, Decision Support Systems

Outline: Mathematical and Heuristic Optimization for Industrial Engineering Problems, particularly for (a) Production Planning and Scheduling of Batch Processors, (b) Routing and Scheduling, Distribution and Facility Location, Supply-chain Management, (c) Logistics of Container Terminal. Decision Support System - Software Development for Distribution Management Problems, Urban Road Transport Problems, and Advertising Media Planning

Sudhakar Rao

msrao

<http://civil.iisc.ac.in/~msrao/>

Keywords: Characterization and treatment of contaminated water including wastewater , Hazardous waste management, Remediation of contaminated ground and problematic soils

Outline: Analytical equipment such as atomic absorption spectrometer, ion chromatograph, gas chromatograph, UV-Visible spectrophotometer, routine microbial assays, ion selective electrodes, and other minor equipment (pH/Eh meter etc). The equipment is part of my laboratory

Prof. M. L. Munjal

munjal

www.mecheng.iisc.ac.in/~frita

Keywords: Industrial Noise Control; Automotive Noise Control; Muffler Acoustics

Outline: I use algorithmic/analytical tools like Integrated Transfer Matrix method developed inhouse over the years at the Facility for Research in Technical Acoustics, for analysis and design of mufflers or silencers for suppression of the intake as well as exhaust noise of automobiles, diesel generator sets, HVAC (heating, ventilation and air-conditioning) systems, gas turbines, compressors, etc.

Murugesan Venkatapathi

muruges

<http://cde.iisc.ac.in/faculty/muruges/index.html>

Keywords: Optical emission; Electromagnetic scattering; Nanoscale materials; Computational Science; General-purpose algorithms

Outline: computational methods and algorithms

Manoj Varma

mvarma

<http://www.cense.iisc.ac.in/manoj-varma>

Keywords: Optics, Molecular sensors

Outline: Experimental and computational studies of complex systems

D Nagesh Kumar

nagesh

<http://civil.iisc.ernet.in/~nagesh/>

Keywords: Water Resources Engineering; Hydrology; Climate Change Impact on Water Resources; Optimal Reservoir Operation; Water Resource Systems

Outline: Optimization Tools; Remote Sensing; Satellite Image Processing; GIS; DEM; Matlab; Fortran; Statistical tools; GPS;

Dipankar Nandi

nandi

<http://biochem.iisc.ernet.in/dpnLab/>

Keywords: T cell activation, Microbial stress responses, Inflammatory responses, Mice infection studies, Thymic atrophy, Immune cell biology

Outline: Flow cytometry, ELISA, Westerns, Microbial growth, Gene expression studies, Mice infection studies, Generation of knockout strains in microbes

A. K. Nandakumaran

nands

www.math.iisc.ac.in/~nands

Keywords: partial differential equations, homogenization, control problems

Outline: I do theoretical studies on partial differential equations. Homogenization is an area of applied mathematics which has tremendous applications like in material science of composite materials, fluid flow problems in porous media, thin structures, complex domains like domains with rapidly oscillating boundaries and so on. We try to understand the mathematics behind it. I am also interested in control and controllability problems

S K Nandy

nandy

<http://cadl.iisc.ernet.in/cadlab/>

Keywords: Multi-core and Many-core architectures for System-on-chip (SoC) solutions, Compiling for massively parallel heterogeneous architectures, and Synthesis of accelerators on runtime reconfigurable, massively parallel, many-core SoCs

Outline: Most of our research and development work is based on public-domain tools like Chisel (High Level Hardware Description Language), Verilator, iVerilog, RISC-V ISA simulator, Gem5 architecture simulator, and other licensed EDA tools from Aldec, Synopsys, Xilinx, etc., Matlab, REDEFINE many-core SoC development system for realization of accelerators.

Lakshminarayana Rao

narayana

<https://sites.google.com/site/narayanarao/>

Keywords: Plasma Technology for waste to energy and water treatment

Outline: Chemkin, Fluent, Optical Emission Spectroscopy (own facility), Water and waste water characterization lab (own facility), Ozone generation and quantification methods

N. Balakrishnan

nbalak

aero.iisc.ac.in

Keywords: Computational Fluid Dynamics, Aerodynamics

Outline: 1. HiFUN solver developed in the Computational Aerodynamics (CA) Lab, Dept. of Aerospace Engineering and commercialized through S&I Engineering Solutions a venture incubated out of IISc (see www.sandi.co.in) 2. Standard commercial tools for gridding 3. CA Lab also supports a 700+core Vichar cluster for meeting its parallel computing needs

Neelesh B Mehta

nbmehta

<http://ece.iisc.ac.in/~nextgenwrl/>

Keywords: Wireless communications, 4G/5G cellular systems, Green Sensor Networks, Internet of Things

Outline: Research work on the design, modeling, analysis, and optimization of current and next generation wireless systems. We place significant emphasis on the knowledge and modeling of practical aspects, such as those imposed by standards such as 3GPP, IEEE 802.11, etc.

Nagasuma Chandra

nchandra

<http://proline.biochem.iisc.ernet.in>

Contact information: CSIC, IISc, Bangalore 560012 || csic.iisc.ac.in || chair.csic@iisc.ac.in || +91(80) 2293 2516/ 2446

Keywords: Modelling biological systems, Bioinformatics, Protein structures, Genomic data analysis for biomedical applications, Drug discovery, Bio-marker discovery

Outline: Genome-wide Biological networks, Graph analysis, ODE models, Constraint based models, Boolean models, Bioinformatics and chemoinformatics, Integration with experimental biology

N. Ravishankar

nravi

<http://www.mrc.iisc.ac.in/n-ravishankar/>

Keywords: Nanostructures, Electron Microscopy

Outline: Electron Microscopy

Nirupam Roy

nroy

<http://www.physics.iisc.ernet.in/~nroy/>

Keywords: Astronomy, Astrophysics, Cosmology, Radio Astronomy

Outline: Interferometry, Radio frequency receiver/antenna/back-end, Radio Telescopes (international observatory facilities), Fourier imaging algorithms/techniques

Prof. N. Suryaprakash

nsp

<http://nrc.iisc.ernet.in/nsp/1.html>

Keywords: NMR Spectroscopy, Chiral Analysis, Weak Molecular Interactions, Structure Elucidation, DeDevelopment of NMR Techniques

Outline: Design and Development of Novel NMR Experimental Techniques. The necessary infrastructure is available in my laboratory.

Narayan Sundaram

nsundaram

<http://civil.iisc.ac.in/~nsundaram/>

Keywords: Contact mechanics (elastic, viscoelastic); Large strain plasticity; Simulation of metal forming and machining operations; Microstructural effects; Indentation; Adhesion; Tribology

Outline: I analyze contact problems using indirect and direct boundary elements (BEM). I have a suite of specialized contact mechanics codes developed by me and my students for this purpose. I use explicit dynamic finite elements to study large strain plastic deformation in indentation, sliding, cutting and other processes. I have my own custom code (FEMESH2D) for meshing and post-processing these complex analyses e.g. to study microstructural effects. I have used arbitrary Lagrangian Eulerian (ALE) and remeshing to handle large plastic strains.

Omkar Subbaram Jois Narasipura *omkar*

<http://aero.iisc.ac.in/people/s-n-omkar/>

Keywords: Helicopter dynamics, Satellite image processing, Biomechanics, Uninhabited Air Vehicles (UAV), Composite design optimization, Structural health monitoring.

Outline: Directed by S N Omkar, the UAV laboratory at the Aerospace Engineering Department operates a variety of unmanned aircraft used to perform research in several areas. Drones are developed for various issues associated with urban planning, agriculture, security and surveillance, and environmental applications. The lab is equipped with CNC and laser cutting machine that is used to build prototypes. The other facet of Dr. Omkar's research includes composite design optimization using nature inspired techniques where state-of-art algorithms both serial and parallel mode has been implemented. Dr. Omkar has pioneered in using biomechanics for aerospace applications. This is of significance in the light of country's interest in human space mission. He has established a laboratory facility towards this. The lab has also developed a Brain Control Interface that detects and measures the features of the brain signals that reveal the user's intentions and translates these features in real time into commands that achieve the user's intent.,

Padaikathan P*padai*materials.iisc.ac.in/faculty/p-padaikathan

Keywords: *ALLOYS DESIGN AND DEVELOPMENT: STEEL AND ALUMINUM, , *HIGH STRENGTH AND HIGH TEMPERATURE ALLOYS OF STRUCTURAL CHARACTERISATION BY TRANSMISSION ELECTRON MICROSCOPY, , * DEFORMATION BEHAVIOUR OF METAL/POLYMER MATRIX COMPOSITES

Outline: ELECTRON MICROSCOPY, MECHANICAL TESTING, THERMAL ANALYSIS

Radhakant Padhi*padhi*<http://www.aero.iisc.ernet.in/people/radhakant-padhi/>

Keywords: • Optimal control theory and applications, • Real-time optimal control synthesis for optimal guidance and control, • Nonlinear and adaptive control design, • Guidance and control of aerospace and autonomous vehicles, • Integrated guidance and control of aerospace vehicles, • State estimation for feedback control and other applications, • Control system design for biomedical applications, • Control of distributed parameter systems

Outline: Nonlinear and optimal control design techniques, namely Dynamic inversion, Back-stepping, Sliding model control, neuro-adaptive design, Model predictive control, Model predictive static programming and its variants, Adaptive Critic designs, Single Network Adaptive Critic, Kalman filtering etc.

