Catherine E. Welsh

CB #3175 Sitterson Hall
UNC Chapel Hill, NC 27599
Mobile: (919) 360-4948
cwelsh@cs.unc.edu
`www.cs.unc.edu/~cwelsh`

Education

May 2013 *(expected)* **Ph.D., Computer Science**, *University of North Carolina*, Chapel Hill, NC.
Dissertation Title: Genomic Engineering and the Techniques Necessary for Implementation
Advisor: Dr. Leonard McMillan

May 2007 **M.S., Computer Science**, *Lehigh University*, Bethlehem, PA.

May 2004 **B.S., Computer Science**, *Ursinus College*, Collegeville, PA.
GPA: 3.71
Minors in Mathematics and Business Administration

Teaching Experience

Spring 2012 **Guest Lecturer**, *Data Mining*, UNC-Chapel Hill.

Spring 2012 **Teaching Assistant**, *Practical Computing for Biologists*, NEScent Academy.
Assisted with software installation, classroom assignments, and taught database design section of course.

Spring 2011 **Instructor**, *COMP 110 - Introduction to Programming*, UNC-Chapel Hill.
Topics Included: Algorithm Design, If-Else Statements, Loops, Arrays, Inheritance.
Designed (and graded): Syllabus, Slides, Lectures, Projects, Assignments and Exams.
Class consisted of 35 undergraduates.

2011-2012 **Tutor**, *COMP 110 - Introduction to Programming*, UNC-Chapel Hill.
Held weekly tutoring sessions throughout the summer semester for 3 different students.

Spring 2009 **Teaching Assistant**, *Professor Wei Wang's Data Mining*, UNC-Chapel Hill.
Met with students upon request and graded all written work, including final projects.

Research and Professional Experience

2007-Present **Research Assistant**, *Computational Genetics Group (UNC)*, Chapel Hill, NC.
Research in the areas of bioinformatics and developing efficient algorithms to work with large datasets, such as genotyping and sequencing data.

2006-2007 **Research Assistant**, *Semantic Web Group (Lehigh University)*, Bethlehem, PA.
Adapted an existing knowledge base system to support functions related to routing, forwarding, storage management, progressive name resolution, policy processing, and content-based retrieval of information, and modified this system to be efficient and reliable for use with disruption tolerant networks.

2004-2006 **Software Engineer**, *ICANON Associates*, Hatfield, PA.
Developed software in Java using the JBoss environment set up as described during internship. Also worked as a sub-contractor on an IRS project team, converting an existing application to a web application using an Oracle Application Server and Oracle Database.

2002-2004 **Intern/Web Site Developer**, *ICANON Associates*, Hatfield, PA.
Converted web pages from ASP to JSP, created Java applications to access remote databases and aid in data conversion, and wrote a new company website in JSP, that incorporated JavaBeans, SQL, HTML, and Javascript. Set up an IDE to work with a JBoss server, Ant scripts, XDoclet, and XJavadoc to create Enterprise JavaBeans.

Awards and Honors

2012 International Mouse Genome Conference (IMGC) Student Scholarship Recipient

2011 Association for Computing Machinery - Bioinformatics and Computational Biology Conference (ACM-BCB) Student Scholarship Recipient

2009 Google Workshop for Women Engineers (GWWE) Travel Award Recipient

2009 CRA-W Grad Cohort Workshop Selected Participant

2008 CRA-W Grad Cohort Workshop Selected Participant

2000 Recipient of Ursinus College Steinbright Award - Full Four Year Academic Scholarship

Publications

[1] Chen-ping Fu, **Catherine E Welsh**, Fernando Pardo-Manuel de Villena, and Leonard McMillan. Ancestry Inference of Admixed Populations with Microarray Probe Intensities. *ACM-BCB*, 2012.

[2] **Catherine E Welsh**, Darla R Miller, Kenneth F Manly, Jeremy Wang, Leonard McMillan, Grant Morahan, Richard Mott, Fuad A Iraqi, David W Threadgill, and Fernando Pardo-Manuel de Villena. Status and access to the Collaborative Cross population. *Mammalian Genome*, July 2012.

[3] Collaborative Cross Consortium **Catherine E Welsh**. The Genome Architecture of the Collaborative Cross Mouse Genetic Reference Population. *Genetics*, 190(2):389–402, February 2012.

[4] **Catherine E Welsh** and Leonard McMillan. Accelerating the inbreeding of multi-parental recombinant inbred lines generated by sibling matings. *G3: Genes, Genomes, Genetics*, 2(2):191–8, February 2012.

[5] Karen L Svenson, Daniel M Gatti, William Valdar, **Catherine E Welsh**, Riyan Cheng, Elissa J Chesler, Abraham A Palmer, Leonard McMillan, and Gary A Churchill. High-Resolution Genetic Mapping Using the Mouse Diversity Outbred Population. *Genetics*, 190(2):437–447, February 2012.

[6] Hyuna Yang, Jeremy R Wang, John P Didion, Ryan J Buus, Timothy A Bell, **Catherine E Welsh**, François Bonhomme, Alex Hon-Tsen Yu, Michael W Nachman, Jaroslav Pialek, Priscilla Tucker, Pierre Boursot, Leonard McMillan, Gary A Churchill, and Fernando Pardo-Manuel de Villena. Subspecific origin

and haplotype diversity in the laboratory mouse. *Nature Genetics*, 43(7):648–55, July 2011.

Presentations and Posters

Catherine E. Welsh, Darla R. Miller, Kenneth F. Manly, Jeremy Wang, Leonard McMillan, David W. Threadgill, and Fernando Pardo-Manuel de Villena. *In silico predictions of the genomic structure for extant CC lines.* Oral and poster presentations at International Mammalian Genome Conference. 2012.

Catherine Welsh, Ryan Buus, Fernando Pardo-Manuel de Villena, and Leonard McMillan. *A Low-density Mouse Universal Genotyping Array (MUGA).* Poster presentation at Mouse Genetics. 2011.

Catherine E. Welsh, Ryan J. Buus, Jennifer Shockley, Stephanie Hansen, Darla Miller, Fernando Pardo-Manuel de Villena, and Leonard McMillan. *Techniques for Accelerating the Inbreeding in the Collaborative Cross.* Oral presentation at the annual meeting of the Complex Trait Community. 2010.

Skills

Languages	Python, Java, C++, PHP, HTML, SQL, JavaScript, JSP
Other	Oracle, MySQL, JBoss, Apache, Tomcat, SVN, CVS, Wikis

Selected Advanced Coursework

Algorithm Analysis ◇ Bioalgorithms ◇ Visualization in the Sciences ◇ Computational Geometry ◇ Genetics & the Coalescent Theory ◇ Scientific Computation I ◇ Images, Graphics and Vision ◇ Computer Networks and Security ◇ Data Mining ◇ Artificial Intelligence ◇ Pattern Recognition ◇ Object-Oriented Software Engineering

Clubs & Certifications

Computer Science Student Association (President 2010)

Association for Computing Machinery (ACM) Student Member

International Mammalian Genome Society (IMGS) Student Member