Inside This Issue

IN THE NEXT ISSUE OF THE VOICE

Building Community

CS Employees Wanted!

Samuel K. Puich

The demand for computer science (CS) graduates is growing because the global demand for technology has grown by leaps and bounds. This demand has opened up new markets and created job openings that cannot be filled due to the lack of computer scientists, even non-U.S. scientists. ACM estimated that in 2006, nearly 150,000 CS jobs in the U.S. sat empty due to the lack of adequate numbers of computer scientists. This number grew in 2007 and 2008. In addition to job opportunities, salaries in technology jobs are generally higher than average private sector jobs.

Business and educational communities, as well as government, have taken action to fill this gap. It appears that students and high school educators are getting the message. In the last couple of years, the number of students entering the CS field has started to level off and, in some cases, grown. In the fall of 2006, there were 7,840 new CS enrollments at 170 schools in the Computer Research Association (CRA) study. The CRA reported that new enrollments were at 7,915 for the fall of 2007 in those same schools.

A number of factors have created this change. Outsourcing still occurs but the global demand for high-level CS skills continues to increase the demand for workers in the U.S. While the number of entry level programming jobs has decreased significantly, the need for software engineers, software architects and designers, database experts, and security and information assurance specialists has exploded. Many of these positions require

specific knowledge of local language, culture, and society, which is difficult to replicate in other locations. This affords students in the U.S. opportunities that can lead to high-paying and exciting careers.

Opportunities exist in:
- Software engineering
- Systems programming
- Computer security
- Operating systems
- Programming languages
- Database systems
- User interface design
- Computer networks
- Cryptology
- Hardware engineering
- Embedded systems
- Video game design and development
- Software development
- System modeling and architecture
- Digital and graphical design
- Robotics and artificial intelligence
- Computer animation

The future looks bright for students studying CS. However, as technology becomes more sophisticated and complex, employers demand a higher level of skill and expertise from their employees. According to CRA, individuals with an advanced degree in CS or computer engineering, or with an Master's in Business Administration coupled with a concentration in information systems, should enjoy favorable employment prospects. College graduates with a bachelor's degree in CS, computer engineering, information

Voice

CS EMPLOYEES WANTED!

science, or MIS also should continue to see favorable prospects, particularly if they have supplemented their formal education with practical experience.

Because employers continue to seek computer specialists who can combine strong technical skills with good interpersonal and business skills, graduates with degrees in fields other than CS, who have had courses in computer programming, systems analysis, and other information technology areas, should also continue to find jobs in these computer fields. Students who receive a CS education that is rich in interpersonal and business skills will be in high demand as they enter the job market.

Computer scientists, database experts, and information assurance specialists are expected to be among the fastest growing occupations through 2014. The Bureau of Labor Statistics reports that employment of these computer specialists is expected to

> Job increases will be driven by very rapid growth in computer systems design and related services,…

grow much faster than the average for all occupations as organizations continue to adopt and integrate increasingly sophisticated technologies. Job increases will be driven by very rapid growth in computer systems design and related services, which is projected by ACM to be one of the fastest growing industries in the U.S. economy. The sign is out: CS Employees Wanted!

Aspirations in Computing

Rewarding Passion and Achievement

Editor's note: *In a nationwide effort to encourage more young women to choose careers in technology, the National Center for Women & Information Technology (NCWIT) and Bank of America have honored 32 high school women for their accomplishments and aspirations in computing and technology. The young women from across the U.S. were awarded the NCWIT Award for Aspirations in Computing, which recognizes high school women for their computing-related achievements and interests. Lucy Sanders, CEO and Co-founder of the National Center for Women & Information Technology, visited with CSTA about the competition and its impact on the career choices of young women.*

CSTA: What was the motivation for starting the Award for Aspirations in Computing?
Sanders: There are many awards out there for K–12 students but very few for students who excel in computing, and none aimed at young women in particular. We wanted to find a way to identify young women who love computing, honor them for their accomplishments and enthusiasm, encourage them to persist in computing, and create a community for them to connect with one another. A secondary motivation was to elevate awareness of the issue of women in computing and bring more women's innovative thoughts to the technical design table.

One other unique component of this award is that the girls' schools receive a trophy for their trophy case. It's helping to raise the awareness of educators, as well as parents and the general public, that computing is a valuable field of study and a rewarding career choice.

