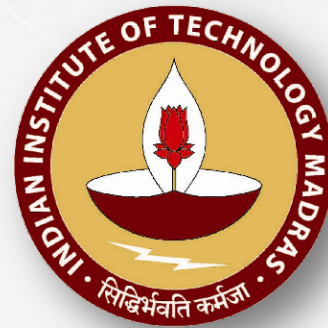
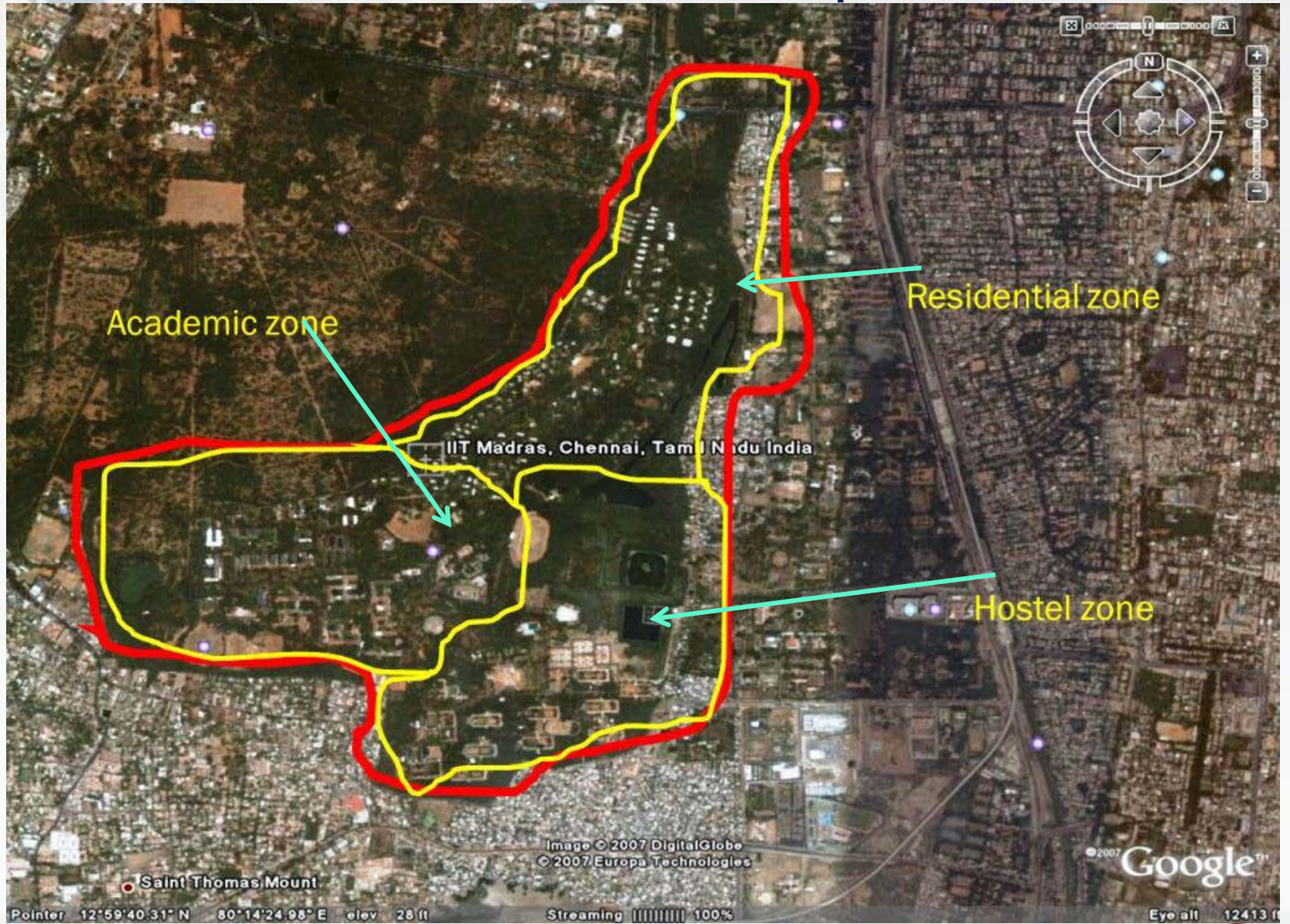


