

## Competition Opportunities

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*American Computer Science League*

**Carlen Blackstone**

The American Computer Science League (ACSL) presents an exciting opportunity for teachers and students in the wake of the terminated Advanced Placement Computer Science (AP CS) AB exam. The College Board's decision to eliminate the AB exam was initially very disappointing for me since I had prepared students for that exam for 25 years. However, I now see many new opportunities emerging. I believe the change has the potential for making CS more accessible to all students and will make it possible for us to enrich our programs with additional topics, including the ACSL.

The ACSL is an international CS competition that offers a variety of ways for schools to participate. Students in grades 6-9 can compete on five-member teams in the Junior Division. First-year programming students in grades 9-12 have the option of competing on either three-member or five-member teams in the Intermediate Division; more advanced students in grades 9-12 compete in the Senior Division.

Four locally-run competitions are held each year; each competition consists of two parts—a short-problem portion and a language-independent programming portion. The short problems challenge students in topics such as recursion, computer number systems, Boolean algebra, digital electronics, graph theory, data structures, and LISP. Non-programming mathematics and CS classes can also compete in the Classroom Division.

A final All-Star contest offers an opportunity for teams from the highest scoring schools to compete for valuable prizes. The 2009 All-Star contest was held near the U.S. Space and Rocket Center in Huntsville, Alabama. Previous contests have been held in locations including Anaheim, Chicago, Boston, and Washington, D. C. The All-Star contest provides a great incentive for students to work hard in preparation for the local contests.

The registration deadline is Dec. 1, 2009. New teams are encouraged to register as early as possible to access test preparation materials. Information, plus the results and photos of this year's event, are available at [www.acsl.org](http://www.acsl.org).

## Out and About the Community

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*Workshops Partners*

**Stephanie Hoepfner**

The computer science (CS) students of Clermont Northeastern Schools in Batavia, Ohio, were fortunate when Tata Consultancy Services (TCS) came knocking on our door last fall. Community service is a part of the TCS business model so a partnership with the school was a natural for the technology company. After a few conversations, plans were in place for a couple workshops involving our CS students.

About 50 students participated in two workshops and learned about computing careers. The first workshop centered around the theme, "What is IT?" while a second workshop involved 12 students on a Saturday morning to learn about dynamic Web development. TCS was so pleased with the participation and the willingness of the school to partner, that they also planned a two-day summer camp for our students at their corporate offices. The students participated in logic competitions and learned a script language to program small robots through a maze.

Plans for this year include more CS workshops that are not easily accomplished in a classroom and activities to complement course content.

TCS believes that if they invest in local students that some of them will pursue a CS career and perhaps return to work for TCS. This is the beginning of a wonderful partnership that will give our students more than I could have asked for.

## College Connection

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*Indiana University*

**Esfandiar Haghverdi**

**Editor's note:** *This dialog with Esfandiar Haghverdi, Director of Undergraduate Studies at Indiana University's School of Informatics & Computing, is a continuation of our series of interviews with CSTA institutional members. Please share with your students these details about the computer science (CS) programs at Indiana University ([www.informatics.indiana.edu](http://www.informatics.indiana.edu)).*

Indiana University has over 40,000 students enrolled on the Bloomington, Indiana, campus. Students can learn to build computing systems and tools by earning a Bachelor of Science in CS or learn to apply IT tools to a wide variety of application domains by earning a Bachelor of Science in Informatics. They can pursue additional goals by continuing on at the graduate level in the School of Informatics & Computing.

**CSTA: What draws students to your program and what keeps them there?**

**Haghverdi:** Students are drawn to our programs for many reasons, one of the most popular being that they can tailor their major to their own interests and follow their passion. Besides ample professional opportunities, our students see the opportunity to work with IT in innovative ways and enjoy the student-centered environment. Technology is everywhere in today's world, and our students leave with a strong, technology-centered education.

**CSTA: What skills can students acquire before college that will help them succeed in your program?**

**Haghverdi:** High school students should take any course that helps them expand their computing experience and continue with math and science courses throughout their high school years. They should practice both written and oral communication skills and be observant of the many ways information technology impacts life. Activities such as learning a programming language, navigating the Web, or creating a website would be good preparation.

**CSTA: What cool careers are your graduates prepared for?**

**Haghverdi:** Our graduates are starting their own businesses leading IT initiatives to solve world hunger; developing solutions for financial, technology, and consumer product companies; and changing the face of healthcare.

**CSTA: What topics will students study?**

**Haghverdi:** Informatics is a multi-faceted discipline with numerous fields of study and specialty areas that blends the study of information technology with solving real-world problems. An informatics major would likely take courses in social informatics, information infrastructure, human-computer interaction, information representation, multimedia arts and technology, and security.

