



Department of
Computer Science and Engineering
NIT Calicut

PROCEEDINGS OF
C-SCAN '16

Computer Science Conference of All NITs



TEQIP
Phase II



TATA CONSULTANCY SERVICES

ABOUT C-SCAN '16

C-SCAN 2016, the first of its kind, is a conference aimed at bringing in student-teacher fraternity of CSE Departments of all NITs across the nation under a single umbrella for exchange of ideas to spark innovation. The conference would serve as a platform to improve interaction and bridge the gap between faculty and students of different NITs. This would help identify patrons of similar research areas and help initiate collaboration in research projects to subsequently publish research papers. This conference presents an excellent opportunity for students among various NITs to collaborate and form strong ties of technical expertise.

C-SCAN 2016 was hosted by National Institute of Technology Calicut. The conference witnessed a participation from 8 NITs all over the nation including NIT Calicut. The participants included HoDs, Professors, Research Scholars, Graduates and Undergraduates from various NITs. The discussions revolved around student internship schemes, faculty exchange programme, research collaboration, annual conference proposal and implementing a common curriculum for CSE/IT departments across all NITs.

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LIST OF PARTICIPATING INSTITUTES

Sl.No	Institute Name
1	National Institute of Technology, Calicut
2	National Institute of Technology, Delhi
3	Visvesvaraya National Institute of Technology, Nagpur
4	Sardar Vallabhbhai National Institute of Technology, Surat
5	National Institute of Technology, Srinagar
6	National Institute of Technology, Surathkal
7	National Institute of Technology, Trichy
8	National Institute of Technology, Warangal

LIST OF PARTICIPANTS

SL.No	Name	Position	Institute
1	Dr. Raju Bhukya	Faculty	NIT Warangal
2	Dr. Shabir Ahmed Sofi	Faculty	NIT Srinagar
3	Dr. Parag Deshpande	Faculty	NIT Nagpur
4	Dr. Manish Kurhekar	Faculty	NIT Nagpur
5	Dr. Anurag Singh	Faculty	NIT Delhi
6	Dr. Annappa	Faculty	NIT Surathkal
7	Dr. R Mohan	Faculty	NIT Trichy
8	E Sivasankar	Faculty	NIT Trichy
9	Subhasree M	Faculty	NIT Calicut
10	Pournami P N	Faculty	NIT Calicut
11	Saleena N	Faculty	NIT Calicut
12	Dr. K A Abdul Nazeer	Faculty	NIT Calicut
13	Dr. Gopakumar G	Faculty	NIT Calicut
14	Dr. Sudeep K S	Faculty	NIT Calicut
15	Saidalavi Kalady	Faculty	NIT Calicut
16	Dr. R Subashini	Faculty	NIT Calicut
17	Dr. Priya Chandran	Faculty	NIT Calicut
18	Dr. S D Madhukumar	Faculty	NIT Calicut
19	Dr. Vineeth Paleri	Faculty	NIT Calicut
20	Dr. Vinod P	Faculty	NIT Calicut
21	M Sreenivasan	Faculty	NIT Calicut
22	Kranti Kumar	Research Scholar	NIT Trichy
23	Vibha Nehra	Research Scholar	NIT Delhi

SL.No	Name	Position	Institute
24	Guravaiah	Research Scholar	NIT Trichy
25	R Preeth	Research Scholar	NIT Trichy
26	Shivanshu Mehta	Research Scholar	NIT Surat
27	Debayan Chakraborty	Research Scholar	NIT Delhi
28	Nikhil Kumar	M.Tech	NIT Surat
29	Rohan Mazumdar	M.Tech	NIT Surat
30	E Naveen Kumar	B.Tech	NIT Delhi
31	Rekha R Pai	Research Scholar	NIT Calicut
32	Rani M R	Research Scholar	NIT Calicut
33	Gilesh M P	Research Scholar	NIT Calicut
34	Saritha Murali	Research Scholar	NIT Calicut
35	Sithara Kanakaraj	Research Scholar	NIT Calicut
36	Shamna P	Research Scholar	NIT Calicut
37	Mahija K C	Research Scholar	NIT Calicut
38	Jeena K K	Research Scholar	NIT Calicut
39	Shabeera T P	Research Scholar	NIT Calicut
40	Nishamol P H	Research Scholar	NIT Calicut
41	K Nagaraju	Research Scholar	NIT Calicut
42	Sunil Kumar P V	Research Scholar	NIT Calicut
43	Ojus Thomas	Research Scholar	NIT Calicut