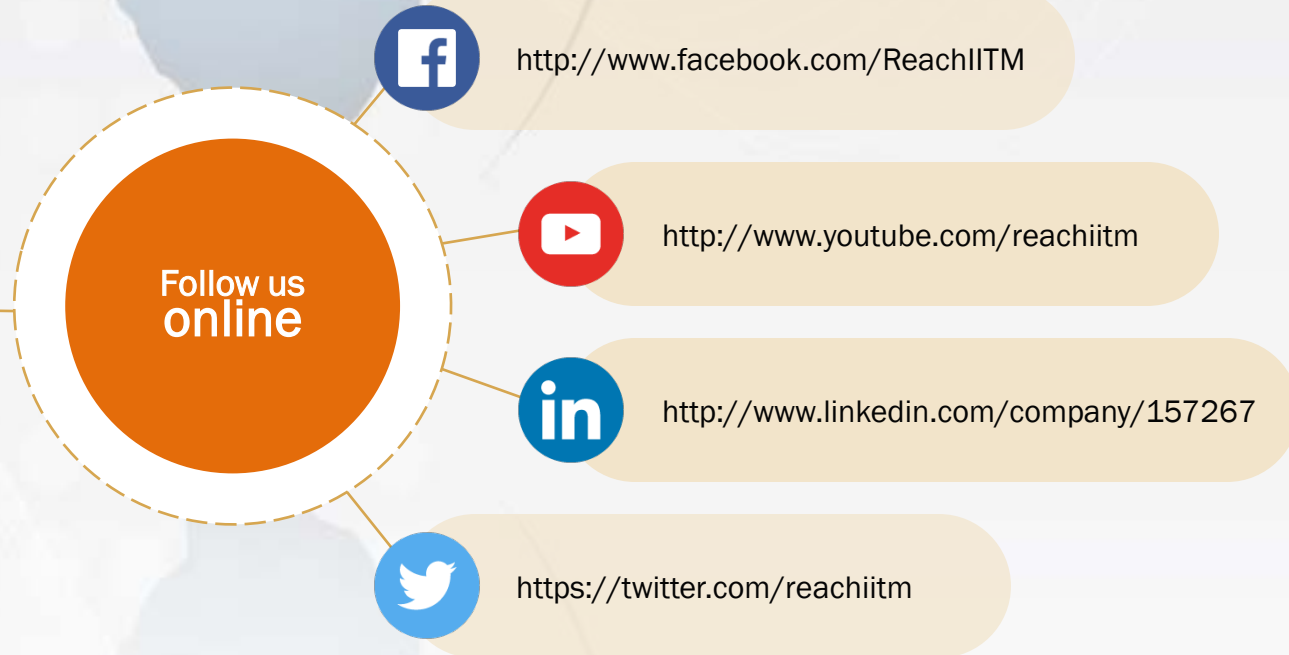
Welcome to IIT Madras



IIT Madras campus



CONNECT WITH IIT-M



Departments

Engineering :

- ❖ Aerospace Engineering
- ❖ Applied Mechanics
- ❖ Biotechnology
- ❖ Chemical Engineering
- ❖ Civil Engineering
- ❖ Computer Science & Engineering
- ❖ Electrical Engineering
- ❖ Engineering Design
- ❖ Mechanical Engineering
- ❖ Metallurgical Engineering
- ❖ Ocean Engineering

Humanities :

- ❖ Humanities & Social Sciences
- ❖ Management

Sciences:

- ❖ Mathematics
- ❖ Physics
- ❖ Chemistry



Academic Programs

COURSE-BASED PROGRAMS

- 4-year Bachelor's - B. Tech
- 5-year Dual Degree - B.Tech and M.Tech
- 5-year Integrated - M.A and M.Sc
- 2-year Master's - M. Sc., M.B.A; M.Tech.,
M.Tech(UOP); M.Tech (Clinical Engineering)

RESEARCH-BASED PROGRAMS

- M.S. - 2 to 3 years after B.Tech/ M.Sc
- Doctoral - 4 to 5 years after Masters



Calendar (Every year)

Odd Semester:

Orientation – 22nd July

Semester start – 29th July

Semester end – 28th November

Application deadline: 15th May

Even Semester (Spring):