CS students complete a curriculum focused on topics such as high performance computing, networks, databases, robotics, and programming languages. They would study software systems, data structures, artificial intelligence, computer

simulation, algorithm design and analysis, computing theory, programming, and computer structures.

**CSTA: Tell us a bit about the social environment of the CS program.**

**Haghverdi:** We play Wii. We play golf for charity. We bring informatics to the Boys and Girls Club. From academic programs to student leadership positions, students have unlimited opportunities at Indiana University and there's something for everyone in the School of Informatics & Computing. An academic advisor helps students plan a class schedule each semester so that they are confident in taking the right classes at the right time, and career advisors are with them at every step of the way. Students can join the Informatics Student Association and attend programs such as gaming hours, industry speakers, and networking events. It's easy to become part of the community at Indiana University.

## Curriculum in Action

### Robot Diaries

Leigh Ann Sudol

Girls in Pittsburgh are using robots to convey moods and emotions with the help of the Robotics Institute at Carnegie Mellon University (CMU). In addition to creating large robots to do extraordinary things like winning the Darpa Urban Challenge, the CMU lab creates small robots to inspire the next generation of robot builders.

Emily Hamner and Tom Lauwers' Robot Diaries project engages girls to design and build robots that can communicate and express emotion from craft materials, programmable lights, and motors. Hamner and Lauwers initiated the project as a way to involve girls in science, technology, engineering, and mathematics (STEM) at the age when they typically wrestle with their self-concept. While they might be interested in technology, few have the opportunity to explore technology-related activities in depth.

The Carnegie Science Center in Philadelphia began its outreach effort by offering FIRST Lego League robotics activities for girls. Those efforts were not as successful as was hoped. The Robot Diaries project addresses some of the shortcomings by providing a non-competitive, artistic environment which has proven to be a better fit for many girls.

The robots are created in the development platform called Hummingbird. Participants connect motors for motion, LEDs for lights, and even vibration motors for sound effects. The robot bodies are typically built out of cardboard and paper allowing for creative animal and other creature shapes. Over the course of the workshops, the girls connect parts and add new functionality to the developing project. During a final session, the girls and their robots play charades by acting out and guessing emotions.

Hamner noted that, "The project gives the girls more confidence with their own abilities and with technology in general. They have the confidence to explore; they are more willing to try."

Hamner related a story about a particular young woman with limited technology skills who was easily frustrated with technology challenges. Over the course of the workshop, her skills and confidence grew to a level where she took immense pride in her talking robot and is now excited to use technology to enhance her creative writing.

Participants were recruited with the help of the local library and youth groups including the YWCA, a local home school group, and a CMU-sponsored group, CMITES. CMU is now working on ways to expand the program beyond the CMU lab

and the Pittsburgh area, and plan to offer training workshops so that teachers can offer similar programs in their own areas.

The curriculum for various workshops is available online at [www.terk.ri.cmu.edu/curricula/robotDiaries-overview.php](http://www.terk.ri.cmu.edu/curricula/robotDiaries-overview.php).

## Classroom Tools

### Evolving Words

One of the challenges we face as computing teachers is that we work, not just in a field of acronyms, but in a discipline where the definitions themselves seem to undergo subtle changes over time. As a result, we sometimes may be using the same words as someone else, but meaning something a bit different.

In the interest of clarity, it might be helpful to see how Wikipedia defines the core areas that often fall under computer science. Take a look at the definitions below and see how well they match your own definitions.

**Technology** in human society is a consequence of science and engineering. It is the man-made world of material objects of use to humanity, including systems, methods of organization, and techniques. People's use of technology began with the conversion of natural resources into simple tools.

**Information Technology (IT)** is a general term that describes any technology that helps to produce, manipulate, store, communicate, and/or disseminate information. IT is the study, design, development, implementation, support, or management of computer-based information systems.

**Computing** is the activity of developing and using computer technology, including computer hardware and software. It is the computer-specific part of information technology.

**Computer science** is the study of the theoretical foundations of computing and the application of the theories in computing. It is the study of the theoretical foundations of information and computation and their implementation and application in computer systems

**Computation** is a general term for any type of information processing that can be represented mathematically. This includes phenomena ranging from human thinking to calculations. Computation is a process following a well-defined model that is understood and can be expressed in an algorithm, protocol, network topology, etc.

## SHOW ME THE NUMBERS

Gender and Ethnicity of CS and CE Bachelor's Recipients 2007-2008

	% CS	% CE	% US Population
Male	88.2	89.3	49
Female	11.8	10.7	51
Native Am.	0.8	0.4	1
Asian	14.7	19.8	4
Black	4.0	5.4	12
White	65.8	57.6	74
Hispanic (of any race)	6.1	8.1	13

Sources: Computing Research Association [www.cra.org](http://www.cra.org)  
U.S. Census Bureau [factfinder.census.gov](http://factfinder.census.gov)