



## ACM India Annual Report (2014-2015)

The Association for Computing Machinery (ACM), originally founded in 1947, is currently the topmost body of computer science professionals and researchers in the world. ACM India was founded to further ACM's mission of advancing computing as a science and a profession in the Indian context. The report has been collated from contributions by various ACM India people who have led the activities.

### 1. ACM India Annual Event



The ACM India Annual Event celebrates computer science in India, and the sixth event was held at the BITS Pilani, Goa campus. Some truly esteemed guests and speakers made the event the great success. February 5<sup>th</sup>, 6<sup>th</sup> and 7<sup>th</sup> of 2015 saw many esteemed ACM professional and student chapter members descend on the BITS Pilani, Goa campus for a few days of invigorating talks and presentations. The event was hosted by the ACM Goa Professional chapter.

Day 1 saw the re-instating of Inter Research Institute Student Seminar (IRISS). This provided a forum for research scholars from Indian academic institutes to present their

work and was followed by a poster presentation for the delegates to view and interact with the students. 16 of the best PHD students also presented their work as talks. Professor Krithi Ramamritham, IIT Bombay delivered an engaging keynote address on "Smart things". Professor S Srikanth of IIT Bombay delivered a invited talk and the day closed with many potential employers presenting their problem statements for the benefit of the researchers.

Day 2 dawned bright and early and held the main agenda for the ACM India event. The inauguration happened in the presence of Professor Alexander Wolf, President of ACM and Professor at Imperial College, UK, Fabrizio Gagliardi, ACM Europe chair, Dr Srinivas Padmanabhuni, ACM India Chair, Dr Sheila Anand (ACM-W India Chair), Prof K E Raman, Acting Director of BITS Pilani Goa Campus and Shri Chandrashekar Sahasrabudhe, CEO, ACM India. The morning was made more exciting by the announcement of the "Best Dissertation award" to Rijurekha Sen from IIT Bombay for her work on "Different Sensing Modalities for Traffic monitoring in Developing Regions". Prof. Kathy Yelick from University of California, Berkeley delivered a keynote on "Antisocial Parallelism: Avoiding, Hiding and Managing Communication" to an enraptured audience.

The afternoon session was kicked off by a keynote address by Prof. John Hopcroft, winner of the 1986 A M Turing prize. His address on the "Future of Computer Science" was very relevant and interesting to the large student population.



Prof. Susan Rodger from Duke University capped the evening by her talk on “Computer Science Concepts Come Alive”.

On Day 3, ACM India was proud to launch the Special Interest Group for Computer Science Education (SIGCSE). It was a privilege to have the global SIGCSE champion Prof. Susan Rodgers with us for this. Prof. Madhavan Mukund of CMI Chennai chaired a panel discussion on “Overcoming challenges within the university system” – a much needed and hotly debated topic.

The local organizing committee including members from ACM Goa Chapter, faculty members and student volunteers from Goa University and BITS Pilani Goa campus and ACM members from Persistent Systems, Verna worked tirelessly to make this event a successful and memorable one. The event was sponsored by Oracle Academy, Google, TCS, Microsoft and Persistent.

## 2. ACM India Doctoral Dissertation Award 2014

The ACM India Doctoral Dissertation Award was established in 2011 to recognize the best doctoral dissertation(s) in Computer Science and Engineering from a degree-awarding institution based in India for each academic year. The award consists of a plaque and a cash award of Rs. 2,00,000.

The call for nominations for the 2015 award was sent to more than 100 Indian institutions awarding Ph.D. degrees in Computer Science and related disciplines and was also announced on ACM India's webpage. A jury panel consisting of 11 distinguished computer scientists from around the world was constituted with Prof. Anuj Dawar (Cambridge University, UK) as the Chairperson to review and evaluate the nominations. Jury members reviewed the nominated dissertations and also sought reviews from external experts. The review process lasted four months, and resulted in at least 2--3 reviews for almost all nominated dissertations. The top



4 nominated dissertations were shortlisted after extensive electronic discussions. All of these 4 nominations were of the highest standards and were award worthy. Finally, after additional rounds of discussions, the jury selected Dr. Rijurekha Sen's dissertation titled “Different Sensing Modalities for Traffic Monitoring in Developing Regions” for the ACM India Doctoral Dissertation Award, 2015. At a close second, the ACM India Honorable Mention Award 2015 went to Dr. A. V. Sreejith for his dissertation titled “Regular Quantifiers in Logic”. Dr. Sen completed her Ph.D. from Indian Institute of Technology Bombay under the guidance of

Prof. Bhaskaran Raman. Dr. Sreejith completed his Ph.D. from Institute of Mathematical Sciences, Chennai under the guidance of Prof. Kamal Lodaya.