Orientation – 7th January

Semester start – 14th January

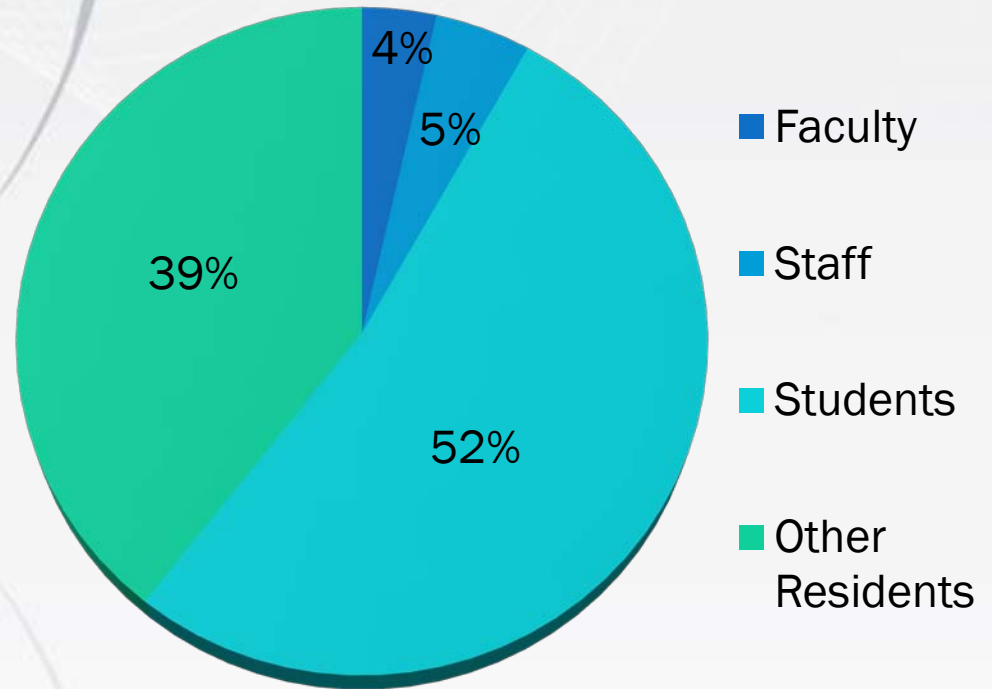
Semester end – 10th May

Application deadline: 15th November

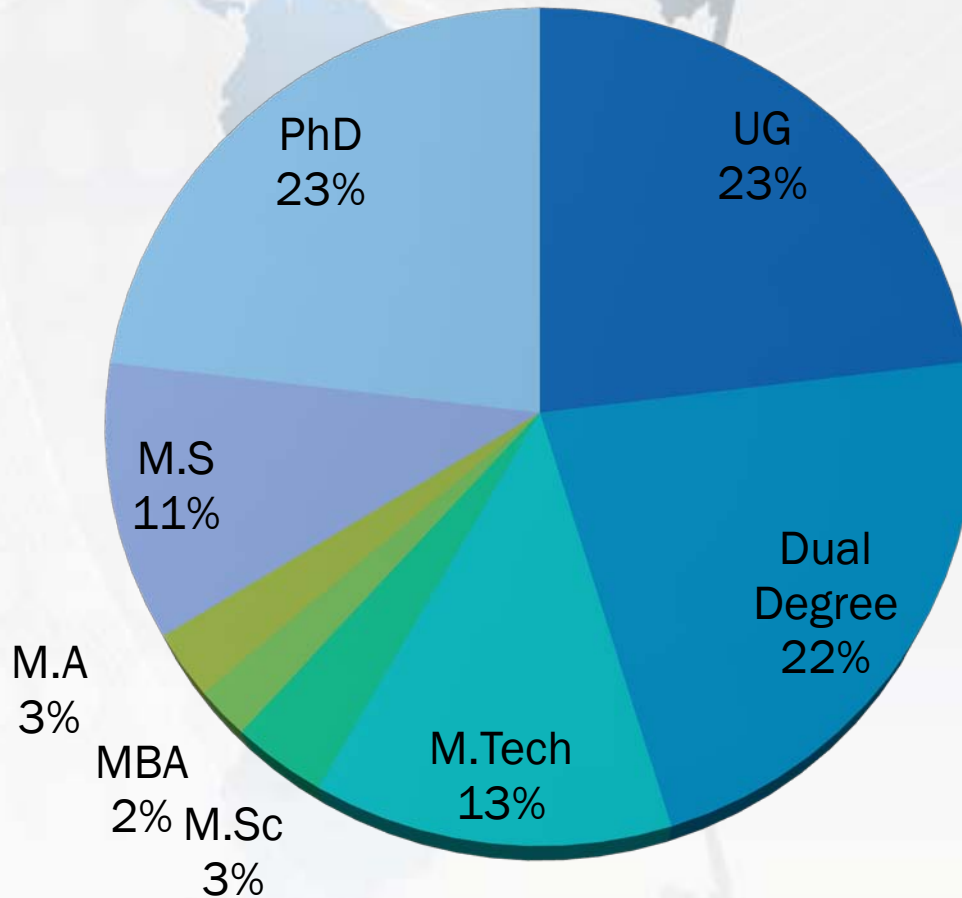


IITM Today

Faculty	540
Staff	1250
Students	9000
Other Residents	5400
Total	16190



Current Student Population



UG	1983
Dual Degree	1994
M.Tech	985
M.Sc	285
MBA	135
M.A	286
M.S	968
PhD	2253



RESEARCH & IP

Academic (basic, open-sky) research

- ✓ Publications

Translational research

- ✓ Industry
- ✓ Space
- ✓ Defence
- ✓ Incubation

Transformational Research

- ✓ Direct societal impact
- ✓ Disruptive improvement in housing, water, healthcare, education, energy

900+

Projects Annually

250

Indian Companies

40+

Multinational
Companies

90+

IP Annually

SOCIETAL IMPACT

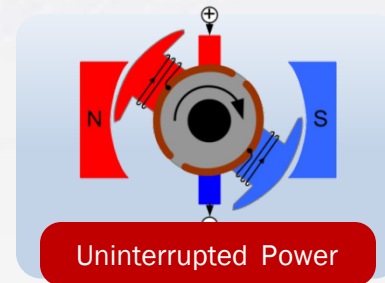
Transformational Research



Clean Water



Affordable Housing

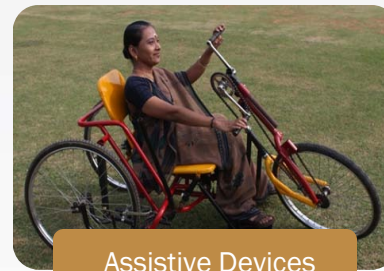


Uninterrupted Power

Changing every Indian's way of life



Available Healthcare



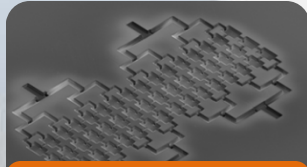
Assistive Devices

CENTERS OF EXCELLENCE (COE)

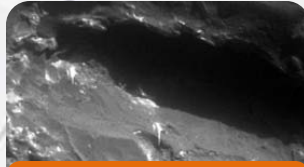
Translational Research



Combustion Research



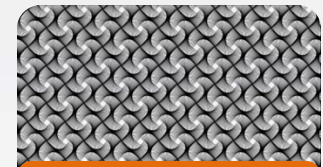
Nano-Devices & Materials



Decentralized Energy



Decision Sciences



Soft Matter



Machine Tools & Manufacturing



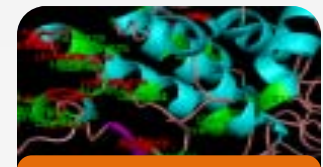
Tyre & Vehicle Dynamics



Transportation



Non-destructive Testing



Cancer

Make in India



MRI



Water



Heritage Structures



China Studies

IGTCS
INDO-GERMAN Centre
for SUSTAINABILITY

Sustainability



NEW COES

Propulsion
Technologies (COPT)

