

# Kevin C. Webb

kcwebb@cs.ucsd.edu  
2725 W Canyon Ave. #149  
San Diego, CA 92123  
(865) 567-7453

## EDUCATION

University of California, San Diego, CA, 2007 - Present  
Ph.D. in Computer Science, 2013 (Expected)

University of California, San Diego, CA, 2007 - 2010  
M.S. in Computer Science, 2010

Georgia Institute of Technology, Atlanta, GA, 2003 - 2007  
B.S. in Computer Science, 2007

## RESEARCH INTERESTS

Many areas of computer systems, especially networks, distributed systems, cloud computing, operating systems, and parallel computation. Particularly interested in software defined networking and data center control platforms. Additionally interested in assessment and interactive teaching methods in computer science education.

## TEACHING EXPERIENCE

**Instructor (Expected)**                      CSE 91: Perspectives in CS                      Jan. 2013 - Mar. 2013

A position usually held by a member of the faculty. In the upcoming winter quarter, I will be leading a weekly undergraduate seminar course that covers topics like career planning, study habits, finding internships, and trends in computing.

**Head Teaching Assistant**                      CSE 120: Operating Systems                      Sep. 2012 - Dec. 2012

Taught discussion sections, graded assignments, managed grading, and developed grading utilities. Led review sessions, answered student questions, and developed exam questions.

**Instructor**    CSE 120: Operating Systems                      Jul. 2012 - Aug. 2012

A position usually held by a member of the faculty. Prepared and taught a class of 22 students covering introductory operating systems topics such as processes, scheduling, synchronization, memory management, file systems, and I/O. Applied peer instruction teaching methods with great success.

**Teaching Assistant**                              CSE 120: Operating Systems                      Jan. 2012 - Mar. 2012

Taught discussion sections, graded assignments, led review sessions, answered student questions, and developed exam questions.

**Teaching Assistant**                              CSE 223b: Distributed Systems                      Mar. 2011 - Jun. 2011

Graduate course. Answered student questions, graded assignments, and advised students on course research projects.

**Teaching Assistant**                              CS 4270: Internet Lab (GA Tech)                      Jan. 2007 - May 2007

Configured lab equipment, answered student questions, and piloted lab assignments.

## UNIVERSITY SERVICE

**Committee Member** UCSD Education Initiative Nov. 2012 - Present

Member of a newly-formed university committee whose goal is to pioneer and adopt best practices for teaching and education at UCSD. Served on the Technology-Enhanced Education subcommittee, which focuses on improving student engagement, faculty adoption, and assessment techniques for technology in the college classroom.

**Departmental Master TA** UCSD Computer Science Department Sep. 2012 - Present

Liaison between departmental teaching assistants and faculty. Coordinated new teaching assistant training course, led and developed materials for teaching assistant discussion session practicum. Managed departmental teaching assistant mentorship staff.

**Graduate Mentor** Jacobs Undergraduate Mentoring Sep. 2012 - Present

Met biweekly with a group of undergraduates to help acclimate them to the college experience. Advised students on topics like course selection, professors, time management, finding internships, and career planning.

**Residential Technology Advisor** Georgia Tech Dept. of Housing Aug. 2004 - Aug. 2007

Provided technical support to campus housing residents. Assisted the 2005 National Resnet Conference.

## RESEARCH SUMMARY

**Graduate Researcher** UC San Diego Sep. 2007 - Present  
Advisors: Alex Snoeren & Ken Yocum

### *Blender & Topology Switching*

Data center networks represent a critical component of large scale systems, both for traditional web hosting and for elastic cloud computing services. Despite an enormous variety in use cases, current data center networks take a one-size-fits-all approach to forwarding and isolating data center application traffic. Blender gives control back to the users, enabling each user to choose network characteristics that best match their networking needs.

Created a model to capture the general networking requirements of data center applications. Constructed a simulator to validate the viability of the model for large scale networks. Implemented a prototype network allocation system on a software-defined networking testbed.

### *Distributed rate limiting*

Provisioning and accounting for resource usage in wide-area environments is a challenging technical problem. Distributed rate limiting provides a network control mechanism whereby multiple traffic limiters work together to enforce a global rate limit across multiple sites. The coordinated rate limiting behavior bounds provider costs and improves service predictability.

Designed and implemented a reliable group membership protocol to coordinate wide-area distributed resource accounting. Constructed distributed rate control software used by the global PlanetLab testbed.