Parimal Parag*parimal*<http://ece.iisc.ernet.in/~parimal/>

Keywords: Design, analysis, optimisation, and control of large complex systems and networks

Outline: Probabilistic methods, optimization methods, game theory, statistical signal processing, queueing theory, information theory, estimation & detection theory, combinatorics.

Dilip P. Patil*patil*www.math.iisc.ac.in

Keywords: Commutative Algebra and Algebraic Geometry, Finite Group Theory

Outline: Please see details on my homepage

Balachandra Patil*patilb*<http://mgmt.iisc.ac.in/newwordpress/home-2/>

Keywords: Energy and Environmental Economics and Policy, Sustainability Transition, Technology Management, Techno-economic-financial feasibility studies, Socio-economic assessment, Sustainable Energy Access, Public Policy, Urban Policy and Planning, Sustainable Transport, Electricity System Analysis, Climate Change, Renewable Energy Systems, Sustainable Development

Outline: Mathematical Models, Statistical Methods, Indicators Approach, Multi-criteria decision support analysis, Questionnaire-based surveys, Field studies, Financial analysis, Qualitative analysis, Data analytics

Paturu Kondaiah*paturu*www.mrdg.iisc.ernet.in

Keywords: Cancer biology; cancer therapeutics; screening for anti cancer activity; Signal transduction pathways in cancer;

Outline: in vitro and in vivo cancer biology assays

Pavankumar Tallapragada*pavant*<http://www.ee.iisc.ac.in/people/faculty/pavant/>

Keywords: Controls, networked control systems, distributed control systems, smart transportation

Outline: Control and optimization theory. Design of algorithms with provable guarantees. Verification of algorithms using computer simulations.

Nagaphani B Aetukuri

phani

<http://sscu.iisc.ac.in/faculty/naga-phani-b-aetukuri/>

Keywords: Batteries, energy storage, electrochemical devices, grid storage, solid-state batteries

Outline: Battery materials synthesis, electrochemical mass spectrometry, battery cycling, Li-ion and Na-ion battery assembly and testing, impedance measurements, thin film deposition and device measurements

P. K. Das

pkdas

<http://ipc.iisc.ac.in/pkd.php>

Keywords: Spectroscopy and Optics

Outline: High Power Lasers (own lab), Various spectrophotometers such as uv-visible, infrared (own lab), time resolved fluorescence (central), Calorimeters (central), Polarizing microscopes (central)

P N RANGARAJAN

pnr

<http://biochem.iisc.ernet.in/pnrangarajan.php>

Keywords: Eukaryotic Gene Regulation

Outline: Recombinant DNA technology, Recombinant protein expression in *Pichia pastoris*, Development of new expression vectors

Partha Talukdar

ppt

<http://www.talukdar.net>

Keywords: Machine Learning, Natural Language Processing, Knowledge Graphs

Outline: Knowledge Graphs, Deep Learning, Semi-supervised Learning, Large-scale data analysis.

Prabeer Barpanda

prabeer

www.prabeer.in

Keywords: Li-ion and Na-ion batteries, electrochemistry

Outline: solvothermal (wet chemical) synthesis, physical / structural characterization, battery testing

K. R. Prabhu

prabhu

<http://www.orgchem.iisc.ac.in/kr-prabhu>

Keywords: Synthetic Organic Chemistry, Green Chemistry, Asymmetric Synthesis, Organophosphorous Chemistry, C-H activation, Process Development, Organometallic Chemistry, and Hydrogen Economy

Outline: Design and development of efficient, novel, environmentally benign strategies for organic chemical synthesis, involving metallic, non-metallic, organometallic and organocatalysts is the chief area of interest of Prof. Prabhu. The major focus is the utilization of redox chemistry in transition metal and equivalent nonmetallic catalyst systems to achieve efficient transformations. Dr. Prabhu has initiated a program to develop highly selective oxidation methods, similar to those found in nature, for the direct installation of oxygen, nitrogen and carbon functionalities into aliphatic C-H bonds of organic molecules and their intermediates. His work relies on the delicate electronic and steric interactions between C-H bonds and transition metal complexes of small molecules to achieve the desired selectivity. The core work of his laboratory lies in designing 'easy to use' and robust processes using inexpensive and commercially available, environmentally friendly catalytic systems. The synthesis of compounds of importance in drug design is another activity in the research group. Specifically, work carried out in Prof. Prabhu's laboratory involves C-H functionalization, C-C bond forming reactions and functional group transformations. Generation of hydrogen using sustainable method is one of the main focuses of Prabhu's group. The process development for economically viable methods is one of the target areas which Prabhu is effectively perusing in developing methods in large-scale reactions. For this work, Prabhu relies on NMR, Mass spectrometry, GC-MS, HPLC and other instrumental methods to arrive at the desired results.

Pradeep Mujumdar

pradeep

<http://civil.iisc.ac.in/~pradeep/>

Keywords: Hydrology & Water Resources - Urban Floods, Reservoir Operation, Climate Change Impacts, Adaptive Responses, Water Resources Systems, Irrigation Scheduling, IoT Applications, Stochastic Modeling, Optimization

Outline: Monte Carlo Simulations, Stochastic Modeling, use of Remote Sensing Products, LiDAR survey datasets for urban flood modeling, MATLAB and R for extreme value analyses, Water level sensors for flood management

Pradipta Biswas

pradipta

<https://cambum.net/l3D.htm>

Keywords: UI/UX Design, Human Computer Interaction, Intelligent User Interface, AI, ML, Inclusive Design, Assistive Technology, Automotive UI, Aviation UI

Outline: MS Visual Studio for software development, Tobii Studio for eye gaze data analysis, Weka and MATLAB for ML, <https://cambum.net/l3DLab/Facilities.htm>

Kavirayani R Prasad

prasad

<http://orgchem.iisc.ernet.in/faculty/prasad/>

Keywords: Synthetic Organic Chemistry, Medicinal Chemistry

Outline: organic synthesis, sythetic methods, medicinal chemistry

Prasanta Kumar Ghosh

prasantg

<http://www.ee.iisc.ac.in/people/faculty/prasantg/>

Keywords: Signal Processing and analytics

Outline: Multi-modal data analytics including speech, audio, gestures and other bio-signals such as articulation, wheeze, snore using statistical modeling, signal processing and machine learning.

Rudra Pratap

pratap

<http://www.cense.iisc.ac.in/rp/>

Keywords: MEMS Sensors, MEMS Technology, Vibrations, Dynamics, Mechanobiology

Outline: MEMS design, micro fabrication, nano fabrication, vibration measurements, modal analysis, laser Doppler vibrometry, FEM modelling and simulation, multi physics modelling, MATLAB programming and modelling, sensor modelling

Praveen C Ramamurthy

praveen

<http://materials.iisc.ac.in/~praveen/>

Keywords: Polymers, sensors, photovoltaic, electroactive polymers, functional materials

Outline: Details at <http://materials.iisc.ac.in/~praveen/>

Praveen Kumar

praveenk

<http://materials.iisc.ernet.in/~praveenk/index.html>

Keywords: Mechanical behavior of materials

Outline: We have range of equipment for performing mechanical tests. Some of these facilities, such as high temperature nano-indenter, micro-mechanical tester, instrumented micro-hardness tester, etc. are in my lab, whereas some facilities, such as standard universal testing machines, etc. are in central facilities in our department. In addition

to experiments, we also perform finite element simulations using commercial packages (e.g., ANSYS, COMSOL) and crystal plasticity simulations.

