ACM Survey on PhD Production in India for Computer Science and Information Technology
2012 – 2013

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The purpose of this study is to collect reasonably reliable data on PhD production in CS in India, and then use it to identify useful trends. This exercise was motivated by the Taulbee report in the US, and Prof. Pankaj Jalote of IIIT-Delhi has been leading it. The first report was done for the year 2011- 2012 (available at http://iiitd.ac.in/news/acm-phd-study/2012). Based on the inputs and experience from the same, the survey and report for academic year 2012-13 has incorporated a few changes.

Institutes Included

Last year, the study included approximately 40 PhD granting Institutes, which were identified by a committee and a criterion. This year, the study has attempted to include all institutions which have a PhD program in CS/IT.

A list of 2507 institutes from all over India was obtained from AIEEE. According to the data available on the websites, of these institutes, 73 institutes stated that they have a PhD in CS or IT. We added to these, other institutions (IITs, NITs, etc.) which are known to be granting PhDs in computer science – inputs for this was taken from various researchers and faculty and from the previous study. This gave a total of 132 institutes which have a PhD program and which could be included in this study. This list of institutions is given in Appendix H.

Data Collection

An online form was created, and sent to the Head of Department (CSE/IT) and the Director of the institutes. The form asked for information on: the number of PhD faculty, number of non-PhD faculty, total number of PhD students enrolled and the total number of PhDs graduated last year who got their degree. The form also asked for the stipend that was paid to the PhD students and the major problems that the institutes face with regard to the PhD programme.

Reminders were sent, and the institutions were informed that if they failed to respond, the data from their websites would be used. To those institutes which provided the data for the last report, but did not do so for this report, it was mentioned that data from last year's report would be used.

We got responses from 29 institutes from the form and 5 on email. From those which did not respond, we used data from website or last year's report – through this another 14 institutes were included. Thus, a total of 48 institutes are finally included in this study. We assume that

the other institutions (i.e. which did not respond and for which we could not find relevant data) don't have an active PhD program, or if they do, it is too small to be of any significant impact.

For this year's report, we have grouped the institutions as follows:

- Group 1: Institutions which provided the data about number of faculty, PhDs enrolled, and PhDs awarded. (34)
- Group 2: Institutes which provided data last time but did not do so for this year's report. (4)
- Group 3: Institutions which did not submit the filled form, but the number of faculty, and the total number of PhDs enrolled was available on their website. (3)
- Group 4: Institutions which did not submit the form and we could not find information about the PhD students enrolled on their websites, but obtained information about the number of faculty. (7)

We estimated PhDs produced for Group 3 and 4 in the manner similar to last year, based on the number of PhD students enrolled, or based on the number of PhD faculty (in some cases, like the new IITs, as they have not been around for long, if they did not provide the data, the number of PhDs produced last year was taken as 0).

For group 2, we took the data from last year's study – assuming that it would not have changed significantly this year.

Analysis

PhD Production
The number of students who completed their PhD between June 2012 to August 2013:

Group 1 institutes: 167
Group 2 institutes (estimated): 3
Group 3 institutes (estimated): 12
Group 4 institutes (estimated): 12

To better understand where these PhDs are being produced, we divide the institutions in two categories: those that have 80% or more faculty with PhDs, and others. Presumably the first category represents the more research-focused institutions, while the second category is likely to be the more teaching-focused institutions. There are 29 institutions in the first category (List of these institutions and their data ids given in Appendix E), and 19 institutions in the second category (Appendix F). With this classification, we have the following for PhD production:

- *Research-focused institutes produced a total of 148 PhDs and other institutions produced 46. The total number of PhDs produced last year from all institutions is 194.*

Last year, this number was 137, but we had included mostly the research-focused institutions. The change is largely due to the inclusion of other institutions in the study. From the Institutions that were included in the previous study, the number of PhDs produced has

increased by about 10 this year. Based on the detailed data provided by Group 1 institutions, we can say:

- *Of the total PhDs produced, 59% were male and 41% were females.*

Looking at the statistics for the number of students who are enrolled:

Group 1: 1359

Group 2: 31

Group 3: 99

Group 4 (Estimated): 108

For all the institutes, the total adds up to 1597 and for Group 1, 2 and 3 the total number of PhD students enrolled are 1489. Additionally, the total number of part time students doing PhDs in institutes belonging to Group 1 is 239.

