CRAB Lab highlighted in invasive species exlporation

Travon Cooman
COPY EDITOR

Invasive species are plants, animals, or pathogens that are non-native and cause harm. They may be transported by various means and can alter the ecosystem in many ways. It is such concerns which have united six IIT undergraduate students, Dr. John Terschak and several other universities around the world in finding solutions to this problem.

Dr. Terschak, who formerly taught for three years at IIT, was also the faculty member who helped establish the Creative Research in Animal Behavior Laboratory (CRAB Lab). Biology and Chemistry Colloquium students were graced by Dr. Terschak's presentation on the "Potential Chemical Cues that Influence Invasive Crab Species" on October 2. For the past four years, he has spent his summers working with students at the University of Hull, England, where he coordinates this team, in addition to the one at IIT.

Carcinus maenas, known at the European Shore Crab—or the green crab in the US—is one such invasive species the team is currently studying. Named as one of the top 100 invasive species in the world, it is typically 45 to 65 mm but it can get up to 110 mm in diameter. These crabs deplete the resources in the ecosystem which affects other native species. An annual estimated loss of $22 million affects the mariculture and fisheries industry because of these crabs. Tomales Bay Oysters and Hog Island Oyster Co., among other companies have also incurred losses. It is therefore evident that invasive species affect farmers' livelihood and suitable control measures need to be implemented.

The use of nets have been an unsuccessful, expensive, time consuming, and labor intensive attempt to control the crabs. Since there is insufficient meat on the crabs, they have been used to make fertilizers. However, there are other, cheaper ways of making fertilizers. The use of pesticides has also been explored, but they harm other organisms in the ecosystem, including humans and other crustaceans. This was also one of the problems faced when the parasitic barnacle Sacculina carcini was introduced as a biological control. Although the barnacle alters the crab's hormonal system after it enters the crab, it is possible that other crustaceans get affected similarly.

Due to the extreme difficulty in completely eradicating all the pests, the use of Integrated Pest Management (IPM), is a technique that is also being explored to decrease the number of reproductively viable crabs. IPM discourages pest populations and keeps pesticides to a level that minimizes risks to health and the environment. It allows for safer means of controlling pests and emphasizes the growth of crops with the least possible disruption to ecosystems while encouraging natural pest control mechanisms.

In his project, Dr. Terschak and his team have turned to chemical ecology, the study of chemicals involved in the interactions of living organisms. It focuses on the production of and response to signaling molecules and toxins. This is particularly important to seek a solution without introducing predators or pesticides or nondiscriminatory parasites.

In one experiment, it was observed that the male crab was attracted to areas where the female pheromone was present. In order to identify the compound responsible for this behavior, a sample of urine was taken and analyzed. Uridine diphosphate (UDP) was thought to be the compound responsible for such behavior. However, only some crab species were attracted to UDP.

Students at the CRAB Lab are currently experimenting with Flapjack "Jack" Africa, an octopus, to find out whether the behavioral response of crabs being afraid of octopuses is innate. This is an ongoing project and students who are interested in being part of the lab should email their resume to crablab.iit@gmail.com.

It must be emphasized that students should be highly motivated, committed and willing to spend 10 to 15 hours a week in the lab. Although any undergraduate can join the CRAB Lab, a Computer Science student would be welcomed to assist in developing their website. For more information about the Lab, the website http://is.gd/crablab can be visited.

The students at the CRAB Lab wish to thank Dean Russell Betts and the Physics Department among many other collaborators for their assistance in the project's advancement.

Photos by Travon Cooman

SIAM hosts interactive MATLAB seminar

Swasti Khuntia
LAYOUT EDITOR

The Society for Industrial and Applied Mathematics (SIAM) chapter at IIT, in association with MathWorks, organized a free technical seminar on MATLAB on Tuesday, October 22.

The title of the seminar was "Speeding up MATLAB Applications" and it was presented by two of MathWorks' Application Engineers.

Although the seminar was organized by the SIAM chapter, there were students from a variety of majors who attended, with a keen interest in increasing their knowledge of MATLAB and solving their technical problems. The seminar was aimed at illustrating the various techniques and strategies for speeding up the MATLAB applications. The agenda included optimum use of vector and matrix operations in MATLAB, adopting efficient programming practices, identifying and devising solutions for various barriers in a code, distributing the MATLAB applications and simulations on multiple cores or clusters, use of Graphic processing Unit (GPU) and generating C-code from MATLAB.

In talking about optimum use of vector and matrix operations, the presenter, Mehernaz Savai, gave an overview of exploiting vectorisation in MATLAB. Using sparse matrices when possible saves a great deal of space and time, using matrix operations instead of 'For' loops, improving the code execution time by 'pre-allocating' the maximum amount of space required for the array, minimizing changing variable class, and minimizing dynamically changing paths were a few techniques she talked about. She had examples to support all of her points, which made it simpler and easier to understand for the audience.