The ACM India Doctoral Dissertation Award and the ACM India Honorable Mention Award for 2015 were presented during the ACM India Annual Event on February 6, 2015 at the Birla Institute of Technology and Science, Pilani (K. K. Birla Campus) at Goa. Tata Consultancy Services (TCS) generously sponsored the awards. Dr. Rijurekha Sen was present in person to receive her award. Dr. A.V. Sreejith could not receive his award in person because of travel constraints; the award was sent to him subsequently.

## 3. ACM-W India

The ACM-W event has been conceived as a one-stop event that provides an opportunity for young students and professionals to listen to, interact with, and be motivated by leading women professionals across the world. 2014/15 was a busy year for ACM-



W India. A gamut of activities filled our calendars to help enrich and engage us through the year. Here's a short summary of the events.

- ACM-W Regional Celebration Goa, September 2014
- Grace Hopper Celebration India, November 2014
- ACM All India Annual Event, February 2015
- ACM-W & MMA talk series - Feb 2015 - Ajitha M of Pay Pal

### **Conference Participated**

NYUAD Women in Computing in the Arab World Conference 2015

### **ACM-W Regional Celebration at Goa University on 26th September**

The ACM-W Regional Celebration at Goa was organized by ACM-Goa in association with ACM-W India and Goa University on 26<sup>th</sup> September, 2014. The Conference was inaugurated by Dr Satish Shetye, Vice-Chancellor, Goa University.

This one-day celebration had several intellectually enriching opportunities for women students and professionals in the field of computing. It brought together a unique opportunity of collective learning, interacting with world class researchers and peers and discussing the work-in progress research to an enlightened audience and getting their valuable insights.

With a stellar line up of speakers like Dr. Silvia Giordana (ACM Distinguished Speaker from Switzerland) and many others, the event was a grand success. It also included the first Lady Ada National Programming Contest for girl students which saw enthusiastic participation. It was hard to believe that it was ACM-W Goa's first ever Regional celebration of Women in Computing. Kudos to the organizing team.

### **GHC India 2014, November 19 – 21, 2014 Bangalore**

The 2014 Grace Hopper Celebration of Women in Computing India hosted a sold-out group of 1,600 attendees. It was a great learning and networking experience for women in technology. The program featured many events to support women in computing in India, including sessions on entrepreneurship, building confidence, and professional development, as well as technical presentations on topics ranging from wearable technology to machine learning.

More than 100 developers built apps in keeping with the theme "Tech for Good" at the all-women hackathon; The Women Entrepreneur Quest gave budding entrepreneurs the opportunity to compete for prizes by making pitches for their technology ventures to a panel of judges composed of investors, technology experts, entrepreneurs and mentors.

Grace Hopper India was co-presented by ACM and the Anita Borg Institute for Women and Technology. At the inauguration ceremony Dr. Srinivas Padmanabhuni, President, ACM India Council highlighted the importance of ACM in Computing Community and urged the members to actively participate in ACM activities. Dr. Sheila Anand, ACM-W India Chairperson addressed the gathering and introduced them to ACM-W mission, events, and membership benefits. ACM had sponsored 40 women members from various Student and Professional Chapters across India.

## ACM-W talk series – Feb 2015

The collaboration between ACM-W and the Madras Management Association (MMA) has always led to interesting and engaging talks. Our February 2015 talk was no different. Ajitha Molakalappalli of Paypal helped demystify the world of online and mobile payments for us.

The talk saw her cover the basics of mobile payments for those of us unfamiliar with the under the hood details. This included its history, growth, current technologies used for mobile payments. She covered trends in the field, relevance to India in particular with the advent of the smart phone and the multibillion-dollar opportunity waiting for the stakeholders in this domain.

Prof Ramanujam, IMSC, helped chair the event and Dr. Sheila Anand gave the welcome address. Around 70 participants, comprising of Industry professionals, bankers, consultants and students made for an engaged audience. The talk came to a close with a very active Q & A session. Overall, it was a fascinating evening of discussions about Money matters in the mobile world!