Graphene
Applications
(TSAMRC)

Steel
Research
(COXIST &
CREST)

Railway
Research
(CRR)

Industrial
Internet of
Things (IIT-GE)

Urban
Development
& Smart City
(CUBE)

Automotive
Research
(CAAR)

Solar Hub

CENTRE OF PROPULSION TECHNOLOGY

Deliverables based on *directed basic research* towards four products



Gas turbine engines



Hypersonic propulsion



Solid rocket combustion modelling



Morphing aircraft

Other tangible deliverables



Tangible goals: ~50 PhD, ~100 MS/M Tech over 5 years



Training DRDO scientists in advanced R&D



Technical dissemination:
Conduct of & participation in international workshops/seminars

40 M LIGO PROTOTYPE

Next Generation Technologies

- 2 mm fibre lasers
- Silicon photonics platform
- Squeezed light detectors
- Adaptive optics

Partner to the LIGO labs at Caltech, MIT

10+ faculty working across disciplines

- Astrophysics, Photonics
- Sensors, Controls, Instrumentation
- Mechanical and Civil Engineering, Seismology
- Signal processing, data analytics



Caltech LIGO-lab

INTER-DISCIPLINARY CENTRE FOR DATA SCIENCES

Algorithms (Data Analytics/Mining)

Architecture (Data Management/Storages)

Sensors and Internet of Things (Data Gathering)

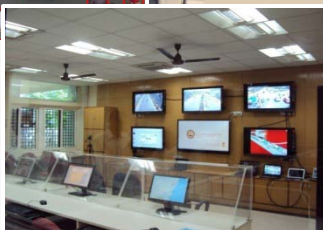
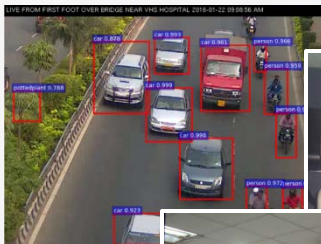
Manufacturing Analytics
(with Centre for Advanced
Manufacturing Technology)

Fintech
Microfinance
Risk Analytics

Smart Cities
Transportation
Power
Water
Pollution

**Systems Biology
and Health Care**
Cancer Genomics,
Brain Mapping

TRANSPORTATION ANALYTICS



Center of Excellence in Urban Transport has

- Over 120 devices installed by IIT Madras
- Over two years of data
- Every 10 seconds
- ~8 Lakh records a day!
- 28 video cameras
- Live feeds to our lab

ILDS leverages on these data sources to

- Perform automated extraction of bus-stop location data and congestion hotspots from GPS data
- Advanced image processing techniques to identify, track, classify vehicles from real-time video feeds

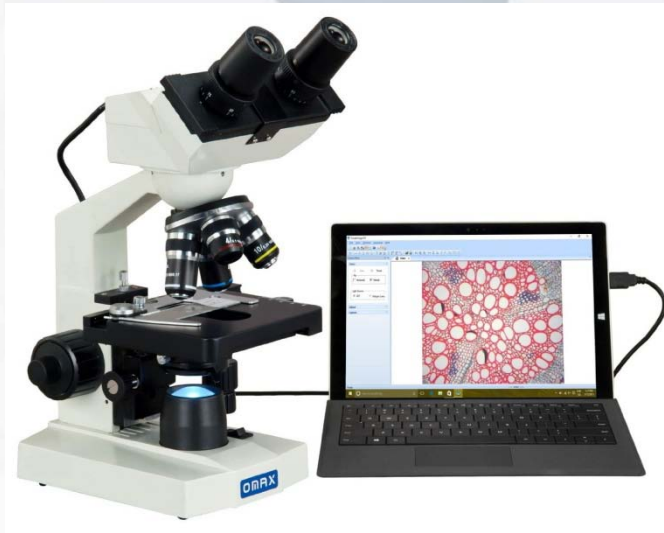
Jointly with TCS: Measuring and predicting congestion from multiple sources of data

DECENTRALIZED SOLAR DC



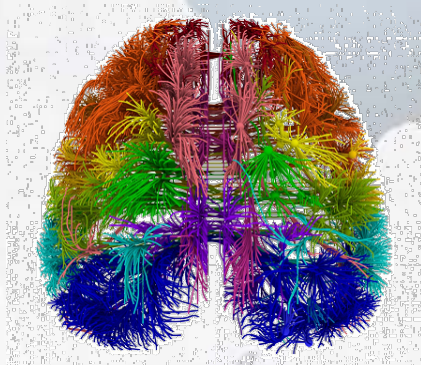
- ✓ Switchover to 48V DC lights, appliances
- ✓ In commercial buildings, DC VAVs, AHUs, Chillers
 - All networked
- ✓ Rooftop solar
- ✓ Thermal storage, some battery storage
- ✓ With increases renewable, power availability can fluctuate over short time-scales (minutes)
- ✓ Move to dynamic pricing and load management
 - Leverage thermal time constants and local storage to smooth power requirements
- ✓ Grid-wide demand management at quarter-hour resolution to match availability/ minimize cost