Savai gave examples on how to generate C-code from MATLAB with various options. As C-code has a wide range of applications, the code generator in MATLAB was widely accepted in various fields of application. She then talked about how to improve the performance of the MATLAB code itself by taking advantage of hardware advances like multi-cores and computer-clusters.

The seminar was both informative as well as interactive. The presenters were very interactive–they asked questions and gave away freebies. The attendees had a chance to interact directly with the presenters at the end of the seminar.

A good range of people, from students in different majors, to faculty members from the Department of Applied Mathematics, including the chair, Dr. Fred J. Hickernell were present.
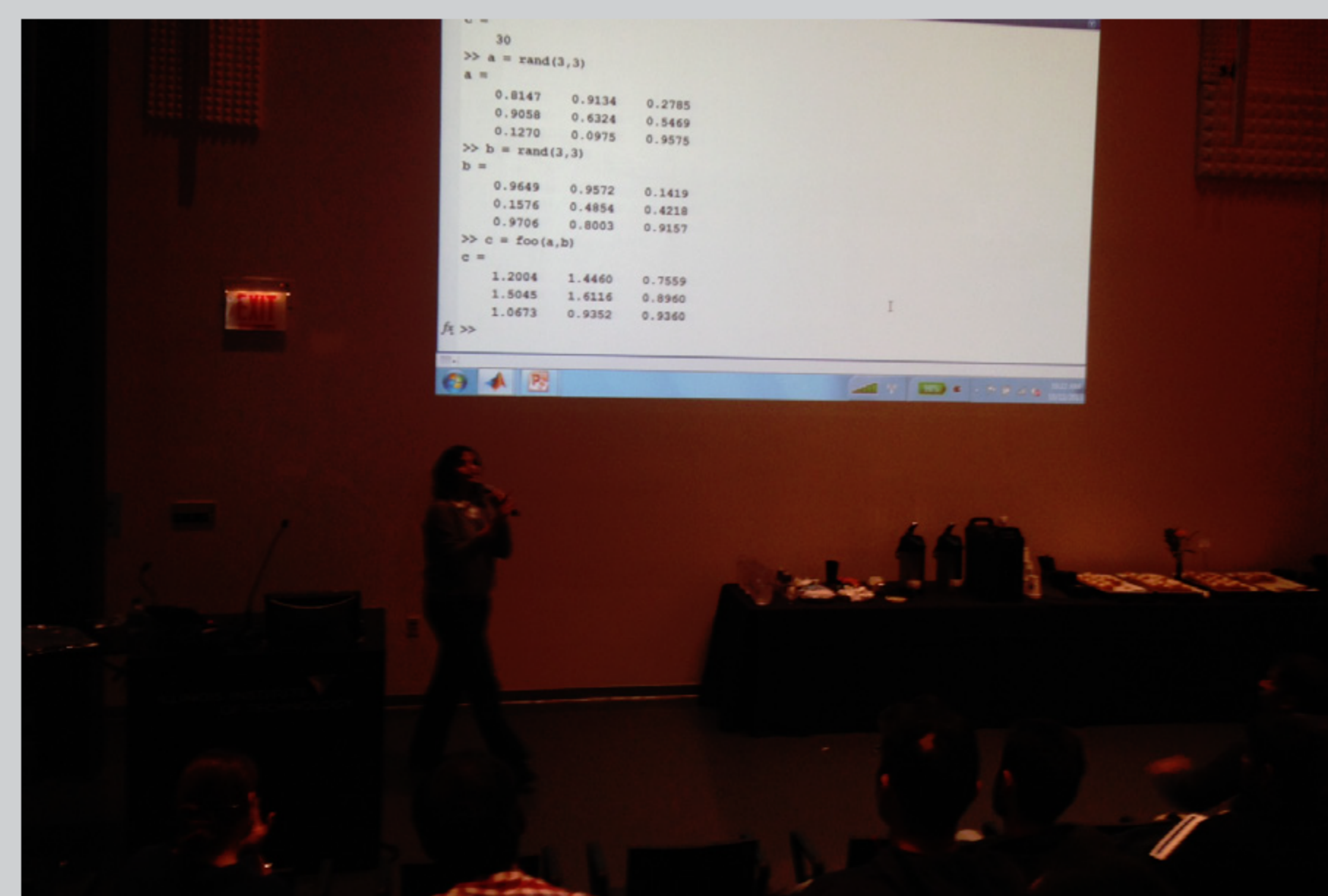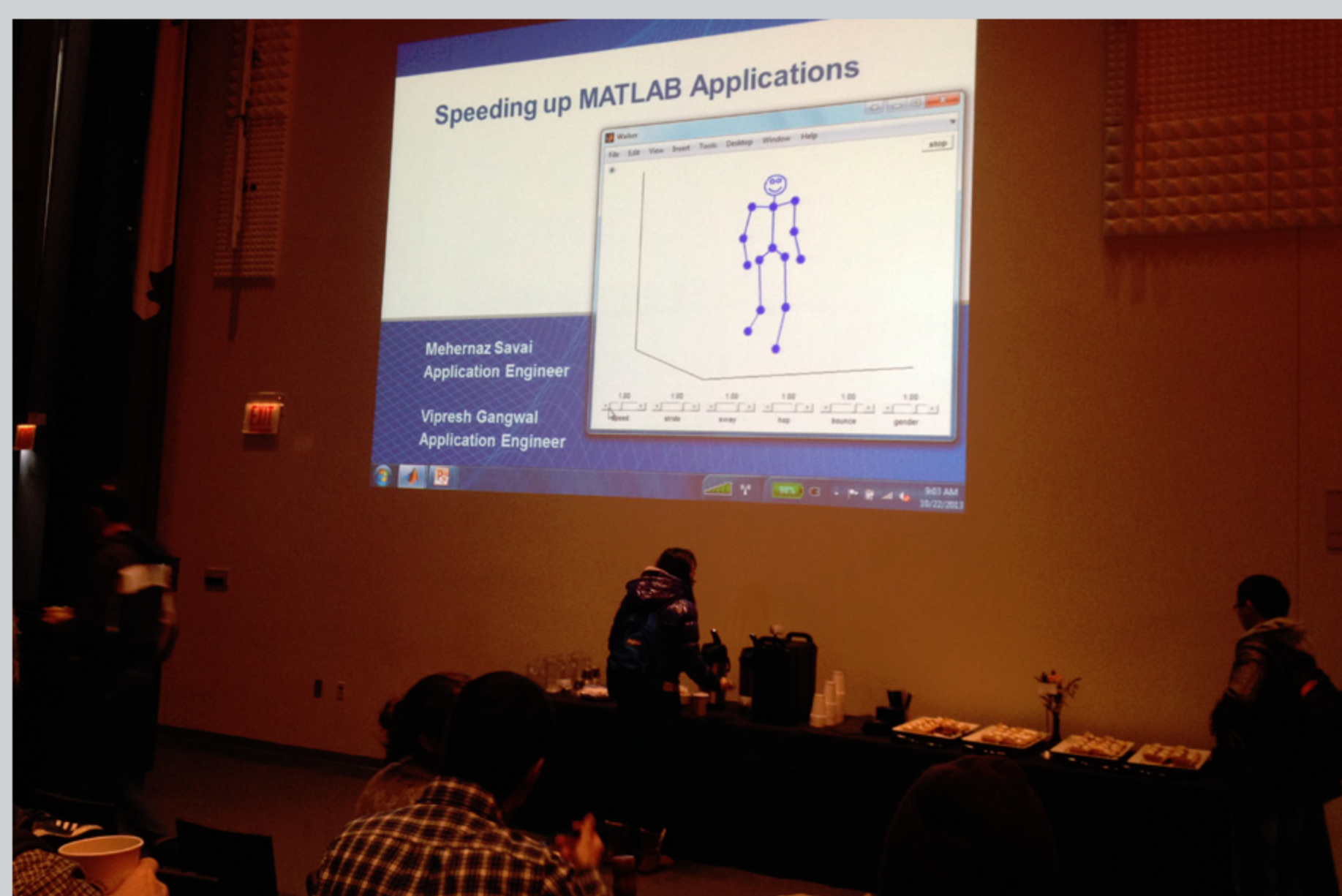
Photos by Swasti Khuntia