To estimate the number of students who would be completing their PhD in another 5 years, we use the same method we used for last year's report. With this we can say:

The estimated number of PhDs graduating will gradually increase in 5 years to about 260 from research-focused institutes, and a total of about 350 per year from all institutions. If we also include the part time PhD students, then the estimated number of PhD in the next 5 years is appx 420.

Areas of Research

In this section we analyse the areas of research chosen by the students who completed their thesis between 2012 – 2013.

As can be seen from fig 1, the most popular area of research is Networks. Theory and Algorithms and Database/Information Retrieval are fields which are also popular as a research interest among PhD students. (This data is only from institutes in group 1 who filled the online form.)
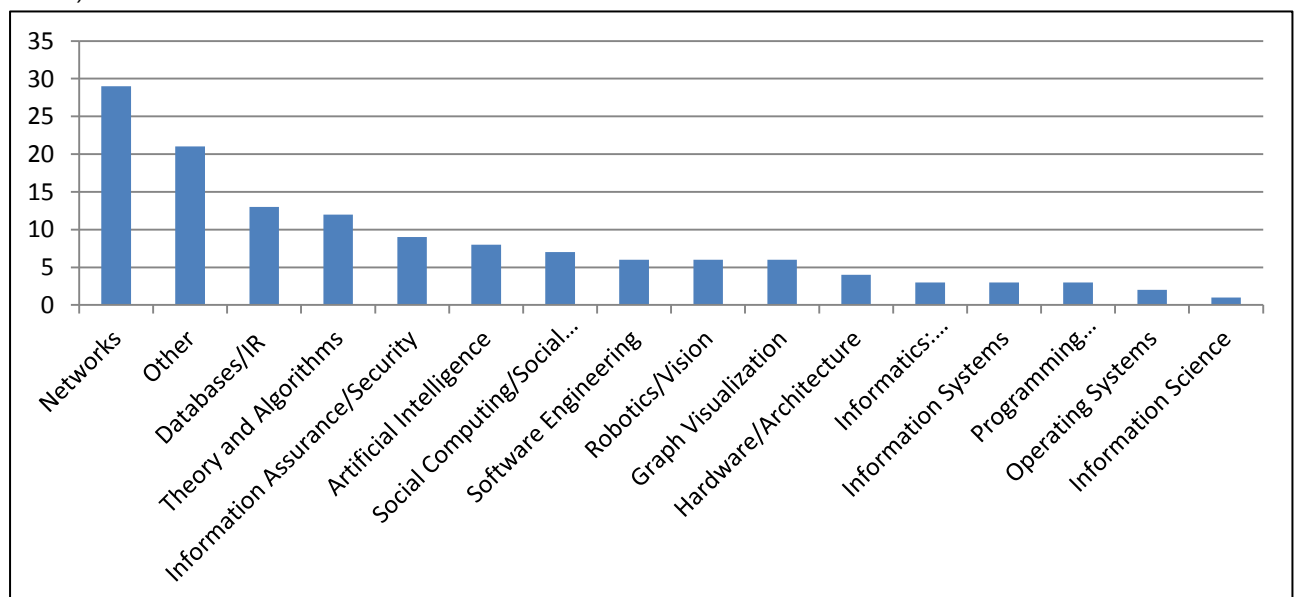

Fig 1: Area of research chosen by students who completed their PhD in 2012 - 2013

Comparing this with last year's response, we observe an increase in interest for networks and Database/Information Rertieval.

