Indian Institute of Technology Madras

Office of Alumni & Corporate Relations
Travel Grant recipients visit report and thank you message

Ms. Parveena Shamim
Went to the Scientific Conference “Crowds: Models & Control” that took place on
June 3-7, 2019 in “Centre International de Rencontres Mathématiques” in Marseille, France.

Report on attending the conference Crowds-Models and Control

3rd- 7th June 2019, C.I.R.M., Marseille, France

"Crowds: Models and Control" was a small conference organised for people working specifically in the field of Crowd dynamics modelling and control. It was a meeting of some of the pioneers in the field as well as currently active researchers working on Crowds. Since my research topic is on modelling crowd dynamics, this conference provided a complete opportunity for improving my knowledge on the topic, gathering information on the current research interests as well as networking with peers in the field. This conference was an ideal platform for an early researcher like me as it was an international forum which had the participation of not only mathematicians but also physicists, statisticians and engineers working in the field.

The talks in the conference covered various topics: mathematical modelling, mean field games approach to crowd dynamics, experimental studies on crowds and optimal control in crowd motion. I was more inclined towards the modelling related talks.

Day 1:

There were four keynote presentations and four other short presentations. The talk by Armin Seyfried, who is popular in the field for conducting crowd experiments and analysis of data, focussed on the empirical state of knowledge on bottleneck flow of crowds. The phenomenon of clogging and its effects on the flow was discussed. Alethea Barbaro (USA) presented her model of stressed crowds and Rafeal Bailo presented a two-step (perception- decision) model of pedestrians. Each of these talks was particularly interesting on how they were trying to use the concepts of social psychology to understand/model the crowd. This approach had been intriguing me for quite some time and hence, it led to some questions and discussions with the speakers after the talks. Other talks discussed different mean-field games approach to modelling crowds and the mathematical aspects related to it.

Day 2:

There were four keynote presentations and four other short presentations. The talk on "What can machine learning bring to crowd analysis, modelling and simulation?" by Giuseppe Vizzari, a computer scientist was unique and entirely new. The talk by Adreas Schadschneider, a physicist, delved into the physics of the phenomenon to explain the stop-and-go waves. The role of inertia in second-order models of pedestrian motion was very interesting to learn about. Another couple of talks on experimental data and calibration were delivered by Winnie Dammen and Dorine Duives. I was curious to know about how crowd experiments were conducted by them and how exactly the data can be used for calibaration of model parameters. In future, I will need data to calibrate the model I propose too, and this is a potential source for data. Another talk on modelling moving obstacles provided some ideas for my modelling exercises. I am yet to develop on those ideas

Day 3:

There were four keynote presentations and four other short presentations. Pierre Degond, a pioneer in the field, presented a review of work on modelling of collective dynamics and self-organisation in crowds. The complex system approach to crowd dynamics is of my interest, and hence, this talk reviewing the literature and highlighting the challenges was particularly fruitful. Another talk which caught my attention on day 3 was presented by Bertrand Maury on 'Faster is Slower (FiS) effect in crowd evacuation'. The way a mathematical term in non-frictional models explains the FiS effect was impressive.

Day 4 and Day 5:

There were three keynote presentations and one other short presentation on each day. There were talks on optimal control and mean filed games. The talk on 'Traffic flow model on road networks' by Simmone Gottlich was the one I was attracted to as I plan to work on combine pedestrian and traffic models.

Overall, the conference involved 50 participates, including 18 invited speakers to present their recent works on Crowd dynamics. It provided me with a valuable learning experience. For instance, it was an excellent opportunity to gather together, interact and exchange their findings and views during conference sessions, coffee breaks and conference dinner. Consequently, I have known several academics from different countries who have similar research interests.

Finally, I would like to thank the Office of Alumni & Corporate Relations, IIT Madras for giving me the opportunity to attend the conference via their conference funding covering part of my expenses. The whole

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To: Parveena Shamim
Department of Mathematics
Indian Institute of Technology Madras
Chennai, India

Padova, June 11th 2019

SUBJECT: Certificate of attendance for the conference "Crowds: Models and Control"

With this letter, we confirm the participation of

Ms. Parveena Shamim

to the scientific conference

"**Crowds: Models and Control**"

that took place on June 3rd-7th, 2019 in "Centre International de Rencontres Mathématiques" in Marseille, France.

