Alumni Endowment Fund - Report

The purpose of the Alumni Endowment is to use the annual interest accruals to fund initiatives that will have a key transformational impact on the Institute and keep it as a world-class institution of technological advancement. Every year, the Director of the Institute will issue instructions on disbursements to be made from the fund, which will be equal to or less than the amount that has additionally accrued to the fund as returns from its investments. The capital of the fund and any additional capital contributed during the year will not be disbursed.

The selection of projects, for which the money was raised, should be in line with the following:

➢ Key transformational initiatives, where the results are not proven or have uncertain outcomes, and hence do not get funded from the regular government funds

➢ Act as a catalysts in risk-projects, some of which might get funded later by the Government after their success is proven

➢ Support the Institute in innovating strategies to maintain IITM as a world class institution.

- The initial contribution was received from **1985** batch in 2011. They have added about **Rs. 274 lakhs.**

- The **1986** batch contributed Rs. 6 lakhs.

- The **1987** batch contributed Rs. 223 lakhs.

- The **1988** batch contributed Rs. 118 lakhs.

- The **1978** batch contributed Rs. 20 lakhs.

- Other alumni contributed Rs. 2.6 lakhs.

- Currently the endowment is worth about **643 lakhs.**

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FY 2017-18 Deployments

Annual interest from the Alumni Endowment Fund was utilized towards Travel Grant (Rs.41.75 lakhs) and Web studio activities (Rs. 3 lakhs).

1. Travel Grant

o Travel Grant program is very popular amongst Institute students, and is one that impacts the students directly by helping them financially to participate in International Conferences to present research papers, as well as participate in competitions, workshops, summits, exchange programs, internships, etc.

o **Rs. 41.75 lakhs** was deployed towards **IITM Travel Grant.** 94 students benefited through this travel grant.

o Please click on the below link to view travel grant beneficiaries list

Travel Grant Beneficiaries 2017-18

Feedback from a few student beneficiaries
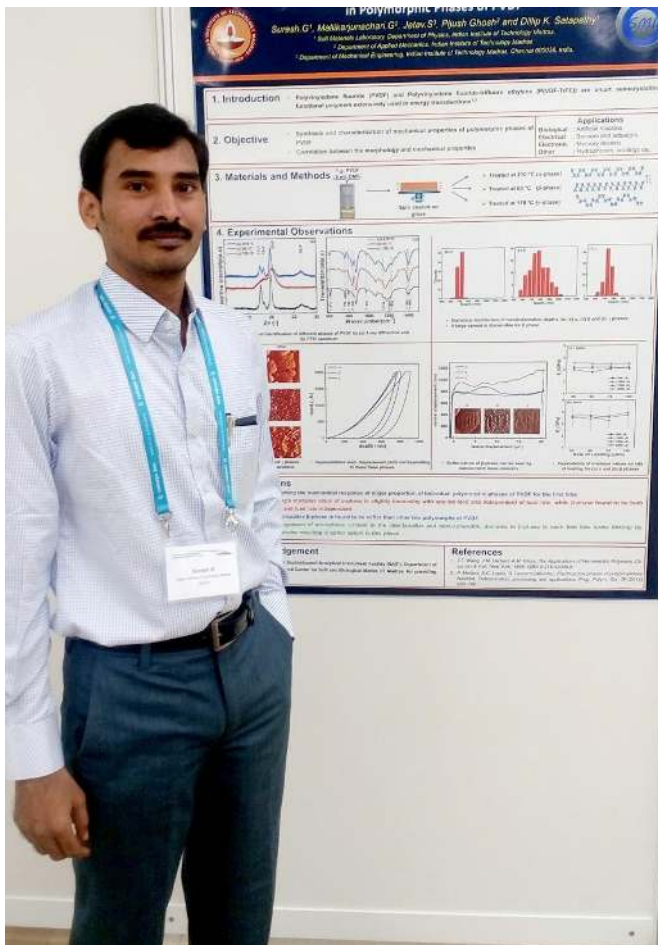
Suresh G (PH12D058)