We started the award in early 2007 with a local round in the Denver/Boulder area. Now, less than two years later through five rounds, we've received 573 applications and we've honored 82 students.

CSTA: What is the goal of this award program?
Sanders: The goal of the NCWIT Award for Aspirations in Computing is, quite simply, to attract and retain young women to computing and IT fields. Technology should be designed by as broad and creative a population as the one it serves, and in a world that is increasingly dependent on IT, it is increasingly important that women participate fully.

We also created this award for the benefit of the young women who study computing in high school. These young women, as well as their teachers and administrators, need to know their contributions are valued and will be valued.

CSTA: What is your measure of success?
Sanders: We want to see as many as possible of these young women persist in their study of computing, and we will stay in touch with them over the years. Our outreach extends not just with our award-winners, but with applicants and even parents. Our plans call for aggressive scaling of the award program, and consequently, scaling of the community we are providing for these girls.

CSTA: Why is it important that more young women choose technology as a career area?
Sanders: The future of this country—the world's future—depends on technology. Technology is everywhere. Technology solves problems and creates opportunities. With women comprising more than half of the world's population (and more than half of the U.S. professional workforce), they represent a growing source of innovation, talent, economic stability, and consumerism. It's essential that women be creators of technology, and not simply its consumers.

There are many data to support women's increased participation in IT: for example, according to the U.S. Department of Labor, technology jobs are among the fastest-growing and the highest-paying. And studies of U.S. technology patents show that when men and women work together to create tech products and services, their patents are more highly cited—considered a measure of usefulness and value.

CSTA: Tell us about a project or two from the competition.
Sanders: Here are just a few examples of the kinds of projects our winners have done:
- adapt a program to detect gamma ray bursts in space and calculate the mass of Jupiter,
- lead an independent research project using remote sensing and computer algorithms to determine areas at risk for the mountain pine beetle epidemic,
- develop a tool for the design of knit textiles, and
- develop a pace-per-mile program for her track team.

We also had a winner who was a member of the winning team at the 2008 Raytheon Engineering Competition. This team built a hovercraft powered by a leaf-blower. Another winner's high-school robotics team adopted a junior robotics team. She taught the elementary kids how to use LabView software and create software to apply their strategies. We even have one winner who has applied for a patent!

CSTA: How has this opportunity affected the girls?
One participant reported, "Through this application process, I was happy to become familiar with NCWIT and all the wonderful things you do on behalf of women and IT. I realized how much I have accomplished in computing and IT. I will continue to pursue my passion in this field."

We had one parent tell us that this award has changed his daughter's life. The teachers have been thrilled for their students and several have acknowledged that winning this award and the connections it brings will make the students' future paths smoother.

ASPIRATIONS IN COMPUTING
continued from page 3

CSTA: How can high school teachers involve their female students?

Sanders: High school teachers can encourage their students to apply for the award. The program call will be made through NCWIT member organizations like CSTA, ACM, and CRA as well as through our Web site (*www.ncwit.org/award*).

We also have a Facebook group, NCWIT Award for Aspirations in Computing, which teachers and students can join at any time. It's a great way to connect with other young women who are interested in computing.

CSTA: How else is NCWIT involving K–12 in its work?

Sanders: The NCWIT K–12 Alliance is working together to put computing resources directly into teachers' hands, and then follow up with them to see how they are using the resource kits and how we can improve them. We are also working on a novel technical entrepreneurial curriculum that will teach animation skills to middle school students. Many teaching resources are available free of charge at *www.ncwit.org*.

Attracting the Next Generation of Students to Computing (Part 2)

Dan Lewis

Editor's note: *This is the second of a two-part series on re-designing computer science (CS) at the university level in order to engage today's students.*

The national decline of undergraduate enrollment in computing is a frustrating but familiar story. But while recent surveys suggest a modest improvement, we have yet to answer the key questions that should shape our thinking about the CS curriculum. Adding concentrations or specialization tracks to highlight the application of computing to areas such as game development or robotics and embedded systems have caused only modest increases in enrollment.

One solution is to take advantage of this generation's love affair with the Web; we can and should offer them a comprehensive program that combines the part of CS and engineering that empowers the Web, the graphic design and Web programming technologies that are used to create its content, and an understanding of the social implications of its use. Such a framework

> The new program does not replace, but is intended instead to complement, the existing B.S. in CS and Engineering.

can be appealing, technically challenging, and socially relevant—essential components for an enrollment recovery.