Dr. S.D Madhukumar
Convener, C-SCAN '16

NIT STUDENT INTERNSHIP SCHEME

Draft Proposal

This is a draft document aimed at initiating a discussion on **Inter NIT Internships for CS Students**.

This document may evolve to contain guidelines for offering such internships in CS departments of NITs.

Motivation: Most of the NITs give their students about three month vacation during May, June, July. While very few students get internship offers from reputed firms and top-tier institutes of the country and abroad, there are many who are left with no decent offers.

Plan: Participating CS departments of NITs will provide a common platform for students who have completed 3 years of the 4 year B.Tech CS programme to apply for academic internships in CS departments of other NITs. Minimum period of internship is 2 months. Offers will be given based on student's interests and availability of faculty.

Discussion Points (may add more):

1. Will we get 'good' students?
May be - SURGE, VSRP have very limited number of seats. We have so many students left out with no good options for internship. Instead of joining some training centers, CS departments in other NITs could be a good choice. Further there might be students interested in joining institutes near them.
2. Who will meet the expenses?
Students are expected to take care of their travel and food expenses. Institute accommodation in student hostels (on payment basis) need to be offered to the selected students.
3. Who all will participate?
Any NIT Computer Science department who is willing to accommodate, few students, say 5, from other NITs can participate in this programme. The selected students are to be closely guided by a permanent faculty of the department. A certificate of internship also needs to be given to the students on successful completion of the internship.

4. What do we gain?
Our students may get a decent internship option and an internship certificate. We get a chance to interact with students of other NITs who are interested in our area of work.
5. Who will co-ordinate?
In each NIT CS department, there will be one coordinator who will shortlist few application (say a maximum of 15 from that department to other NITs restricting requests to any specific outside NIT at a maximum of 5) and forward the concerned applications to the corresponding coordinators.
6. How is the shortlisting done?
This may be left to the individual department / coordinator. CGPA may be the best decider.
7. What is the role of the department coordinator?
 - Invite applications from students of the department, shortlist if necessary, and send it to the corresponding coordinators.
 - Receive applications from other coordinators and make a decision and communicate this decision to other coordinators.
 - Once the decision on student applications are available from other NITs, the coordinator may verify and pass on the information to the students and ensure that the offers are not ignored.
8. How will a coordinator make an offer?
Once a coordinator gets all the applications to his/her department (sent from other coordinators), a confirmed list and a wait list of offers may be prepared by him/her based on the faculty / infrastructure availability and nature of applications. The offers are to be sent to the coordinator of the NIT to which the student belongs.
9. Who will inform the students?
The coordinator of the department to which the student belongs.
10. What happens if a student does not turn up - an offer is rejected?
We expect that some offers will be rejected. The concerned coordinator has to be informed at the earliest.
11. Do we create a portal for uploading / viewing applications?
May be in the first run, it is better to go with emails and based on the feedback of coordinators and students' interest, we could think of a more automated system from next year.