Employment Statistics

Based on the data provided by institutes of group 1, the most popular choice of employment after completing PhD is teaching or joining a research job in India.
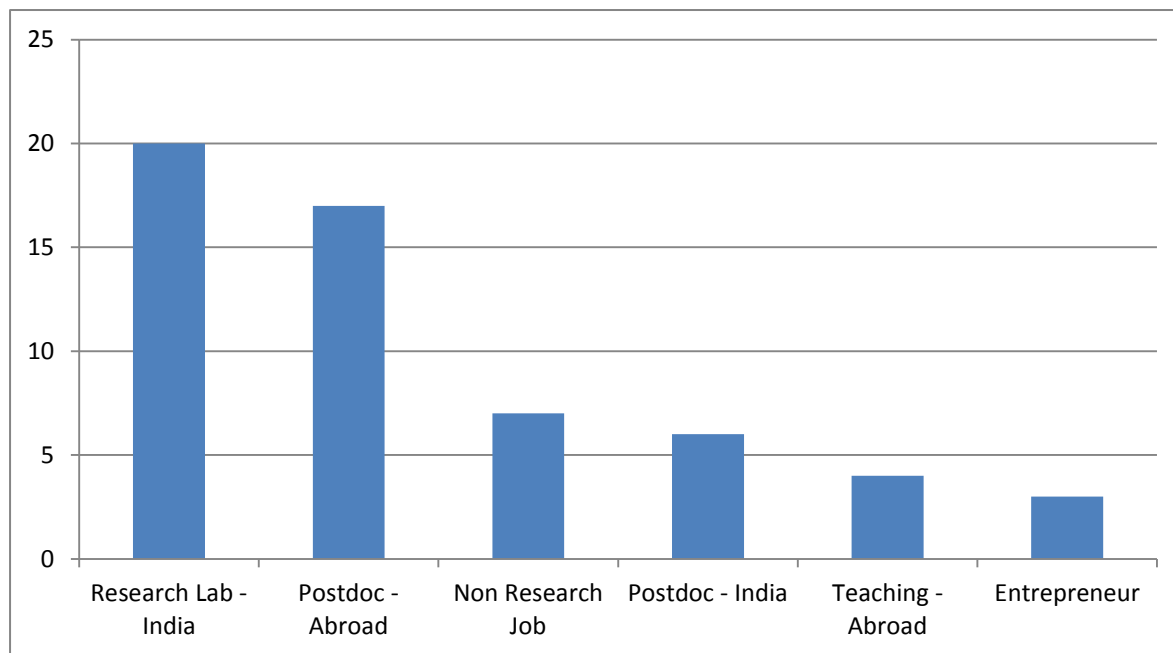

Fig 2: The employment options chosen by students who completed their PhD in 2012-2013.

Stipend/Compensation given to PhD students

Based on the data provided by 27 institutes about the stipend paid to a PhD student, we can say:

The highest salary given: Rs 29,000
The lowest salary given: Rs 8,000
Average salary a student can expect is: Rs. 18,237

Issues/Challenges faced by the PhD program

The online form had an open question for institutes to list down the issues they face with the PhD program. The response that we got can be broadly categorized into the following (in order of importance):

- Shortage of Faculty
- Attracting good students to pursue PhD
- Financial Support
- Lack of tie ups in the industry and other institutions
- Employment opportunities after successful completion
- Choice of Problem area for PhD

Faculty

For the 48 institutes covered in the study, the total number of faculty with PhD is 818 and the average faulty with PhD in the CSE/IT department of an institute is 17.

References

1. CRA Taulbee Survey. http://cra.org/resources/taulbee/

Acknowledgements

Appendix

A. Group 1 institutes: Provided Data

Name of Institution	PhD Faculty	Non PhD Faculty	Male PhD Graduates ('12-'13)	Female PhD Graduates ('12-'13)	Total PhD Graduates ('12-'13)	Faculty from PhD Students	PhD Students Enrolled	Part Time PhD Students Enrolled
BHU IT	6	1	1	0	1	Data Not Provided	Data Not Provided	Data Not Provided
BITS Pilani	9	11	3	0	3	1	27	0
Chennai Mathematical Institute	10	0	1	0	1	0	19	1
Delhi University (Main Campus)	5	1	5	16	21	4	Data Not Provided	Data Not Provided
Dhirubhai Ambani Institute of Information and Communication Technology	54	4	2	1	3	0	61	28
IIIT Allahabad	49	1	9	2	11	3	81	0
IIIT Bangalore	29	0	1	0	1	0	42	29
IIIT Delhi	36	0	0	0	0	0	53	0
IIIT Hyderabad	60	3	2	0	2	0	77	24
IITB-Monash Research Academy	0	0	1	0	1	0	25	25
Indian Institute of Science Bangalore	41	4	Data Not Provided	Data Not Provided	18	1	112	0
Indian Institute of Technology Bombay	41	0	4	8	12	0	100	17