Poster Presentation

**Emerging Polymer Technologies Summit, Melbourne, Australia**

I am, Suresh. G, a research scholar from the Dept. of Physics working in the area of polymer composites, would like to summarize my recent foreign conference visit to Melbourne, Australia. I was fascinated by the innumerable applications of polymers and their derivatives in the field of science, engineering and technology. Inspired by this, I tried to develop and understand mechanisms of a multiferroic flexible polymer composite material system for high energy density storage and magneto-dielectric applications during my Ph.D. The experimental observations and results were accepted by the research community in the form of a research article. I was interested to show my findings to the polymer research experts hence

applied for Emerging Polymer Technologies Summit 2017 held at Melbourne. I presented my research work titled 'Improved Dielectric and Ferroelectric Properties in Cobalt Ferrite Doped PVDF Multiferroic Polymer Composites' as a poster at the summit. I could clarify the queries and receive fruitful suggestions from the fellow researchers. During the visit I interacted with experts in this field and inspired by the showcases of the latest and exciting innovations taking place around the world.

During the visit, I got the chance to visit the labs of Prof. James Macnae, leader of the Applied Electromagnetic and Radiation Physics Research Group at RMIT University. I have discussed the feasibility of developing a prototype magnetic field sensor from my research findings. I thank Prof. James for his appreciation and positive response to my ideas. His suggestions would certainly be helpful in developing sensitive field sensors for geophysical exploration applications. The discussions with Prof. Paul Dastoor and Dr. Madhu Bhaskaran inspired me to think in new dimensions of research requirements of global issues such as emerging fields of flexible organic electronics. The work related to PDMS/ Carbon nano-fiber composite presented by Dr. Shuying Wu, was very much relevant to my work and also very informative. I got new mechanisms responsible for improvement of stretchable strain sensors that I would try to implement in my composite system. I can say that this summit was a perfect platform for academia and industries to share their successes and difficulties which can trigger ignition of new ideas to young researchers.

In conclusion, with lots of both professional and personnel outlooks, I was benefitted from this visit with new ideas to implement and improve my research quality. With due respect of that, I am obliged and thankful for the help provided by the IIT Madras Alumni relations office to achieve this unforgettable memory.
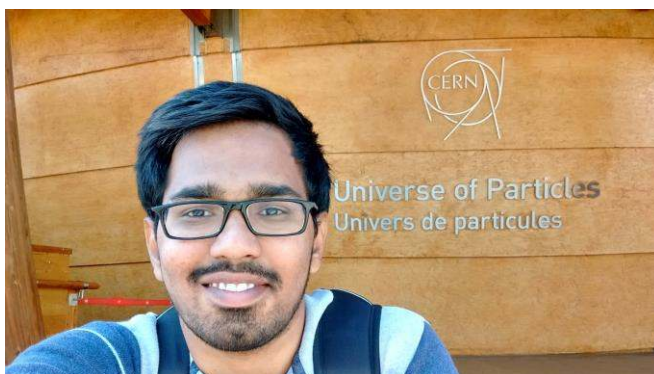
YASHWANTH SAI B (EP14B036)

Summer Internship, CERN

Geneva, Switzerland

Collisions in LHC produce 40 million events per second. That's about 1TB of data per second. We neither have computation powers to store that much data nor are we interested in all the events. Most of the events that are produced are known events. So we only need to accept and store the data or events that are "interesting". This is where triggers come into the picture. Triggers are coded to select only the events that we are interested in storing and analyzing. CMS has L1 (Level-1) trigger and High Level Triggers (HLT). My internship was based around HLTs.

Events can be talked in terms of rate. The incoming data from the collisions is 40 MHz. L1 triggers reduce this rate to 100 kHZ. HLT farms further reduce the rate to 1 kHz and this data is then stored on disks for offline reconstruction and analysis. This reduction can be done by putting "cuts" on the incoming particles. These cuts can be on a wide range of parameters

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like the transverse momentum of the particle, charge of the particle, mass of the particle and even on the derived quantities like pseudo-rapidity, etc. By combining these parameters we can build triggers or "seeds" which accept events according to our requirement.