Prerna Sharma

prerna

<https://sites.google.com/site/biocolloids/home>

Keywords: Soft Matter Physics, BioPhysics

Outline: Optical Microscopy, Optical Tweezers, Image Processing

Prabhu R Nott

prnott

http://chemeng.iisc.ac.in/chemeweb/faculty_prabhu.htm

Keywords: Complex fluids, Granular mechanics, powder flows, rheology, suspension rheology, multiphase flows

Outline: Experimental rheology and flow imaging (in my lab Lab), Particle dynamics simulations, such as discrete element method (DEM), Stokesian Dynamics, Continuum and constitutive modelling, Detailed analytical or numerical calculations of particle-fluid interactions

Prosenjit Sen

prosenjits

<http://www.cense.iisc.ac.in/prosenjit-sen>

Keywords: Microfluidics, Lab-on-Chip Devices, Liquid at Nano-Structured surfaces, MEMS Device Packaging, 3D Stacking

Outline: Microfluidic device fabrication, High speed imaging setup, Electrical impedance spectroscopy in microfluidic devices, Goniometer, Droplet jet printing, Nanostructured surface fabrication

Raghuveer Rao Palapati

prvrao

<http://civil.iisc.ernet.in/~prvrao/>

Keywords: Geotechnical & Geoenvironmental Engineering, Foundation Engineering, Pipeline Engineering

Outline: Finite element method, Finite difference method and Method of characteristics

Raghuram P T

ptr

http://chemeng.iisc.ac.in/chemeweb/faculty_raghuram.htm

Keywords: Bubble size estimation, gas liquid reaction, Radioactive safety, Equipment design, Laboratory setup, pilot plant etc

Outline: Experimental investigations, mathematical tools, and computational methods

Vikram Jayaram

qjayaram

materials.iisc.ac.in/~qjayaram

Keywords: Metallurgy, Materials Engineering, Mechanical Behaviour, Structural Characterisation, Electron Microscopy

Outline: Small scale testing, creep (in my lab.) nanoindentation (both in my lab. as well as central facility), scanning and transmission electron microscopy (central facilities)

Rachit Agarwal

rachit

<http://www.be.iisc.ac.in/~rachit/>

Keywords: Biomaterials, Antibiotic resistance, Tuberculosis, Microparticles, Nanoparticles, Drug delivery, Osteoarthritis, Bacteriophages, Phage therapy, Dry powder inhalation, Intra-articular delivery, Mycobacterium

Outline: We use experimental techniques for research. Several instruments that we use in the lab are FPLC, Flow cytometry, Lyophilizer, Upright fluorescence microscope, western blotting, particle synthesis and characterization
Contact information: CSIC, IISc, Bangalore 560012 || csic.iisc.ac.in || chair.csic@iisc.ac.in || +91(80) 2293 2516/ 2446

tools, AFM, Confocal microscopy. Other central instruments that we use are SEM, TEM, histology etc. In the lab, we also focus a lot on pre-clinical mice models and have established disease model such as surgically induced Osteoarthritis via medial meniscus ligament transection, mice infection with mycobacterium tuberculosis.

Prof. S.V. Raghurama Rao

raghu

<http://www.aero.iisc.ernet.in/people/s-v-raghurama-rao/>

Keywords: Computational Fluid Dynamics (CFD), Numerical Methods for Hyperbolic and Parabolic Systems.

Outline: Algorithmic or computational techniques: Finite Volume Methods, Meshless Algorithms, Kinetic theory based methods, Lattice Boltzmann Method, Algorithms for Turbulence Simulations, Aerodynamic Shape Optimization.

Soumyendu Raha

raha

cds.iisc.ac.in/faculty/raha

Keywords: constrained and stochastic dynamics: control, simulation, optimization and data assimilation and application to space, robotics, physical and biochemical systems; hardware-software co-design of numerical linear algebra libraries for emerging processor and accelerator architecture

Outline: Computational Mathematics: Differential-Algebraic Equations, Stochastic Differential Equations, Applied Differential Geometry; and Systems Approach

Rahul Pandit

rahul

<http://www.physics.iisc.ernet.in/~rahul/>

Keywords: Physics and Computational Science of the following problems:, (A) Turbulence: statistical properties of fluid, passive-scalar, magnetohydrodynamic, and Burgers turbulence; fluid turbulence with polymers and/or particles; superfluid turbulence., (B) Spiral- and scroll-wave turbulence in mathematical models for cardiac tissue; this is of relevance to the control of life-threatening arrhythmias like ventricular fibrillation., (C) Statistical physics of condensed-matter systems and phase transitions (e.g., phases and transitions in cold-atom systems).

Outline: We use methods of statistical physics, fluid dynamics, nonlinear dynamics, numerical analysis, and high-performance computing. We have several cluster computers in our group; and we also use the central computing facilities at the Institute.

Rahul Roy

rahulroy

nanobiology.nanobiophotonics.org

Keywords: Bioengineering, Biophysics, Genomics, Microfluidics, Single molecule and Single cell analysis, Diagnostics

Outline: Super resolution microscopy, single molecule spectroscopy, microfluidics, DNA Next generation sequencing

BS Rajanikanth

raj

<http://hve.iisc.ac.in/~raj>

Keywords: Electrical discharge based applications for pollution control

Outline: Basically my work involves controlling the gaseous pollutants by exposing the polluted gas to electrical discharges which in turn bring out the necessary chemical reactions.

Rajan kanhirodan

rajan

physics.iisc.ernet.in/~rajan

Keywords: Tomography, Optical Tomography, Diffuse Optical Tomography, Ultrasound Assisted Optical Tomography, Radiation dose studies, medical radio-therapy

Outline: Development a 3-Dimensional Diffuse Optical Tomography (DOT) System for breast tumor detection, Functional DOT System, Graphic Processing Unit (GPU) based real-time FEM based reconstruction algorithm for DOT, hyperthermia system (PID based controlled heating and monitoring of remote region-of-interest tissue), Real-time 3D reconstruction algorithm for fluorescence microscopy, Algorithm for dose estimation and quality assurance using electronic portal imaging device (EPID), Algorithms for reconstruction of Positron Emission Tomography (PET).

Rajesh Sundaresan

rajeshs

<http://www.ece.iisc.ernet.in/~rajeshs/>

Keywords: Internet of Things; Industrial Internet of Things; Communication, Computation and Control over Networks; Decentralized Algorithms over Graphs and Networks; Smart Grid Sensing and Inference; Network Analytics; Data Analytics.

Outline: Mathematical modeling and performance analysis of complex interacting networks; design and analysis of communication, computation, and control decentralized control algorithms; applied statistics and data analysis for IIOT, water networks, electricity networks.

Rajiv Soundararajan

rajivs

<http://www.ece.iisc.ac.in/~rajivs/>

Keywords: Image and video processing, computer vision, virtual reality, image and video quality assessment, video streaming, deep learning for image/video processing,

Outline: Statistical models, machine/deep learning, neuroscience, signal processing

Purusharth I Rajyaguru

rajyaguru

<http://rajgodhuli.wixsite.com/rajyaguru-lab>

Keywords: Gene expression control, Yeast Strain development, Translation control, RNA granules, Optimization of protein expression

Outline: Live cell imaging (DELTA VISION MICROSCOPE; in my lab), in vitro reconstitution using purified proteins, Biochemical analysis using cell free systems (using Ball Mill; in my lab), in vitro transcription, in vitro translation, construction of yeast strains with gene deletions, genetic manipulation of yeast strains (tagging). Almost all the equipments needed for above are available in my laboratory.

S Ramakrishnan

raman

<http://ipc.iisc.ac.in/raman.php>

Keywords: Polymer Chemistry

Outline: Molecular spectroscopic techniques for structural characterization; DSC, TGA and other thermal characterization; solution properties; GPC, fluorescence, etc.

S. Ramasesha

ramasesh

<http://sscu.iisc.ac.in/faculty/prof-s-ramasesha/>

Keywords: Strongly correlated systems, Numerical Many Body methods, low-dimensional systems. Functional Materials. Organic Electronic Devices, Molecular Magnetism, Low-lying Electronic States, Conjugated Polymers, Graphene Nano Ribbons, Density Matrix Renormalization Group, Exact Diagonalization

Outline: I use numerical techniques to model conjugated carbon systems and magnetic molecular materials. I study magnetic anisotropy, frustrated magnets, conjugated carbon systems such as polymers, graphene nano ribbons and polycyclic aromatic hydrocarbons. The properties studied are one and two photon absorption, singlet fission, electron-hole recombination processes.

Govindan Rangarajan

rangaraj

<http://math.iisc.ac.in/~rangaraj/>

Keywords: Time series analysis; nonlinear dynamical systems; computational neuroscience

Outline: Time series analysis; stochastic processes; ordinary differential equations; Granger causality; autoregressive processes; sparse representation of high dimensional data

Chinmoy Ranjan

ranjan

<http://ipc.iisc.ac.in/cr.php>

Keywords: Electrochemical Technology, Renewable Energy, Hydrogen Production, Electrolysers, CO₂ to Fuels, Fuel Cells, Batteries, in situ spectroscopy, water oxidation, electrochemical fuel oxidation,

Outline: Electrochemical testing, in situ Raman Spectroscopy, in situ Mass Spectroscopy, testing of fuel cells, electrolysers, material characterisation

Rathna G N

rathna

Keywords: Embedded Systems, Sensor networks and Real time systems and Signal/Image processing

Outline: FPGA and signla/Image processing boards

Ratnesh Shukla

ratnesh

<http://www.mecheng.iisc.ac.in/users/ratnesh>

Keywords: Fluid mechanics, Computational fluid dynamics, high performance computing, multiphase flows, cavitation, fluid-structure interaction, high-speed flows

Outline: We employ state-of-the-art computational techniques to perform calculations on CPU/GPU based heterogeneous high performance computing systems such as SAHASRAT (<http://www.serc.iisc.in/facilities/cray-xc40-named-as-sahasrat/>).