Institution								
Indian Institute of Technology Delhi (CSE and School of IT)	48	0	Data Not Provided	Data Not Provided	5	Data Not Provided	69	0
Indian Institute of Technology Gandhinagar	2	0	0	0	0	0	4	0
Indian Institute of Technology Guwahati	27	0	0	1	1	0	60	8
Indian Institute of Technology Hyderabad	8	0	0	0	0	0	14	1
Indian Institute of Technology Indore	9	0	0	0	0	0	25	3
Indian Institute of Technology, Kanpur	26	0	Data Not Provided	Data Not Provided	6	Data Not Provided	30	
Indian Institute of Technology Kharagpur(CSE and School of IT)	34	1	7	3	10	0	85	5
Indian Institute of Technology Madras	26	0	Data Not Provided	Data Not Provided	8	Data Not Provided	83	0
Indian Institute of Technology Mandi	12	0	0	0	0	0	9	0
Indian Institute of Technology Patna	10	0	8	2	10	0	22	4
Indian Institute of Technology Roorkee	10	0	3	2	5	0	14	0
Institute of Mathematical Sciences Chennai	8	0	2	0	2	0	24	0
Jadavpur University Kolkata	27	4	8	3	11	2	20	11
Jamia Hamdard	5	7	0	1	1	5	7	0
JIIT	18	63	0	0	0	0	55	0
MNNIT Allahabad	10	13	9	3	12	2	53	31
National Institute of Technology Surathkal	13	11	3	2	5	3	35	15
National Institute of Technology, Bhopal	9	11	2	4	6	3	25	13

Netaji Subhas Institute of Technology	9	10	1	1	2	0	22	0
TIFR	15	0	1	1	2	0	28	0
University of Hyderabad	19	7	3	4	7	0	72	24
Vishwakarma Institute of Information Technology	2	58	0	0	0	0	6	0
TOTAL	687	210	76	54	167	24	1359	239

B. Group 2 institutes: Provided data for last year's report

Name of Institute	PhD Faculty	Non PhD Faculty	PhD Graduates ('12-'13)	Total PhD Enrolled
Indian Institute of Technology Ropar	4	0	0	6
National Institute of Technology, Trichy	7	8	0	10
National Institute of Technology, Warangal	9	6	2	11
Visvesvaraya National Institute of Technology, Nagpur	5	8	1	4
TOTAL	25	22	3	31

C. Group 3 institutes: PhD faculty and students enrolled data found on website

Name of Institute	PhD Faculty	Non PhD Faculty	PhD Graduates 12'-13' (Estimated)	Total Enrolled
Indian Institute of Technology Bhubaneswar	0	0	0	0
Indian Institute of Technology Rajasthan	8	0	2	16
ISI Kolkata	43	0	10	83
TOTAL	51	0	12	99

D. Group 4 institutes: Only PhD faculty data available on website

Name of Institute	PhD Faculty	Non PhD Faculty	PhD Graduates'12-'13 (Estimated)	Total Enrolled (Estimated)
Amrita University	5	20	1	10
BIT Mesra	1	12	0	2
Delhi Technological University	7	14	2	14
Indian School of Mines, Dhanbad	10	0	2	20
JNU	17	1	4	34
Thapar University	14	18	3	28

