



**COMPUTER SCIENCE**

UNIVERSITY OF MARYLAND

**Department Newsletter**  
**Spring 2013**

# Chair's Message

Welcome to the spring 2013 edition of UMD's Department of Computer Science newsletter. Our department turns 40 this year, continuing its legacy as one of the oldest CS collegiate programs in the country. I began my appointment as Chair on July 1, 2012 and would like to thank Prof. Larry Davis for his 12 years of dedicated service to the department as Chair. I have been a UMD faculty



*Samir Khuller*  
*CS Department Chair*

a first place finish and this group of students will advance to the World Finals this summer in St. Petersburg, Russia.

The first Computer Science Connect summer camp for middle school students was held from June to July 2012 and was well received and oversubscribed; thus, we expect this activity to again be held this summer. The Department hosted its first annual Hackathon in August, and in October some of our students attended the Grace Hopper Conference in Baltimore, Md.

The fall season brought with it a vast array of computing talent with the Distinguished Lecturer colloquium series: Moses Charikar (Princeton University), Farnam Jahanian (National Science Foundation Directorate for Computer and Information Science and Engineering), S. Cenk Sahinalp (Simon Fraser University), Michael Kearns (University of Pennsylvania) and Jennifer Rexford (Princeton University).

member for 21 years, and previously served as the Associate Chair for Graduate Education for four years.

During this academic year, the Department had three teams participate in the Mid-Atlantic regional of the ACM International Collegiate Programming Contest where they all ranked in the top 10 spots. One UMD team secured

This spring saw an impressive start with the overwhelming success of February's CS undergraduate internship and career fair. For the first time, the event was moved to the Samuel Riggs Alumni Center with approximately 525 students and 72 companies in attendance. Also in February was the Department's 23rd annual High School Programming Contest with 30 teams from Maryland, Virginia and the D.C. metropolitan area.

Two prestigious speakers will arrive to UMD in late April: Jennifer Chayes (Managing Director of Microsoft Research New England) and Maneesh Agrawala (Professor at UC Berkeley).

In addition to the events above, this newsletter contains articles about The Corporate Partners Program, led by Eric Chapman. The purpose of the partnership, which is joint with the Department and UMIACS, is to facilitate internship, career and research opportunities with our students and faculty members.

I would like to thank our current partners for their continued support: Appian, CyberData Technologies, Dante Consulting, Google Inc., Palantir Technologies, Susquehanna International Group, TATA Consultancy Services and Yahoo! Inc. and invite others to participate in this exciting program.

Information about our faculty's participation in the campus I-series and department honors courses, along with information on professors who have received national awards, is also contained in these pages. In addition, we were delighted to learn that Prof. Larry Davis was selected as an ACM Fellow and Prof. Aravind Srinivasan was selected as an AAAS Fellow. Prof. Emeritus Jack Minker published a book in spring 2012 titled "Scientific Freedom and Human Rights: Scientists of Conscience During the Cold War" (IEEE Computer Society Press).

Lastly, the Department is now a member of LinkedIn.com, an online professional networking site. Please join us in our effort to connect with all current and former students, faculty and staff through our new group "University of



Maryland Department of Computer Science” located at <http://www.linkedin.com/groups/University-Maryland-Department-Computer-Science-4783306>. This account will serve as a platform to learn and share department news, as well as career opportunities.

As part of our transition process last July, there are two new associate chairs: Jeff Foster for graduate studies and Alan Sussman for undergraduate studies. The UG honors program, currently enrolling 28 students, is led by two new co-chairs Profs. Neil Spring and Atif Memon.

During the past three years, we have hired five fantastic new additions to our professional faculty: Hector Corrada Bravo, Hal Daumé III, Jon Froehlich, Mohammad Hajiaghayi and Elaine Shi. This semester, the Department is continuing to actively recruit faculty in several research areas and I will update you on these efforts next fall.

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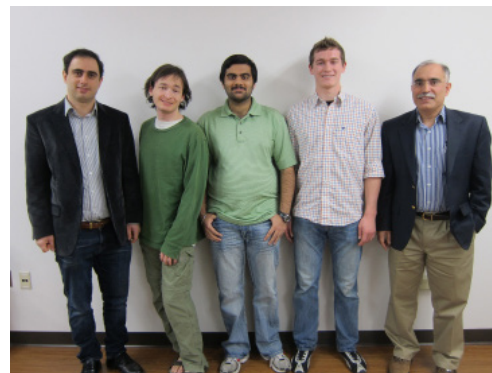
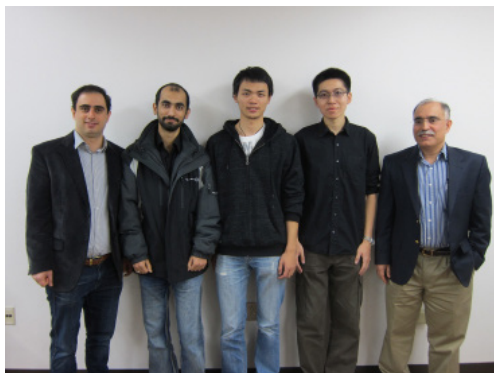
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# ACM-ICPC Regional Win Contributes to UMD's History of Success

By Elizabeth Roberts



*UMD's student teams pose with Samir Khuller, Professor and Chair, and their coach Mohammad Hajiaghayi, Associate Professor. In order of place at competition: 1st (left), 7th (middle), 9th (right)*

The University of Maryland placed first at the 2012 Mid-Atlantic regional division of the ACM International Collegiate Programming Contest (ACM-ICPC), advancing to the summer 2013 World Finals in St. Petersburg, Russia.

The team, coached by Assoc. Prof. Mohammad Hajiaghayi, consisted of students Hossein Esfandiari, Ang Li and Shangfu Peng. Despite the fierce competition, UMD had three groups place in the top 10 slots among 173 teams.

The other two teams also did extremely well, placing in 7<sup>th</sup> (Melika Abolhassani, Anirudh Bandi and Milad Gholami) and 9<sup>th</sup> (Mandeep Bedi, David Karesh and Luke Valenta).

The final rankings can be viewed at <http://midatl.radford.edu/docs/scoreboard/index.html>.