Ashwini Ratnoo

ratnoo

<http://aero.iisc.ac.in/people/ashwini-ratnoo/>

Keywords: Guidance and Control of Autonomous Vehicles, Path/Trajectory Planning, Aerial Robotics

Outline: We extensively use Guidance Theory, Control Theory and Nonlinear Control for the research we carry out. We have a Motion-Capture System built with 10 Prime 13 Cameras procured from Natural Point Inc. More information about the motion capture system can be found at , <https://optitrack.com/>, The motion capture system is used for validating the guidance/control/path planning methods/algorithms we develop for ground and aerial robots.

R. V. Ravikrishna

ravikris

www.mecheng.iisc.ac.in/users/ravikris

Keywords: Combustion, Computational Fluid Dynamics, Atomization and Sprays, IC Engines, Gas Turbines, Industrial Burners, Fuels & Emissions

Outline: Laser-based Diagnostic Measurement Techniques applied to Combustion and Sprays, High-pressure automotive spray facility, Planar Laser-induced Fluorescence (PLIF), Particle Image Velocimetry (PIV), Spray and Droplet Characterization using Laser Shadowgraphy, High-speed Camera, Computational Fluid Dynamics (CFD) software

Prof Ramesh Chandra Mallik

rcmallik

<http://www.physics.iisc.ernet.in/~rcmallik/>

Keywords: Thermoelectric material for high temperature and low temperature applications

Outline: Seebeck coefficient measurement, thermal conductivity and electrical conductivity measurement, SEM, TEM, XRD, EPAM, Raman, XPS

Reddy Kommaddi*reddy* <http://www.cns.iisc.ac.in/home/people/reddy-p-kommaddi/>**Keywords:** Alzheimer's disease, GPCR, Arrestins**Outline:** <http://www.cns.iisc.ac.in/home/people/reddy-p-kommaddi/>**Rishikesh Narayanan***rishi*<http://mbu.iisc.ac.in/~rngrp/>**Keywords:** Cellular Neurophysiology, Computational Neuroscience, Neuronal Plasticity, Active Dendritic Physiology

Outline: We employ a combination of electrophysiological and computational tools to address questions in neurophysiology. Computationally, our analyses spans the molecular, cellular and network scales of neurophysiology with specific tools employed for biophysically and physiologically relevant computational modeling. Electrophysiologically, our laboratory is equipped with tools for in vitro patch-clamp electrophysiology and in vivo field potential recordings. The fundamental question we address is on information processing in single neurons and their networks, with specific emphasis on voltage-gated ion channels and plasticity associated with them.

Rangarajan Muralidharan*rmuralidharan*CENSE.iisc.ac.in**Keywords:** Semiconductor materials and devices, Monolithic Microwave Integrated Circuits, Power semiconductor devices**Outline:** <http://www.cense.iisc.ac.in/content/infrastructure>**Raghuraman N. Govardhan***rng*<http://www.mecheng.iisc.ac.in/users/raghu>**Keywords:** Fluid Mechanics, Turbo-machinery, Fluid-Structure Interaction

Outline: We use a number of experimental facilities and techniques to probe the flow physics of various problems of practical importance. The problems that we are presently are working on are flutter of turbo-machinery blades in tran-sonic flow, drag reduction in water flows using bubbles, and fluid-structure interaction problems in a variety of flow configurations. Some of the facilities that we have within our laboratory include Wind tunnels (low and high speed), Water channel, Tran-sonic cascade tunnel and other smaller more specialized facilities. All the facilities are well equipped for measurements ranging from classical load cell and pressure based measurements to more advanced laser based diagnostics.

Prof. R. Sukumar*rsuku*ces.iisc.ernet.in/rsukumar/**Keywords:** Forest Ecology, Climate Change and Wildlife Ecology**Outline:** Field observations, molecular techniques for wildlife ecology, isotope and other lab. techniques for Climate Change research**Dr.R.T.Naik** *rtnaik*<http://www.mecheng.iisc.ac.in/users/rtnaik>**Keywords:** Internal Combustion Engines, Bio-fuels, Combustion, Automotive Engineering, Renewable Energy, Transportation Engineering, Simulation of Diesel Engines and Gasoline Engines, Hydrogen Engines and Antenatal Fuels.**Outline:** Engines experimental facilities and Simulation facilities by using the different software tools etc.

Sachin Deshmukh*sachin*<http://www.cns.iisc.ac.in/home/people/sachin-deshmukh/>

Keywords: Spatial Navigation, Neuroscience, Behaviour, Hippocampus, Entorhinal Cortex, Electrophysiology, Awake Recordings

Outline: Computer aided design and manufacture of hyperdrives for targeting multiple brain regions simultaneously, electrophysiology, data analysis and signal processing for studying neural correlates of behaviour and information processing in the brain, histology

Sachin Kotak*sachinkotak*<https://kotakcellbiology.wixsite.com/spindlebehaviour>

Keywords: Cell Division, Mitosis, Asymmetric Cell Division, Motor proteins, Cytoskeleton

Outline: Microscopy (Confocal microscope, DIC microscope etc.), incubators, centrifuges, -80 and -20 refrigerators

Saibal Chatterjee*saibal*<http://mcbl.iisc.ac.in/saibal.html>

Keywords: small RNA metabolism, RNA Biology & Chemistry

Outline: All wet lab techniques to handle RNA and protein. R for the analysis of High Throughput small RNA sequences/ reads and also for transcriptome analysis

Sai Siva*saisiva*<http://iap.iisc.ac.in/~saisiva.gorthi>

Keywords: Lab-on-a-Chip, Microfluidics, Optical Instrumentation, Optofluidics, Point-of-Care Diagnostics, Healthcare, Biomedical Instrumentation, Flow Cytometry, Optical Metrology, Interferometry, Non-Destructive Testing and Evaluation (NDT & E), Computational Imaging

Outline: Microfluidic Device Fabrication and Characterisation Facilities, Custom-built Imaging Flow Cytometers, Haematological Analysers (including Sysmex), BioChemical and PCR Workstations, Gel Doc, Cell Culture, Deep Freezer, Centrifuge, Microscopes (Fluorescent and Bright Field), Optical Tables and Setups, Digital Holography, Interferometers, Structured Illumination Systems, Gas Gun, Syringe Pumps, Light Sources and Detectors (Cameras and Photodiodes), Optoelectronics, Optomechanics, Nanoparticle Synthesis Lab.

Arnab Samanta*samanta*<http://www.aero.iisc.ernet.in/people/arnab-samanta/>

Keywords: Aeroacoustics, acoustics, hydrodynamic stability, compressible flows, wave mechanics

Outline: We use a range of numerical and theoretical tools, that include direct numerical simulations and large eddy simulations, physics-based reduced-order models and other analytical techniques that exploit complex analytical properties of transformed functions. Most of our codes are developed in-house supported via the use of free and commercially available numerical libraries. We perform advanced visualization of our simulations using commercial software.

Sandeep M Eswarappa*sandeep*<http://biochem.iisc.ernet.in/sandeep/>

Keywords: Translation regulation and vascular biology

Outline: Routine molecular biology and cell culture techniques and rodent models

Sandhya S. Visweswariah*sandhya*<http://www.mrdg.iisc.ernet.in/sandhya-s-visweswariah/>

Keywords: cell biology; biochemistry; gastrointestinal physiology; mycobacterium; signal transduction in biological systems

Outline: Animal models; cell culture; confocal microscopy; mouse transgenics;

Sangram Keshari Samal

sangramsamal

http://mrc.iisc.ernet.in/Faculty/FacultyFellows/Faculty_Fellows_Home.htm

Keywords: Biomaterials, Tissue engineering, Drug Delivery, Biofilm, Antimicrobial biomaterials, Phagetherapy,

Outline: My scientific activities have focused on the following areas of research: a) phage for therapeutic applications, b) engineered nano-biomaterials for the treatment of biofilm infection, c) the synthesis of cationic polymers and investigating their therapeutic potential, d) graphene oxide, quantum dots synthesis in aqueous protein phase for bioimaging and biosensor applications, e) designing of nanocarriers (synthesis and functionalization of PLGA, PCL, gold and magnetic based nanobiomaterial) for controlled targeted delivery and imaging applications.

Sanjeev Kumar Gupta

sanjeev

<http://chemeng.iisc.ernet.in/sanjeev>

Keywords: Batteries, nanoparticles, foams, emulsions, dispersions, process modelling, process intensification

Outline: Experimental investigations, CFD, Modelling, Population balances

Santanu Mahapatra

santanu

<http://santanu.dese.iisc.ac.in>

Keywords: Nanoelectronic Device Modelling, Energy Storage

Outline: High performance computing, density functional theory, Quantum transport model, Non-equilibrium Green's function, Numerical Techniques, Molecular Dynamics, Circuit Simulator (SPICE), Device Simulator (TCAD)

Sarasij Das

sarasij

<https://sites.google.com/site/sarasijiisc/>

Keywords: Smart Grids, Power System Protection, Power System Analysis, Power System Monitoring and Operation,

Outline: We have one secondary injection kit to test protection relays. In addition we have controllers such as CompactRIO and myRIO by National Instruments. We also have on FPGA, DSP boards and energy meters.

