



Brooklyn College
The City University of New York

COMPUTER AND INFORMATION SCIENCE DEPARTMENT NEWSLETTER SPRING 2011 VOLUME 1, ISSUE 2

A Publication of the Brooklyn College CIS Department

This issue focuses on the work of some of our students and their collaboration with faculty. The CNC Machine is one of the main projects developed by students under the direction of Prof. Murray Gross with the objective of having students gain experience with robotics. This is followed by some projects presented on Science Day 2010 and 2011 by CIS students. It also gives us great pleasure to report the first place UIST award won by a team including a Brooklyn College CIS student for designing the “Most Useful” Software at the international UIST Student Innovation Contest in September 2010. The team designed the software, W.H.A.C.K for keyboard which thwarts both software and hardware keyloggers by utilizing the ability of an adaptive keyboard to change the display of each key. Finally, we report some of the activities and accomplishments of our faculty.

SPOTLIGHT ON FACULTY STUDENT COLLABORATION

Waqar Amjad and **Aleksey Myastkovskiy**, advised by Professor Murray Gross, completed a project “Building, Examining and Correcting Errors on 3-Axis CNC Milling Machine.” The intent of the project was to obtain experience with robotics, to observe interactions between software and hardware, and to satisfy the desire to replicate small broken components and to carve wooden patterns.

Modified CNC Machine

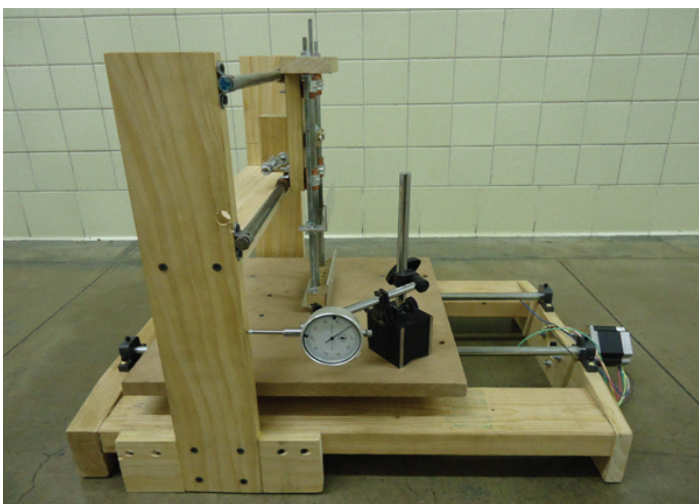


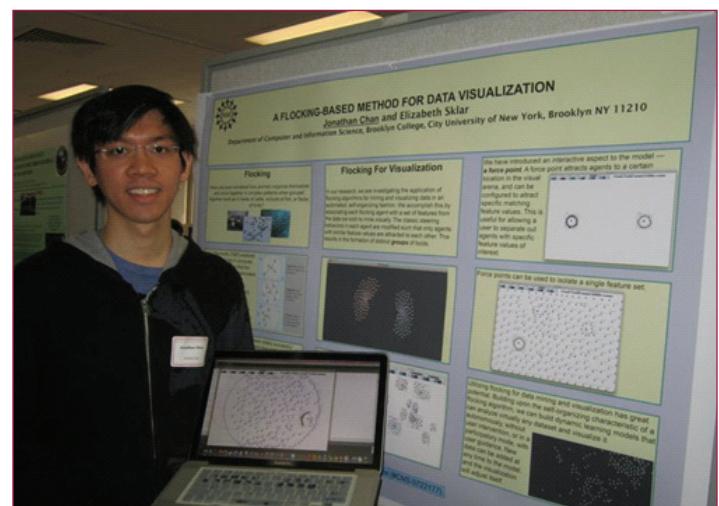
Figure 3 CNC Milling Machine with modified components and dial indicator placed for measuring error