UMD has a rich history of performing well at the ACM-ICPC throughout the years. In the fall of 2010, a team coached by Assoc. Prof. Amol Deshpande (Anirudh Bandi, Holman Gao and Scott Zimmerman) was selected for the World Finals in Orlando, Florida.

Assoc. Prof. Hajiaghayi took over coaching the team for the international contest where the students received an honorable mention in the summer of 2011.

In the summer of 2010, Alan Jackoway, Mitchell Katz and Matt McCutchen placed 14<sup>th</sup> in the ACM-ICPC World Finals held in Harbin, China.

Coached by Assoc. Prof. Deshpande, the team tied with groups from several other U.S. universities (Stanford, Cornell, CMU, MIT and Michigan) for the best placement by a North American team.

The contest featured 103 groups of students chosen from over 7,000 teams that participated in regional contests worldwide. The UMD team won the Mid-Atlantic regional contest in the fall of 2009 to qualify.

A UMD team consisting of the same CS undergraduates above (Jackoway, Katz, and McCutchen) was ranked 20<sup>th</sup> at the 2009 ACM-ICPC World Finals.

The team coached by Assoc. Prof. Deshpande was ranked 4<sup>th</sup> among U.S. universities, narrowly missing a medal behind teams from MIT, CMU and Stanford.

This highly competitive contest took place in Stockholm, Sweden and featured 100 groups of students chosen from over 7,000 teams worldwide in a series of preliminary events.

The UMD team won the Mid-Atlantic regional contest in the fall of 2008 to qualify.

Congratulations to all of our students' successes and good luck to the team advancing to the World Finals this summer!



# With Recent Hires, UMD's Faculty Continues to Expand in Leading Research Areas

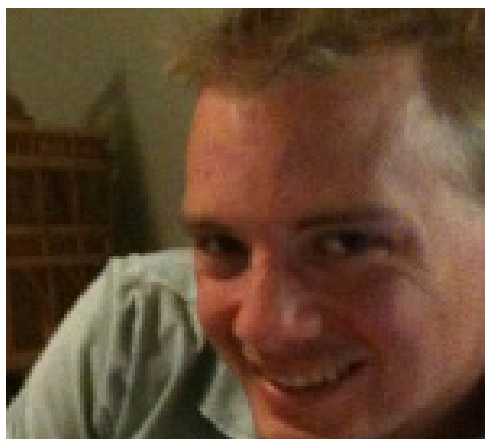


Hector  
Corrada-Bravo

Hector has been an Assistant Professor in the Department since 2010. He is a member of the Center for Bioinformatics and Computational Biology (CBCB, <http://www.cbc.umd.edu>) in the University of Maryland Institute for Advanced Computer Studies (UMIACS).

He received his Ph.D. from the University of Wisconsin in Computer Science in 2008 and held a post-doctoral fellowship in Biostatistics in the Johns Hopkins Bloomberg School of Public Health.

His research centers on methods for high-throughput genomic and epigenetic data analysis: pre-processing of measurements from high-throughput assays, integrative disease risk models cancer epigenetics and biomarker discovery using and developing methods in statistical and machine learning, data management and numerical optimization.



Hal Daumé III

Hal has been an Assistant Professor in the Department of Computer Science, UMIACS and the Department of Linguistics since 2010.

Prior to joining UMD's faculty, Hal earned his Ph.D. in Computer Science at the University of Southern California in 2006 and was an Assistant Professor in the School of Computing at the University of Utah.

Hal's research interests span language (computational linguistics and natural language processing) and machine learning (structured prediction, domain adaption and Bayesian methods).

At UMD, he is affiliated with the computational linguistics lab, the machine learning reading group, the language science program and AI group, as well as interacting closely with LINQS and computer vision.



Jon Froehlich

In 2012, Jon was appointed in the Department and UMIACS as an Assistant Professor. His research interests include sensing and feedback systems for environmental behaviors; smart cities and sustainable transport; health and wellness; as well as computer and world accessibility.

Jon received his Ph.D. in Computer Science from the University of Washington in 2011 where he received a Microsoft Research Graduate Fellowship and the 2010 College of Engineering Graduate Innovator of the Year Award. His Ph.D. dissertation entitled "Sensing and Feedback of Everyday Activities to Promote Environmental Behaviors" recently won the 2012 University of Washington Distinguished Dissertation Award. During Jon's graduate studies, he interned at a number of research labs including Telefónica Research in Barcelona, Microsoft Research in Redmond, and Intel Research in Seattle.



# With Recent Hires, UMD's Faculty Continues to Expand in Leading Research Areas



Mohammad  
Hajiaghayi

Since 2010, Mohammad has held the first Jack and Rita G. Minker Professorship with joint appointments in CS and UMIACS; he is currently an Associate Professor.

Mohammad's research interests are algorithms, game theory and network design. He has published more than 120 papers in top conferences and journals of computer science, won a few best paper awards, and served on program committees or editorial boards of several well-known international conferences and journals.

He has received an NSF CAREER Award, an ONR Young Investigator Award, a Google Faculty Award, and a RASA among other awards. Before joining UMD, Mohammad was a postdoc in the School of Computer Science at CMU and CSAIL at MIT. Mohammad earned his Ph.D. in computer science from MIT in 2005.



Elaine Shi

Elaine joined the Department and UMIACS as an Assistant Professor in 2012. Her research combines systems and theory to design new computing systems that are secure and privacy-preserving.

In particular, Elaine is interested in verified computation, privacy, system security, secure hardware, and secure cloud computing.

Prior to joining the faculty at UMD, Elaine obtained her Ph.D. in computer science from Carnegie Mellon University in 2008.

She was a member of the research staff at PARC from 2008-2011 and a research scientist at UC Berkeley from 2010-2012.



# Twelve Teams Compete in Department's First Annual Hackathon

By Elizabeth Roberts



The Department hosted its first annual Hackathon from August 27-28, 2012. Twelve teams rapidly developed software throughout the night to present to judges Professors Jon Froehlich, Elaine Shi and Neil Spring, as well as other students and administrators.

After hearing about the contest PennApps from friends at the University of Pennsylvania, senior CS major Eric Rosenberg came up with the idea for UMD to host a Hackathon.