Charting a new path

Social relevance seems to be an important factor for attracting today's students. While enrollment in electrical engineering and computing was falling during the last decade, other technical disciplines whose names suggest a more obvious and direct benefit to humanity, such as environmental science and biomedical engineering, remained popular, especially among female students.

So how do we repackage computing so that students will take a second look?

Taking Action

Beginning in the fall of 2009, the Santa Clara University's Department of Computer Engineering will offer a new interdisciplinary B.S. degree in Web Design and Engineering (BSWDE). The new program does not replace, but is intended instead to complement, the existing B.S. in CS and Engineering. The stated goals of the BSWDE program are to produce graduates (1) who can analyze, design and improve the computational

infrastructure of the World Wide Web, (2) who can develop interactive multimedia content that is appealing, engaging, effective and easy to use, and (3) whose work will be guided by an understanding of, and sensitivity to, the social, political, ethical, and legal relationships between their work and those that it affects. Not counting University core requirements and electives, the distribution of material

> Surveys conducted when the BSWDE program was proposed indicated that 48% of students currently majoring in art and 36% of those majoring in communications were either definitely or possibly interested in the BSWDE as a major.

in the remainder of the program includes 24% math and science, 43% CS and engineering, and Web-related material amounting to 15% graphic arts, 12% communication, and 4% each in sociology and applied ethics. A detailed list of degree requirements is available on the department website *www.scu.edu/engineering/cse/ ugrad/degrees.cfm*.

With a high percentage of required liberal arts courses in art, communications, and sociology, the BSWDE is expected to attract students from those disciplines which have traditionally had significantly higher enrollments of women students and somewhat higher enrollments of other underrepresented groups. Surveys conducted when the BSWDE program was proposed indicated that 48% of students currently majoring in art and 36% of those majoring in communications were either definitely or possibly interested in the BSWDE as a major. Among those students, 73% are female and 18% are Hispanic (compared to only 12% and 13% in computer engineering) suggesting that the new program will increase the percentage of both female and Hispanic students enrolled in the department.

As Dan Reed suggests in his blog, "The magic hierarchy of computing—from atoms to gates to bits to in-order instruction architecture and machine language to code translation to 'hello world'—was an attractive and emotionally enticing technology story to previous generations." However, he continues, "It is often esoteric and off-putting to a generation of students reared on ubiquitous computing technology." (Reed, 2008)

The time has come to add another chapter to the story—a story relevant and exciting to today's students.

Reference: Reed, D. (2008). Computing education and the infinite onion. Reed's Ruminations. Retrieved February 11, 2008, from *www.cra.org/govaffairs/blog/archives/ 000657.html*.

CSTA Members in the News: ACM Senior Member Award

Congratulations!

Chris Stephenson, Duncan Buell, & Mark Guzdial

Stephenson, Buell, and Guzdial have been recognized by ACM as 2009 Senior Members. The award recognizes members with at least 10 years of professional experience and 5 years of continuous Professional Membership who have demonstrated performance that sets them apart from their peers (*awards.acm.org/html/awards.cfm*).

Stephenson has been the Executive Director of CSTA since it was founded in 2005. Buell (University of South Carolina) is the University Faculty Representative on the CSTA Board. Mark Guzdial (Georgia Institute of Technology) is recognized for his ideas with teaching CS through media computation.

Meet the Authors

Dan Lewis
Santa Clara University, CA
Dan was chair of the Computer Engineering department for 17 years and ran JETT and TECS summer workshops for middle school and high school teachers. He is currently the principal investigator on a collaborative multi-institution NSF grant to train teachers in the Alice programming environment.

Samuel Puich
Neumont University, UT
Samuel is the Provost and Chief Academic Officer with over twenty years of experience in the classroom at both the high school and collegiate levels. He is interested in problem-and project-based learning.

Stuart Reges
University of Washington, WA
Stuart is a principal lecturer in the Computer Science and Engineering department since 2004. He restructured the introductory courses and co-published a CS textbook, *Building Java Programs*.

Lucy Sanders
CEO, National Center for Women & Information Technology
Lucy is the co-founder of NCWIT and also serves as Executive-in-Residence for the ATLAS Institute at the University of Colorado at Boulder. She has worked in R&D and executive positions at AT&T Bell Labs, Lucent Bell Labs, and Avaya Labs.