Prof. Sashikumar Ganesan

sashi

<http://cde.iisc.ac.in/faculty/sashi/>

Keywords: finite elements - high performance computing - fluid dynamics

Outline: Finite element methods for the solution of PDEs and surface PDEs, Stabilization (SUPG, LPS) and variational multiscale method, Multigrid methods, ALE approach for moving meshes, Multiphase flows with surfactants and heat transfer, Moving contact line problems, Dynamics contact angles, Turbulent flows with moving/deforming solid bodies, Population balance systems in crystallizers, Complex (viscoelastic) fluid flows, Biophysical model of cancer invasion, Computational models for eye, ParMooN, an open-source finite element software development, OpenMP and MPI based hybrid parallel algorithms

P. S. Sastry

sastry

www.ee.iisc.ac.in/faculty/sastry

Keywords: Machine Learning, Neural Networks, Noise-tolerant Learning, Temporal Data Mining, Learning Automata, Computational Neuroscience

Outline: Most of our work is on design and performance analysis of learning algorithms and is often theoretically motivated. Except for standard software tools in ML and standard GPU based systems for doing simulations, we do not use any specialized equipment.

Sathees C Raghavan

sathees

<http://biochem.iisc.ernet.in/scraghavan.php>

Keywords: DNA damage, repair, genome instability and cancer

Outline: Cell culture, Animal models, Biochemical and Biophysical methods

L. Satish

satish

hve.iisc.ernet.in/~satish

Keywords: Frequency response analysis, Studies on transformer windings, Monitoring and diagnostics of power apparatus

Outline: Theoretical studies

Satish V. Kailas

satvk

<http://www.mecheng.iisc.ac.in/?q=users/satvk>

Keywords: Tribology, Metal Forming, Friction Stir Welding/Processing, Eco-friendly lubricants

Outline: Lab Equipment: Various tribo-testers (fretting, pin-on-disc, 4-Ball, etc.), 2-axis and 5-axis Friction Stir Welding Machines, UTM, Scanning Electron Microscope, Atomic Force Microscope, Goniometer, Dynamic Light Scattering, 3-D profilometer

Satyam Suwas

satyamsuwas

Keywords: Processing of metallic materials, Mechanical behaviour of metallic materials, Microstructure-property relationship

Outline: My research span over the entire domain of materials processing-characterization - mechanical property evaluation. We primarily use deformation processing like rolling, extrusion and heat treatment for processing; X-ray diffraction, Optical and Electron microscopy for characterization; and tensile and compression tests, hardness and microhardness tests. All these facilities are owned by the department and we are the users.

Sushobhan Avasthi

savasthi

<http://www.cense.iisc.ac.in/sushobhan-avasthi>

Keywords: Semiconductor devices, photovoltaics, micro-nanofabrication

Outline: Most of the work uses the state-of-the-art fabrication facilities at National Nanofabrication Centre (<http://nnfc.cense.iisc.ac.in>), and the characterization at Micro-Nano Characterization Facility (<http://www.mncf.cense.iisc.ac.in>). We also have some dedicated capabilities such as recombination lifetime measurement system, bottom-illuminated LED solar simulator, glove-boxes for device fabrication, and a oxide CVD reactor. More information about current research please visit <http://www.cense.iisc.ac.in/heterojunctionLab/>

Sumanta Bagchi

sbagchi

sumantabagchi.weebly.com

Keywords: Ecology and environment

Outline: Biogeochemistry, Mathematics, Statistics

S Bose

sbose

<https://sites.google.com/site/polymerprocessinggroup/>

Contact information: CSIC, IISc, Bangalore 560012 || csic.iisc.ac.in || chair.csic@iisc.ac.in || +91(80) 2293 2516/ 2446

Keywords: Polymer nanocomposites, EMI shielding materials, membranes for water remediation, polymer crystallization, phase separation, directed self assembly

Outline: Twin screw extruders, rheometer, FTIR, DSC, DMTA, SEM, TEM, XRD

Swetaprovo Chaudhuri *schaudhuri* <http://www.aero.iisc.ernet.in/people/swetaprovo-chaudhuri/>

Keywords: Reacting flows, combustion. propulsion, gas turbine engines

Outline: Particle Image Velocimetry, Laser Induced Fluorescence, Pressure and Temperature measurements, Direct Numerical Simulations

Sourabh S. Diwan *sdiwan* <http://www.aero.iisc.ernet.in/people/sourabh-suhas-diwan/>

Keywords: Experimental Aerodynamics, Flow transition and turbulence, Boundary layer separation

Outline: Facilities used: Low speed wind tunnels (14ft x 9ft tunnel, 2ft x 2ft tunnel), Measurement techniques used: How-wire anemometry for velocity measurement, Piezo-resistive transducers for measurement of fluctuating pressure, Flow visualization

K. Sekar *sekar* <http://www.physics.iisc.ernet.in/~dichome/sekhome/index.html>

Keywords: Structural Biology, Computing and Bioinformatics

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

Shalabh Bhatnagar *shalabh* <http://www.csa.iisc.ac.in/~shalabh/>

Keywords: Reinforcement learning; data driven optimization techniques

Outline: The algorithms I design or use are of the stochastic approximation type. These algorithms are also applicable in reinforcement learning applications. The applications I currently look are vehicular traffic control, wireless networks, smart grids, robotics, etc. The problems specifically require control or optimization when system model is unknown and only data from a real or simulated system is available. We make use of software that is licensed or publicly available such as VISSIM for traffic simulations, ROS for robotic simulations etc. or (if these are not available) develop our own platforms from scratch to design and test our algorithms.

Shayan Srinivasa Garani *shayangs* <https://pnsil.dese.iisc.ac.in>

Keywords: Physical Data Storage (includes signal processing, coding and VLSI architectures), Neural Networks and Learning Systems, Quantum Information Processing

Outline: Mathematical Techniques and Algorithms, System Prototypes

N D SHIVAKUMAR *shivak* www.cpdm.iisc.ac.in

Keywords: Polymer based composites, Bio-Composites, Foam based materials, Synthesis/Manufacturing of lightweight materials, testing of lightweight materials, Computer Aided Design and Analysis of lightweight materials, Optimization & DOE based studies, Design and Application of developed/Novel lightweight materials.

Outline: FEA SOFTWARES

Siddhartha P Sarma

sidd

<http://mbu.iisc.ac.in/~siddlab/index.html>

Keywords: Structural Biochemistry, Chemistry and Pharmacology of natural peptides from animal venom and plant toxins, Structural Enzymology

Outline: Nuclear Magnetic Resonance and Mass Spectrometry for analysis of structure and function of proteins and peptides, transcriptomic and proteomic analysis of natural peptide libraries, design and biosynthetic production of disulfide rich toxins from natural plant and animal sources. The facilities for this research is available within the department and the Indian Institute of Science.

Siddharth

siddharth

<http://www.be.iisc.ernet.in/~siddharth/>

Keywords: Immunoengineering

Outline: Work with mouse and human innate immune system. Also develop drug delivery systems and surface modified biomaterials

Yogesh Simmhan

simmhan

<http://cde.iisc.ac.in/faculty/simmhan/>

Keywords: Big Data Platforms, IoT Platforms, Edge and Cloud Computing

Outline: Large-scale stream processing platforms like Apache Storm, Spark streaming., Distributed and temporal graph processing and graph databases., Scheduling applications and analytics on edge, fog and cloud computing resources., Scalable IoT applications and analytics., Open source platforms such as GoFFish, GoDB, ECHO, VIoLET, etc., , <http://www.dream-lab.in>, <https://github.com/dream-lab/>

Mahavir Singh

singh

<https://singhmlab.weebly.com/>

Keywords: Protein-nucleic acid interaction and biophysics

Outline: We employ recombinant protein expression and purification and use different biophysical methods that include NMR, CD, fluorescence, ITC, SPR etc. methods to study protein-protein and protein-nucleic acid interactions.

T G Sitharam

sitharam

<Http://civil.iisc.ac.in/~sitharam>

Keywords: Geotechnical engineering: design of dams and tailing dams. Geotechnical design and dynamic behaviour of soils and geotechnical structures, wind mill and solar plant foundation systems, foundation design and geotechnical/geophysical test analyses, Slope stability analyses, rock engineering, tunnelling in soils and rocks , rock slopes, pile foundations

Outline: MASW survey, Slope stability, foundation design techniques, evaluation of dynamic properties of soils and rocks, rock mass characterization techniques, rocscience suit of software's, FEM, See for details <http://tgsitharam.in>

Srikanth K. Iyer

skiyer

<http://math.iisc.ac.in/~skiyer/>

Keywords: Probability, Stochastic Processes with applications to Random Graphs, Mathematical Finance etc.and occasional dabbling in Statistics.