"I've had a couple of internships at some really cool tech companies (Amazon, Atlassian) where Hackathons were a big part of their company culture," Rosenberg said. "I've always had a blast participating in them and I thought we could see some really amazing Hackathon projects come out of UMD students."

Many of the teams developed websites on issues pertinent to college students, such as subleasing housing and finding course evaluations.

Rosenberg's "Team Gorkhali" created Unicourse, a website that converts course evaluation data into a series of charts and graphs. It allows students to rank and search classes based on different attributes such as GPA, amount of work required and quality of the instructor.

"The basic premise of Unicourse was to allow students to optimize class selections for their specific preferences," Rosenberg said. After the Hackathon was over, all participants presented their work to the judges. This allowed the panel to evaluate how students were able to build a piece of software and then articulate what they learned in the process of creating it.

The team "Tropo Troopers" won the Judges Prize and "Team Gorkhali" won the Audience Prize. The



Judges' Prize team members: Adam Hamot, Andy Baer, Chris Sadowski and Zachary Fogg

judges determined the winners based on each team's idea (development and efficacy), and the presentation.

"Future Hackathons will involve a theme and students will have to create and develop software based on that theme," Brandi Adams, Assistant Director of the Undergraduate Program, said.

The Judges' Prize included lunch with the Chair of the Department and Associate Chair, individual plaques, the Google Prize Pack (Android Pajamas, Google Duffel Bags), the Palantir Gift Pack (Best Buy gift certificates) and the Microsoft MVP Prize of an Xbox Kinect.

The Audience Prize included lunch with a Professor of the team's choice, a group plaque, the Palantir Gift Pack (Best Buy gift certificates) and the Amazon MVP Prize of a Kindle Fire.

Whether it is value gained from working with friends toward a common goal or learning new technology such as Ruby web framework, participants are in agreement that the Hackathon should continue.



# CS Internship and Career Fair

By Savannah Renehan

On Thursday February 7th, 2013 the Undergraduate Office hosted its 7th bi-annual Career and Internship Fair.

The Samuel Riggs Alumni Center housed a record breaking 72 participating companies, ranging from tech giants and government agencies to startups and Fortune 500 companies.



*Audience Prize team members: Paige Nelson, Justin Kruskal, Andrew Gorkhali and Eric Rosenberg*

"I think it is a great idea to keep having this event because it is a great way to do programming outside the academic environment, learn to work in a team, and promote entrepreneurship and creativity among students," junior CS major Jonathan Chen said. According to Rosenberg, "Spending 24 straight hours hacking away on a project is a great way to forge lasting friendships."

The department plans on hosting another Hackathon in 2013. For information about last year's teams, please visit <http://undergrad.cs.umd.edu/hackathon/2012/>



*Eager CS students fill the Alumni Center*

Over the course of the evening approximately 525 CS/CE majors, minors, graduate students and alumni networked and met with representatives and industry leaders from across the nation.

The response to the event was overwhelmingly positive from both students and company representatives. Company feedback includes "This was the best recruiting event that we have attended to date."; "I'd have to say in baseball terms, you all knocked the cover off the ball. The [CS] fairs keep getting better and better."; and "We met a lot of outstanding students and hope the students enjoyed meeting us as well!"

The CS Daemon Ambassador Club was essential in the execution of the event. The Undergraduate Office would also like to thank Professors Khuller, Sussman, Spring, Levin, and Hicks for their participation.



*Students speak to UMD's Corporate Partner, Appian*





# Computer Science Connect Program Fosters CS Interest in Middle School Students

By Dr. Jan Plane



*Program participants working diligently on a project*

Computer Science Connect is a UMD outreach program that encourages middle school students, particularly girls and racial minorities, to learn about various areas of computer science.

The participants are exposed to web development, programming and robotics with an emphasis on interdisciplinary connections and global citizenship.

Created in the summer of 2012 by Dr. Jan Plane and her teaching assistants Uran Oh, Angelisa Plane and Elissa Redmiles, the program began with a 3-week summer day camp and is continuing during the school year with monthly weekend meetings.



*Prof. and Chair Samir Khuller, Senior Lecturer Jan Plane, sponsor AFCEA- Bethesda representative Mary Ellen Condon and CS Connect attendees*

The program is free to participants through generous funding from AFCEA Bethesda. Contributions were also made by The Association for Women in Computing and UMD's Department of Computer Science.

We are currently seeking funding to allow these students to continue in the program next summer while adding a new cohort of rising 7th graders.

This camp was designed to address the fact that computer science suffers from a lack of diversity. It is one of very few disciplines that continue to decrease in the percentage of women graduating with bachelor's degrees and the racial representation is also not improving at the same rate as other fields.

Research shows that people from these populations leave computer science at the highest rates in middle school and early in high school.

One reason theorized for the imbalance is that they have a misunderstanding of what computer science is. They often believe it is a solitary endeavor and that it is less connected to improving the world and the human condition - that computers are studied for their own sake.



*Dr. Plane with her TAs (left to right): Angelisa Plane (Undergraduate), Elissa Redmiles (Undergraduate) and Uran Oh (Graduate)*



Because of these misconceptions, the vision for the Computer Science Connect program is (1) To connect computing minded students to each other- middle school students interested in computing- allowing them to work with others with the same interests and see how collaborative computing functions, and (2) To show them how computer science is connected to the rest of the world and how computers can be an aid for improving society.

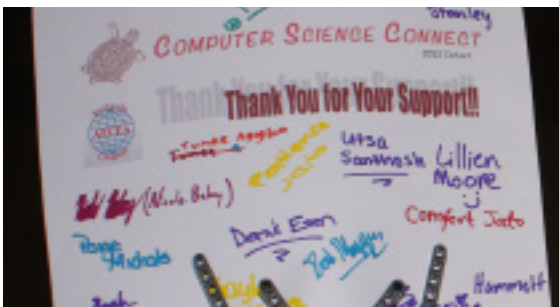
Nineteen rising 7th grade students participated in the summer camp and sixteen have continued to participate during the school year.

They learned about graphics (using GIMP), Scratch programming, NXT Lego Robot programming, encryption, and internet safety in addition to attending field trips to NASA, NSA's Cryptology Museum, the College Park Aviation Museum and the NISPLab (Nanoscale Imaging Spectroscopy and Properties Lab).