Chris Stephenson
Executive Director, CSTA
Chris has been the Executive Director of CSTA since it began in 2005. She joined ACM after 16 years at the University of Toronto's Computer Systems Research Institute and the University of Waterloo's Mathematics and Computing Department, where she designed instructional resources and professional development for educators.

Jennifer Wofford
Cornell University, NY
Jennifer is the Assistant Dean for Educational Programs at Cornell University's Computing and Information Science department.

Classroom Tools

Expanding Career Connections
Chris Stephenson

CSTA has created a new "shareable" resource that will help colleges and universities with their computer science (CS) K–12 outreach.

Last year CSTA received a grant from the National Science Foundation Division of Undergraduate Education (DUE) and support from Google to host a workshop to help college and university faculty and staff improve their outreach to K–12 schools. The workshop, which was held at Google headquarters in Mountain View, CA, was focused specifically on helping institutions either begin or improve their CS roadshow presentations. One of the things we discovered, however, was that not all of these outreach programs have the resources to develop professional-quality outreach materials that they can leave with teachers and students, and so we launched upon a solution to create an attractive (professionally-designed) resource that everyone could share.

Directly following the Roadshow workshop, we formed a small volunteer committee to begin working with professional designer Beth Scandalios to design a new "shareable" poster. The committee included Michelle Craig (University of Toronto), Suzanne Menzel (Indiana University), Katie Siek (University of Colorado-Boulder) and Kim Voll (University of British Columbia).

With brainstormed ideas from the committee, Scandalios designed the 36×48" *Computing: Expand Your Connections* poster with the goal of helping students see the many ways in which computing connects people to each other and to the world.

This poster is now available in a variety of forms. CSTA members can request printed copies of the poster directly from CSTA (*cstephenson@csta.acm.org*), or can download the CSTA version to print for themselves. Institutions can also download a customizable pdf that allows them to add their own logo and contact information (using Adobe Acrobat Pro) and then print as many copies as they need to distribute locally.

CSTA President Michelle Hutton notes that in providing this customizable poster, CSTA is making an important statement about working together as a community to promote CS. "The days of isolated complacency about who is and is not interested and engaged in computing are gone" says Hutton, "and it is essential that organizations such as CSTA show that we are willing to work with everyone in the community who cares about encouraging students, especially underrepresented students, to see computing as a viable and engaging educational and career pathway."

The CSTA and customizable versions of the *Computing: Expand Your Connections* poster can be downloaded from the CSTA website at: *csta.acm.org/Resources/sub/Careers.html*

Out and About the Community

Career Exploration in the Classroom

You'll find a wide variety of career posters, brochures and links to enhance your lessons on careers in computing from CSTA (*csta.acm. org/Resources/sub/Careers.html*). Here are a few more favorite activities and resources from members of the CSTA Board of Directors.

Margot Phillipps *(Auckland, New Zealand)*
Recently the New Zealand Computer Society (*www.nzcs.org.nz*) launched an ICT-Connect program to connect professionals with classrooms. Volunteers will interact with students for an hour each week over 4–5 weeks to provide insights and expertise on the diverse and exciting nature of careers in computing. The program is being piloted in Hawkes Bay, Christchurch, and the Wellington region with plans to expand nation-wide.

Anita Verno *(Bergen Community College, New Jersey)*
I invite a guest speaker from a computer employment placement firm to provide first-hand details on conducting a successful job or college interview. Topics include dressing and grooming for the interview, preparing to answer typical questions, and creating a well-written resume and cover letter. Stories from a career placement specialist are highly credible with students.

Barb Ericson *(Georgia Institute of Technology)*
I recommend the University of Washington's *Pathways* video to show the breadth of computer science and *A Day in the Life* video series to portray young women with careers in computing (*www.cs. washington.edu/education/ugrad/prospective/outreach.html*).

Myra Deister *(Sunny Hills HS, California)*
STEM Transitions (*www.stemtransitions.org*) offers free integrated lessons including assessment tools and instructor and student materials. Lessons demonstrate the convergence of academic and technical content in STEM-related career clusters.

College Connection

Cornell University

Editor's note: *This dialog with Jennifer Wofford (Assistant Dean for Educational Programs at Cornell University's Computing and Information Science) 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 Cornell University.*

Cornell University is an ivy-league university located in Ithaca, NY, on Cayuga Lake in the Finger Lakes region of Upstate New York. The University has a total undergraduate enrollment of about 14,000 students and an additional 4,500 graduate students. Students can earn a Bachelor of Science (B.S.) or a Bachelor of Arts (B.A.) degree in CS through either the College of Engineering or the College of Arts and Sciences. At the graduate level, students can earn a Master's of Engineering (M.Eng.) degree, and a Doctorate of Philosophy (Ph.D.) degree.