There are a lot of Physics Analysis Groups (PAGs) in CMS collaboration like B Physics, Higgs, SUSY, etc. Each group searches for different decays. But our HLT "rate budget" is only 1 kHz. This is divided among all the groups. Each group proposes the seeds of their requirement such that it does not exceed their allotted budget.

I was a part of B Physics group. I helped in developing the HLT paths for Bs -> Jpsi/phi -> mumu decay, a beyond SM decay. The first part is the development of a strategy to probe the data, i.e., what data to collect and what to reject. The two major constraints on the HLT paths are rate and efficiency. We need to see that the rate of the path is within the rate budget and its efficiency is not too low. Thus, we have different strategies in place to probe the data. Following these strategies, HLT paths are created using ConfDB GUI. There are different parameters available to put a cut on. We can ask for minimum Pt, track, mass, etc. There were some strategies already in development.

The next part is to see that, we are within the rate budget. I used the official recipe available in the Twiki pages to calculate the rates. This involves using CMSSW to setup the workspace to run the code and using CRAB to run the HLT paths on the data collected. I used the ConfDB GUI to scan a range of values for different parameters to see how the rate changes. We should also see that the overlap between the particles shouldn't be high, thus I used a recipe to calculate the overlaps. The efficiency studies were carried on by another person simultaneously. We further need to see that these paths are fast enough while collecting the data. I did the timing studies on these paths to produce the necessary timing plots. Final paths were chosen after assessing the rates, efficiencies, overlaps and timing studies that we calculated. I also did the final integration tests that are needed before submitting a JIRA ticket.

My major takeaways from this internship was better understanding of the working of HLTs, having a first-hand experience of the life at CERN and understanding the workings of CMS as a whole to a better extent. I got a good peek into how the strategies are developed.

Varun Praveen Kumar Jain (MS11D201)

Paper Presentation

Healthcare Operations Research PhD Summer School, INFORMS Healthcare Conference

Enschede, Rotterdam, Netherlands

I am Varun Praveen Kumar Jain, a PhD student of Operations Management at the Department of Management Studies, IIT Madras, working under the guidance of Dr. Usha Mohan. I attended Healthcare Operations Research

Summer School (by CHOIR), University of Twente, Enschende, Netherlands, July 21-25, 2017. I presented my research work titled *"A Simulation Based Neighborhood Search Algorithm to Schedule Patients at a Multi-Facility Healthcare Diagnostic Center"* at INFORMS healthcare 2017 conference, held at Rotterdam, Netherlands, July 26-28, 2017.

My doctoral research concerns patient scheduling, with particular focus on scheduling Health Check-up patients alongside other category of patients at a multi facility diagnostic center. Towards this I have developed couple of mathematical models for different settings.

Healthcare Operations Research Summer School was held at, University of Twente, Enschende, Netherlands, by Center for Healthcare Operations Improvement & Research (CHOIR). 40 PhD scholars from all over was the world were shortlisted for the summer school. Given my research area, the topics covered in summer school provided me with good exposure and different perspective to use OR techniques applied in Healthcare. Amongst other sessions, session on MDP in Medical Decision Making by Prof. Brian Denton (INFORMS President) was more relevant and insightful. I have referred to his work for my research and was good opportunity to discuss my work with Prof. Denton. Discussion with other professors helped me further strengthen my doctoral research. Summer school was also a great opportunity to work and network with researchers across the globe and to exchange research ideas and build lasting relationships.

INFORMS healthcare 2017 conference was held at Rotterdam, Netherlands. INFORMS healthcare conference is the one the most highly regarded conference for the discipline of Healthcare Operations Management where top researchers culminate for sharing their knowledge. It turned out to be a great opportunity for me to network with researchers with different background and interests. I personally had the opportunity to associate myself with few PhD students and professors who work in a similar research area and I got few critical inputs from them after my oral.

Plenary sessions were was the highlight of the conference delivered by the likes of Prof. Dimitris Bertsimas, Operations Research Center, Massachusetts Institute of Technology (MIT); Prof. Brian Denton, Department of Industrial and Operations Engineering, University of Michigan; Dr. Eric de Roodenbeke, CEO International Hospital Federation; Erik Gerritsen, Secretary General at the Ministry of Health, Welfare and Sport, Netherlands. Most of the talks were aligned towards use of OR in Healthcare and its future. In a nut shell, the knowledge I gained from this trip is highly valuable.