University of Pune	1	9	0	2
TOTAL	55	74	12	108

E. Research-focused institutes: 80% or more PhD faculty

Research Focussed Institutes	PhD Faculty	Non PhD Faculty	PhD Graduates '12-'13	Total PhD Enrolled
BHU IT	6	1	1	Data Not Provided
Chennai Mathematical Institute	10	0	1	19
Delhi University (Main Campus)	5	1	21	Data Not Provided
Dhirubhai Ambani Institute of Information and Communication Technology	54	4	3	61
IIIT Allahabad	49	1	11	81
IIIT Bangalore	29	0	1	42
IIIT Delhi	36	0	0	53
IIIT Hyderabad	60	3	2	77
Indian Institute of Science Bangalore	41	4	18	112
Indian Institute of Technology Bombay	41	0	12	100
Indian Institute of Technology Delhi (CSE and School of IT)	48	0	5	69
Indian Institute of Technology Gandhinagar	2	0	0	4
Indian Institute of Technology Guwahati	27	0	1	60
Indian Institute of Technology Hyderabad	8	0	0	14
Indian Institute of Technology Indore	9	0	0	25
Indian Institute of Technology Kanpur	26	0	6	30
Indian Institute of Technology Kharagpur(CSE and School of IT)	34	1	10	85
Indian Institute of Technology Mandi	12	0	0	9
Indian Institute of Technology Patna	10	0	10	22
Indian Institute of Technology Rajasthan	8	0	2	16
Indian Institute of Technology Roorkee	10	0	5	14
Indian Institute of Technology Ropar	4	0	0	6
Indian Institute of Technology, Madras	24	0	11	76
Indian School of Mines, Dhanbad	10	0	2	20
Institute of Mathematical Sciences Chennai	8	0	2	24
ISI Kolkata	43	0	10	83
Jadavpur University Kolkata	27	4	11	20
JNU	17	1	4	32
TIFR	15	0	2	28
TOTAL	675	21	148	1189

F. Institutions with less than 80% PhD Faculty

Teaching Focussed Institutes	PhD Faculty	Non PhD Faculty	PhD Graduates '12-'13	PhD Enrolled
Amrita University	5	20	1	10
BIT Mesra	1	12	0	2
BITS Pilani	9	11	3	27
Delhi Technological University	7	14	2	14
IITB-Monash Research Academy	0	0	1	25
Indian Institute of Technology Bhubaneswar	0	0	0	0
Jamia Hamdard	5	7	1	7
JIIT	18	63	0	55
MNNIT Allahabad	10	13	12	53
National Institute of Technology Surathkal	13	11	5	35
National Institute of Technology, Bhopal	9	11	6	25
National Institute of Technology, Trichy	7	8	0	10
National Institute of Technology, Warangal	9	6	2	11
Netaji Subhas Institute of Technology	9	10	2	22
Thapar University	14	18	3	26
University of Hyderabad	19	7	7	72
University of Pune	1	9	0	2
Vishwakarma Institute of Information Technology	2	58	0	6
Visvesvaraya National Institute of Technology, Nagpur	5	8	1	4
TOTAL	143	286	46	406

H. All Institutes Included in the Study

List Of Institutions
AIT Technical Campus
Akshaya College of Engineering and Technology
Aligarh Muslim University
Amity School of Engineering and Technology
Amrita University
Andhra University College of Engineering
Anna University
Asian School of Technology
Aurangabad College of Engineering
Avinashilingam Deemed University for Women
BHU IT
Bengal Science and Engineering University
BITS Pilani

BIT Mesra
Bapuji Institute of Engineering and Technology
Bengal Engineering and Science University, Shibpur
Chennai Mathematical Institute
College of Engineering
College of Technology and Engineering, Udaipur
D.E.I. Technical College
Delhi Technological University
Delhi University (Main Campus)
Department of Computer Science and Applications, Kurukshetra University
Department of Studies in Computer Science, Manasa Gangothri, University Of Mysore
Desh Bhagat Foundation Group of Institutions, Ferozpur Road Moga
Dhirubhai Ambani Institute of Information and Communication Technology
Don Bosco College of Engineering and Technology
Dr. Babasaheb Ambedkar Technological University Institute of Petrochemical Engineering
Dr. B.R Ambedkar National Institute of Technology, Jalandar
Dr C.V Raman Institute of Science and Technology
East West Institute of Technology
GITM Institute of Technology
Goduati Engineering College For Women
Government College of Technology, Coimabtore
Guru Gobind Singh Indraprastha University
Guru Nanak Dev Engineering College
Guru Teg Bahadur Khalsa Institute of Engineering and Technology
IIIT Allahabad
IIIT Bangalore
IIIT Delhi
IIIT Hyderabad
IITB-Monash Research Academy
ISI Kolkata
Indian Institute of Science Bangalore
Indian Institute of Technology Bhubaneswar
Indian Institute of Technology Bombay
Indian Institute of Technology Delhi
Indian Institute of Technology Gandhinagar
Indian Institute of Technology Guwahati
Indian Institute of Technology Hyderabad
Indian Institute of Technology Indore
Indian Institute of Technology Kanpur
Indian Institute of Technology Kharagpur/ School of IT
Indian Institute of Technology Kharagpur/CSE
Indian Institute of Technology Madras
Indian Institute of Technology Mandi