CSTA: What draws students to your program and what keeps them there?
Wofford: Students are drawn to the computer science (CS) program at Cornell by the caliber of the CS community, faculty, and students alike. Consistently ranked among the top five CS departments in the U.S., Cornell faculty are recognized around the world as pioneers in their fields. What sometimes sets Cornell CS apart from CS departments at other research universities is the faculty's commitment to undergraduate education. Tenured professors teach introductory programming classes, as well as develop new courses to teach introductory and advanced CS in innovative ways, including through AI, robotics, and computing in the arts. Students are drawn to Cornell CS because of the outstanding reputation of the faculty, but they remain with CS because of faculty accessibility. Undergraduate students work on faculty-supervised engineering project teams and faculty-supervised independent research, and they have opportunities to work with faculty on grant-funded research projects.

CSTA: What skills can students acquire before college that will help them succeed in your program?
Wofford: Computing experience is not required. Many of our CS majors never took a CS class before coming to Cornell. Good quantitative skills, on the other hand, are essential.

CSTA: What cool careers are your graduates prepared for?
Wofford: Cornell CS graduates are highly sought-after by recruiters from companies all over the globe. Many students take advantage of in-year or paid summer internship opportunities in companies like Microsoft, CISCO, Apple, Yahoo!, Amazon, and Google. The career opportunities in CS are varied and span every industry, including finance, energy, defense, healthcare, education, and entertainment.

CSTA: What topics will students study?
Wofford: All CS students, regardless of their college of admission (Arts vs. Engineering) fulfill the same core curriculum requirements. Additional opportunities for specialization within the major are called 'vectors'. Vectors are CS concentrations selected by individual students based on their personal interests. Students can choose among many options, including: Artificial Intelligence; Computational Science & Engineering; Data-Intensive Computing; Graphics; Human-Language Technologies; Network Science; Programming Languages; Security and Trustworthy Systems; Software Engineering; Systems; and Theory.

CSTA: Tell us a bit about the social environment of the CS program.
Wofford: Students affiliate with their majors in their sophomore year. Student community in CS is sustained by a strong student association in CS—the Association for CS Undergraduates (ACSU). With the help of CS advising staff, the ACSU coordinates student-faculty luncheons and regular general meetings with faculty and corporate speakers. Much (but not all!) of the classroom work in CS is team project based, so students build collaborative relationships that have been known to span decades.

Curriculum in Action

UW in the High School
Stuart Reges

The trend toward more positive and supportive relationships between post-secondary institutions and K–12 computer science (CS) educators is evidenced in a new program from the University of Washington that fills the need for a more advanced CS course.

When the College Board announced last year that it would no longer be supporting the Advanced Placement (AP) AB exam, many school districts and teachers were left scrambling for a solution that would allow them to continue to support an AB-like course. In response to this dilemma, the University of Washington (UW) launched the *UW in the High School* program. This program offers Advanced Placement teachers an option for continuing to teach the content of the AP CS AB course by allowing qualified teachers to offer their students a dual enrollment option through which students receive both high school credit and college credit from the University of Washington.

Participating students pay $275 plus a $35 registration fee to receive five quarter-units of college credit for the UW CSE143 course, which is the second course in the UW CS curriculum. Students are not required to enroll for UW credit if they are not interested in the dual enrollment option, so it is typical for a teacher to have some students enrolled for dual credit and others taking the course just for high school credit.

The programming assignments and syllabus must be approved. The requirements are fairly flexible because it is recognized that many teachers have developed their own approach to teaching the advanced CS topics. Exams provided by the university will determine the major portion of the grade awarded. Guidance in grading the exams and incorporating homework grades into a UW grade will be provided.

Teachers who are interested in learning more about *UW in High School* can visit *www.cs.washington.edu/homes/reges/uwhs* or contact Shannon Matson (*smatson@extn.washington.edu*).