A design from David Steele that was inexpensive, yet efficient

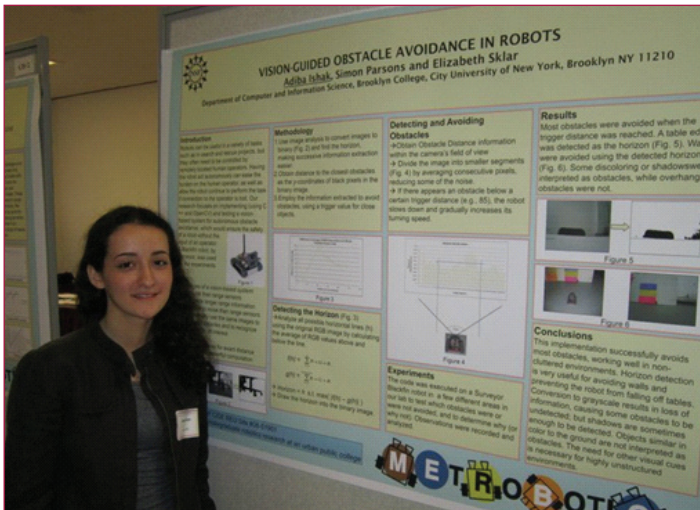
enough to accomplish the project goals was selected. This design can be built with basic saw, drill and screw driver skills and at a total cost under two hundred dollars, not including the cost of electric components. After the machine was initially built, examinations found several major error contributors including faulty connection between the X and Y axes. Adjustments were made after the examinations. The experience in building this machine taught the participant the importance of the tradeoff between complexity, cost and accuracy, as well as unforeseen problems that appear as a project progresses. The participants learned how even a single software programming error can result in significant and potentially dangerous consequences.

STUDENT PROJECTS

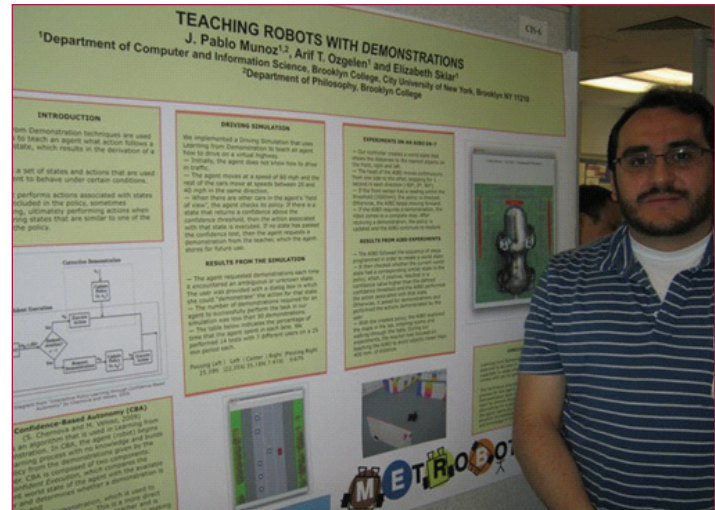
FOLLOWING ARE PROJECTS PRESENTED BY CIS STUDENTS ON SCIENCE DAY, MAY 13TH 2011.



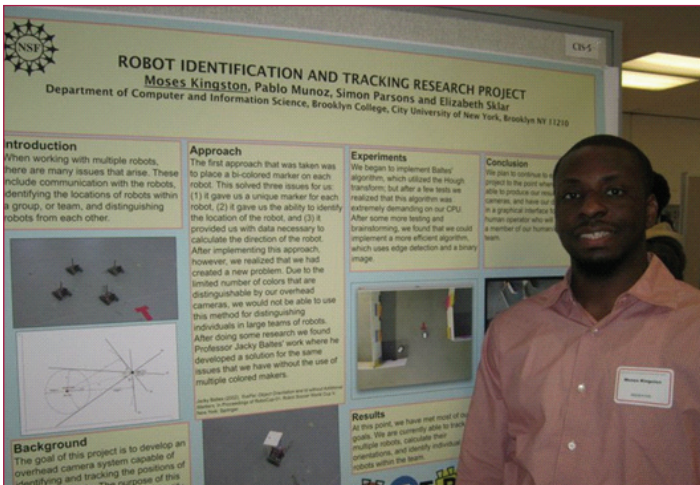
Jonathan Chan, advised by Professor Elizabeth Sklar, presented the project “A Flocking-based Method for Data Visualization.”



