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Message from the Department Chair

The Department of Computer Science in the Howard R. Hughes College of Engineering at UNLV invites you to explore our curriculum, which offers Bachelor, Master, and PhD degrees in Computer Science. Our courses are periodically updated to reflect the changing nature of computer science and information technology. Such courses are selectively embedded to develop specialized programs and concentration areas.

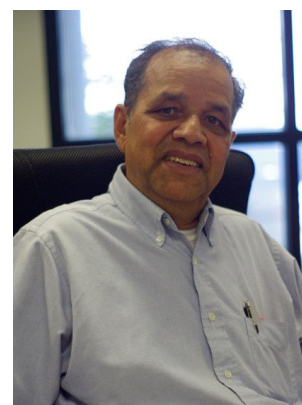
Our BS program, accredited by ABET, is targeted to students who plan to become proficient in problem solving and programming. Students in the BS program go through a rigorous exposition in the core and advanced areas of computer science and programming. The BA program is designed to give adequate skills in computer science fundamentals and to focus on applying such skills to other areas including business, biology, psychology, arts, or the humanities. The department offers optional concentration areas in both the BS and BA programs. By completing selected additional courses, students can obtain certification in concentration areas. At present the available concentration areas are (i) Software Engineering, (ii) Computer Networks, and (iii) Information Assurance.

Our graduate programs, leading to MS and PhD degrees, are designed to pursue research at the frontiers of computer science and application areas. The graduate program is supported by faculty who are actively participating in research and development in specialized areas such as algorithm analysis, database systems, document image processing, scheduling, computational geometry, computer security, parallel programming, programming languages, and multi-media. Four in-house computer laboratories support teaching and research activities.

To meet the changing nature of Information Technology (IT) and Computer Science, the department has recently introduced several new courses in the undergraduate curriculum that include (i) CS443 Information Assurance, (ii) CS559 Digital Forensics, (iii) CS495 Senior Project Development I, and (iv) CS496 Senior Project Development II.

We take the suggestions given by our stakeholders very seriously and incorporate their recommendations to enhance our programs and curricula.

Dr. Laxmi Gewali
Chairman and Professor, Computer Science Department



Faculty Spotlight on Dr. Justin Zhan

Dr. Zhan's research is in the broad areas of BIG DATA SCIENCE, where he has a philosophical vision of using a multidisciplinary and interdisciplinary approach to analyzing and resolving issues in BIG DATA SCIENCE. His research has been extensively supported by the National Science Foundation, Department of Defense, and National Institute of Health. He has designed a pioneering E-science collaboration environment tool by exploring the rich set of socio-metric tools, and the space of relevance algorithms, and by adapting them for different types of semantic bridges that link datasets and large numbers of diverse data into a socio-mapping network. His work on community detection for large networks resulted in novel methods for detection of network communities and for building predictive models of behavior of groups of people.



Quorum Workshop and Programming Experience

This year, funded in part by the National Science Foundation, UNLV, the Readers Digest Partners for Sight Foundation, the Washington State School for the Blind, and the Quorum Outreach and Research Foundation, we held the 6th annual Experience Programming in Quorum workshop (EPIQ). At it, teachers and professionals from a variety of institutions, including predominately K-12 schools, gathered to learn computer science using the Quorum programming language (<http://quorumlanguage.com/>). Teachers practiced programming while learning and collaborating on projects, which they plan to go back and teach at their home institutions.

This year, we focused on several new aspects to Quorum, namely creating computer games and writing programs for LEGO



Robotics. These features, along with a curriculum that is part of the new Computer Science Principles standard, were included as part of the new Quorum 3.0 release developed out of UNLV. To the left is a picture of this year's attendees, taken in July at the Washington State School for the Blind in

UNLV ACM

UNLV ACM is the local student chapter of the Association of Computing Machinery. Founded in 1947, ACM is considered one of the largest and most prestigious science and education societies. UNLV ACM focuses on sharpening students programming skills in weekly on-campus meetings. At these gatherings, participants pose challenging programming problems, workshops and mathematical exercises. Details of UNLV ACM can be found at <http://www.unlvacm.com>.

This year three teams from the UNLV ACM headed to the ACM regional programming competition in Riverside, CA. Jimi Andro Vasko, a UNLV PHD graduate student, is the coach of the team. Students are highly encouraged to join UNLV ACM. For further information contact UNLV-ACM chapter president Daoyun Zeng (zengd@unlv.nevada.edu)

**Team 1: Daoyun Zeng, Stephanie Wirtane, Iting Wen Team
Team 2: Jonathan Lee, Frankie Huang, Austin Ross
Team 3: Sanju Varghes, Evan Thomas, Kevin Duong-Tran**