## NYUAD Women in Computing in the Arab World Conference 2015

Across the world, as diverse as our appearance and tongues are, women in computing are still bound together by the unique need to make progress in the world of technology. It is this common binding factor that took Dr. Arati M. Dixit and Maria Chaudhary to represent ACM-W at the NYUAD WIC event in Abu Dhabi. Dr. Arati M. Dixit delivered a keynote in a Panel-'Prominent International Women in Computing Organizations and Venture Capitalists' on 'ACM-W and Global Women in Computing (ACM-W India and Europe)'.

All the members gave insight on their organizations role towards women in computing and general perspective with statistics on women in their country and globally. Arati M. Dixit's talk highlighted on the vision, activities and benefits of ACM & ACM-W. She also discussed about special events organized by ACM-W India and ACM-W Europe. She discussed about Women in Computing in India with respect to Education, IT work-force, Research domain and Entrepreneurship. The statistics used in this keynote clearly showed that Women in India are inclined towards Computing and the number is growing constantly over the last few decades, which is not the case in many developed and developing nations. The empowerment and encouragement of women in computing globally can be achieved by actively joining hands with ACM-W initiatives!

Dr. Arati M. Dixit volunteered as a Mentor for PhD scholars and Maria Chaudhary volunteered as a Mentor for IT Industry mentees at the ArabWIC Mentoring Session. This conference explored the preliminary research findings focusing on representations, the opportunities as well as the diverse challenges faced by women in computing in the Arab world.

## 4. The Education Committee of ACM India

As was done last year, a five day Workshop on Design and Analysis of Algorithms was conducted by the Thiruvananthapuram Chapter of ACM, as one of the initiatives by ACM India Education, in association with the Indian Association for Research in Computing Science (IARCS) and Indian Institute of Information Technology and Management-Kerala (IIITM-K), Thiruvananthapuram at IIITM-K, Technopark, Trivandrum.

The Workshop was to empower engineering college teachers to teach this core topic more effectively. The Workshop focused on various paradigms and approaches used to analyze and design algorithms. The topics covered in the discussions included basic data structures, concepts of graphs and traversals, finding shortest path, and topics regarding np completeness and dynamic programming.



This year the ACM India Education Committee organized an important two-day Workshop on computing curricula on 9-10 April 2015. The Workshop was co-sponsored by Savitribai Phule Pune University. The Workshop was generously supported by ACM which provided funds to enable the chair of ACM Education Board Dr Mehran Sahami (Stanford University) and Dr Barbara Owens (South Western University) to participate and give talks. John White, CEO ACM, gave an overview of the activities of ACM in different geographies.

The main objective behind the Workshop was to contrast the remarkable success seen by the Indian IT industry with the lack of similar progress in computing education in India.

Participants at the Workshop examined what can be done to bring in a focus aimed both at the future of computing and the needs of employers.

The Workshop concluded with the following observations:

1. The ACM CS2013 curriculum provides a model that can lead to a modern curriculum design; however, any new curriculum will need careful implementation and this will take time.
2. The goals of a new curriculum should be to build the ability to think independently, to solve problems and to work collaboratively; these would be best accomplished if there was a flexible approach to teaching and evaluation.
3. Practices in the current education system have led to a very rigid and inflexible system that has slowly lowered educational standards.
4. A well designed curriculum must be complemented by giving teachers far greater control over all aspects of the delivery of a course, from teaching, problem-solving and setting examination papers to final evaluation.
5. Given the continuing shortage of good faculty, new methods need to be urgently introduced to scale up good teaching and enable it to reach a large number of students.
6. A major improvement in teaching can be achieved by empowering teachers and providing them with video and textual resource material that they can use in their courses.
7. Employers must not merely look for skills of short-term value to serve immediate needs but concentrate on recruiting well-educated computing graduates who might one day lead their industry. This will be a stimulus for the long-term goals of education and move the focus away from placement and towards career building.

Local organization for the Workshop was provided by the ACM India Pune chapter led by Abhijat Vichare.

