

# ROCS: What and Why?

## A Research Career in Computer Science

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# Why This Conversation Matters

- In CS, career discussions often focus on:
  - placements
  - companies
  - packages
- Today we discuss a different question:
  - Who creates new knowledge?
  - Who shapes the future of computing?

- Initiative of ACM-India Council
- Organised by Research Facilitation Committee (RFC)
- Objective:
  - Increase awareness of CS research in India
  - Present (academic and industrial) research as a viable, fulfilling career

- Largest Professional Organisation of Computer Scientists in the World
- Awards **Turing Award**
- Started in 1947 to **Advance Computing as a Science and Profession**
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  - ROCS
- **india.acm.org**

# What Is Research?

- Not studying more
- Not solving known problems
- Research is:
  - Working on problems whose answers are not yet known
  - Expanding the boundary of knowledge

## Coursework

- Known syllabus
- Known answers
- Structured evaluation

## Research

- Unknown outcomes
- Open-ended problems
- Evaluation by global peers

# Myth vs Reality

- **Myth:** Research is only for really smart students.  
**Reality:** Curiosity and persistence matter more than brand.
- **Myth:** Research does not pay well.  
**Reality:** Academia and industry research offer strong careers.
- **Myth:** Research means being isolated.  
**Reality:** Research is collaborative and global.

- Teaching and research are not opposites.
- Strong research strengthens teaching.
- Strong teaching inspires future researchers.
- The two reinforce each other.

# India's Higher Education Expansion

- GER around 27% — target close to 50%
- IITs expanded from 6 to 23
- New IIITs, IISERs, Universities
- Online and digital education initiatives (NPTEL, Swayam)

# India's Higher Education Expansion

News / Education Today / News / India requires 2,500 universities to achieve 50% higher education enrollment

## India requires 2,500 universities to achieve 50% higher education enrollment

NITI Aayog CEO emphasises the need for 2,500 new universities to boost India's student enrollment to 50 percent, alongside the recognition of the country's digital infrastructure as a global leader.

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# India's Higher Education Expansion

The screenshot shows a web browser displaying a news article. The browser's address bar contains the URL: <https://www.thehindu.com/news/national/india-requires-2500-universities-to-achieve-50-higher-education-enrollment-2634657-2024-11-17>. The article features a 'Listen to Story' button, a 'Live TV' indicator, and a 'Share' button. The main content includes an 'In Short' section with three bullet points and a paragraph stating that India needs to double its number of universities to 2,500 to achieve a 50 percent gross enrolment ratio. A 'Recommended' section on the right shows an advertisement for '2&3 BHK Furnished Homes' and another for 'SHINDE BY ALLY'.

View History Bookmarks Profiles Tab Window Help

day.in/education-today/news/story/india-requires-2500-universities-to-achieve-50-higher-education-enrollment-2634657-2024-11-17

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### In Short

- India needs 2,500 universities to enrol 50% of students, says NITI Aayog CEO
- Subrahmanyam highlights India's digital infrastructure as the largest global lab
- India's university enrolment is only 29%, needing significant expansion

India needs to double its number of universities to 2,500 to achieve a 50 percent gross enrolment ratio in higher education, according to NITI Aayog CEO BVR Subrahmanyam.

Speaking at the Indian School of Business (ISB) on Friday, Subrahmanyam highlighted that despite establishing one university and two colleges every week over the past decade, only 29 per cent of the eligible age group currently enrol in universities.

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...to the restricted list, it has been prevented from getting RoDTEP, a senior Commerce Ministry official told *The Hindu*.

...the Diplomatic Corps in New Delhi is fondly remembered by those who served then. He personally built Dominican Republic's relationship with India and took it to great political and economic heights," he said.

## 140 private universities set up in India over past 5 years; Gujarat has highest share

**Press Trust of India**  
NEW DELHI.

As many as 140 private universities were established in the country during the past five years with the highest number being set up in Gujarat, followed by Maharashtra and Madhya Pradesh, show data provided by the Union Education Ministry.

The data say 28 private universities were established in Gujarat and 15 in Maharashtra during the period.

Madhya Pradesh and Karnataka have 14 and 10 of them, respectively.

"A private university is established by an Act passed by the State legislature concerned and notification issued by the State government concerned," a senior Education Ministry

**28 universities started in Gujarat during the period, 15 such institutions were established in Maharashtra**

official said. "The name of a private university is included in the list of universities by the University Grants Commission (UGC) as per Section 2(f) of the UGC Act, 1956, on receipt of the copies of the Act and notification from the university," he said. Such private universities are empowered to award general degree programmes without the specific approval of the commission, the official said.

"However, the approvals for running professional and medical pro-

grammes are given by the respective regulatory or statutory bodies, and such programmes are governed by the norms of respective bodies such as the All-Indian Council for Technical Education, National Medical Commission, and the Dental Council of India," he added.

Seven private universities were established in Chhattisgarh in the past five years, while Jharkhand and Rajasthan got six each.

Five universities each were established in Bihar, Odisha, Uttarakhnad and Telangana, while four each were set up in Andhra Pradesh, Haryana, Manipur, Odisha, Tamil Nadu, Sikkim, and Uttar Pradesh.

At 40, the highest number of private universities were established in the academic year 2018-19.