Faculty and graduate students have given presentations about different areas of research including game theory, algorithms, cryptology and robotics.

On Dec. 8, 2012, the students presented what they had learned to parents, Mary Ellen Condon (AFCEA-Bethesda) and Prof. Samir Khuller (CS Chair). The camp participants will also present to UMCP visitors on Maryland Day (April 27th 2013).

To view web pages created by the students showing the activities and lessons from Computer Science Connect, visit <http://cscamp.weebly.com>. If you have any other comments or questions, contact Dr. Plane ([jplane@cs.umd.edu](mailto:jplane@cs.umd.edu)).



*Thank-you card from CS Connect participants*

## Corporate Partners in Computing Program

By Elizabeth Roberts

The recently revitalized Corporate Partners in Computing Program has benefitted from the joint resources of both the Department and the University of Maryland Institute for Advanced Computer Studies (UMIACS). Approximately 70% of CS faculty members have dual appointments with UMIACS and consolidating the program has provided a more efficient vehicle for corporate engagement, according to Director of Corporate and Government Relations Eric Chapman.

The Corporate Partners in Computing Program gives companies an opportunity for a mutually beneficial relationship with UMD. "Entering this partnership provides unique, sustained access to our students for potential employment and collaboration with faculty for research ventures," Chapman said.

This program allows the university to gain insight into industry trends, learn more about what research areas corporations in the computing field are pursuing, and acquire feedback from leaders in the industry on the state of the Department of Computer Science's curriculum. Additionally, there are many possibilities for site visits, field trips and technical talks along with opportunities for companies to upgrade and refurbish campus infrastructure for student and faculty use.

Current members in the Corporate Partners in Computing Program include Appian, CyberData Technologies, Dante Consulting, Google Inc., Palantir Technologies, Susquehanna International Group, TATA Consultancy Services and Yahoo! Inc. The Department and UMIACS are hoping to expand this list through five to ten more companies for novel research, internship opportunities, as well as academic and professional growth. If you or your company is interested in learning more about how to participate in this exciting program, please contact Eric Chapman at [echapman@umd.edu](mailto:echapman@umd.edu).



# AWC and the 2012 Grace Hopper Conference

By Dr. Jan Plane



*Grace Hopper Conference attendees tabling for UMD (left) and enjoying life in 3-D (right)*

Throughout the history of computing, representation of women has been consistently low. The percentage of bachelor's degrees awarded to women was at its highest point in the mid-1980's when it was just over of a third.

According to the 2010 statistics available from the NSF, 57.2% of all bachelor's degrees and 50.3% of all Science and Engineering bachelor degrees were awarded to women, but only 18.2% of all Computer Science bachelor diplomas were awarded to women. (<http://www.nsf.gov/statistics/wmpd/minwomen.cfm#degrees>)

If you look instead at statistics from the Taulbee Survey, 13.8% of the bachelor degrees from the institutions that complete the Taulbee were awarded to females ([http://www.cra.org/uploads/documents/resources/taulbee/CRA\\_Taulbee\\_2009-2010\\_Results.pdf](http://www.cra.org/uploads/documents/resources/taulbee/CRA_Taulbee_2009-2010_Results.pdf)). One explanation for the

underrepresentation involves the lack of camaraderie and feeling like an outsider because there are very few other women in the classes required for the major.

Both the Association for Women in Computing (AWC) student group and the Grace Hopper Conference seek to reduce these aspects of studying computer science by demonstrating that there are many technical women.

The AWC is a joint graduate and undergraduate student group associated with the national ACM-W. I have been involved with the UMCP AWC chapter since it formed in the early 1990's and took over as faculty adviser after Gwen Kaye retired.

Just this past year we combined with the CS Women to become a student organization for both graduate and undergraduate students. The organization plans activities geared

alternately among AWC members and the general population, undergraduates and graduates, as well as outreach to the university or surrounding community.

This past year we have had a book swap to raise money, a dinner to welcome new students, workshops (one at National Girl Scout Day) to share what we know with girls in the community, and weekly social/study time on Thursday evenings. Our first big event of the 2013 calendar year was our annual Casino Night on February 22. In 2012, one of the biggest events for UMD's AWC chapter was attending the Grace Hopper Celebration of Women in Computing.

In October 2012, the Grace Hopper Celebration was held in Baltimore and had 2,890 participants, most of which were technical women. Twenty women from UMCP attended the conference. The group



included faculty, staff, undergraduates and graduate students.

We are grateful to the organizations that sponsored UMCP participants to attend as well as the Department for providing a shuttle from campus to the Baltimore Convention Center.

The sponsors included the Maryland Cybersecurity Center, FactSet Research Systems Inc., Yahoo Campus Relations, the Anita Borg Institute and the ACM. The financial help from these sponsors is much appreciated because without the assistance, many of the attendees would not have been able to attend.

The Grace Hopper Celebration is a wonderful way for women in computing to both network with other women and to attend technical talks on almost every area in computing. The AWC members were so excited by the experience that they are already discussing fundraisers that would allow a large group to attend next year's conference in Minneapolis!



*GHC participants begin their trip to Baltimore (above)*



*AWC members at National Girl Scout Day event*

## ***Grace Hopper Conference: Student Recap***

**Preeti Bhargava**  
Ph.D. student

### **Highlight of the Conference:**

I talked to PARC folks and got an offer from them for a summer internship. The conference held an entrepreneurs workshop where women such as Robin Chase, the founder of Zipcar, shared their experiences. That inspired me and also gave me confidence that I can achieve my goals.

### **Conference Takeaway:**

All the opportunities are available equally for both men and women in CS; women just lack the confidence to make use of them. All the speakers tried to inspire and instill that confidence and belief in us that we can perform at par with men, if not better.

**Deonna Hodges**  
Senior B.S./M.S. track

### **Highlight of the Conference:**

Hilary Mason's Big Data talk. I've been following her blog for years and she has been a personal idol of mine for a long time. I also got to help facilitate Open Source Day with the Sahana Eden Foundation, which is a platform used in disaster management, development and environmental management.

### **Conference Takeaway:**

I got to see firsthand how serious tech companies were about recruiting female engineers - it is clearly a tremendous forum for women seeking new career opportunities.