## 5. Conference Sponsorships

Several high quality conferences were conducted or are planned to be conducted with ACM sponsorship or cooperation, including:

- AIR '15 (International Conference on Robotics)
- CoDS '15 (Conference on Data Sciences)
- COMAD '15 (International Conference on Management of Data)
- Compute 2015 (Annual ACM India Conference)
- FIRE '15 (Forum for Information Retrieval Evaluation)
- ICDCN '15 (International Conference on Distributed Computing and Networking)
- IPDPS '15 (International Parallel and Distributed Processing Symposium)
- ISEC '15 (India Software Engineering Conference)



- HiPC '15 (International Conference on High Performance Computing)
- PerMin '15 (International Conference on Perception and Machine Intelligence)
- POPL '15 (ACM Symposium on Principles of Programming Languages)



## 6. Compute 2014



The Compute 2014 was organized around two main themes: Advances in Information Management and High Performance Computing, from October 9<sup>th</sup> to 11<sup>th</sup> 2014. The ACM India Nagpur Professional Chapter organized it, and the Department of Computer Science and Engineering, VNIT Nagpur hosted the conference.

The following keynote addresses were held during Compute '14.

1. Prof. Robert Schumaker from Central Connecticut State University, USA  
Topic - "Evaluating Sentiment in Financial News Articles"  
(October 9<sup>th</sup>, 10 a.m.)
2. Prof. Krithi Ramamrithm from IIT Bombay (Fellow ACM, Fellow IEEE)  
Topic - "Smart Energy -- The Role of Ubiquitous Small Data"  
(October 10<sup>th</sup>, 10 a.m.)
3. Dr. Sriram Raghavan from IBM Research Labs, Bangalore  
Topic - "Transforming industries and markets using Big Data Analytics"  
(October 10<sup>th</sup>, 11:30 a.m.)
4. Dr. Yogesh Sabharwal from IBM Research Labs, New Delhi  
Topic - "Graph Exploration on Massively Parallel Distributed Memory Machines"  
(October 11<sup>th</sup>, 10 a.m.)

Tutorials on the following topics were held during Compute '14.

1. Dr. Santonu Sarkar – BITS-Pilani Goa Campus, and Sayantan Mitra, Ravindranath Manumachu - Siemens Technologies and Services Pvt. Ltd.  
Topic - "Making application ready for HPC platform - Software engineering challenges and techniques"  
(October 10<sup>th</sup>, 11:30 a.m.)
2. Dr. Arijit Mukherjee, Dr. Himadri Sekhar Paul, TCS Innovation Labs Kolkata and Dr. Ansuman Banerjee - ISI Kolkata  
Topic – "Mobile Cloud Computing"  
(October 10<sup>th</sup>, 14:00)
3. Dr. Pethuru Raj Chelliah and Anupama Raman - IBM India  
Topic - "High Performance Big Data Analytics"  
(October 11<sup>th</sup>, 14:00)

There were a total of 110 papers submitted. After a thorough review by at least three reviewers per paper, 13 full papers and 8 short papers were accepted.

Total number of registered participants for Compute '14 were 157.



## 7. Chapter Summit

Total number of registered participants for the Chapter's Summit in Compute '14 - 39

Following ACM chapters made presentations during Compute 2014 ACM Chapter Summit:

### Professional Chapters

Nagpur

Pune

Goa

Delhi

### Student Chapters

JIS ACM Student Chapter

ACM SVNIT Surat Chapter

DDUC ACM Student Chapter

ACM BIT Patana Chapter

JNEC Aurangabad ACM Student Chapter

VIT Vellore ACM Student Chapter

Aligarh ACM Student Chapter

ABESEC Ghaziabad ACM Student Chapter

ISM Dhanbad ACM Student Chapter

J.B.I.E.T Hyderabad ACM Student Chapter

Pradnyan DYPCOE -AK Pune ACM Student Chapter

DMIETR Wardha ACM Student Chapter

Goa University ACM Student Chapter

MITS Gwalior ACM Student Chapter

Jayamukhi Warangal ACM Student Chapter

NIT Warangal ACM Student Chapter

DAIICT ACM Student Chapter

## 8. ACM Survey on PhD Production in Computer Science in India

For this year's report, we have expanded the institutions surveyed and, like last year, where data was not provided, estimated the data on PhD production 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). All together about 48 institutions' data was used.

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, and 19 institutions in the second category. 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 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: is about 1600. 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 about 420.

## 9. Details about membership etc.

ACM Membership:

Membership numbers	May 2013	May 2014	May 2015
Professional	2847	3997	3284
Students	3637	4055	4962
Total	6480	8052	8246
No. of Professional Chapters	11	10	12
No. of Student Chapters	73	81	101
No. of SIG Chapters	4	4	5
No. of ACM-W chapters	4	5	11

## 10. DSP and ESP Talks:

There were 30 talks by Distinguished speakers and 18 talks by the Eminent Speakers during the year.

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