DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

भारतीय प्रौद्योगिकी संस्थान हैदराबाद
Indian Institute of Technology Hyderabad
About IIT-H

- Started in Aug 2008
- Ph.D program in Jan 2009
- M.Tech program in Aug 2009
- 14 Departments covering all major engineering, sciences and humanities
- BTech, MTech, MDes, MPhil, MSc, PhD degrees offered
- ~2350 students – 958 BTechs, 504 MTechs, M.Des 32, 10 MPhil, 120 MSc, 749 PhDs
- Effective Oct 2015, functioning from the permanent campus

Kandi (permanent) campus

Next phase of buildings coming up
Students

- BTech: 191
- Masters: 160
- PhD: 62
- Total: 413

Faculty

- Regular: 20 (1 full, 9 Associate & 10 Assistant Profs)
- Adjunct: 1

CSE faculty with director and other guests (Oct 2016)
# Student diversity

<table>
<thead>
<tr>
<th>Program</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.Tech.</td>
<td>170</td>
<td>21</td>
<td>191</td>
</tr>
<tr>
<td>Masters</td>
<td>139</td>
<td>29</td>
<td>169</td>
</tr>
<tr>
<td>Ph.D</td>
<td>45</td>
<td>20</td>
<td>65</td>
</tr>
</tbody>
</table>
Programs Offered @ CSE

B.Tech, MTech and PhD (Computer Science)

Option to get PhD degree jointly from IITH and Swinburne University (Australia)

MTech in Machine Intelligence (jointly with EE)

M.Tech in Data Science
  • A unique online program for working professionals

Other
  • B.Tech (Engineering Sciences)
  • Popular Minor & Double Major for students from other streams
  • CEP Certificate Courses on Foundations of Predictive Analytics & Big Data Analytics for Industry/Academia
Funding for PhD is available thru

**MHRD scholarship**

**IDRBT PhD scholarship**

- Candidate completes course-work at IITH. For rest of his/her PhD, candidate spends most of the time at IDRBT Hyd campus.
- Academic rules and the award of degree are as per the IITH norms
- One adviser each from IITH and IDRBT
- Stipend and other facilities are *as per IDRBT norms*.

**Project funded positions**

- Industry-sponsored, e.g., Intel, Microsoft, SRC, TCS, etc.
- Government-sponsored, e.g., DST, DoT
### Curriculum: Standout Features

1. **1-credit Research Internship courses from 2\textsuperscript{nd} year for B.Techs**

2. **3-credit Honors and Mini-project courses in final two years**

3. **2-year regular M.Tech and 3-year research-focused M.Tech**

4. **Unique course work based M.Tech for working professionals**

5. **Option to convert from B.Tech to dual degree, MTech to PhD**

6. **Direct PhD after B.tech & option to get both MTech & PhD degrees**
Centre for Artificial Intelligence (AI)

• IITH has setup a center for AI
  • Investment of around 100 million INR.
  • CSE department plays a major role in the centre for Artificial Intelligence
    • Designing and running courses related to AI such as M.Tech in Machine learning, B.Tech in Artificial Intelligence, summer program on AI
  • Provides state-of-the-art infrastructure based NVIDIA DGX systems
  • Active collaboration with foreign universities and industries on AI-related research
New Initiatives

2015: M.Tech program in Data Science for working professionals

2016: Samsung Digital Academy

2016-2018: Mentoring IIT Bhilai
# Research Areas

<table>
<thead>
<tr>
<th>Algorithms, Graph Theory, Game Theory</th>
<th>Complexity Theory, Quantum Computing</th>
<th>Networked Wireless Systems, Network Architecture</th>
<th>Modelling and Verification of Hybrid Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Video Content Analysis, Computer Vision</td>
<td>Machine Learning, Artificial Intelligence</td>
<td>Big Data Analytics, Large-Scale Machine Learning</td>
<td>Autonomous driving and Computer Architecture</td>
</tr>
<tr>
<td>Compilers, Programming Languages</td>
<td>Parallel Programming, Distributed Systems</td>
<td>Databases, Data Mining, Information Retrieval</td>
<td>Human-Computer Interaction, Information Visualization</td>
</tr>
</tbody>
</table>

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Research Groups

Networks and Mobile Systems Group (3)
- Networked Wireless Systems (NeWS) Lab
- Practical Networks (PraNet) Lab

Data Science Research Group (7)
- Data Informatics Group (DIG)
- Visual Intelligence and Learning (VIGIL) Lab

Theoretical Computer Science Group (5)

Compilers and Verification Group (2)

Parallel and Distributed Systems Group (1)