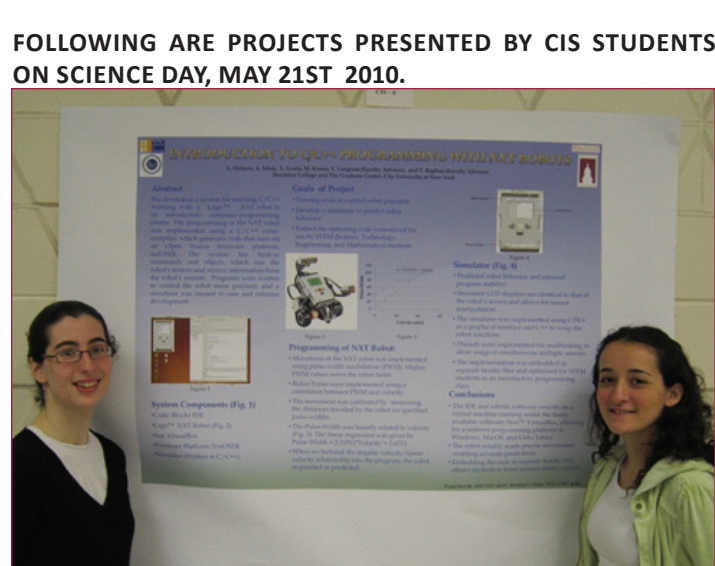
Adiba Ishak, advised by Professor Simon Parsons and Professor Elizabeth Sklar, presented the project “Vision-guided Obstacle Avoidance in Robots.”



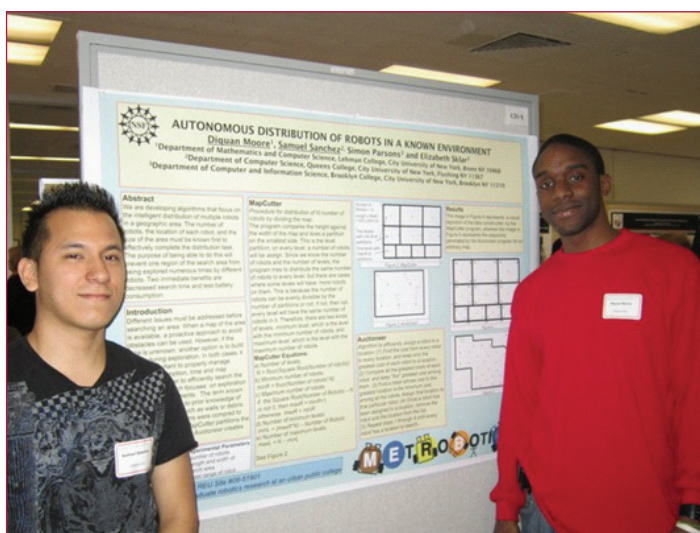
J. Pablo Muñoz, advised by Arif T. Ozgelen (Ph.D. candidate) and Professor Elizabeth Sklar, presented the project “Teaching Robots with Demonstrations.”



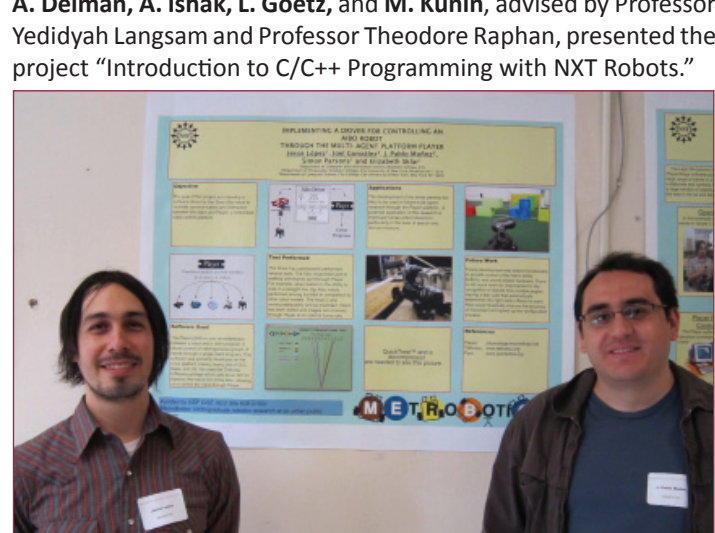
Moses Kingston and Pablo Muñoz, advised by Professor Simon Parsons and Professor Elizabeth Sklar, presented the project “Robot Identification and Tracking Research Project.”