**Aishwarya Thiruvengadam**  
Ph.D. student

### **Highlight of the Conference:**

Networking and the career fair.

### **Conference Takeaway:**

I realized how important interactions with senior women are for women at the early stages of their careers and I learned about the various ways ACM-W (and other organizations) helps in bringing about such interactions.



# Research Spotlight: Machine Learning Group

Machine learning (ML), data science and data mining are rapidly expanding areas of research within computer science. In fact, there are now even departments of ML at top U.S. universities. The general area of “data science” is projected to be a big growth area in coming years. According to the U.S. Department of Labor, demand for tech workers is expected to grow at 19% through 2020, in line with an insatiable need for college graduates with degrees in the field.

At UMD, there is a thriving group of professors, research scientists, postdocs and students working in all facets of ML. Work in neuro and evolutionary-inspired ML is led by Prof. Jim Reggia; work in statistics and ML for computational biology is led by Asst. Prof. Hector Corrada-Bravo; work in ML and natural language processing is led by Asst. Prof. Hal Daume III and Prof. Jordan Boyd-Graber (iSchool); and work in ML applied to networks and relational data is led by Assoc. Prof. Lise Getoor.

There are many other research groups in computer science and across campus which make use of techniques from ML. Examples include computer vision, computational linguistics, and cybersecurity. Research groups are growing fast, well-funded, and publish regularly in the top ML venues. Most of UMD’s graduates go on to top industry, government and academic placements.



## Hector Corrada-Bravo

Hector’s ML research is highly applied to Computational Genomics: biomarker discovery using classification and prediction methods, preprocessing of high-throughput data using statistical modeling, and kernel methods for integrative analysis of genetic data. ML methods and techniques have a long history in Computational Biology, and this will increase as Genomics pursues the goal of individualized medicine: where individual treatment options are tailored based on information gleaned from whole-genome measurements. Algorithms for extracting meaningful signals from big noisy data are a hallmark of ML.

## ***ML COURSES***

### **Asst. Prof. Hector Corrada Bravo**

CMSC702: Computational Systems Biology,  
CMSC726: Intro to Machine Learning

### **Asst. Prof. Hal Daume**

CMSC422: Intro to Machine Learning,  
CMSC726

### **Assoc. Prof. Lise Getoor**

CMSC422, CMSC726

### **Prof. Jim Reggia**

CMSC 422, CMSC 727: Neural Modeling



# Research Spotlight: Machine Learning Group



## Hal Daumé III

In addition to traditional ML classes, Hal's undergraduate artificial intelligence class (CMSC421) has a substantial portion of curriculum dedicated to learning-related ideas, and his "core" graduate course in Computational Linguistics (CMSC723) makes use of a lot of ML technology. ML fascinates Hal because it embodies interesting computational and mathematical challenges, while simultaneously being highly practical.

Technology driven by learning techniques has revolutionized many areas because it largely separates responsibility for understanding computation from understanding a particular application (health, finance, language, vision, biology, etc.). It also provides mechanisms for exploiting and making sense of the vast quantities of data available today.



## Lise Getoor

In Lise's view, AI and ML involves the study of theory and algorithms for solving real-world problems that can have important practical benefits for making computer systems more efficient, useful, and engaging. ML teaches how to build adaptive algorithms that improve based on data, user feedback and interactions.

Lise's research specifically focuses on ML applied to relational and networked data, such as social network data, social media data, biological data, and other data that is best viewed as collections of interacting entities.

Her work involves building rich probabilistic models which can be used for information integration, personalization and discovery.



## Jim Reggia

Within the last two years, Jim has conducted many research projects that involve ML. Some of this research includes the extraction of symbolic representations from what trained neural networks have learned, the neural network models of prefrontal and other brain regions that control human procedural learning and the development of neural network models that learn relations between entities in large social network data sets.

The ML group in UMD's Department of Computer Science has grown rapidly over the last several years, is well funded, and is an area of computer science that has been quickly expanding in general over the last decade.



## 23rd Annual High School Programming Contest



*The first place winning team with Chair Khuller*

Thirty teams of four high school students each, along with their coaches, participated in the Department's 23rd Annual High School Programming Contest on February 23, 2013. Students from Maryland, Virginia and the District of Columbia spent the day programming answers to questions created by Professors Amol Deshpande, Bill Gasarch, Mohammad Hajiaghayi, Pete Keleher, Dave Mount, lecturer Evan Golub and graduate student Ang Li.

The panel of judges included Dr. Golub, Profs. Hajiaghayi and Mount, along with the co-directors of the program Profs. Deshpande and Keleher. Generous monetary assistance was provided by Nancy Garrison, UMIACS, the CMNS Dean's Office, the CS Department, Dante Consulting and Papa John's, for a successful program and discounted lunch. Brenda Chick, Jendayi Nyabingi, James Phongsuwan, and Geoff Ransom, along with four undergraduate volunteers and three student tech staffers, provided the contest with logistic and technical support, and monitored the students during the competition. Prof. Alan Sussman spoke to the coaches about the CS program for approximately one hour while the students were engaged in the competition.

The students answered questions in the theme of "The Hobbit". First place was won by La Plata High School with just three students on its team. Second through sixth places were secured by Thomas Jefferson, Montgomery Blair, Winston Churchill, McDonogh and Sherwood. The prizes ranged from \$500 to \$2,000. The John Gannon Award for the most improved team went to Reservoir High School.

## Department Honors Classes and Gemstone Program Mentoring

By Elizabeth Roberts

The Department offers several honors sections of classes required for CS majors; below are just a few examples of faculty who have taught them. CMSC250H "Discrete Structures" has been taught by Professors William Gasarch and Clyde Kruskal.

"The honors section of discrete math goes slightly faster than the non-honors section and this allows for an extra day every few weeks which is an honors-day," Prof. Gasarch said. "On this day the class works in groups on problems relevant to that part of the course, which are harder and more interesting than the usual problems. For example, when the class is doing combinatorics the honors section may do the hatchcheck problem."

Junior CS major Sawyer Symington elected to take the honors class because he thought it would be more interesting than the regular offering of CMSC250. "We learned to do proofs using various methods like induction and contradiction and other useful mathematical techniques," Symington said. He also found the smaller class size helpful as it "did not have the feel of a big lecture course."