Outline: Use tools from the theory of probability theory and analysis.

Kumaravel Somasundaram

skumar1

<http://mcbl.iisc.ac.in/KumarS/>

Keywords: Cancer biology, molecular biology, molecular virology

Contact information: CSIC, IISc, Bangalore 560012 || csic.iisc.ac.in || chair.csic@iisc.ac.in || +91(80) 2293 2516/ 2446

Outline: cancer biomarkers, qPCR, next generation sequencing, pyrosequencing, retroviral, lentiviral and adenovirus mediated gene transduction, mouse tumor models

Shikha Laloraya

slaloraya

<http://biochem.iisc.ernet.in/shikhal.php>

Keywords: Chromosome organization and function, Cell Cycle, Molecular Genetics, Yeast Cell Biology, Chromosome abnormalities in Human disease, Post-translational protein modifications: Ubiquitylation and Sumoylation, Recombinant protein expression, DNA replication and segregation

Outline: Gel Electrophoresis to resolve DNA (Standard horizontal agarose and vertical acrylamide gels) and proteins (SDS-PAGE, etc.), Electrophoretic karyotyping by Pulsed field gel electrophoresis, Recombinant protein expression in yeast and bacterial cells, Chromatin immunoprecipitation, RNA-Seq, Protein-protein interaction assays (Yeast Two-Hybrid assay, Co-immunoprecipitation, etc.), Fluorescence microscopy, Confocal microscopy, FACs, PCR, Several other techniques in molecular biology and Genetics: e.g. Construction of plasmid vectors (cloning vectors), Mutagenesis, creation of gene-knockout strains and point mutants by integration of mutant alleles, epitope-tagging, Western Blot, Southern Blot, Northern Blot, etc. Bioinformatics: Multiple sequence alignment, Homology modeling, Gene networks.

Santanu Mukherjee

sm

<http://orgchem.iisc.ernet.in/faculty/sm/SM.htm>

Keywords: organic synthesis, enantioselective catalysis, methodology development

Outline: We are a synthetic organic chemistry group and use the routine tools of organic synthesis including analytical techniques such as NMR, IR, Mass Spec etc. As our primary interest lies in enantioselective catalysis, we extensively use analytical HPLC for determination of enantiomeric ratios.

Srimanta Middey

smiddey

<http://srimantamiddey.wixsite.com/middeygroup>

Keywords: Magnetic materials, Superconductor, thin film, metal-insulator transition

Outline: Pulsed laser deposition for thin film (lab facility); High temperature furnace (lab facility)

Srinivasan Natarajan

snatarajan

<http://sscu.iisc.ac.in/people/frameworkslab/>

Keywords: Research in the area of Framework solids (synthesis, structure, properties and mechanistic studies), heterogeneous catalysis, photocatalysis, luminescent and, magnetic materials. Li-ion conduction, Proton conduction and ceramic pigments.

Outline: Single Crystal X-ray Diffraction; Powder X-ray Diffraction, Thermogravimetric analysis, SEM, TEM, Gas Chromatography, UV-Vis and IR spectroscopy, Photoluminescence, Porosity measurements

Somnath Dutta

somnath

<https://www.duttasn.com>

Keywords: Cryo-Electron Microscopy, Structural Biology, Membrane Protein, GPCR, Natural Products, Polyketide Synthase, infectious diseases,

Outline: Cryo-Electron Microscopy, Electron Microscopy, Protein Biochemistry, Enzymology, Biophysics, Massspec

S P Arun

sparun

<https://sites.google.com/site/visionlabiisc/>

Keywords: visual perception, neuroscience, computer vision

Outline: Techniques: , Computational modeling of human vision , , Experimental Tools:, Eye tracker

Satish Patil

spatil

<http://oesscu.in/>

Keywords: Molecular Electronics, Organic Light-emitting Diodes, Organic Solar Cells, Perovskite solar cells, Organic Field-Effect Transistors and Organic Electrochemical Transistors

Outline: <http://oesscu.in/>

Subba Reddy B

sreddy

<http://hve.iisc.ac.in/~reddy/>

Keywords: High Voltage Engg, Insulators, conductors, renewables

Outline: Experimental, computational techniques

Prof R Srinivasan

sri

mgmt.iisc.ernet.in/~sri

Keywords: Marketing , Strategy, Transportation, Energy

Outline: depending on the problem. may use advanced statistical models, marketing analytics, algorithms or computational techniques

V C Srinivas

srinivas

<http://www.physics.iisc.ac.in/~srinivas>

Keywords: High Performance Computing, Systems and Network Administration, Embedded Systems, IOT

Outline: Open source Software

Sriram Ganapathy

sriramg

<http://leap.ee.iisc.ac.in/sriram/>

Keywords: Machine Learning, Signal Processing, Speech Processing, Auditory Neuroscience

Outline: Deep Learning in Python Using Tensorflow/Pytorch, Speech Recognition Modeling Using Kaldi, State-of-art Machine Learning Tools and Algorithms, GPU based centralized cluster computational facility managed by our lab.

Srisha Rao M V

srisharao

<http://aero.iisc.ac.in/people/srisha-rao-m-v/>

Keywords: High Speed Aerodynamics, Gasdynamics, Supersonic Ejectors, Nozzles, Intakes, High Speed Air-breathing Engines, Hypersonic Flows

Outline: My expertise lies in the area of experimental high-speed aerodynamics including supersonic and hypersonic flows. I use established facilities in the department of aerospace engineering like high-speed wind tunnels and shock tunnels. For specific purposes, I design experimental test rigs - a supersonic jet and ejector facility, and a compressible mixing layer facility has been designed and established. Dominantly I use optical flow diagnostics as well as conventional measurement techniques with a particular focus on dynamic measurements. Data analysis algorithms have been developed for extraction of dynamic information from large datasets including images. I use CFD to complement the design and experimental activity including Fluent, CFD++, and OpenFOAM.

Subba Rao Gangi Setty

subba

<http://mcbl.iisc.ac.in/subbarao.html>

Keywords: Cell Biology, Skin pigmentation/lightening/diseases, lysosome biology and storage diseases

Contact information: CSIC, IISc, Bangalore 560012 || csic.iisc.ac.in || chair.csic@iisc.ac.in || +91(80) 2293 2516/ 2446

Outline: High-through put screen (small molecule and shRNA), advanced cellular imaging, Cell biological assays, disease models.

Sudeep N. Punnathanam *sudeep* <http://chemeng.iisc.ac.in/sudeep/Home/Welcome.html>

Keywords: Thermodynamics, Molecular Simulation, Crystallization, Nucleation, Adsorption, Gas Hydrates

Outline: We primarily use molecular simulation techniques such as molecular dynamics and Monte Carlo methods for investigating chemical systems. Our lab is equipped a 400 core computing cluster.

Suhasini Gururaja *suhasini* <http://www.aero.iisc.ernet.in/people/suhasini-gururaja/>

Keywords: Composite Materials, Mechanics, Manufacturing, Fracture and Fatigue

Outline: Dr. Suhasini's research is focused on a major theme in the field of advanced composites that correlates the material microstructure with its performance. Material hierarchy, inhomogeneity and anisotropy – inherent to advanced composites – make the development of accurate structure-property relations quite challenging. Additionally, effective preservation of optimal microstructures is needed during composite manufacturing, where even minor variations result in varied structure-property relations across the acreage of a structural component. Dr. Suhasini's research group – Advanced Materials and Processing Laboratory (AMPL) that she developed and expanded at IISc – explores issues at the intersection of composite microstructure, composite manufacturing, and structural integrity. She has achieved this through developing and leading intertwined research activities in the areas of damage development and progression, machining of composites, and processing of composites.

SUNIL CHANDRAN L *sunil* <http://drona.csa.iisc.ernet.in/~sunil>

Keywords: Graph Theory, Combinatorics

Outline: Basically mathematical work. Discover theorems and prove them.

Supradeepa V R *supradeepa* <http://www.cense.iisc.ac.in/supradeepagroup/>

Keywords: High Power Fiber Lasers, Laser Materials Processing, Laser Applications, Laser Instrumentation, Optical Communications, Fiber Optics, Optical Signal Processing, Ultrafast Optics, Nonlinear Optics, Microwave Photonics, Integrated Photonics, Optical Instrumentation

Outline: We have the entire tool-set and process development for advanced processing of optical fibers including splicing, cleaving and recoating. We have custom lasers developed which can work upto 1kW of optical power. We have the ability to develop high power agile lasers at a variety of wavelengths in the NIR region. We have various optical characterization equipment and advanced RF characterization equipment which can work upto 60GHz.