# The Hidden Corollary

- More colleges  $\Rightarrow$  more faculty
- More faculty  $\Rightarrow$  more PhDs
- More PhDs  $\Rightarrow$  more researchers

# But There Is a Challenge

- Declining postgraduate enrolments
- Large number of vacant MTech seats

5/20/25, 9:40 PM

AICTE Scholarship Hike: Facing decline in MTech enrolments, AICTE proposes 50% hike in scholarships to revive student interest



## Facing decline in MTech enrolments, AICTE proposes 50% hike in scholarships to revive student interest

Latest data shows that nearly two of every three MTech seats in India's engineering colleges lie vacant – a pattern that has persisted even as total postgraduate seats have shrunk by a third since 2017-18.

Written by [Abhinava Harigovind](#) [Follow](#)  
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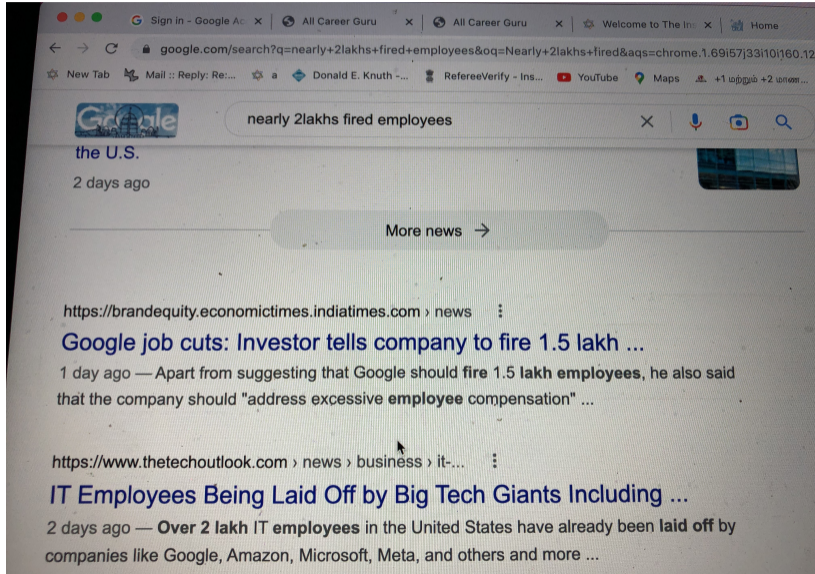
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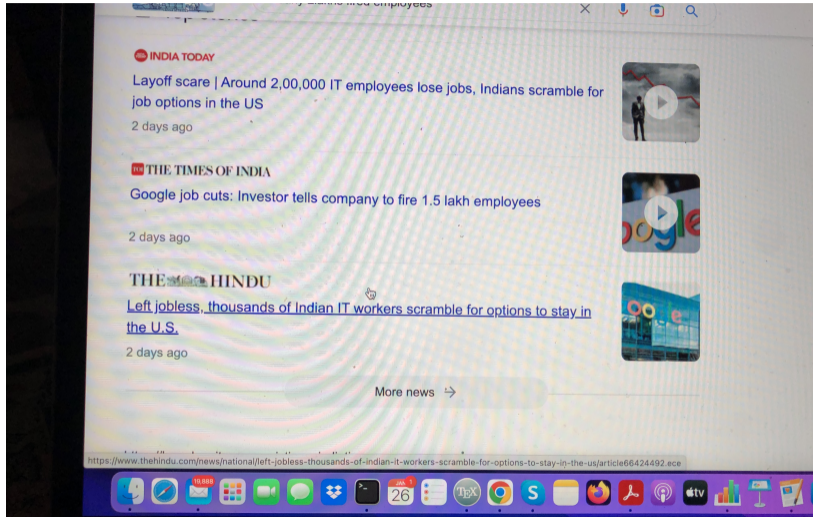
# A Clear Opportunity

- Demand for researchers increasing
- Supply decreasing
- This creates opportunity for motivated students

# Contrast with Industry Jobs



# Contrast with Industry Jobs



With AI revolution, there is more uncertainties

Now that some of you are interested in higher studies,  
**Where/How do you start?**

# What Does a Research Career Look Like?

- BTech  $\rightarrow$  MS / PhD  $\rightarrow$  Post-doctoral fellowship
- Faculty or Industry Research
- Consulting / Entrepreneurship possible

# Research Institutions Landscape

- Pure research institutes: IMSc, TIFR, ISI
- Research with Teaching: IITs, NITs, IISc, IISER, Universities
- Industry labs: Google, Microsoft, IBM, TCS
- International collaborations
- Government agencies: ANRF, CSIR, DAE
- GATE, other institute specific exams, project based entry, ...

# Daily Life of a Researcher

- Reading and thinking deeply
- Discussing ideas
- Designing and validating solutions
- Publishing and presenting work

# Who Should Consider Research?

- Curiosity beyond syllabus
- Comfort with uncertainty
- Patience and persistence
- Desire for depth

# The Honest Picture

- Research is challenging
- Progress can be slow
- Rejections are common
  
- But intellectual satisfaction is deep and lasting

# What You Can Do Now

- Attend talks
- Interact with speakers
- Apply for internships, predocs and summer schools
- Explore research problems early

# Closing Thought

- Nations advance by creating knowledge
- India is expanding rapidly
- The country will need researchers, educators, and innovators
- Perhaps some of you will choose that path

# Thank You

Looking forward to discussions.

For comments or questions, write to [vraman@imsc.res.in](mailto:vraman@imsc.res.in)