Indian Institute of Technology Patna
Indian Institute of Technology Rajasthan
Indian Institute of Technology Roorkee
Indian Institute of Technology Ropar
Indian School of Mines, Dhanbad
Institute Of Engineering Jiwaji University, Gwalior
Institute Of Technology, Guru Ghasidas Vishwavidyalaya, Bilaspur
Institute of Mathematical Sciences Chennai
Invertis Institute of Engineering & Technology
ITM University, Gwalior
JNU
Jadavpur University Kolkata
Jaipur National University
Jamia Hamdard
Jamia Millia Islamia
JIIT Noida
JNTUH College of Engineering Hyderabad
K S R Institute For Engineering And Technology
K S Rangasamy Institute of Technology
K. L. E. Society's College of Engineering And Technology, Belgaum
K.V.G. College of Engineering
LMNIIT
MNNIT Allahabad
Madan Mohan Malvia Engineering College
Madhav Institute of Technology & Science
Maharashtra Institute of Technology, Pune
Manonmaniam Sundaranar Uviversity
Mumbai University
National Institute of Technology Agartala
National Institute of Technology Bhopal
National Institute of Technology Calicut
National Institute of Technology Durgapur
National Institute of Technology Goa
National Institute of Technology Jamshedpur
National Institute of Technology Kurukshetra
National Institute of Technology Meghalaya
National Institute of Technology Raipur
National Institute of Technology Rourkela
National Institute of Technology Silchar
National Institute of Technology Surathkal
National Institute of Technology Trichy
National Institute of Technology Warangal
National Institution of Technical Teachers' Training and Research

Netaji Subhas Institute of Technology
Padmashree Dr. D. Y. Patil Institute of Engineering and Technology
PSG College of Technology
Rajeev Gandhi Proudyogiki Mahavidyalaya
Ramrao Adik Institute of Technology
Sant Longowal Institute of Engineering and Technology
Sardar Patel College of Technology
School of Computer Science and IT
School of Computer Sciences, Mahatma Gandhi University
Shobhit Institute of Engineering and Technology
Shri G.S Institute of Tech. and Science
Shri Guru Gobind Singhji Institute of Engineering and Technology
Shridevi Institute of Engineering And Technology
Sir M.visvesvaraya Institute of Technology
SJB Institute of Technology
SNDT Womens University
SNS College of Technology
Sona College of Technology
Sri Jayachamarajendra College of Engineering
Ssbt's College of Engineering and Technology
Swami Vivekanand Institute of Technology, Sagar
Symbiosis Institute of Technology
Symbiosis Institute of Technology & Science
Thapar University
Thiagrajan College of Engineering
TIFR
University Institute of Engineering and Technology
University of Hyderabad
University of Pune
Veer Surendra Sai University of Technology, Burla
Vishwakarma Institute of Information Technology
Vishwakarma Institute of Technology
Visvesvaraya National Institute of Technology Nagpur

Notes:

- JIIT, IIT Kanpur, IIT Mandi provided their data on email and were subsequently moved to Group 1.
- IIT Kharagpur corrected the number of their non-PhD faculty after the initial draft of the report was sent.
- IIT Gandhinagar was moved to Research Oriented Institutes after a correction was made in the number of their non-PhD faculty data.

- IIT Delhi provided their PhD data in two categories - IIT Delhi CSE and School of IT after the initial draft of the report was ready.
- The data of IIT Delhi and IIT Kharagpur which was given in two categories – School of IT and CSE, was combined after suggestions were given for the initial draft of the report.
- IIT Madras also gave their PhD data after initial draft of the report. Their faculty data was taken from the website and they were moved to Group 1 from Group 2.
- IIT Patna corrected their PhD data after the initial draft of the report was sent.
- Data for both CSA and SERC was combined and given by IISc on email when asked for validation.
- ISI Kolkata has many different departments/centres which has CS faculty. Faculty from ACMU, MIU, CVPR, ECSU, ASU, BIRU, CoEC was taken in account in last year's report and has been used this time also.
- For DTU, the data for the IT and the CSE department was obtained from their website and then combined.
- The faculty data for the rest of the institutes in group 3 and 4 was obtained from their respective websites.