Junior Jakub Bialas, a triple major in CS, mathematics and general biology, took CMSC 250H because he enjoyed taking 132H "Object-Oriented Programming II". Bialas agreed with Symington about the benefits of a small class size, stating that it afforded more contact with the professor and TA.

"Overall, I appreciated how dynamic the course was and how much input we, as students, were able to have in shaping the direction of the course," Bialas said.

The Department is also connected to Gemstone, UMD's four-year multidisciplinary honors program that explores how technology and science can contribute toward society. A few CS professors have mentored Gemstone students' capstone research projects.



Prof. Aravind Srinivasan supervised Team RIO (<http://www.teamrio.blogspot.com>) from 2011 and will continue until the project's completion in 2014. The students are developing a system aimed at college students that will present email, Facebook and tweets in a more efficient manner so that a user's information overload is alleviated.

From 2002- 2004, Prof. Bobby Bhattacharjee mentored students who studied the technical, social and ethical aspects of anonymous communications. Students implemented an anonymous communication protocol, and conducted a survey assessing the utility and concerns about online anonymous communication systems.

## Prof. Hanan Samet Wins ACM Paris Kanellakis Award

In June 2012, Prof. Hanan Samet received the ACM Paris Kanellakis Theory and Practice Award at the ACM Turing Centenary Celebration Banquet held in San Francisco, California.

The award was given for his pioneering research on quadtrees and other multidimensional spatial data structures for storing spatial information, as well as his previously published books, which have significantly influenced the application of these structures.

Spatial data structures have found myriad and diverse uses especially in biomedical imaging, maps (GIS), video games and computer graphics. Prof. Samet's foundational work in spatial indexing and spatial data mining illustrate the huge impact his work has had. Its impact can be seen in a wide array of practical applications including Google Earth.

Prof. Samet's most recently published book in 2006, "Foundations of Multidimensional and Metric Data Structures", was an award winner in the Best Book Competition of the American Publishers Association's Professional and Scholarly Publishers Group.

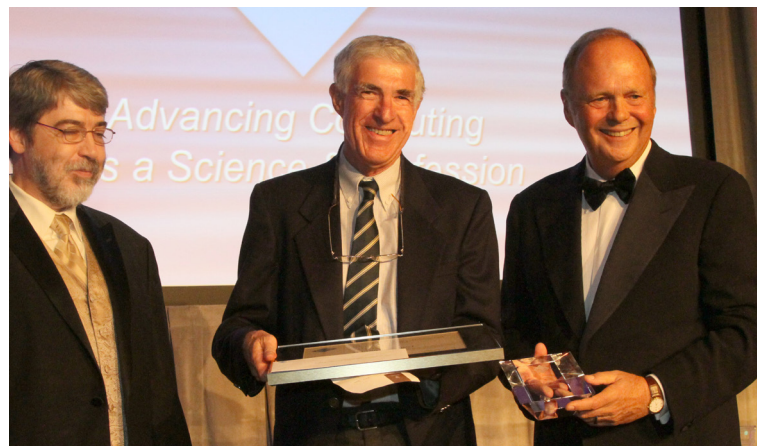
His Ph.D. thesis on formal proofs of correctness of compilers and the symbolic execution of compiled execution sequences was among the earliest contributions to the field that later became known as translation validation for compilers, as well as proof carrying code.

Prof. Samet is the Founding Chair of the ACM Special Interest Group on Spatial Information (SIGSPATIAL) as well as the Founding Editor-in-Chief of the ACM Transactions on Spatial Algorithms and Systems (ACM TSAS).

Prof. Samet is a Fellow of ACM, IEEE, AAAS and IAPR (International Association of Pattern Recognition), and a winner of the 2009 UCGIS (University Consortium for Geographic Information Science) Research Award.

The Paris Kanellakis Award honors specific theoretical accomplishments that significantly affect the practice of computing. Prof. Samet joins an illustrious list of other winners including Leonard Adelman, Edmund M. Clarke, Allen Emerson, Michael Rabin, Ron Rivest, Adi Shamir, and Robert Tarjan.

See the complete list of awardees at <http://awards.acm.org/homepage.cfm?srt=all&awd=147>.



*Professor Hanan Samet accepting the Kanellakis Award*





# Lecturers Bring Diverse Wealth of Knowledge to CS Classrooms

In an occasional series, we highlight some of our seven full-time lecturers:



## Fawzi Emad

Fawzi has been a Lecturer for the Computer Science Department since 2001. Previously, he served as Advising Coordinator in the Mathematics Department for four years and was a Math instructor from 1992 through 2000.

Fawzi enjoys teaching the introductory programming sequence, as well as the introductory Theory courses (Discrete Structures and Algorithms). He has been the recipient of the Computer Science Department's Teaching Excellence Award numerous times, and has also received the CMPS Dean's Award for Teaching Excellence.

Outside of the classroom, Fawzi enjoys thinking about problems related to Game Theory, Complexity, Model Theory, or Combinatorics.



## Nelson Padua-Perez

Nelson began as a lecturer in the CS Dept. in 1997. Over the years he has taught several of the CS 100-level courses. Nelson's research interests include computer science in education, web programming, and software engineering.

His awards include the CMPS Instructor Award (2000 and 2003). He has developed winter session courses for PHP and JavaScript, and co-developed CMSC122. For several years, Nelson was the coordinator and instructor for the Passport program, a program designed to encourage high school students to pursue computer science. He also organizes the CS Latino Group.

He received his M.S. in Computer Science from UMD in 1996 and a B.S. in Computer Engineering from the University of Puerto Rico.



## Jandelyn Plane

Jandelyn is the Senior Lecturer and has taught a wide variety of lower level CS courses since 1990. Jan earned her bachelor's in Computer Science, Philosophy and Mathematics at Wartburg College, her master's in Computer Science from UWM, and her Ph.D. in Education from UMCP.

Besides the regular teaching and advising, Jan is most interested in Computer Science Education – specifically for underrepresented populations or in underdeveloped countries (with the largest projects in Afghanistan and Rwanda).

She is the advisor to UMD's chapter of the Association of Women in Computing and runs the Computer Science Connect program to interest more students from the underrepresented populations in computer science.