Selected Recent Publications

- A. K. Datta and R. Patel, CPU Scheduling for Power/Energy Management on Multicore Processors Using Cache Miss and Context Switch Data, *IEEE Trans. Parallel Distributed Systems*, Volume 25, Number 5, May 2014, pp. 1190--1199.
- Sungchul Lee, Juyeon Jo, Yoohwan Kim, "Restful Web Service and Web-based Data Visualization for Environmental Monitoring", *International Journal of Software Innovation (IJSI)*, Jan 2015.
- E. A. Yfantis, and A. Fayed, (2014) Authentication and Secure Robot Communication, *International Journal of Advanced Robotic Systems*, Vol. 11, 2014 pp. 1-6.
- Berghel, H., "Leadership Failures in the National Security Complex," *IEEE Computer*, 47:6, pp. 64-67 (2014).
- A. K. Datta, L. L. Larmore, and T. Masuzawa, "A Communication-Efficient Self-stabilizing Algorithm for Breadth-First Search Trees," *Principles of Distributed Systems - 18th International Conference, OPODIS 2014, Cortina d'Ampezzo, Italy, December 16-19, 2014. Lecture Notes in Computer Science*, Vol. 8878, Springer-Verlag, pp. 293—306.
- Stefan Endrikat, Stefan Hanenberg, Romain Robbes, and Andreas Stefik. 2014. How do API documentation and static typing affect API usability?. In *Proceedings of the 36th International Conference on Software Engineering (ICSE 2014)*. ACM, New York, NY, USA, 632-642.
- J. B. Pedersen, A. Stefik. Towards Millions of Processes on the JVM, *Proceedings of Communicating Process Architectures (CPA'14)*, Oxford, United Kingdom, August, 2014.
- Andreas Stefik and Susanna Siebert, "An Empirical Investigation into Programming Language Syntax", *Trans. Comput. Educ.* 13, 4, Article 19 (November 2013), 40 pages. DOI=10.1145/2534973 <http://doi.acm.org/10.1145/2534973>
- A. K. Datta and S. Devismes, "Distributed Computing and Networking (ICDCN 2012)", *Theoretical Computer Science*, Volume 496, July 2013.
- Laxmi P. Gewali and Romas Hada, "Roaming regions for Delaunay nodes", *Journal of Combinatorial Mathematics and Combinatorial Computing*, 86, (2013) PP. 135-149

Mobile Application Project Competition

The *First Year Experience, Computer Science* class is designed to introduce new students to college level classes. The laboratory part of the class uses the MIT App Inventor (<http://appinventor.mit.edu/explore/>) integrated development environment to create simple Android-based mobile applications.

As part of the class, a competition was held where students were required to propose and implement a final project. The final project could be a game, animation, or an interactive project. The scoring criteria for the final project included originality, visual appeal, user engagement, and functionality/complexity. The class contains approximately 100 students.

The final project judging was completed by the local student chapter of the Association of Computing Machinery (ACM) and some UNLV CS alumni.

The winners are listed below:

First Place (\$500)

Dyanna Burnham, *Generic Evil Quest*

Second Place (\$300)

Kevin Wessman, *Dunder Ball*

John Patrick Buen, *PokeTap*

Patrick Mariano, *Mining Hunt*

Third Place (\$100)

Keenan Srisaeng, *Meteor*

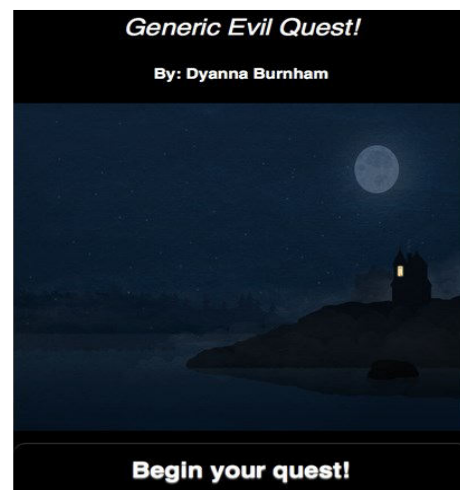
Nicholas Lower, *Polygon Panic*

Mikel Jedrek Ramos, *Bounce Arcade*

John Soriano, *Soriano Quiz*

Stephen Haataja, *Super Dodge*

David Pasalom, *Trashter*



Software Development for Visually Impaired People

As part of Software Engineering, the *inSight* application was developed. *inSight* was commissioned by Derrick Smith, a professor at the University of Alabama in Huntsville, is an attempt to bridge the gap in communication that exists between visually impaired students and teachers, parents, or peers who are not Braille literate. Currently, teachers of visually impaired students (TVI's) have software at their disposal that allows them to write Braille documents and homework assignments for their students. The problem is that when visually impaired students enter their homework solutions into a computer, the output files consist of specially encoded ASCII characters (called SimBraille) which must be manually and painstakingly translated in order to be readable. Project *inSight* is an open source desktop application that converts files containing the mathematical subset of SimBraille to files containing MathML, a type of markup language used for viewing mathematical symbols on websites. These files can then be easily viewed, printed, and graded from a browser. TVIs, parents, or peers can simply run the *inSight* program, select the SimBraille file to be converted, click 'convert', and then the file will be placed into a default or selected directory. Once *inSight* has finished, the file can be viewed as traditional mathematical characters by opening it with Firefox, which is a MathML compatible browser, or Google Chrome, which has an available plug-in that supports MathML.