Computer Architecture for Machine Learning Group (2)
R&D Thrust Areas

- Center of Excellence in Data Science
- 5G, IoT & Smart Commute (ITS)
- Mobile Social Networks & Computing
- Behavioural Data Science -- AI and Deep Learning
- Data analytics for real-time security and surveillance
- Computational Epidemiology, autonomous driving
- Storage and Retrieval Mechanisms
- Middleware & Compiler optimization for HPC
Research Collaborations

Industry

- KDDI R&D Labs, Japan
- Microsoft Research, Bangalore
- IBM Research, Bangalore
- AMD, Bangalore
- ANURAG, DRDO
- RCI, DRDO
- NetApp, Bangalore
- LG Soft (R&D Division of LG Electronics)
- Uurmi Systems, Hyderabad
- Samsung Research India (SRI) Delhi
- Intel, Redpine Signals

Academic

- IISc, TIFR, CMI, IIT Delhi/Bombay
- UT Dallas, U of Pittsburgh, Penn State U, UCSD, CMU (US)
- INRIA, Paris, France
- Tel Aviv University, Israel
- Paris Tech, Eurocom, France
- Royal Holloway University of London, UK
- NTU and NUS, Singapore
- University of Tartu, Estonia
- Mid Sweden University, Sweden
<table>
<thead>
<tr>
<th>External Funding</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of R&amp;D Projects Sanctioned</td>
<td>21 of budget approx. Rs. 17.52 Cr</td>
</tr>
<tr>
<td>No. of R&amp;D Projects Ongoing</td>
<td>12 of budget approx. Rs. 12.75 Cr</td>
</tr>
<tr>
<td>No. of joint R&amp;D Projects /w other depts &amp; institutes</td>
<td>7 of total budget of approx. Rs. 81.18 Cr</td>
</tr>
<tr>
<td>No. of Consultancy Projects Sanctioned</td>
<td>4 of Rs. 17.8 L</td>
</tr>
<tr>
<td>No. of Computational Infrastructure Grants</td>
<td>2 or 2.4 Cr</td>
</tr>
</tbody>
</table>
## Sponsored Research Projects

<table>
<thead>
<tr>
<th>Project Description</th>
<th>Sponsor/Agency</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smart Cities for Emerging Countries based on Sensing, Networking and Big Data Analysis of Multimodal Regional Transport System (joint /w EE/CE depts. &amp; other institutes in Japan)</td>
<td>JST/JICA SATREPS (2017-22)</td>
<td>38 Cr</td>
</tr>
<tr>
<td>Converged Cloud Communication Technologies (joint /w EE Dept)</td>
<td>Deity, GoI (2014-19)</td>
<td>24 Cr</td>
</tr>
<tr>
<td>Infrastructure Grant</td>
<td>DST FIST (2017-22)</td>
<td>2.2 Cr</td>
</tr>
<tr>
<td>Hardware architectures for autonomous driving</td>
<td>SRC USA (2018-2021)</td>
<td>$36000</td>
</tr>
<tr>
<td>Deep Learning for Multimedia Analytics</td>
<td>Ekam Technologies, Bangalore (2016)</td>
<td>2.1 L</td>
</tr>
<tr>
<td>Tools for Large-Scale Graph Analytics</td>
<td>Intel, USA</td>
<td>$60000</td>
</tr>
</tbody>
</table>
Recent Achievements

Publications in top-tier venues


Best Paper/Poster Awards

- IoT workshop @ TSDSI 2016, IEEE ICACCI 2015, IEEE HiPC 2014
- Best poster award in Ph.D symposium of ICDCN 2019, Best Poster Award at Netys 2018

Fellowships/ Early-career research (ECR) award

- Intel India PhD Fellowships (3)
- Visvesvaraya PhD Fellowships (16)
- Young Faculty Fellowships (3), ECR awards (4), INSPIRE faculty award

Scholarships

- Google Anita Borg Scholarship 2016, Sukrut Rao won Honda YES award
- Viterbi and SN Bose Scholarships for Summer Internships @ US Universities
- Scholarships Summer Internships @ Purdue University
- Sakura Science Plan Summer Internships @ UoT, Japan 2016, 2017, 2018
- Google Venkat Panchpakesan Memorial Scholarship 2016
Recent Achievements