### *Continuous bulk processing*

Many data-intensive applications perform complex, multi-step computations over successive generations of data. MapReduce and other bulk processing models are popular as they make it simple to leverage commodity clusters to process large volumes of data. Unfortunately, they do not account for the incremental arrival of new data, instead requiring all data to be reprocessed.

Extended the core MapReduce model to incorporate incremental state. Built stateful bulk processing mechanisms into the Hadoop MapReduce framework.

**Research Intern**Hewlett-Packard Labs  
Mentor: Jean Tourrilhes

Jun. 2011 - Sep. 2011

*Multi-tenant data centers*

Cloud service networks simultaneously carry traffic for many users, who want predictable performance and bounded networking costs. Cloud providers seek to maximize their profits by meeting customer needs while supporting as many customers as possible without oversubscribing the network.

Devised a data center rate limit management model to enable flexible admission control and resource provisioning. Constructed a prototype implementation on a physical testbed network.

**Research Intern**Microsoft Research  
Mentor: Emre Kiciman

Jun. 2009 - Sep. 2009

*Fluxo*

Distributed web services have seen an enormous increase in popularity in recent years. Despite their importance, they face many complex challenges when providing data consistency and high performance to large numbers of users. The Fluxo project aims to construct a large, scalable Internet service from a relatively simple specification in a manner that is analogous to traditional program compilation.

Implemented major portions of the Fluxo service compiler. Profiled Fluxo and developed significant performance optimizations. Build and demonstrated several example Fluxo applications, including an email and chat service.

**Undergraduate Researcher**Georgia Tech  
Advisor: Ellen Zegura

Jan. 2006 - May 2007

*Disruption tolerant networking*

Many environments like deep space, rural villages, or even battlefields lack the typical communication infrastructure necessary for reliable network connectivity. Disruption tolerant networking aims to overcome this challenge via a specialized opportunistic exchange protocol.

Designed and implemented a cross-platform disruption tolerant network implementation for use on PDAs, phones, and other hand-held equipment. Formulated several disruption tolerant performance measurement applications.

**PAPERS**

K. Webb and C. Taylor. Using a Pre- and Post-Course Conceptual Test to Gauge Operating Systems Learning. In Preparation.

K. Webb, K. Yocum, and A. Snoeren. Blender: Mixing Data Center Network Isolation Models. Submitted to NSDI for review.

K. Webb, B. Vattikonda, K. Yocum, and A. Snoeren. Wide-Area Group Membership for Tightly-Coupled Services. UC San Diego Technical Report CS2012-0973, February 2012.

D. Logothetis, C. Trezzo, K. Webb, and K. Yocum. In-situ MapReduce for Log Processing. USENIX Annual Technical Conference (ATC), June 2011.

K. Webb, A. Snoeren, and K. Yocum. Topology Switching for Data Center Networks. Workshop on Hot Topics in Management of Internet, Cloud and Enterprise Networks and Services (Hot-ICE), March 2011.

E. Kiciman, B. Livshits, M. Musuvathi, and K. Webb. Fluxo: A System for Internet Service Programming by Non-expert Developers. ACM Symposium on Cloud Computing (SOCC), 2010.

D. Logothetis, C. Olston, B. Reed, K. Webb, and K. Yocum. Stateful Bulk Processing for Incremental Algorithms. ACM Symposium on Cloud Computing (SOCC), 2010.

## REFERENCES

Prof. Alex Snoeren  
UCSD Computer Science and Engineering  
9500 Gilman Drive (MC 0404)  
La Jolla, CA 92093-0404  
(858) 822-2289  
snoeren@cs.ucsd.edu

Dr. Beth Simon  
UCSD Computer Science and Engineering  
9500 Gilman Drive (MC 0404)  
La Jolla, CA 92093-0404  
(858) 534-5419  
bsimon@cs.ucsd.edu

Dr. Ken Yocum  
UCSD Computer Science and Engineering  
9500 Gilman Drive (MC 0404)  
La Jolla, CA 92093-0404  
(858) 822-3287  
kyocum@cs.ucsd.edu

Prof. Joe Pasquale  
UCSD Computer Science and Engineering  
9500 Gilman Drive (MC 0404)  
La Jolla, CA 92093-0404  
(858) 534-2673  
pasquale@cs.ucsd.edu

*Additional references available upon request.*