Team Members:

Steven Craythorn, Omar Navarro Leija, Scott Hale, Colton Muri, Dr. Andreas Stefik, Jeevake Attapattu, and not pictured, Alana Watkins, Chelsea Bhadra, Jimmy Bivans

Alumni Spotlights

Pratik Hada, Software Engineer, Allegiant Travel Company

Pratik Hada (2014 MS, CS) is a software engineer at Allegiant Travel Company. At Allegiant, he is responsible for developing the web services that provides the functionality for the public facing website reservation systems and the internal call center reservation system. He developed the web services using the Java Rest API including JavaEE, JMS, JBoss, MySQL, DB2, MongoDB and others.

He regularly works with business analysts and product sponsors to define requirements. He also works with team members to provide estimates and to discuss application design. His responsibility includes documenting the design and code of the web applications



A few questions with Pratik:

What are the popular programming languages in the industry sector where you are working at present?

Java is still used by a majority of programmers. Python is being adopted very quickly in the last two years. In embedded systems such as gaming machines in casinos, C/C++ is still very popular.

How can we improve graduate computer science education/curriculum in our program?

The projects/theses's topic should be made compatible to current/emerging technologies. Practical aspects of cryptography, big data, and geometric computing should be emphasized in graduate curriculum.

How can we improve networking with local and regional companies in IT?

We have seen job-fair/tech-connect events organized on the UNLV campus where industry representation comes to meet with students for possible recruitment. We should send our representatives also to big companies for establishing a working relationship. The intern program should be reinforced to include on-going research/development activities in the university available to industries.

What is your plan for the future?

- I will continue to gain more experience on developing software component at the present company Allegiant Travel.
- I plan to concentrate on the backend development of application software.
- I also plan to increase my understanding and use of emerging big data technologies.

Alumni Spotlights

Kelly Klare, Software Engineer, Zappos

Kelly Klare (BS 2014) launched her Software Engineering career in 2014 at the now defunct startup SHIFT by Project 100. At SHIFT, she developed Java Spring Boot applications for internal RESTful web services including vendor API wrappers, a decision engine, a rules engine, and an internal systems operations API and service.

She has since moved on to Zappos to work on the website search team, where she is focusing on search relevancy projects. She continues to develop in Java with the Spring Framework and uses the search technologies Lucene and Solr.

Kelly is a recent addition to our department's Advisory Board supporting initiatives such as Tech Connect for our current Computer Science students.



A few questions with Kelly Klare

1. Java, C++ and Python are the popular programming languages used for teaching in universities. What is your opinion of these languages?

Python is a great language for exposing all university majors to programming. It's compact, readable, and useful in areas outside of traditional software engineering. For example, a student could use Python to check their math and statistics problem sets. Python is excellent for timed coding competitions (e.g., ACM, IEEE) because your programs will be many less lines of code than C++ or Java.

C++ is a great language to expose computer science majors to object oriented programming. It allows lower level access to memory, which is useful before taking courses like Computer Organization and Operating Systems.

I recommend students get exposed to Java before graduating as well. It is easy to learn coming from C++ and is very popular in industry. Some benefits of Java are that it is very portable with the Java Virtual Machine (JVM) and it has a robust open source community with a ton of libraries.

2. What are your observations on big data research and development?

From an industry perspective, one of the biggest trends in e-commerce is using behavioral data (such as what the customer clicks on) to enhance the quality and relevancy of search results returned to the customer. To take that another step forward, you can improve search relevancy even more by analyzing how the behavior changes per geographical region. With developments like this, big data becomes a huge part of creating the best experience for our customers. No one knows your customer better than the data that their actions supply.

3. How can we attract more female students in computer science programs?

Get young women coding as soon as possible! I believe that once females are properly exposed to computer science, they will have the opportunity to fall in love with it. One of the most formative experiences that led me to computer science was a C++ course I took in high school. I could see a female-only high school coding club as being hugely successful in encouraging more women into the field.

4. What is your advice to currently enrolled CS majors at UNLV?

Get an internship as soon as possible. Participate in ACM and IEEE student groups. (IEEE has a super fun 24-hour coding competition!) Utilize office hours even if it is only to get to know your instructor/professor. Do coding projects for fun and push it up to Github.

5. What are your future plans?

I will remain at Zappos working on the Website Search team for the foreseeable future. We just pivoted from a migration project that used Amazon A9 back to using our legacy Zappos search where we boast a 99th percentile (p99) response time of 40-50 ms. While our latency is low, we have a lot of work ahead of us to upgrade our current version of Apache Solr, migrate our Search servers to use Amazon Web Services (AWS), and work on some search relevancy projects to keep giving our customers the best experience. I still have a lot to learn and am excited to work on a variety of projects from architecture changes to leveraging behavioral data to boost search results.