I thank IITM Alumni for funding part of the expenses incurred during my travel and this shall help me mould my research to a good shape. Also, I am ever grateful to the Alumnus who generously supported my visit.

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NITIN N NAVALI (CE15B041)
Student Exchange Program
Czech Technical University, Prague

I am Nitin A Navali, a 3rd Year BTech Civil Engineering student. Tall structures and monuments have always enthused me to choose Civil Engineering and in #1 Technical Institute of India, I have always wanted to make the most out of my education here at IIT Madras, be it Academics or Co-Curricular. I was selected for the exchange program for the spring 2017 Semester (February 2017 - May 2017) at the Czech Technical University, Prague. I have taken an active part as a coordinator in CEA fest, a civil engineering department annual technical festival, and also won many competitions in my first and second year.

The exchange program was an opportunity to become a part of a different culture, meet people from around the world and explore. During my exchange, I learned a lot of things cooking, traveling to new countries, managing expenses, opening up to people, new languages, and cultures from different places, etc. I participated in a lot of cultural activities there and was also instrumental in country presentations. I was able to network with people from around the world. Also, I used the opportunity to tell people about India and also IIT Madras. After coming back from the exchange I have written an article for a magazine and a blog in WordPress, so that people can get to know about my experiences there.

The courses that I took during the exchange semester were: Construction Management, Prague Architecture and field trips, Environmental Engineering, BIM Revit, Social Science, MATLAB for simulation, Czech Cultural Course.

One of the most difficult thing during the exchange was to manage my expenses and sustain in Europe at the lowest cost possible. Coming from a middle-class family, the travel grant will be of a very great help. Hence, I request you to kindly approve my travel grant request.

I would like to thank the support of the alumni of IITM for supporting students like me who want to explore new opportunities that the institute provides. I would definitely give back to the institute as alumni once I graduate as I sincerely believe that such wonderful opportunities like an exchange should be accessible to everyone.

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SOMISETTY NEELKAMAL (ME14B063)
Internship
RWTH AACHEN University, Aachen, Germany

This summarises the study performed on Hollow Cone Gas Jet Injection using virtual sources. It involves the study of the Mach disks formed due to the Under-expanded gas jets. CONVERGE software is used to create a Hollow Cone Gas Jet Injection model similar to experimental model. Paraview is used to visualise the results after the simulations. Four approaches have been developed as inputs to the virtual source using Mass, Momentum and Energy balance. Simulations with these virtual sources are performed and compared with Large-eddy-Simulations (LES), Reynolds Averaged Navier Stokes (RANS) and Experiment models. The important parameters relevant to the study which include Axial penetration, Radial penetration, Momentum flow, Mass flow are used to compare and validate the approaches.

Compressed Natural Gas (CNG) engines with direct injection systems are a promising technology for future internal combustion engines especially as the emission norms become stricter. However the direct injection of CNG or any gaseous fuel is not fully understood due to complexity arising from the compressible nature of gases and resulting shocks in the narrow gas passages in the injector. Experiments and Numerical simulations have been performed with the hollow cone injector in order to qualitatively observe gas jet formation and sub- sequent mixing. But these simulations with the real nozzle source in the model makes the simulations computationally longer and expensive. This motivates a detailed study on modelling a virtual Nozzle source by studying the behaviour of gas after injection.

The simulation setup used in this study consists of a Virtual hollow cone gas injector at the position of first Mach disk which also has shape similar to Mach disk. Using the conditions before Mach disk or at exit of real nozzle, helium gas is injected with certain velocity and temperature into a cylinder block of 75 mm internal diameter and 82.5 mm height initially at 1-atm pressure and 300 K temperature. The species present initially are Nitrogen and Oxygen at standard atmospheric proportions. The valve is taken to be fully opened with a lift of 350 micron. Four approaches have been developed as inputs to the virtual source using Mass, Momentum and Energy balance. Mach disk approach is developed using parameters just before Mach disk. Pseudo-diameter approach and Adiabatic Expansion approach are developed using parameters at exit of real nozzle. Pseudo-diameter approach involves Mass and Momentum balances whereas Adiabatic Expansion approach involves Mass, Momentum and Energy balances. One more approach is direct values approach in which we directly input the parameters values which are after Mach disk.