Open-source & standardization efforts

- TSDSI, NS-3 modules, OAI 5G Software Alliance, Cache Modeling tools

Contests/World-wide competitions

- 2nd rank in a subcategory in SVCOMP 2019
- 1st and 2nd prize in incomplete weighted MaxSAT in MaxSAT evaluations 2018
- 2nd rank in Pseudo-Boolean 2016
- Joint winner in Microsoft Hacking Contest, 2015
- 1st prize in Mobile and Web Application Testing, BugAthon 2015
- 2nd prize in TCS CodeVita Coding Challenge, 2015 (International)
- 1st prize in TCS CodeVita Coding Challenge, 2016
- Bronze medal at Inter IIT Tech Meet 2015 for the event Model Village

Others

- Hosted NCC 2018
- Google Summer of Code projects, 2015-2018 (to multiple students)
- MoU with Hyderabad city police to enhance safety of citizens by using video analytics, 2016
M.Tech in Data Science

- Course work based degree for working professionals
- Live (synchronous) video lectures, remote attendance
- 35 students per batch
- Slow paced (3-5 years)
- 48 Credits (equivalent to regular MTech)
- Assignments graded remotely
- One visit per semester

4*4 Display wall showing instructor & active participants in a live class
# Placements

<table>
<thead>
<tr>
<th>Year</th>
<th>B.Tech</th>
<th>M.Tech</th>
<th>Package (per annum)</th>
<th>Top Hiring Companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>35/44 (5 - higher education)</td>
<td>13/14 (1 external candidate)</td>
<td>Highest: 29L (India); Lowest: 6L</td>
<td>Amazon, Microsoft, Yahoo Japan, Google, Dell, Flipkart, Samsung, Snapdeal</td>
</tr>
<tr>
<td>2016</td>
<td>40/44</td>
<td>17/18</td>
<td>Highest: 35L</td>
<td>Yahoo Japan, Murata, Hikari, Tsuchin, Qualcomm, Securifi, UHG, Paypal, Practo, Deshaw, Dell, Walmart, Paypal, Bank of America</td>
</tr>
<tr>
<td>2017</td>
<td>35/43 (3 - higher education)</td>
<td>13/13</td>
<td>Highest: &gt;30L; Lowest 6L</td>
<td>Rakuten, Amazon, Qualcomm, Oracle, Samsung, Walmart, Mathwork, Dell, Microsoft, Dello itte, Yahoo Japan, PayPal</td>
</tr>
<tr>
<td>2018</td>
<td>32/42 (7 – higher study)</td>
<td>28/31 (1- higher study)</td>
<td>Highest: 40L</td>
<td>Rakuten, GE, Flipkart, Microsoft, Samsung, Yahoo Japan, Walmart, Xilinx, Amazon, DE Shaw, etc.</td>
</tr>
<tr>
<td>2019</td>
<td>33/44 (3-higher study)</td>
<td>15/22(5-higher study)</td>
<td>Highest:54L</td>
<td>Toyota, Oracle, Robert Bosch, Microsoft, Flipkart, DE Shaw, Deloitte, Amazon, Honeywell, GE, Mathworks, Zensar, Dell, Softbank</td>
</tr>
</tbody>
</table>
CSE graduates doing higher studies @

- Stanford, USA
- Georgia Tech, USA
- Rice University, USA
- UC San Diego, USA
- University of Chicago, USA
- ETH-Zurich, Switzerland
- Hungarian Academy of Sciences, Hungary
- Stony Brook University
- MIT, USA
- EPFL
- Keio University, Japan
Media coverage

• IITH develops dataset to understand online user engagement (The Hindu)
• IITH develops AI-enabled software to catch bike riders without Helmet (Times of India)
• Coverage in technical news websites: InsideHPC, HPCWire, etc.
Entrepreneurial Activities

Three start-ups

- Plianto Technologies ([http://www.plianto.com/](http://www.plianto.com/)) by Dr. Sobhan Babu
- StoryXpress by students
- Kaddi Labs by students
Common Computing Resources

- 32+ high-end servers (Intel Xeon E5 Series CPUs)
- 60+ Workstations
- SDN switches, Cisco routers
- 2 SAN Storage Systems (30/50 TB)
- 50 Thin Clients, 60 Desktops
- GPGPU server with 6 Tesla K20X GPU cards
- IoT & Other Equipment
  - Microsoft Surface, FireEye Programmable camera, LeapMotion Controller
  - IoT devices (Odroid, RasberryPi) & wireless dongles
  - UHD smart TVs & smart phones
Samsung Digital Academy

- IoT and Pervasive computing courses by Samsung Research India (SRI) Delhi @ IITH
- Signed MoU on academic & research collaborations
- IoT lab setup /w budget of 20 L
- Summer internships & campus placements
Other events
For updates ...

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http://cse.iith.ac.in/
Upcoming CSE-EE Department Building
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