INITIATIVE FOR BIOLOGICAL SYSTEMS ENGINEERING



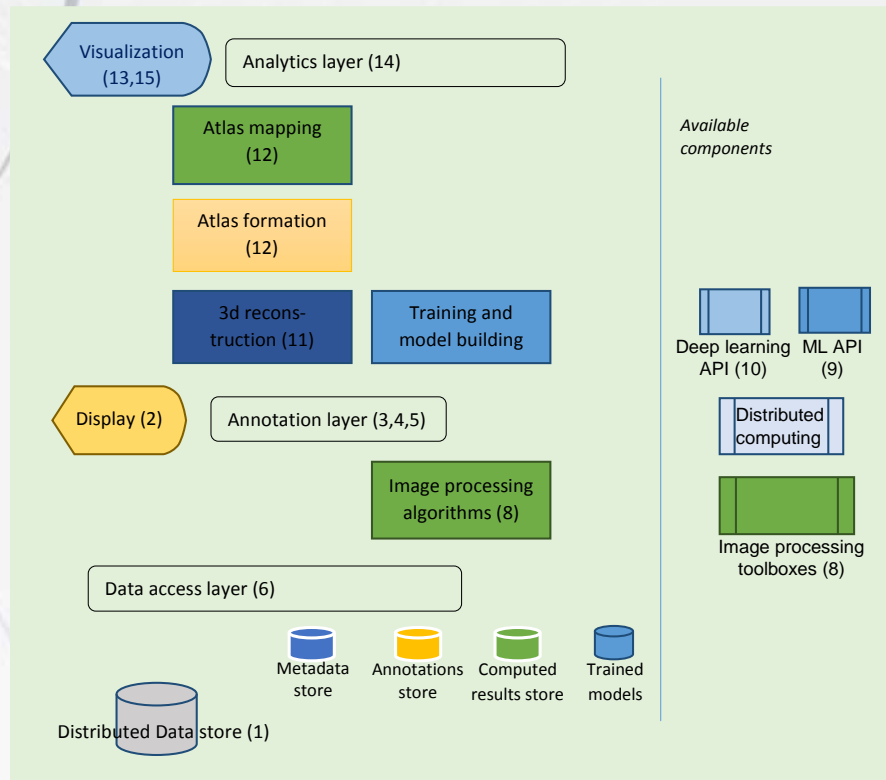
- ✓ **Large-scale biological Data Analysis**, in collaboration with Prof. Ashok Venkitaraman, MRC Cancer Unit, Cambridge, UK
- ✓ **Identifying critical mutations underlying cancer**
 - through a comparative analysis of sequences from healthy and mice conferred with cancer-inducing mutations
- ✓ **GOAL:** Understanding Genotype-Phenotype Mapping in Disease through a longitudinal integration of diverse “omics” datasets, novel algorithms
 - Genomic / Transcriptomic / Proteomic / Phosphoproteomic / Metabolomic
 - leveraging publicly available datasets (e.g. ICGC) and data from collaborators in India and abroad

MOUSE BRAIN MAPPING



Desired Brain Map

- Led by Computational Brain Research Chair Partha Mitra and HTIC's Mohansankar
 - Terabytes of images



MAJOR COMPONENTS OF CPWC

Four key focus areas

Technology Development & Training

- Mobile platforms
- Data & mining
- Navigation
- Dredging
- Investigations
- Traffic management
- Coastal Environment

Modelling & Software products

- Hydrodynamics
- Morphodynamics
- Navigability
- Nautical depth
- Visualization
- Traffic & Management

Bridge Simulator

- Port navigation
- Optimization
- Project development
- Interactive simulation & Optimization

High speed Towing tank & Large scale wave flume

- Next generation ports and vessels
- Large investments in Naval vessels
- More accurate results
- Compete with the best
- Indigenous technology

IITM Research Park

India's First University Research Park



IITMRP

- IITMRP will have a built-up space of 1.6 million sq. ft. when complete.
- The First tower with 0.4 million Sq.Ft. started functioning from March 2010.
- IITMRP Phase – II, about to be complete has three blocks, each with Ground + 10 floors, with a total built up area of 0.82 million Sq.Ft
- A separate Multi Level Car Park (MLCP) with Ground + 5 Floors is being built
- Located prominently with amenities like food court, Child Care Center, ATMs and a Transit Accommodation by the Ginger Hotels
- 100% Power back-up and Centralized HVAC and Fiber optic connectivity