Impact of the Internship:

I consider this internship to be a turning point in my career. It transformed me from a student with strong theoretical foundations to a researcher who wants to contribute something to

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make the world a better place to live. It was my first experience of research and has definitely inspired me a lot. I am currently doing my final year B.Tech project on Acoustics of a muffler which is based on many things I learnt from the internship. I have also decided to pursue a PhD in Automotive as I feel that I have found the right balance between what I'm good at and what I wish to do in my life. In short, it has created a new path for my career which I am delighted to pursue.

Thanks to Alumni:

I would be very thankful to the Alumni if I would be able to get a travel grant for the internship. This is a very good initiative by the Institute and its Alumni for supporting to the students to have an experience of international facilities before they graduate with their degrees. There would be many other students like me who would also benefit from this initiative. This would help students who get an opportunity like this but find it difficult due to financial constraints. I would always remain grateful for this support and would definitely contribute back for this when the possibility arises.

HARSHIT DOHARE (EE13B078)

Student Exchange Program

Czech Technical University, Prague

I am Harshit Dohare, a 5th Year Dual Degree Electrical Engineering student. I have always wanted to make the most out of my education here at IIT Madras whether it is Academics or Co-Curriculars. I was selected for the exchange program for the spring 2017 Semester (February 2017 - May 2017) at the Czech Technical University, Prague. I have taken part in a lot of Tech Soc events, have also been a coordinator and Core in Shaastra for Envisage, the only student run techno entertainment show in India.

The exchange program was an opportunity to become a part of a different culture, meet people from around the world and explore a different academic system. I learnt a lot of things during my exchange like managing expenses, opening up to people more easily, learning new languages, meeting new people and learning about cultures from different places, etc. I participated in a lot of cultural activities there and was also instrumental in country presentations. I was able to network with people from around the world. Also, I used the opportunity to tell people about India and also IIT Madras. A few of my friend from Czech Republic were impressed and are coming to IIT Madras to spend one year on exchange program!

The courses that I took during the exchange semester were: Wireless Technologies and Sensor Networks, Multimedia Technology, Data Networks, Business Economics, Philosophy and Czech Language.

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One of the most difficult thing during the exchange was to manage my expenses and sustain in Europe at the lowest cost possible. Coming from a middle class family, the travel grant will be of a very great help. Hence, I request you to kindly approve my travel grant request.

I would like to thank the support of the alumni of IITM for supporting students like me who want to explore new opportunities that the institute provides. I would definitely give back to the institute as a alumni once I graduate as I sincerely believe that such wonderful opportunities like an exchange should be accessible to everyone.

2. Web Studio Activities

In order to keep the alumni connected and constantly updated about the activities undertaken by this office, and about significant alumni related events at the Institute, campus Events are recorded and uploaded on YouTube. An amount of Rs. 3 lakhs was disbursed towards the services of a professional videographer and the associated web-studio activities.

Some of the major activities are listed below

- Leadership Lecture series
- Reunion videos
- IITM Heritage Centre Videos
- CCBR International workshop
- Video conferences on Skype and web based video conference for I & AR and other departments.
- Alumni Interviews
- Multi-site video conferences coordination for MHRD and all Directors of IITs on behalf of Director, IIT Madras
- Various online courses
- Video for Deshpande Centre
- Short Videos of IITM- Departments and Projects
- Recording of Lab experiments in Civil Engg for NPTEL
- PhD defense and Viva via Video conference
  and several routine admin, video recordings, Post Production and conference assignments.

To view previous years deployments please click on the below link:

http://alumni.iitm.ac.in/wp-content/uploads/2018/05/Previous-years_Deployments-till2016_17.pdf

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