12. For 2016 internships what do we do?

- Finalize on discussion points at the end of this meeting.
- Inform all NIT CS departments of this proposal and ask them to nominate a coordinator for 2016, if interested.
- Make the list of 'participating institutes' with coordinators - share it among all coordinators.
- Each coordinator invites applications from students (Submission **Deadline:** March 15)
- Format of application form: (A google form template is prepared for reference)
- The relevant applications (restricting to a total of 15, maximum 5 to a particular NIT) are shared among the concerned coordinators (Consolidating **Deadline:** March 31)
- Each department communicates its offers (with a possible wait list) to the concerned coordinators.
(Results **Deadline:** April 15)
- Each coordinator finalizes the offers received ensuring that no student gets more than one offer and communicates to the students. (Offer **Deadline:** April 20)
- Students are expected to accept the offers and commit for the internship. (Acceptance **Deadline:** April 25)
- The accepted offers are communicated back to the concerned coordinators. (**Deadline:** April 30)
From then on, the student may interact with the coordinator / faculty of the department where he/she is expected to carry out the internship.

13. What is the responsibility of the host department to the visiting interns?

The faculty who has agreed to mentor the visiting intern is expected to be available during the internship period. For the visiting students, the responsibility of the host department is limited to providing student accommodation and food in the institute hostels (on payment basis). Permissions for using lab facilities, library and internet are also expected. An internship offer letter from the host institute along with the valid ID from the student's institute may be sufficient for a legal stay in the campus.

Decisions Taken

- A website for announcements regarding internships in CSE/IT departments of different NITs will be setup.
- Each participating NIT will have a coordinator for this programme.
- The coordinator will inform cscan16@nitc.ac.in the names and web links of those faculty who are willing to receive the internship requests from students of other NITs.
- A webpage will be created in C-SCAN'16 site for consolidated display of the received information and the link will be shared with all the coordinators for publicity among students. The C-SCAN website will be hosted and maintained by the respective NIT which is hosting C-SCAN for the year.

FACULTY EXCHANGE

Draft Proposal

Objectives

1. Sharing the faculty expertise across NITs for the benefit of students.
2. Better faculty interaction among NITs which may lead to collaborative research.
3. A means to address faculty shortage.
4. To find resource persons for FDPs, Workshops, Short term training programmes etc.
5. To work and act as a single CSE department at national level.

Terms and conditions

1. The exchange will be from one to three weeks maximum.
2. The hosting Institute will provide campus accommodation and travelling allowance and necessary logistics for pickup and drop etc.
3. A nominal honorarium if possible may be given.
4. The faculty going to another NIT for a short assignment should obtain permission from the DCC so that work in the parent department is no way affected.
5. The period of this deputation will be considered as special casual leave/duty leave sanctioned by the H.O.D or Dean (Faculty Welfare).
6. The attendance statement from the visiting NIT will be counted for salary calculation in the parent Institute.

Guidelines on Implementation

Following are the proposed guidelines for the implementation of Faculty Exchange Programme:

1. CSE departments of each NIT shall have a co-coordinator for Faculty Exchange Programme.
2. It is good to have a central coordinator to facilitate communication among the department coordinators as well as to make sure that any important updates are reaching to all in the participating departments via email or website. The central coordinatorship can be changed also if one of the department coordinators wishes to serve in that role. This change can be once in two years.
3. Each participating department will publish their requirements as well as resources (details of faculty who are willing to serve as resource persons under this programme) at least once every semester. For getting sufficient time to make necessary preparations on various matters, these announcements can be made in the first week of July and December every year. This information could be circulated among the co-coordinators through e-mail or a website
4. Departments interested in utilizing this service may get in touch directly with the coordinator of the department that offers resources.
5. There would be a Central database, possibly located on a web server, and each coordinator can update the details on the website. The central coordinator can be the in-charge of the central database. The central database can be using any of the social networking sites well.
6. The central coordinator can take charge of the maintenance of the website/ central database.
7. Department coordinators can ask for the interest of faculty members from their departments, who would like to serve as a resource person and share with other coordinators. Once a request for a particular course is received from other NITs,
8. Department coordinators can inform the faculty members from their departments about the availability of resource persons from other NITs on different subjects in a semester.

Major Recommendations from C-SCAN'16 conference participants

Using the scheme for FDPs, Implementing similar to Visiting Faculty Scheme, and Concentrating on research collaborations, Granting of Duty leave, Making use for elective courses offered by Ad-hoc faculties and maintaining a central database are some of the points raised by various participants.