# Undergraduate Honors Program Expands CS Interests and Jump-Starts Graduate School Ambitions

By Elizabeth Roberts

Since 1975, high achieving students have graduated with honors from the Department. The key feature of the program is the honors thesis, providing an outlet for in-depth research such as Michael Wasser's ('08) "SocialBrowsing: Augmenting Web Browsing to Include Social Context".

Selection to this program gives undergraduates access to advanced coursework through honors or graduate classes and the opportunity to conduct an independent research project with a faculty mentor. Upon completion of the honors thesis, students deliver an oral defense to a faculty committee and their peers.

Currently, 28 students are participating in this program and maintain a CS GPA of 3.5 or higher and an overall GPA of at least 3.25. Co-honors chair, Assoc. Prof. Neil Spring, says that students with initiative can gain a unique experience at UMD through departmental honors. "Students get to follow their passion for creative research and have their accomplishments recognized by the university," Assoc. Prof. Spring said.

CS senior Joshua Brulé sees the honors program as a way to expand on a basic foundation of research skills. "The problem that I proposed to work on, kind of a probabilistic version of the classic Josephus problem, was something that had been on the back-burner for a while and I wanted to see what could come out of it," Brulé said.

For other CS honors students, the program offers an intersection for cross-disciplinary interests. Junior Ozzie Fallick is a double major in computer science and linguistics that is currently working on a machine transliteration project.

"Through this research, I am getting my first exposure to how CS and linguistics can be applied together to solve problems," Fallick said. "Since the work I'm doing requires more self-direction than classwork, it will be good preparation for a position in industry where I no longer have the

oversight and guidance of instructors."

Some alumni have found that graduating with CS honors has aided them in admission to graduate school and completion of research goals. Kristin Stephens ('09) says participating in CS honors enabled her to prepare for the Ph.D. in the computer science program at the University of California, Berkeley as well as "gain a better understanding of how research works and work with professors outside of the regular classroom." She is currently researching educational technology.

Katrina LaCurts ('08) received her M.S. in 2010 from the Massachusetts Institute of Technology and is currently a Ph.D. candidate in MIT's Electrical Engineering & Computer Science department. She credits the honors program in helping her narrow down what research to pursue.

"I was able to figure out what area of CS I was interested in before I even applied to graduate school," LaCurts said. "Had this not happened, I probably would've wasted a lot of time in school trying to decide what to work on."

Besides the notation of graduating with honors, benefits of the program include access to professors and diverse research experiences that provide concrete preparation for future careers. For more information about the CS honors program, please contact Professors Neil Spring or Atif Memon and visit <http://undergrad.cs.umd.edu/departmental-honors>.

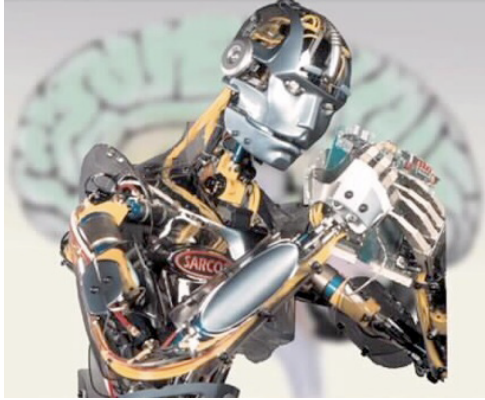


*Professors Neil Spring (left) and Atif Memon (right)*



# I-Series Courses Innovate Traditional CS Curriculum

By Elizabeth Roberts



Since fall 2010, UMD has incorporated I-Series courses into its undergraduate curriculum. Students who take these courses have the opportunity to be challenged with learning interdisciplinary concepts, connecting current events to academia and engaging in open discussion about “hot topic” issues. CS has facilitated I-Series courses about artificial intelligence and algorithms for every-day purposes such as navigation tools.

One I-Series class is CMSC 289I “Rise of the Machines: Artificial Intelligence Comes of Age” which focuses on the question “Can a machine be intelligent, and if so, is that dangerous?” Prof. Jim Reggia has taught this course for three semesters.

Students examine the successes and failures of various methods used by computer scientists trying to create machine intelligence, including automating logical reasoning, neural modeling, swarm intelligence and simulated evolution.

They also conduct online experiments using existing AI software, such as performing a simulated Turing Test, implementing an expert system for which they provide the knowledge, and using machine learning and neural network methods to generate pattern classifiers.

Prof. Reggia’s motivation for teaching the course is based on the increasing use of AI technology in the real world, making the implications of AI relevant for everyone today, not just computer scientists.

“Most undergraduate students do not have a basic understanding of how AI systems work,” Prof. Reggia said. “They are ill-equipped to understand how real computer technology in AI differs dramatically from what is presented in the science fiction literature and film, or to assess the risk-benefit choices that face society in co-existing with intelligent machines.”

Sophomore CS major John Purtilo, a member of the Gemstone Honors Program, took CMSC289I in fall 2012.

“I saw this class as an opportunity to help separate fact from fiction,” Purtilo said. “More importantly, I was motivated to take this course in order to sample what studying artificial intelligence at the 400-level might be like. Before I find a specific field to focus on within the discipline of computer science, I want to get a taste of some of the different areas.”

In spring 2011, a new course was introduced: CMSC 198I “The Science Behind Computing: What Makes Web Search, Navigation Systems and Social Media Work?”

Taught by Prof. Samir Khuller, this course provides an eye-opening glimpse into algorithms and illuminates how they are a central paradigm in computing.

Prof. Khuller was motivated to offer the course because he believes that most CS courses teach programming rather than scientific concepts, therefore teaching a false impression about the field.

“I wanted to have a course that gave a good bird’s eye view of the field as to how computer scientists think about problems and deal with data,” Prof. Khuller said.

Junior CS major Huixian Yin found the course very helpful as a background for upper level computer science classes while sophomore CS major Kathleen Won took the course for a fresh perspective on computing.



"I liked the idea of looking at well-known, everyday tools like Google's search engine and unraveling the logic behind them," Won said. "I learned how to compute a range of algorithms from data compression to cryptography in addition to some machine history." Both students took the course in spring 2012.