G. K. Ananthasuresh *suresh* <http://www.mecheng.iisc.ac.in/~suresh>

Keywords: Compliant mechanisms, topology and shape optimization, biomechanics, MEMS, mechanical design

Outline: Confocal microscope, 3D printers, dynamic motion analyzer, micromanipulation, cell culture, finite element analysis, simulation, optimization

V. Susheela Devi *susheela* <http://drona.csa.iisc.ac.in/~susheela/>

Keywords: Pattern Recognition, Machine Learning, Artificial Intelligence

Outline: Classification and clustering techniques, soft computing techniques, optimization techniques

Prof. S. V. Bhat

svbhat

<http://www.physics.iisc.ernet.in/~svbhat>

Keywords: Electron Paramagnetic Resonance, magnetism, glass physics

Outline: Electron Paramagnetic Resonance, magnetic measurements

Venugopal Santhanam

svgpal

<http://venuiisc.wixsite.com/lab2a>

Keywords: Nanostructured Materials, Process Design, Chemical Engineering, Flexible Electronics, Surface Enhanced Raman Spectroscopy, Fuel Cells, Gas Sensors

Outline: <http://venuiisc.wixsite.com/lab2a/facilities>

Tarun Rambha

tarunrambha

<http://civil.iisc.ac.in/~tarun/>

Keywords: Network Optimization, Traffic Networks and Equilibrium, Congestion Pricing, Routing Algorithms, Logistics, Shared Ride Systems, Signal Control Algorithms

Outline: I primarily work at the intersection of transportation engineering and optimization.

Tejas G Murthy

tejas

civil.iisc.ac.in/~tejas

Keywords: Geomechanics, Drilling in solids, manufacturing processes, granular flow, experimental soil mechanics, x-ray computed tomography

Outline: I am an experimental solid mechanist. I study large deformation processes especially in the context of manufacturing. I work on processes such as drilling, cutting, milling etc. in materials such as rocks, soils, bone and teeth. I use image based deformation measurements including x-ray tomography in my research work. I study flow of granular materials such as powders, food grains etc.

Thilagar P

thilagar

<https://ipc.iisc.ernet.in/thilagar.php>

Keywords: Design and development of bio-imaging agents, peptide, proteasome inhibitors, Boronno peptides, boron, Luminescent materials, stimuli responsive luminescence materials, optical sensors

Outline: Research in our group is highly interdisciplinary, involving aspects of organic, organometallic, polymer and Nanomaterials chemistry. We are involved in the design and synthesis of new molecules/materials containing p-block elements for the potential application in the field of Catalysis, Molecular Electronics and Chemosensory materials. Our laboratory equipped with state-of-the-art facilities to carry out all type of chemical and materials synthesis. , spectrometers "UV-Vis-NIR, Fluorescence, Phosphorescence, Time resolved photoluminescence, HPLC, thermal evaporator, Four port Glove box Fume hood, non-grease special Schlenk lines to carry out air and moisture sensitive reactions. Immersion coolers (up to -120 degree) to carry out low temperature reactions. high pressure reactors, Programmable hydrothermal oven, sonicator, orbitalshaker, available, , We are also actively pursuing design and development of boronopeptides and their role as antibacterial and diabetes wound healing drug molecules. Recently we had set up Chemical/micro/molecular biology laboratory with facility to handle both bacterial and mammalian cells. Our lab facilities also include, biosafety cabinet, CO₂-incubator, electrophoresis, refrigerated centrifuge, Liquid N₂ storage container, Cryocan, Gel-doc, blotting, fluorescence microscope, orbital shaker, deep freezer, freezers (-50, -20 and 4 degree), stirrers, vortex mixer, autoclave etc.

TIRTHANKAR BHATTACHARYYA *tirtha*

math.iisc.ac.in/~tirtha

Keywords: Subject - Mathematics. Broad area - Functional Analysis. Key words - Hilbert spaces, operator theory. Of interest to - Physicists, Electrical Engineers, System theorists, Control theorists.

Outline: To industry, the best use of my work will be in control and systems, especially H infinity control. The best is to look at my home page math.iisc.ac.in/~tirtha

Tushar Kanti Chakraborty

tushar

<http://orgchem.iisc.ernet.in/faculty/tkc/index.html>

Keywords: Organic synthesis, natural product synthesis, peptides, peptidomimetics, medicinal chemistry, drug discovery

Outline: We work on the development of new designer molecules based on sugar amino acids and related multifunctional building blocks, study their three-dimensional structures and properties, such as antimicrobial properties of cationic peptides, cyclic as well as linear, against Gram positive and negative bacteria as well as selective activities against MTB; anticancer activities targeting microtubule dynamics, c-MYC and other gene promoters, VIP receptors, HDAC and others., In the area of organic synthesis, we give special emphasis on stereoselective synthesis and pursue total synthesis of natural products, with challenging structures and potent biological properties, ranging from polyketide-based macrolides to sesquiterpenoids using often a Ti(III)-mediated opening of chiral epoxides and epoxy alcohols, developed in our lab, as a key step.

Prabhakar Venkata

tvprabs

<http://zenlab.dese.iisc.ac.in/>

Keywords: Networked embedded systems, IoT Protocols and Data management, Electronic System Building and System Security, Energy Harvesting Systems, Tactile/Low latency Internet Applications, Heterogeneous Networks

Outline: Research is mostly algorithmic by nature with special emphasis on their efficient construction. As an example, a simple goal can be to build an embedded network of wireless nodes that can survive 10 years. For the hardware part, novelty in electronic circuits is the emphasis. IAR workbench, NS3 simulators, Multi physics engines are used in the lab. Machine learning frameworks such as Tensor flow for embedded intelligence run on cloud platforms.

Thippur Sreenivas

tvsvree

<http://www.sagiisc.in/people/faculty>

Keywords: Signal Processing, Speech/Audio recognition/classification, Speech/Audio coding/compression/enhancement, Robotic communication, Multi-microphone/speaker spatial audio processing

Outline: STFT, Chirp transform, Stochastic models, GMM, HMM, Bayes estimation, Compressive sensing, Sparse estimation, Dereverberation, mic-reflectors, hearing aid design/assessment.

Uday Kumar Reddy B

udayb

<http://www.csa.iisc.ac.in/~uday>

Keywords: High-Performance Computing, Compilers,

Outline: Multicore processors, Accelerators, Stencil computations, Image processing pipelines, Parallelization, Tiling,

Udaya Kumar

udayk

<http://www.ee.iisc.ac.in/faculty/uday/index.php>

Keywords: Lightning, Electromagnetics, Grounding, High Voltage Engineering

Outline: Different numerical methods for electrostatics to electromagnetic wave-propagation on thin wires, which includes FDM, FEM, FVM, TD-WFIE, etc.; , modelling of electrical breakdown of air, soil; distributed circuit modelling of electrical system, etc

Upendra

uharbola

<http://ipc.iisc.ac.in/uharbola.php>

Keywords: Statistical Physics, Quantum mechanics, nonlinear dynamics

Outline: Statistical tools to analyze fluctuations in quantum system. We frequently use Mathematica software and C++ programming to solve model equations.

U Jayachandra Shenoy

uj

www.ee.iisc.ac.in/faculty/uj/index.php

Keywords: Development of Smart power system protection systems, protection issues in grid connected renewable sources and microgrids, DSP and AI applications in protective relays

Outline: Development of signal processing algorithms for high speed and accurate fault detection in power system networks. Design and Development of hardware platforms based on DSP processors for numerical relay implementation

Upendra Nongthomba

upendra

<https://dbgl.wordpress.com>

Keywords: Developmental Genetics, Cell and Molecular Biology

Outline: Fruitfly and Zebrafish as in vivo model systems for drug screening, toxicological testing, pathway identification, genetic interaction studies, functional genomics

Vibhor Singh

v.singh

<http://www.physics.iisc.ernet.in/~v.singh/wordpress/>

Keywords: Superconducting quantum devices, nano-electro-mechanical devices, electron-transport in meso-scopic devices, condensed matter physics

Outline: My group specialized in performing microwave measurements at ultra-low temperature as small as -273 C. There has been a considerable interest in developing superconducting devices operating in microwave frequency regime (1GHz - 10 GHz) at low temperature. These devices provide a potential platform to realize emerging technologies such as quantum-computing. , My lab has a dilution refrigerator custom-designed to perform low-noise microwave measurements at temperatures as low as 10 mK, utilizing standard microwave measurements tools, such as vector network analyzer, High-bandwidth arbitrary waveform generators, microwave signal generator, spectrum analyzers, etc. , We also have access to fabrication facilities available at Center for Nanoscience and Engineering for the fabrication of high-quality devices. More information on research facilities can be found at: , <http://www.physics.iisc.ernet.in/~v.singh/wordpress/facility>

Vamsi Pritham Pingali

vamsipingali

<http://www.math.iisc.ac.in/~vamsipingali/>

Keywords: Differential geometry, several complex variables, mathematical physics, some aspects of computer science that involve a lot of differential geometry and partial differential equations (PDE)

Outline: Being a pure mathematician, I do not employ any such "tools". The main theme of my research is to study (existence of solutions for) PDE that arise from geometry and physics. My contributions in the computer science aspect were also of the type "calculate this geometric quantity" or "prove that a certain error estimate holds using techniques from PDE".