The meeting accepted the draft proposal with the following major recommendations based on the above mentioned points:

1. Individual NITs are requested to present the main points of the Faculty exchange programme in their respective Department Consultative Committees.
2. The implementation plan has to be decided by each CSE department at their parent institute.

RESEARCH COLLABORATION

Draft Proposal

Expected Outcome: A document/guideline/proposal for research collaboration of all NIT's. Identifying experts/group for finalizing and implementation of the proposal.

Topics for Discussion:

Why collaborate?

Better research output

Tangible outcomes of collaboration?

Joint research projects, combined Ph. D guidance

Beneficiaries

Students and faculty of NITs and society ultimately.

How to collaborate?

The following points were placed before the committee for discussion. Viewpoints, more ideas were invited.

Points:

- Joint Research Guidance
- Infrastructure Exchange
- Expertise Sharing
- Coursework for research students in other NIT's
- Post-doctoral scheme for faculty
- Research group formation

Joint Research Guidance:

- Exploring the possibilities of joint research guidance and also about sponsored research.
 - M.Tech joint guidance and external thesis evaluation.
 - M.Tech student spending 2 weeks/4 weeks in other NIT's where the co-guide is available.

Infrastructure Exchange:

- Utilizing the infrastructure of other NIT's for research activities
 - Accessing of digital library (journal/conference proceedings access)

- Software (Rational rose, Plagiarism checking software)
- Hardware (Clusters, Super computer)

Expertise Sharing:

- Expertise sharing through invited lectures, offering courses etc (formal and informal).
- Short term visits to organize/attend expert lectures etc.
- Arranging video-conference/Webinars.

Coursework for research students in other NIT's:

- Proposal to do coursework in other NIT's if the course is not offered or experts are not available
- Transferring the credits of the respective courses to the parent institute

Post-doctoral scheme for faculty:

- Faculty spending minimum of 6 months in other NIT's for post-doctoral fellowship through which faculty can interact with experts and research students in other NIT's
- Joint publication with faculty and students of other NIT's

Research group formation:

- Research group formation and arranging regular talks/seminars on a weekly/monthly basis in the emerging areas
- Hosting, maintenance etc. of the central repository.
- Online research discussion - Platform like Research gate exclusively for NIT's
- Identifying research tracks in reputed conferences
- Forum for identifying/circulating information regarding sponsored projects/proposals etc.
- **A few proposed research groups:**
 - Algorithms and Theoretical Computer Science
 - Big data, Cloud and Distributed Computing
 - Computer Architecture and Operating Systems
 - Databases and Software Engineering
 - Machine Learning, data Mining and AI
 - Security and Computer Networks
 - Programming languages and Compilers
 - Bioinformatics
 - Image Processing and Pattern Recognition

Decisions Taken:

- The participants unanimously agreed that there is a requirement for research collaboration

- The participants expressed their approval for the formation of proposed research groups, with the inclusion of a new group for *Internet of Things*, and modification of the title of the group *Image Processing and Pattern Recognition* to Image Processing, Speech processing and Pattern Recognition.
- The participants volunteered to take on, for the area, the task of identification of faculty, students and the resources available across NITS and host the information repository for the Special Interest Group, and be responsible for the updation and maintenance of the repository.
- The participants opined that certain matters regarding research, like the status of guides in a jointly guided thesis, crediting of courses from other NITs, technicalities of joint sponsored projects need to be worked out in detail before getting ultimately placed before the NIT Boards and/or NIT council, for their approval.
- The table illustrates the NITCs who have volunteered to take up the task of co-ordinating the special interest groups, to start with