Career Corner

10 Reasons to Major in Computing

1. Computing is part of everything we do!
2. Expertise in computing enables you to solve complex, challenging problems.
3. Computing enables you to make a positive difference in the world.
4. Computing offers many types of lucrative careers.
5. Computing jobs are here to stay, regardless of where you are located.
6. Expertise in computing is valuable in every career.
7. Computing offers great opportunities for true creativity and innovativeness.
8. Computing has space for both collaborative work and individual effort.
9. Computing is an essential part of well-rounded academic preparation.
10. Future opportunities in computing are without boundaries.

Visit *computingcareers.acm.org/* for more details on the *Top 10 Reasons to Major in Computing* plus many more great resources to encourage your students to explore careers in computing.

Survey Winners Announced

Steve Judd (Loretto Academy, El Paso, TX) and
Jennifer Bond (Beth Eden Baptist School, Wheat Ridge, CO)

won a Flip video camera for participating in the
CSTA National High School Computer Science Survey.

The cameras were generously donated by
Joe Ross of PureDigital Inc.

SHOW ME THE NUMBERS
CS Employment Growth 2006–2016

OCCUPATION	% OF CHANGE
Computer software engineers	44.6
Computer systems analysts	29.0
Network systems/data communications analysts	53.4

Compare to other careers.
www.bls.gov/news.release/ecopro.t05.htm

MARK YOUR CALENDAR

School Programming summer camps
July 2009 in Birmingham, Alabama
www.cis.uab.edu/programs/camps

**Computer Science and Information Technology
Symposium (CS & IT)**
June 27, 2009 in Washington, D.C.
www.csitsymposium.org

NECC 2009
June 28–July 1, 2009 in Washington, DC
center.uoregon.edu/ISTE/NECC2009

TECS Workshop CS4HS 2009
July 24–27, 2009 at Carnegie Mellon University
tecs.acm.org/public/TECS/workshops

Alice Educator Workshop
July 13–17 & July 20-24, 2009 in Santa Clara, California
www.scu.edu/engineering/cse/outreach/workshop.cfm

The 21st International Olympiad in Informatics
August 8–15, 2009 in Plovdiv, Bulgaria
ioinformatics.org

**Consortium for Computing Sciences in Colleges
(CCSC: Northwestern)**
October 9–10, 2009 in Parkland, Washington
www.ccsc.org/northwest/2009

**Consortium for Computing Sciences in Colleges
(CCSC: Midwestern)**
October 9–10, 2009 in Chicago, Illinois
www.ccsc.org/midwest

**Consortium for Computing Sciences in Colleges
(CCSC: Rocky Mountain)**
October 16–17, 2009 in Farmington, New Mexico
www.ccsc.org/rockymt

**Consortium for Computing Sciences in Colleges
(CCSC: Eastern)**
October 30–31, 2009 in Villanova, Pennsylvania
ccsce09.villanova.edu

**Consortium for Computing Sciences in Colleges
(CCSC: Southeastern)**
November 13–14, 2009 in Salem, Virginia
www.ccscne.org/2009

2010 NCWIT Award for Aspirations in Computing
Fall 2009 Applications accepted
www.ncwit.org/award

**CSTA INSTITUTIONAL MEMBER
K–12 OUTREACH PROGRAMS**
TechTopia Challenge - Neumont University
July 31, 2009 in Jordan, Utah
www.tech-topia.com

RESOURCES

Here's more information on topics covered in this issue of the *CSTA Voice*.

Page 1: Computer Research Association *www.cra.org*

Page 1: Association for Computing Machinery *www.acm.org*

Page 1: Bureau of Labor Statistics *www.bls.gov/oco/oco1002.htm#comp*

Page 2: NCWIT Promising Practices & Programs-in-a-Box *www.ncwit.org*

Page 2: NCWIT Aspirations in Computing *www.ncwit.org/award*

Page 4: Santa Clara University School of Engineering
www.scu.edu/engineering/cse/ugrad/degrees.cfm

Page 5: ACM Awards *awards.acm.org/html/awards.cfm*

Page 6: CSTA Career Resources *csta.acm.org/Resources/sub/Careers.html*

Page 6: New Zealand Computer Society *www.nzcs.org.nz*

Page 6: University of Washington Career resources
www.cs.washington.edu/education/ugrad/prospective/outreach.html

Page 6: STEM Transitions *www.stemtransitions.org*

Page 6: Cornell University *www.cornell.edu*

Page 7: UW in High School *www.cs.washington.edu/homes/reges/uwhs*

Page 7: Computing Degrees and Careers *computingcareers.acm.org/*