IITMRP - ATRIUM

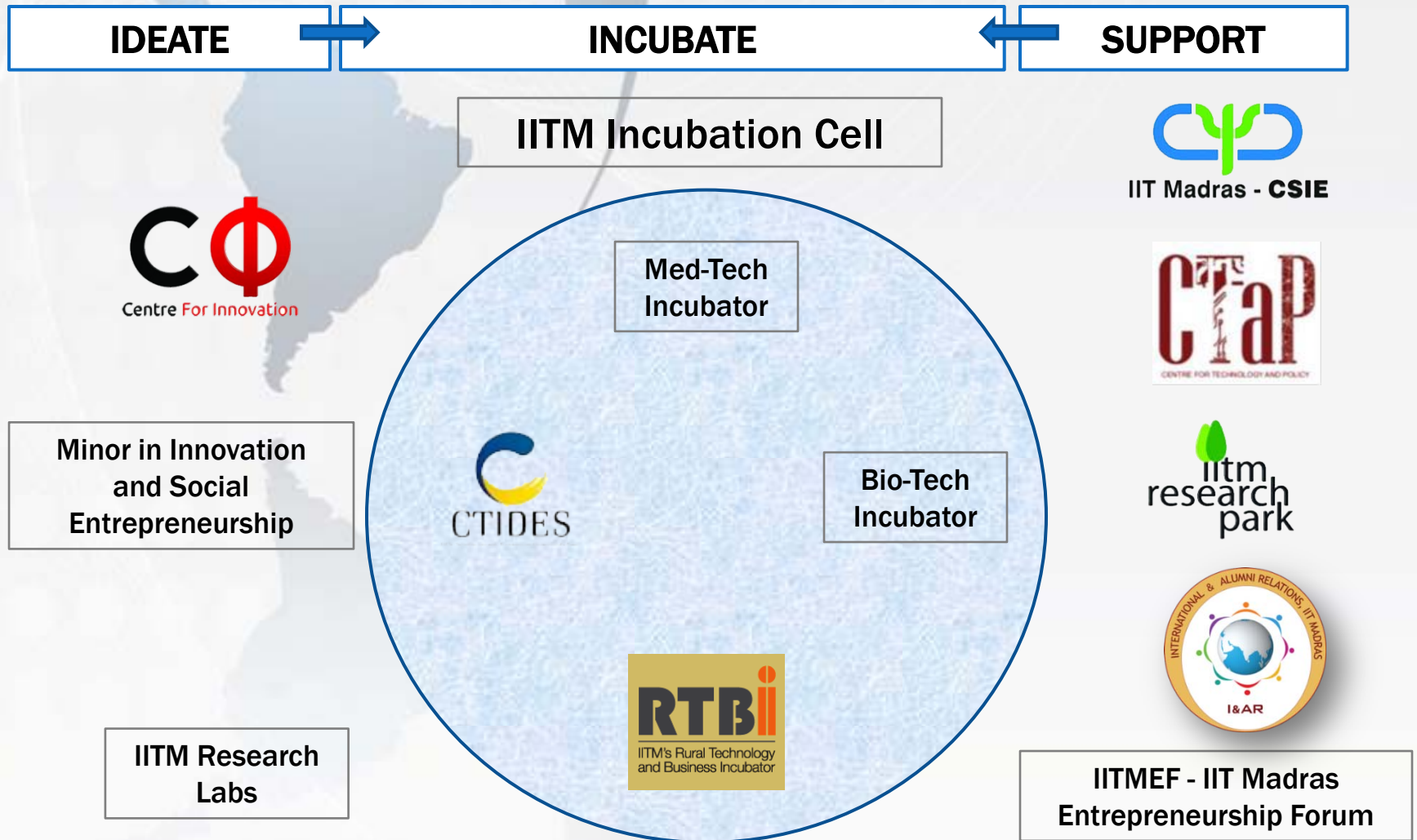




R&D Clients



Entrepreneurship @ IIT Madras



IITM has incubated 100+ companies

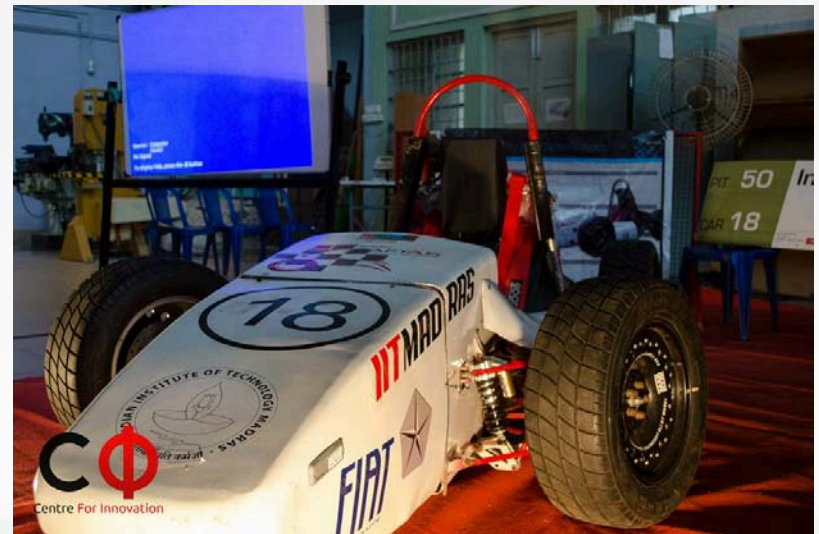


Centre for Innovation



Walk in with an **I**dea. Walk out with a **P**roduct

- Centre for Innovation (CFI) is a “Student Lab” at IIT Madras.
- Set up with funds donated by the batch of 1981.
- Started in 2008 with an objective to be a forum for creative output
- Provides students the necessary platform for realizing their ideas.
- Successfully evolved into a hub which encourages thinking and novel ideas



C-TIDES



Cell for Technology Innovation, Development and Entrepreneurship Support

- Hub for entrepreneurship related activities in IIT Madras.
- Created in Oct 1998.
- A student body that encourages and supports the idea of student-led entrepreneurship in the institute.
- Full-fledged business incubator & conglomerate of entrepreneurial spirits aimed at fostering innovation and entrepreneurship
- Promotion of creative new ideas, technological research, promotion of originality and technology oriented approach
- Solving domestic and industrial problems
- Creating a holistic platform for the support of techno-business entrepreneurship.