A. Delman, A. Ishak, L. Goetz, and M. Kunin, advised by Professor Yedidiah Langsam and Professor Theodore Raphan, presented the project “Introduction to C/C++ Programming with NXT Robots.”



Diquan Moore and Samuel Sanchez, advised by Professor Simon Parsons and Professor Elizabeth Sklar, presented the project “Autonomous Distribution of Robots in a Known Environment.”



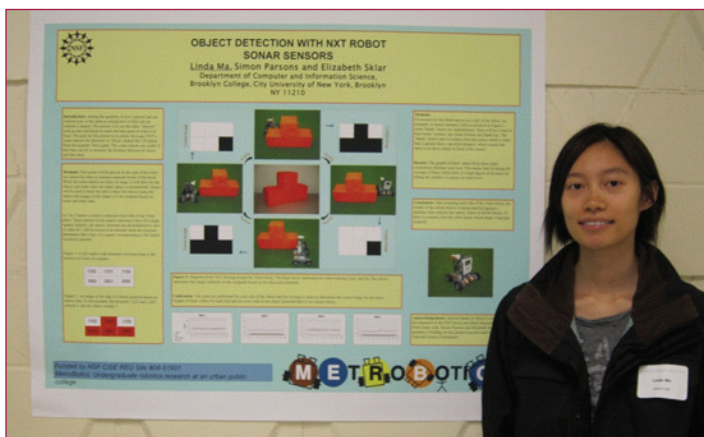
Jesse López, Joel González (City College), and J. Pablo Muñoz, advised by Professor Simon Parsons and Professor Elizabeth Sklar, presented the project “Implementing a Driver for Controlling an AIBO Robot through a Multi-Agent platform Player.”



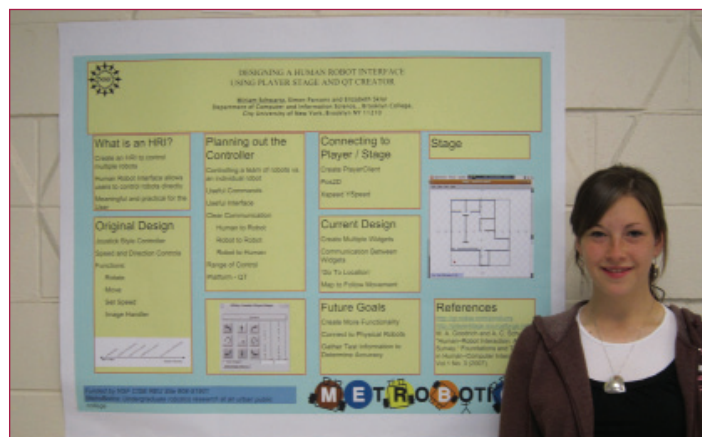
Mitchell Lustig, advised by Professor Simon Parsons and Professor Elizabeth Sklar, presented the project "Superior Robot Design."



Mark Manashirov, Sam Anzaroot, Saul Salazar, and Carlos Jaramillo, advised by Professor Simon Parsons and Professor Elizabeth Sklar, presented the project "Adopting and Adhering to a Common Robotics Interface."



Linda Ma, advised by Professor Simon Parsons and Professor Elizabeth Sklar, presented the project "Object Detection with NXT Robot Sonar Sensors."



Miriam Schwartz, advised by Professor Simon Parsons and Professor Elizabeth Sklar, presented the project "Designing a Human Robot Interface Using Player Stage and QT Creator."