Special Interest Group	Co-ordinating NIT	Contact Person
Algorithms and Theoretical Computer Science	NIT Delhi	Dr. Anurag Singh
Big data, Cloud and Distributed Computing	NITK Surathkal	Dr. Annappa
Computer Architecture and Operating Systems	NIT Calicut	Mr. Saidalavi Kalady
Databases and Software Engineering	NIT Warangal	Dr. Raju Bhukya
Machine Learning, Data Mining and AI	VNIT Nagpur	Dr. Parag Deshpande
Security and Computer Networks	NIT Trichy	Dr. R Mohan
Programming languages and Compilers	NIT Calicut	Dr. Vineeth Paleri
Bioinformatics	VNIT Nagpur	Dr. Parag Deshpande
Image Processing, Speech Processing and Pattern Recognition	NIT Calicut	Dr. Priya Chandran
Internet of Things	NIT Srinagar	Dr. Shabir Ahmad Sofi

ANNUAL CONFERENCE PROPOSAL

Draft Proposal

1. Conduct the C-SCAN as an annual event coordinated by each of the participating NITs
2. C-SCAN can be made a 3 day event with the following programmes:

- a. Day 1: Summit of CS Departments of NITs

Track-1 (For Faculty)

- Discussions/Review of Faculty/Student exchange
- Discussions/Review of Formation of Inter-NIT Research groups (faculty) in various areas
- Discussions/Review of Joint Research Projects

Track-2 (For Students)

- Colloquium of Research Scholars & PG students of various NITs
- Inter-NIT Technical contests (For UG Students)

- b. Track-3 (Industry Academic Summit)

- i. Representatives from all leading IT companies in India will be invited to have a summit/discussions with the CSE faculty and research scholars of all NITs

- c. Day 2 & Day 3: International Symposium on Computing

- i. Parallel tracks on various areas of computing, each track to be coordinated by individual NITs (similar to ACM SAC)

Major Recommendations & Decisions Taken after CSCAN'16 Conference

There were deliberations regarding the content of the conference about whether it should be a summit with in-house discussions between NITs or make it a full conference.

A steering committee was formed comprising of the following members was formed to workout the modalities of conducting the annual conference for the coming years:

- 1.Dr. Priya Chandran, NIT Calicut, Chairperson
- 2.Dr. Parag Deshpande, NIT Nagpur, Co-Chairperson
- 3.Dr. Shabir Ahmad Sofi, NIT Srinagar
- 4.Dr. Annappa, NIT Surathkal
- 5.Dr. Anurag Singh, NIT Delhi
- 6.Dr. R Mohan, NIT Trichy
- 7.Dr. Gopakumar G, NIT Calicut
- 8.Dr. Raju Bhukhya, NIT Warangal
- 9.Mr. Shivanshu Mehta, NIT Surat, Research Scholar
- 10.Ms. Vibha Nehra, NIT Delhi, Research Scholar
- 11.Mr. Kranti Kumar, NIT Trichy, Research Scholar
- 12.Mr. Likewin Thomas, NIT Surathkal, Research Scholar

The venue and dates for the next C-SCAN conference will be decided by March 30, 2016 by the chairpersons of the steering committee after discussions through an email group formed for the steering committee members. The venue and other details will be informed to all the C-SCAN'16 participants and other NITs through email and C-SCAN'16 website.

COMMON CURRICULUM FOR CSE/IT FOR ALL NITs

Recommendations from C-SCAN'16 participants

Brief-up of 1st meeting held on 8th December, 2015 at NBCC Bhavan, Lodhi road, New Delhi was presented in C-SCAN 2016 by Dr. Anurag Singh, HoD, CSE department and Assistant Prof, NIT Delhi. This was discussed and participants of C-SCAN appreciated some of the points in the proposal of the committee with the following observations and recommendations:

1. No specific rules should be imposed on common curriculum for all the NITs, but it should only be a guideline and should ensure preserving the idea of the academic freedom/autonomy of CSE/IT departments in India.
2. In the common curriculum, core/elective courses should be identified and implementation must be institute specific.
3. Student Internships should only be optional.
4. Final year project should be flexible and it should be left to the institutes to decide on project work or elective course(s).
5. Virtual classrooms, virtual-labs and MOOC courses cannot be considered as a substitute for the regular academic process and they are appreciated as enhancements to the learning process.