C-TaP

Centre for Technology and Policy



- Established to explore interaction between technology and public policy
- Addressing the country's pressing development problems
- Identification of key technology gaps in following domains: Energy, Water, Human Health, Education, Telecom and IT Applications.
- Encouraging innovations and technology to meet public goals.
- Groups to work on a range of technologies that could help address public policy challenges.
- Technologies include Energy, Medical Devices & Healthcare, Water, Built Environment, Transportation, Telecommunication & Information Technology, Environmental Pollution, Smart Materials, and Synthetic materials/processes.



CSIE

Centre for Social Innovation and Entrepreneurship



IIT Madras - CSIE
(Center for Social Innovation & Entrepreneurship)

- Started in April 2010, funded by alumni batch of '82, '84 and '86
- Objective of prodding students towards social entrepreneurship
- Minor course for undergraduate students on social innovation and entrepreneurship
- Links and works with institutes like Tata Institute of Social Sciences, CIIE of IIM-A, Centre for Innovation in Public Systems (Hyderabad), the UN Global Compact and the Ateneo School of Government (Philippines)
- Successful in building an innovation and entrepreneurship ecosystem.



Office of International Relations

Roles:

- Coordinate international delegation visits to IITM and reach out to foreign universities.
- Encourage, maintain and sustain relationships with foreign universities and enterprises.
- Promote international student exchanges (both inbound and outbound), and facilitate acclimatization of international students.
- Facilitate faculty exchange



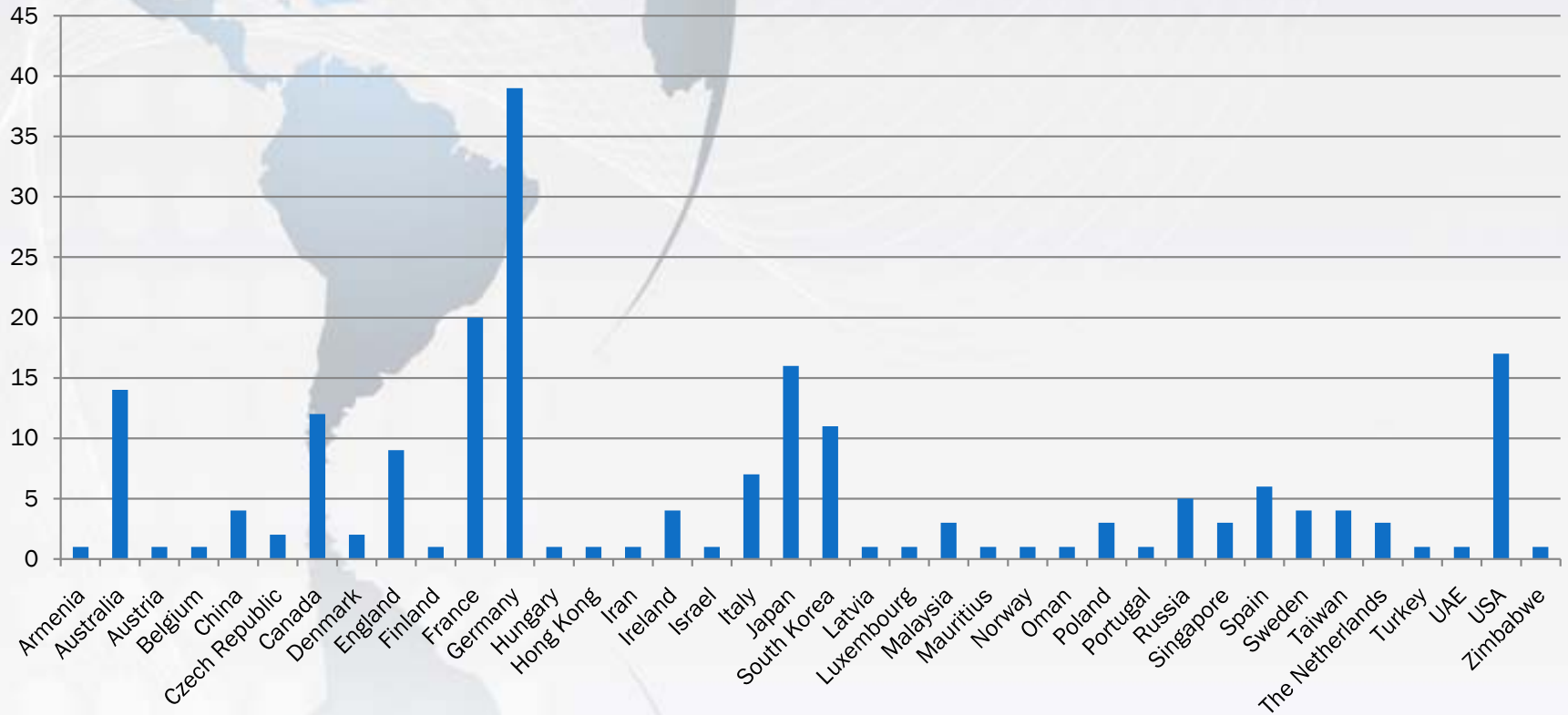
University Partnerships

We are focused on building strong research collaborations with leading global institutions. To accomplish this, we envisage a 4-stage process:

- Faculty interactions (visits & workshops, video-conferencing, joint proposals, co-authored papers)
- Student exchanges (Ph.D. and M.S. scholars to spend 3-6 months carrying out research at collaborators' laboratories)
- Joint-supervision of research scholars, serving on doctoral and Masters' committees
- Joint-degree programs (where sufficient sustainability and scalability of relations has been demonstrated)
- Currently:
 - > 180 MOUs in effect, including
 - 12 Joint Degree Programs. **Australia** (Swinburne Univ, Deakin Univ, Queensland Univ of Tech, Univ of Tech Sydney, Univ of Melbourne, Curtin Univ). **Germany** (RWTH Aachen, Univ of Duisburg, Univ of Passau). **Taiwan** (National Tsing Hua Univ). **Singapore** (National Univ of Singapore). **France** (Univ of Bordeaux).
 - 4 Joint Supervision Programs. **Australia** (Univ of Sydney, Univ of Melbourne, Deakin University). **USA** (Purdue University)



MoU



Australia	Europe	Asia	North America
14	110	49	34



RESEARCH PHILOSOPHY



General Guidelines for International Academic Collaborations

Study-Abroad Programs:

- Intended for (mainly) undergraduate and (some) graduate students
- Credit transferability to be ensured

Internships Abroad:

- Linked to student's academic or research pursuits

Research Scholar Exchange:

- Gains on both sides
- Cements a strong collaborative relationship

Faculty Visits:

- Encouraged to make visits to research labs abroad to continue or establish collaborations.
- Short visits during the semester, longer stays over vacation periods/ sabbaticals.



IITM – RUSSIA COLLABORATION

Faculty Collaboration:

IIT Madras has been sanctioned six projects in the last five years, under the Indo-Russian scheme, by the Department of Science and Technology, Government of India, of which 5 have been successfully completed. The list of Indo-Russian Projects are listed below

S.No	DEPARTMENT	IITM Faculty (DR.)	TITLE
1	Chemistry	SELVAM P	Iron-containing nanostructured catalysts for environmental protection (INDO-RUSSIA)
2	Ocean Engineering	SANNASIRAJ S A & SRIRAM	Development a new method of regime characteristics assessment for wind and waves along the Indian coast (ONGOING)
3	Biotechnology	AMAL KANTI BERA	Study of mechanisms of NO action on acid sensing ion channels
4	Ocean Engineering	SANNASIRAJ S A & SUNDAR V	Study of an energy exchange between wind and waves and variability of their climate characteristics in the Indian Ocean
5	Chemistry	SANGARANARAYANAN M V	Reductive cleavage of carbon-chlorine bonds in polychlorobiphenyls-A complementary synthetic, electrochemical and computational approach
6	Physics	NIRMALA R	Synthesis, crystal structure and magnetic phase diagram of novel rare earth intermetallic compounds and their functional property studies



IITM – RUSSIA COLLABORATION

Faculty Collaboration:

Other Projects:

i) **Title:** Impact of waterborne debris on the nearshore structures during extreme coastal floods.

Russian University: Nizhny Novgorod State Technical University

IITM Faculty: Dr. V.Sriram, Prof. V.Sundar, Prof. S.A.Sannasiraj, Dr.Deepakkumar

ii) **Title:** Developing a new method of regime characteristics assessment for wind and waves along the Indian coast.

Russian University: Obukhov Institute for Physics of Atmosphere of the Russian Academy of Sciences,

IITM Faculty: Prof. S.A. Sannasiraj, Dr. V. Sriram, Prof. V. Sundar.

iii) Prof. Sannasiraju and Dr. V. Sriram have a project under DST-Russia scheme. Project research work under at Obukhov Inst. of Atmospheric physics at Moscow, Russia

iv) Dr. V. Sriram has a project under Department of Science & Technology and Russian Foundation for Basic Research) with Nizhny Novgorod State Technical University, Russia.



IITM – RUSSIAN COLLABORATION

Agreements:

S. NO	Name of University	Date of Signing (DD/MM/YYYY)	Faculty Champion
1	Northern (Arctic) Federal University	23/06/2017	Prof. Rama Verma
2	Innopolis University	01/09/2016	Prof. S. Ramkrishnan
3	Peter the great St. Petersburg Polytechnic University Russia	15/09/2015	Prof. R. Nagarajan
4	Ural Federal University, Yekaterinburg	08/05/2015	Prof. R. Nagarajan
5	National Research Tomsk State University, Tomsk	08/05/2015	Prof. R. Nagarajan
6	National Research Tomsk Polytechnic University	12/11/2014	Prof. Krishnan Balasubramanian



IITM – RUSSIA COLLABORATION

Incoming Students

S.No	Student Name	Home Institute	Nature	Department	Mentor
1	Mr.Ruslan Kimossov	Tomsk Polytechnic University	Course Work	MME	Prof Kamaraj
2	Ms.Katerina Filippova	Tomsk Polytechnic University	Research Work	BT	Prof. D. Karunagaran
3	Mr. Anton Logachev	St. Petersburg Polytechnic University	Internship	BT	Dr. Baskar R

Outgoing Students

S.No	Student Name	Host Institute	Programme	Department
1	Nishant Atmakoori	Tomsk Polytechnic University	Course Work	ME
2	Vivek Venkatraman	Tomsk Polytechnic University	Course Work	ME





Thank You