Yours sincerely,

For the Organizing Committee
Francesco Rossi

Ms. Ajay Piriya V.S

Attended 236th Electrochemical society (ECS) Conference that was held at Atlanta, U.S.A from October 13 – 17, 2019

Visit Summary of 236th ECS Conference, Atlanta USA I had attended 236th Electrochemical society (ECS) conference that was held at Atlanta, USA. The mission of The Electrochemical Society is to advance theory and practice at the forefront of electrochemical and solid-state science and technology, and allied subjects. To encourage research, discussion, critical assessment, and dissemination of knowledge in these fields, the Society holds meetings, publishes scientific papers, fosters training and education of scientists and engineers, and cooperates with other organizations to promote science and technology in the public interest. The vision of ECS is to be recognized as the steward of electrochemical and solid-state science and technology. By creating uninhibited availability of the science through open access, ECS can free the Science, and accelerate scientific discovery and innovation, leading the community as the advocate, guardian, and facilitator of our technical domain. ECS meeting provides a platform to exchange knowledge and share ideas in the field of electrochemistry which can be helpful for the research development.

I had presented a paper entitled ‘Dual Storage Mechanism Induced High Capacity Cathode for Rechargeable Aluminium Ion Battery’ The work describes about the design of synthesis technique as well as the realisation of the concept from the understanding of electrochemical studies. Briefly, the method of opening up of few outer layers of multiwalled carbon nanotubes and sulphur incorporation is discussed. This presentation provides a new approach of improving the performance of cathode material in rechargeable aluminium ion battery to the research community. The event helps to interact with the various researchers working in the field of energy storage application. It was very much helpful for me since it provided a good platform to exchange the ideas and to gain more understanding about the existing technology in the field of energy storage.

Mr. R. Sandeep Kumar
Went to the American Institute of Aeronautics and Astronautics which held their forum in Orlando, Florida, in USA, from 5th to 12th January 2020.

Visit Summary: 2020 AIAA SciTech Forum

AIAA SciTech Forum is the world's largest event for aerospace research, development, and technology. The American Institute of Aeronautics and Astronautics held the forum in Orlando, Florida, the USA, from 5th to 12th January 2020.

Over 5000 attendees and 1500 students from diverse backgrounds attended the conference, and more than 2500 papers were presented. The presentations were distributed across 50 technical sessions that ran parallel based on aerospace research subtopics.

Danielle Wood from MIT media labs delivered the keynote speech, where she spoke about supporting sustained development using space technologies. The conference provides a platform for people working on aerospace from academia, industries, and defense to interact with each other and address the challenges in research.

The forum was also an excellent opportunity to interact with the pioneers in the field and hear about their work and their opinion on our work. The interest they showed in the work we are doing was both exciting and encouraging.

They were very patient in answering our questions and gave genuine advice on how we can improvise further on our work. The conference at all levels provided a great learning experience. "Flatness-based aircraft trajectory optimization and tracking using pseudo spectral method" authored by myself and my guide Dr. Ranjith Mohan was selected for oral presentation at the Guidance navigation and control session in the forum. The session was chaired by Dr. Melvin Rafi and Alok Menon and attended by industry people and academicians.

The comments and suggestions from the session helped us in further advancing our work. Apart from this, I also had opportunities to interact with authors of several textbooks, which I used for my undergraduate. The exhibitors at the conference included a wide variety of people from the aerospace industry. The virtual reality experience by NASA was personally my best.

I take this opportunity to thank everyone involved, including the Boeing Company, our Alumni, and the Alumni office IITM, for helping me avail the Boeing travel grant.

Avinash P, ME15B088

Visit Summary (Travel Grant) Avinash P, ME15B088 International Conference on 3D Immersion (IC3D) is an annual conference on 3D computer vision and photogrammetry problems. IC3D 2019 was scheduled from 10th to 13th December at Brussels, Belgium. The purpose of my visit was to give an oral presentation of my research paper titled “Predicting Forward & Backward Facial Depth Maps from a Single RGB Image For Mobile 3D AR Application”, which was accepted at the conference after being reviewed by renowned subject experts. This has been later published by IEEE at https://ieeexplore.ieee.org/document/897589.

My presentation was scheduled on day 1 afternoon. After listening to various other authors present, I gave a brief overview about what my research work is and what impact it creates.