Joseph Quacinella, Amy Delman, Rena Delman, Larry Goetz advised by Professor Yedidya Langsam and Professor Theodore Raphan (Mentor) presented the project "Robust Algorithms for predicting turning as a function of Pulse Width Modulation(PWM) and duration in Lego NXT Robots." (Not pictured)

UIST AWARDS

A team including a Brooklyn College CIS Student, Yosef Skolnick, won first place for the "Most Useful" Software at the International UIST 2010 Student Innovation Contest. UIST (ACM Symposium on User Interface Software and Technology) is the premier forum for innovations in the software and technology of human-computer interfaces. Each year, students from around the globe are challenged with designing software for unique hardware. The competition involved a Microsoft Applied Sciences "adaptive keyboard," a computer keyboard with dynamic (visually modifiable) keys, equipped with a touchscreen.

Yair Saperstein (YC '12) together with Yosef Reisin and Marco Pariente-Cohen of the Jerusalem College of Technology, and Yosef Skolnick of Brooklyn College, designed software, W.H.A.C.K (We Hinder All Keyloggers), for the keyboard which thwarts both

software and hardware keyloggers. Keyloggers capture every keystroke inputted to the computer. With the W.H.A.C.K. software, the dynamic key displays scramble. A random configuration of letters is displayed over the QWERTY keyboard.

When the user types his password, the W.H.A.C.K. software deciphers the appropriate password, and the user continues unhindered. Keyloggers only record the hardwired key, and will not be able to record the user's password. As Yosef Reisin, who flew in from Israel for the contest, put it, "this revolutionary software is the answer to stopping traditional keyloggers, for which no other solution currently exists." These students, under the guidance of Dr. G.L. Warren, Visiting Assistant Professor of Chemistry at YU, hope to continue working with the keyboard, and eventually to market their software with Microsoft's new products.

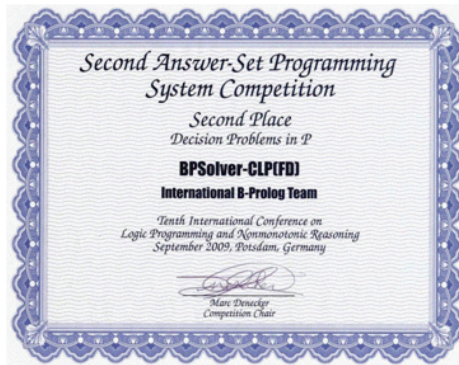
FACULTY PUBLICATIONS

Prof. Paula Whitlock published papers including “Random packing of hyperspheres and Marsaglia’s parking lot test” and “Generalizing Sudoku to three dimensions” Monte Carlo Methods and Application, with undergraduates Stefan Agapie and Tiffany Lambert respectively.

Prof. Noson Yanofsky gave two talks at Oxford University in January. One talk, “Simplicial Sets and No-Go Theorems,” was given at the Computing Laboratory. Another talk, “Galois Theory of Algorithms,” was given in the Departmental Seminar.