Prof. Aravind Srinivasan is developing a proposal for "Networks", a former university honors class, into an I-series course. The premise of the class is that networks are everywhere: social, biological, technological, etc.

"We will study models for networks, how information diffuses through them, how undesirable types of diffusion (e.g., infectious diseases) can be slowed down by understanding network structure, and analyze the future of networked science," Prof. Srinivasan said.

"Networks" has a tentative enrollment date of spring 2014.

For more information about I-Series courses, visit: <http://www.gened.umd.edu/i-series/iseriess.php>

## Combined B.S./M.S. Computer Science Degree Program

By Jenny Story

Since 2008, the Department has offered a combined B.S./M.S. degree program in order to enable our very best students to earn both a B.S. and an M.S. in 5 years. The program keeps intact all course requirements for the B.S. and M.S. degrees.

Students who are admitted to the program may use up to 9 graduate credits taken as an undergraduate toward both degrees, with CS Dept. and Graduate School approval in advance. While there is no specific deadline, students generally apply in the spring semester of their junior year or early in the fall semester of their senior year.

The general requirements for acceptance are:

- An overall GPA of at least 3.5
- Recommendations from two faculty members, at least one of whom is in the CS Dept.
- An essay or statement of purpose
- Approval of the Associate Chairs for Undergraduate and Graduate Studies

For further information, interested students should contact the CS Graduate Coordinator ([gradcoord@cs.umd.edu](mailto:gradcoord@cs.umd.edu)).

## MC2 Center Prepares for Summer Opening

By Associate Professor Michael Hicks

The Maryland Cybersecurity Center (MC2) has been undergoing renovation.

The Center, led by Interim Director and Assoc. Prof. Michael Hicks, is located in the old CMPS Dean's Suite on the third floor of the A.V. Williams building.

The space was designed to have an open feel, and to encourage in-person meeting and collaboration.

The new layout includes a waiting area for visitors, half-height cubicles for students and post-docs, a lounge area with tables and couches for reading papers and chatting about ideas, and offices around the perimeter for faculty and research scientists.

There will also be a kitchen, several conference rooms and a few cubicles for use by MC2 corporate partners and visitors.

Currently, the physical renovations are complete and the furniture is on order. The space is expected to open in early June 2013.



# Congratulations to Our 2012 Ph.D. Graduates!

Name	Advisor(s)	Dissertation Title
Arvind Agarwal	Hal Daume III	<i>Distance Geometry: Application in Data Mining and Machine Learning</i>
Saeed Alaei	Samir Khuller	<i>Mechanism Design with General Utilities</i>
Randolph Baden	Bobby Bhattacharjee	<i>Sharing Private Data Over Public Systems</i>
Carlos Castillo	David Jacobs	<i>Dense Wide-Baseline Stereo Matching and its Application to Face Recognition</i>
Nicholas Chen	Francois Guimbretiere	<i>The Use of Multiple Slate Devices to Support Active Reading Activities</i>
Nikolaos Frangiadakis	Nicholas Roussopoulos	<i>Connectivity and Data Transmission over Wireless Mobile Systems</i>
Mohammadreza Ghodsi	Mihai Pop	<i>Searching, Clustering and Evaluating Biological Sequences</i>
Huimin Guo	Larry Davis	<i>Face Recognition and Verification in Unconstrained Environments</i>
Neha Gupta	Ashok Agrawala	<i>Learning Techniques in Multi-Armed Bandits</i>
Bo Han	Aravind Srinivasan, Bobby Bhattacharjee	<i>Wide-Area Mobile Content Delivery</i>
Christopher Hayden	Michael Hicks, Jeff Foster	<i>Clear, Correct, and Efficient Dynamic Software Updates</i>
Chang Hu	Ben Bederson	<i>Crowdsourced Monoligual Translation</i>
Thuan Huynh	Jim Reggia	<i>Extracting Symbolic Representations Learned by Neural Networks</i>
Sergey Koren	Mihai Pop	<i>Genome Assembly: Novel Applications by Harnessing Emerging Sequencing Technologies and Graph Algorithms</i>
Ranjit Kumaresan	Jonathan Katz	<i>Broadcast and Verifiable Secret Sharing: New Security Models and Round Optimal Constructions</i>



Name	Advisor(s)	Dissertation Title
Benjamin Langmead	Steven Salzberg	<i>Algorithms and High Performance Computing Approaches for Sequencing-Based Comparative Genomics</i>
Jaehwan Lee	Alan Sussman	<i>Decentralized Resource Orchestration for Heterogeneous Grids</i>
Louis Licamele	Lise Getoor	<i>Knowledge Discovery from Gene Expression Data: Novel Methods for Similarity Search, Signature Detection, and Confounder Correction</i>
Michael Lieberman	Hanan Samet	<i>Multifaceted Geotagging for Streaming News</i>
Bo Liu	Mihai Pop	<i>Computational Metagenomics: Network, Classification and Assembly</i>
Justin McCann	Michael Hicks	<i>Automating Performance Diagnosis in Networked Systems</i>
Galileo Namata	Lise Getoor	<i>Identifying Graphs from Noisy Observational Data</i>
Morimichi Nishigaki	John Aloimonos	<i>The Image Torque Operator for Mid-Level Vision: Theory and Experiment</i>
Robert Patro	Carl Kingsford	<i>Computationally Comparing Biological Networks and Reconstructing Their Evolution</i>
Hossam Sharara	Lise Getoor	<i>The Dynamics of Multi-Modal Networks</i>
Sukhyun Song	Alan Sussman, Pete Keleher	<i>Decentralized Network Bandwidth Prediction and Node Search</i>
Alexandros Tzannes	Rajeev Barua, Uzi Vishkin	<i>Enhancing Productivity and Performance Portability of General-Purpose Parallel Programming</i>
Krist Wongsuphasawat	Ben Shneiderman	<i>Interactive Exploration of Temporal Event Sequences</i>
Shanchan Wu	Louiqa Raschid	<i>Prediction in Social Media for Monitoring and Recommendation</i>

We wish to extend our additional congratulations to students who have received their Ph.D. degrees between 2010 and 2011. To view the complete list of Ph.D. alumni, visit <https://webapps.cs.umd.edu/gradoff/alumni/PhDALumni.php>