The presentation lasted around 8 minutes in front of 50 odd people. It was well received by the audience. The surprising element of the day was the variety of problems that people from other countries’ academia tackle and how different they were from Indian academia.

The next day we had a lot of lectures from industry experts on topics like photogrammetry, augmented reality, imaging in healthcare etc. These were very insightful and rare to come by even in the age of the internet, as such technologies are evolving at a rapid pace.

There was also a dedicated section for companies in the computer vision industry to showcase their products and network with investors and students like us. I got hands on experience on some state of the art virtual reality hardware which was thrilling.

At night, there was an awards ceremony for innovations by different companies in Europe working on computer vision problems. It continued into a networking event which provided many insights on how others got into this field and how they were progressing further. Being a very young person all these advice were really helpful in charting out my future career plans. Overall, the event was a wonderful and insightful experience.

Visit Summary: Arvind Pujari (MM16B017), Purdue Undergraduate Research Experience (PURE) 2019

Project Title: Fabrication of free-standing Inverse Opal (IO) membranes for Nano filtration

Arvind Pujari (MM16B017)

Supervisor: Dr. David Warsinger, Department of Mechanical Engineering, Purdue University

Duration: 9 weeks

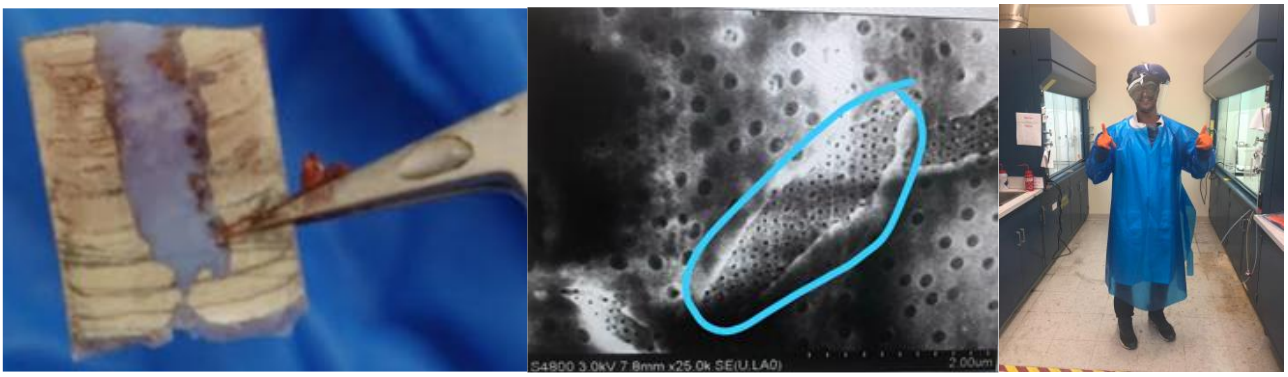
Description of Work: Inverse Opals (IOs) have long generated considerable interest for a variety of applications, ranging from bio sensing, optical and photocatalytic applications. Inverse opals are also an ideal candidate for the production of isoporous membranes. The ideal substrate for the self-assembly of colloidal is a planar, non-porous and chemically homogenous surface.

However, inverse opal membranes have long been gaining attention due to their size selectivity, chemical inertness and possible photocatalytic activity. Inverse Opals are typically grown on a silicon substrate. However, to use them as flow through membranes, they must be peeled off. As the membranes are cracked, this results in the disintegration of the membrane.

To counter this problem, I proposed a novel method which relies on growing IOs on a flat substrate, such as aluminium or titanium, and then making the substrate itself porous, through a process known as anodization. The following schematic illustrates this process:

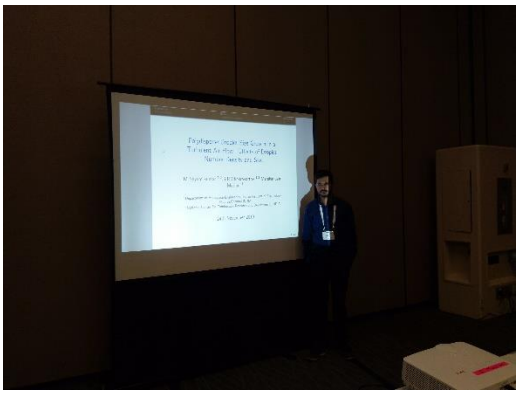
A consequence of the process is the cracks in the inverse opals are filled with aluminium oxide as a consequence of anodization. This has led us to a new paradigm of: “crack-filled” inverse opals. In the regions containing cracks, the aluminium is exposed to the oxalic acid solution, leading to selective anodization of the cracked regions. This fills the cracks, much like how grass grows between concrete blocks.