Varsha Singh

varsha

http://mrdg.iisc.ernet.in/varsha_2014/thewormlabmrdg.html

Keywords: host pathogen interactions, Quorum sensing in bacteria, swarming and biofilm formation in *Pseudomonas aeruginosa*

Outline: Genetics in bacteria and *Caenorhabditis elegans*, microbiology, clinical microbiology, molecular biology, gene expression analysis, survival, lipid analysis

Umesh Varshney

varshney

<http://www.mcbl.iisc.ernet.in/Varshney/>

Keywords: Protein synthesis, ribosomes, antibiotic resistance, DNA repair

Outline: Molecular biology, microbiology, molecular genetics and biochemistry

Varun Raghunathan

varunr

<https://www.sites.google.com/site/varunr196/>

Keywords: Photonics, Nonlinear optics, Integrated optics, Bio-imaging

Outline: Electromagnetic simulations of photonic structures, nanophotonic device fabrication, experimental characterization, Label-free, multiphoton microscopy of biological and non-biological samples.

Sudhir Kumar Vempati

vempati

<http://chep.iisc.ernet.in/Personnel/pages/vempati/index.html>

Keywords: Theoretical High Energy Physics

Outline: Our group are experts in various mathematical techniques used in theoretical physics research , problems. While typically both analytical or numerical methods are used in a segregated manner, , we try to tailor our solutions depending on the problem at hand, sometimes using both sets of, techniques. We have build numerical codes involving various mathematical entities like differential equations, integrations, matrices and vectors manipulations and their functions etc. , Simulations over large amount of parameter space and statistical analysis of data are other techniques we use. Most of these methods can be applied in other branches also. , Our main strength is on building home grown computational codes tailored to solve specific , mathematical /statistical problems either numerically, semi-analytically or analytically. We have, already released public codes in Fortran and are proficient in C,C++ , python and packages , like mathematica, matlab etc.

B V Venkatarama Reddy

venkat

civil.iisc.ac.in

Keywords: Construction materials, concrete structures, masonry, energy in buildings, materials from non-organic solid wastes, sustainable and green buildings

Outline: State of the experimental and analytical/numerical techniques

V. Venkataraman

venki

<http://www.physics.iisc.ernet.in/~venki/>

Keywords: semiconductor, instrumentation, microfluidics

Outline: Electronic instrumentation to measure conductivity, magnetization, capacitance, inductance and resistance of solid state samples. Optical microscopes and image processing setup. High magnetic field generation through transient pulses. Instrumentation for pulsed signal capture and processing. High power semiconductor circuits for kiloamp current measurement and control. Lock-in amplifier signal processing for low level current, voltage and noise measurements. Circuits for interfacing electronic instruments to personal computers using GPIB, USB or wireless buses for data logging, remote control and management. Semiconductor processing tool development such as spin coater, quartz crystal thickness monitor and pressure gauges. Microcontroller based circuits with analog opamps and digital gates for automatic monitoring and control of instruments. Embedded controller software development. Website development using open-source CMS platforms such as Drupal. Microfluidics prototype development using PDMS soft lithography. Colorimetric biosensors based on TMB substrate. Enzymatic blood glucose detection using colorimetric TMB strips along with optical reader. TMB liquid substrate technology for ELISA, immuno-histochemistry and other diagnostics. HbA1c detection in blood using TMB technology. Ecoli bacterial colorimetric detector for monitoring water contamination based on TMB fluorescence technology. All these technologies are available in our laboratory.

R. Venkatesh Babu

venky

<http://cds.iisc.ac.in/faculty/venky>

Keywords: Computer Vision, Deep Learning, Image Analysis, Image Processing, Video Analytics, Data Compression

Outline: Deep learning, Visual Analytics

Vinod Ganapathy

vg

<http://www.csa.iisc.ac.in/~vg>

Keywords: Computer security, privacy and computer systems.

Outline: At IISc, I direct the Computer Systems Security Laboratory. We seek to build practical computer systems with sound security guarantees. My research projects have considered security issues in a broad spectrum of computer systems, from cloud platforms through Web browsers to mobile devices. I have wide-ranging interests, and my projects usually draw on ideas and methods developed in a variety of areas, such as applied cryptography, program analysis, formal methods, machine intelligence, and hardware architecture.

Victor Suvishesha Muthu D

victor

<http://www.physics.iisc.ernet.in/~victor/>

Keywords: Raman Spectroscopy

Outline: We study the vibrational properties of materials using Raman scattering technique under high pressure (up to 30 GPa), low temperature (up to 4 K) and high magnetic field (up to 5 T).

S. Vijaya

vijaya

http://mcbl.iisc.ac.in/s_vijaya.html

Keywords: Infectious disease biology, host-pathogen interactions

Outline: Immunology, molecular biology, molecular virology, cell biology, flow cytometry, microscopy

Vijayalakshmi Ravindranath

viji

<http://www.cns.iisc.ac.in/home/people/vijayalakshmi-ravindranath/>

Keywords: Neurodegenerative disorders, aging brain

Outline: molecular biology, biochemistry, histology, behaviour

P N Vinayachandran

vinay

<http://caos.iisc.ac.in/person.php?type=Faculty>

Keywords: Oceanography, Ocean Modeling, Marine Ecosystem Dynamics, Ocean observations, climate modeling

Outline: Numerical Modeling, Data analysis, measurements and surveys, high-performance computing, climate modeling

Vinod John

vjohn

<http://www.ee.iisc.ac.in/new/people/faculty/>

Keywords: Power electronics, power quality, and switch mode power supplies

Outline: Extensive facility for analytic and hardware studies on power converters, and their controllers, and filters used with the power converters.

Sathish Vadhiyar

vss

<http://cde.iisc.ac.in/faculty/vss/>

Keywords: High performance computing (HPC), supercomputing and HPC middleware, parallel computing, GPU computing, fault tolerance for parallel applications, HPC application frameworks, Scalability studies

Contact information: CSIC, IISc, Bangalore 560012 || csic.iisc.ac.in || chair.csic@iisc.ac.in || +91(80) 2293 2516/ 2446

Outline: We employ CPU-GPU hybrid computing and divide-and-conquer techniques for accelerating graph applications and scientific irregular applications including AMR, molecular dynamics and N-body simulations., We use matching applications with execution profiles of kernel benchmarks to predict scalability and identify scalability bottlenecks., For fault tolerance, we use the strategy of replication and checkpointing., For middleware research, we use supercomputing job traces to analyse the workloads, and predict their queue waiting times. We then build metascheduling techniques that use these predictions.

Venkatesh V

vvenkatesh

<https://venka71.wixsite.com/dr-venkatesh-iisc>

Keywords: Cancer Research, metal nanoclusters

Outline: NMR, HR-MS, TEM, etc

V V Srinivas

vvs

<http://civil.iisc.ernet.in/~vvs/>

Keywords: Prediction and simulation of environmental extreme events (e.g., fluvial/riverine and pluvial floods, droughts, rain storms), hydro-meteorological variables (e.g., rainfall, temperature, wind speed, evapo-transpiration), and hydrological processes (e.g., surface runoff, streamflows/environmental flows) in river basins; Regionalization of watersheds and hydrometeorological monitoring networks (to predict hydrological & meteorological processes in ungauged basins); Impact assessment of climate and land-use/land-cover changes on hydrological processes in river basins; Reliability assessment of urban storm water drain networks; Modelling flood propagation and inundation resulting from breach of civil engineering infrastructure (e.g., dams, levees and dikes) in a river basin; Forecasting streamflows and floods in river basins

Outline: New stochastic techniques/algorithms developed by my research group over the past 16 years, and several conventional procedures/techniques/approaches used by practitioners

William R. Surin

wrsurin

<http://mcbl.iisc.ac.in/William-R-Surin.html>

Keywords: Inflammatory respiratory diseases, chronic obstructive pulmonary diseases (COPD), animal models, in vitro test systems, Cardiovascular diseases, Intravascular thrombosis, Platelet signaling pathways

Outline: We use flow cytometry and fluorimeter as a technique to address various biological problems and developing newer and novel protocol in understanding various cellular signaling and processes.

Phaneendra Yalavarthy

yalavarthy

<http://cds.iisc.ac.in/faculty/yalavarthy/>

Keywords: Medical Imaging, Image Reconstruction, Inverse Problems

Outline: Computational Methods, Numerical Algorithms, Deep Learning, Image Processing, Image Analytics, Algorithm Development

Yashonath Subramanian

yashonath

<http://sayuja.sscu.iisc.ac.in>

Keywords: theoretical physical chemistry, separation science, petroleum refining

Outline: molecular dynamics, ab initio

Yoginder Kumar Negi

yoginder

<https://yknegi.github.io/>

Keywords: Computational Electromagnetics

Outline: Numerical method, Linear algebra, High Performance Computer