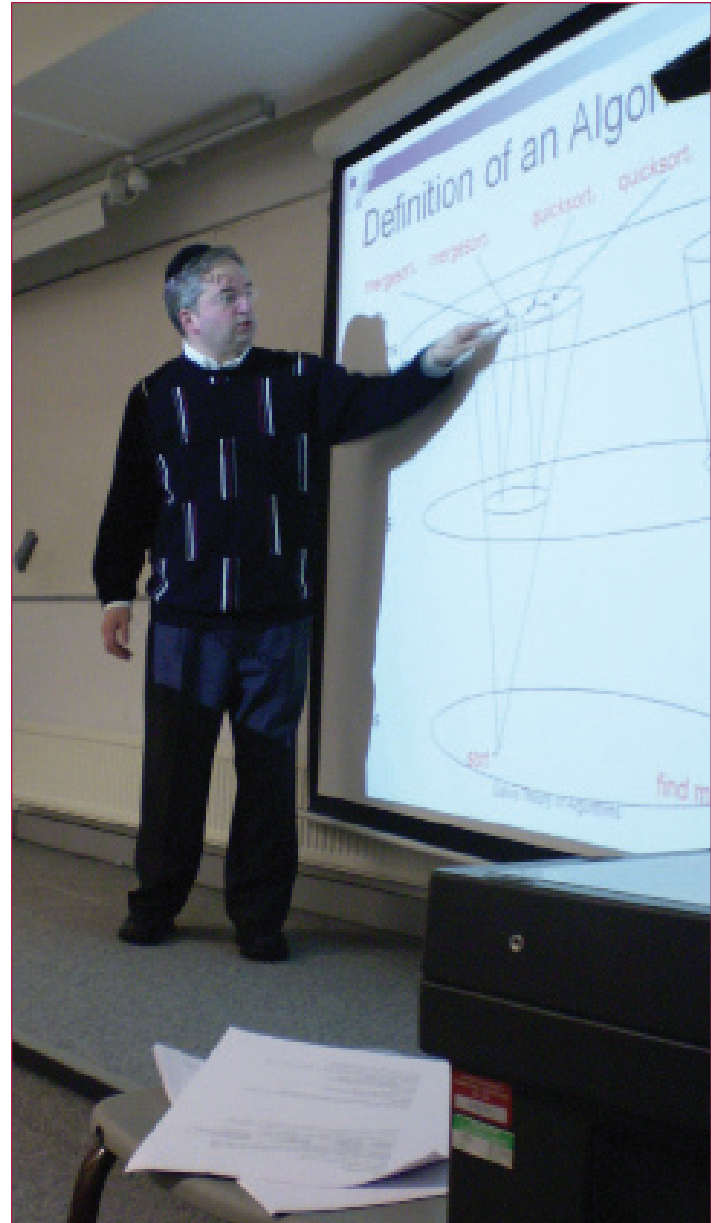
Prof. Dina Sokol published a journal paper entitled “TRedD: A Database for Tandem Repeats over the Edit Distance”, with a Ph.D student Firat Atagun. The paper describes new database, TRedD for tandem repeats found in the human genome. The database and the software for locating the repeats are available online. Shoshana Neuburger, a Ph.D student with Prof. Sokol, presented a paper, “Small-space 2d Dictionary Matching”, at the 21st Annual Symposium on Combinatorial Pattern Matching, at NYU-Poly.

Prof. Neng-Fa Zhou led the international B-Prolog Team in the second ASP solver competition in 2009 and won the second place among 16 teams at 10th International Conference on Logic Programming and Nonmonotonic Reasoning. The solutions submitted by the team performed well in different categories, it was placed second in the number of benchmarks won and placed sixth in the P and NP categories combined.



Prof. Zhou received an NSF award entitled “SHF: Small: An Integrated Parallel Constraint Programming Platform for Combinatorial Search Problems” (\$277,065, # 1018006, 8/2010 – 7/2013).

Prof. Rohit Parikh’s new book “Proof, Computation and Agency: Logic at the Crossroads” provides an overview of modern logic and its relationship with other disciplines. As a highlight, several articles pursue an inspiring paradigm called ‘social software’, which studies patterns of social interaction using techniques from logic and computer science. The book also demonstrates how logic can join forces with game theory and social choice theory. A second main line is the logic-language-cognition connection, where the articles collected here bring several fresh perspectives. Finally, the book takes up Indian logic and its connections with epistemology and the philosophy of science, showing how these topics run naturally into each other. The book is Synthese Library, Vol.352.



Prof. Noson Yanofsky lecturing

We would like to congratulate those CIS students, both undergrad and grad, who graduated on June 1-2 including our Upsilon Pi Epsilon honorees. There is now a **Brooklyn College Department of Computer and Information Science** Facebook page. This Newsletter was largely developed by **Sajida Noreen** and **David Liu**, CIS Masters Students and **Emrah Usar**, a Political Science major. Newsletter Editor: Prof. Danny Kopec assisted by Prof. Ira Rudowsky.

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