Sharing Table teams up with 33rd Street Productions

Shireen Gul
COPY EDITOR

The Sharing Table is almost here and guess what? This time we are bringing it to you with a twist. Yes, this time we will be featuring '33rd Street Productions.' They will be there to answer your questions regarding their production and how you can contribute. Many of you have hidden talents within you, which can be polished and highlighted in this society. So, what are you waiting for? This will be a perfect time for you to come and discover your talent, with the help of 33rd Street Productions.

33rd Street Productions is a theater group that is run by students. They produce all aspects, from play selection to directing, stage managing to props and set design/construction, acting to creating costumes, backstage help, technical lighting and sound. In short, it's a complete package of entertainment. So if you want to be a part of this theater or want to know more about it, then make sure you mark your calendar on Thursday, November 7, for The Sharing Table as they will be there from 12:50 a.m to 1:30 p.m.

They also performed a one-act play during I-Fest last weekend, which I personally really liked as it was so closed to reality. The dialogue and the performance were up to mark and trust me, they did look like professional actors.

I hope you have already marked your calendar for the coming luncheon, which will be held on November 7 at The Commons. Don't forget we also have personal invitations that you can give to your instructors.

You can get them by just sending an e-mail to scdi@iit.edu. Last, but not least don't forget to follow us on twitter and Instagram @ iitdiversity and like us on SCDI IIT.

Hope to see you all there with your shining faces and beautiful smiles!