This methodology can also be extended to titanium. By growing titania IOs on titanium, and anodizing it, we can obtain fully flow through titania membranes for photocatalytic activities.



(A) (B)

Fig. (A) Anodized inverse opal membranes produced by our technique (B) SEM images reveal how anodization fills up the cracks in the IO membranes



Shyam kumar M

AE13D028

Work accomplished during the visit

Annual meeting of American Physical Society-Division of Fluid Dynamics (APS-DFD) is one of the largest conferences on fluid dynamics. APS-DFD offers a top-level platform for scientists to deliver cutting-edge presentations. The conference agenda includes keynotes, plenary presentations, oral communications and platform for personal discussions. The scope of the conference includes a variety of topics in the field of fluid dynamics, especially in multiphase flows and particle laden turbulent flows, which are among my main research interests. The invited speakers are stalwarts in their respective fields and APS - DFD provides a platform to have personal, in-depth discussions with them during and after the conference. The conference, in addition, will also provide an excellent opportunity to connect with other researchers working in my area and also build connections with faculty and researchers in other universities around the world, which would help me in my post-doctoral applications and my research career ahead.

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Name: Ashish Vaigandla

Department: Ocean Engineering

Ashish Vaigandla
B.Tech. + M. Tech

Email address: na17b117@smail.iitm.ac.in

Nature of Visit: (Conf/Workshop/Internship/Exchange/etc.) Semester

Exchange Place visited: Lisbon, Portugal Duration of visit: 4.5 Months (137 days) Funds Received from other sources: Rs.0 Recent Photograph Current affiliation at IITM: B.Tech.+ M. Tech [Dual Degree] , currently in 7th Semester. Name of the Guide/Faculty advisor: Dr. V. Sri Ram Title of the event: Semester Exchange at Instituto Superior Técnico(IST) in Lisbon, Portugal. Highlight of the event (two bullet points; if any coursework taken at foreign university under exchange)

• Systems Reliability & Maintainability- Stood Top 2 in the class (A-Grade-17/20). Developed Failure Mode & Effect Analysis (FMEA) & analysed the production availability of an offshore oil & gas production system.

• Maritime Transportation & Ports- Obtained a solid foundation, and an on-site experience on the First largest Artificial Port of Portugal – PSA (Porto de Sines) and developed a preliminary plan for a Container Terminal. Outcome of the event for your professional growth; compelling reason to go abroad (two bullet points)

• Personally, I have become more sociable and learned to acknowledge the value of small things in life. Professionally, I have acquired sufficient knowledge to determine my career goals. I have also gained a lot of international friends whom I can repute for any help internationally.

• This exchange made me multicultural and amplified empathy within me, which made me to bring out the best version of me and make confident conversations without any hesitation. Given an opportunity after graduation, how would you like to give back to IIT Madras?

• I will contribute to the Alumni Fund as grants to help students to experience the abroad semester exchange programs / internships.

• I wanted to help students through the visa process to avail the abroad exchange opportunities.

PhD Research Scholar, Department of Civil Engineering

Ms. Anna Mary Philip

Conference: The IEEE Intelligent Transportation Systems Conference (ITSC)

Date and Place: 27-30 November, 2019; Auckland, New Zealand

"As a PhD research scholar working on machine learning techniques for traffic flow modelling, this conference held numerous networking opportunities for me. The conference attracted a number of researchers and practitioners in the fields of machine learning and AI applications in transportation engineering. I attended a number of sessions and was able to interact with many professionals and researchers in these fields and was able to acquire valuable input and insights regarding my research. The conference provided a friendly and informative environment to discuss, share and improve my technical knowledge. This visit was possible for me due to the financial assistance from IIT Madras and the Office of Alumni & Corporate Relations, IITM. I am grateful to the alumni of IITM who have contributed to the institute for this valuable opportunity that I received"