

*Cristián I. Castillo-Davis*  
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## CURRICULUM VITAE

### EDUCATION

**Harvard University**, Post-Doctoral Fellowship, Department of Statistics, 2004 – 2006 (with Jun S. Liu)  
**Harvard University**, Ph.D. Organismic and Evolutionary Biology, 2003 (under Daniel L. Hartl)  
**Cornell University**, B.S. Ecology and Evolutionary Biology, 1997

### PROFESSIONAL EXPERIENCE

**Visiting Assistant Professor of Biology**, Department of Biology, **University of Maryland**, 2011 – 2012  
**Assistant Professor of Biology**, Department of Biology, **University of Maryland**, 2006 – 2011  
**Post-Doctoral Fellow**, Department of Statistics, **Harvard University**, 2004 – 2006  
**Post-Doctoral Fellow**, Department of Organismic and Evolutionary Biology, **Harvard University**, 2003 – 2004

### RESEARCH FOCUS

Evolutionary genomics. I analyze comparative and functional genomic data in a statistical framework to test evolutionary hypotheses. Past work focused on the evolution of proteins, duplicate genes, introns, *cis*-regulatory DNA, and gene networks. My current interest is the development of models for mapping complex traits that allow for gene-gene interaction and the application of statistical genomics methods to data outside biology.

### PUBLICATIONS

Landry C.R.\*, **C. I. Castillo-Davis**\*, A. Ogura, Jun S. Liu, D. L. Hartl. 2007. Systems-level analysis and evolution of the phototransduction network in *Drosophila*. **Proceedings of the National Academy of Sciences**. 104(9):3283-3288. \*contributed equally

Ma, P., **C. I. Castillo-Davis**\*, W. Zhong, J. S. Liu. 2006. A data-driven clustering method for time course gene expression data. **Nucleic Acids Research**. 34:1261-1269. \*contributed equally.

**Castillo-Davis, C. I.** 2005. The evolution of noncoding DNA: how much junk, how much *func*? **Trends in Genetics**. 21(10): 533-536.

**Castillo-Davis, C. I.**, D. L. Hartl, and G. Achaz. 2004. *cis*-regulatory and protein evolution in orthologous and duplicate genes. **Genome Research**. 14(8):1530-1536

**Castillo-Davis, C. I.**, T.B.C. Bedford\*, D.L Hartl. 2004. Accelerated rates of intron gain/loss and protein evolution in duplicate genes in human and malaria parasites. **Molecular Biology and Evolution**. 21(7):1422-1427.  
\*contributed equally

## PUBLICATIONS (Continued)

**Castillo-Davis, C. I.**, R. J. Kulathinal\*, F.A. Kondrashov, D.L Hartl. 2004. The functional genomic distribution of protein divergence in two animal phyla: coevolution, genomic conflict, and constraint. **Genome Research**. 14(5):802-811. \*contributed equally

**Castillo-Davis, C. I.** and D. L. Hartl. 2003. Conservation, relocation and duplication in evolutionary genomics. **Trends in Genetics**. 19(11):593-597.

Ranz, J.M., **C.I. Castillo-Davis**, C.D. Meiklejohn, D.L. Hartl. 2003. Sex-dependent gene expression and the evolution of the *Drosophila* transcriptome. **Science**. 300 (5626): 1742-1745.

**Castillo-Davis, C. I.** and D. L. Hartl. 2003. GeneMerge- post-genomic analysis, data-mining and hypothesis testing. **Bioinformatics**. 19(7): 891-892.

Winzeler, E.A., **C.I. Castillo-Davis**, G. Oshiro, D. Liang, D.R. Richards, Y. Zhou, and D.L. Hartl. 2003. Genetic diversity in yeast assessed with whole-genome oligonucleotide arrays. **Genetics**. 163(1):79-89.

**Castillo-Davis, C. I.**, S.L. Mekhedov, D. L. Hartl, E.V. Koonin, F.A. Kondrashov. 2002. Selection for short introns in highly expressed genes. **Nature Genetics**. 31(4): 415-418.

**Castillo-Davis, C. I.** and D. L. Hartl. 2002. Genome evolution and developmental constraint in *C. elegans*. **Molecular Biology and Evolution**. 19(5): 728-735.

Hartl, D. L., C. D. Meiklejohn, **C. I. Castillo-Davis**, D. Cavalieri, J. M. Ranz and J. P. Townsend. 2003. Gene expression profiling in evolutionary genetics. Pp. 74-93. *In The Evolution of Population Biology: Modern Synthesis*. Eds. R. Singh, S. Jain and M. Uyenoyama. Academic Press, New York.

Hajek, A.E., **C.I. Castillo-Davis**, C.C. Eastburn, F.M. Vermeulen. 2002. Deposition and germination of conidia of the entomopathogen *Entomophaga maimaiga* infecting larvae of the gypsy moth, *Lymantria dispar*. **Journal of Invertebrate Pathology**. 79: 37-43.

## INVITED LECTURES

"Comparative genomics and phenotyping to reveal gene network function in *Drosophila*"  
**National Institutes of Health (NIH), NIDDK**, Bethesda, MD, April 16, 2009.

"*cis*-regulatory complexity, intergenic size, and the architecture of animal genomes"  
**Princeton University**, Princeton, NJ (Departmental Seminar), Department of Ecology and Evolutionary Biology, September 25, 2008.

"Variation in gene expression and protein evolution in the phototransduction network in the genus *Drosophila*."  
**George Mason University, Bioinformatics Colloquium**, Fairfax, VA. February 26, 2008.

"The evolution of gene networks. Lessons from the genus *Drosophila*."  
**University of Maryland, Baltimore County**, Baltimore, MD (Biology Departmental Seminar), May 1, 2008.

"Molecular evolution of the phototransduction network in the genus *Drosophila*."  
**Department of Cell Biology and Molecular Genetics, University of Maryland, College Park**  
(Departmental Seminar) March 5, 2008.

"A tale of 12 species: evolution of the phototransduction network in the genus *Drosophila*."  
**University of Texas, Austin**. November 5, 2007.

## INVITED LECTURES (Continued)

"Gene network evolution in sibling species of *Drosophila*."

**17<sup>th</sup> Algorithmics and Biology Seminar, Banyuls-sur-Mer, France.** October 27, 2005

"Evolutionary and functional genomic analysis."

**Tsinghua University, Beijing, China,** July 23, 2004

"Measuring *cis*-regulatory evolution."

**The Broad Institute, Cambridge, MA** – Medical and population genetics group, April 15, 2004

"New directions in evolutionary and ecological functional genomics."

**Gordon Research Conference - Evolutionary & Ecological Functional Genomics,** August 7, 2003

"Rules of evolutionary genomics? Networks, selection, and constraint."

**Radcliffe Institute for Advanced Study, Harvard University,** Cambridge, MA. Function, pathways, phylogenies, and populations *Workshop in Computational Biology.* May 19, 2003.

"A functional genomic analysis of positive selection in mammals."

**Cornell University,** Ithaca, NY. November 27, 2002.

"GeneMerge: post-genomic analysis and data mining software for biologists (not just bioinformaticians)."

**Center for Genomics Research,** Harvard University. November 6, 2002.

"Comparative genomics: Testing evolutionary hypotheses in yeast, worm, and fly."

**Center for Genomics Research,** Harvard University. December 5, 2001.

"Genome evolution and developmental constraint in *Caenorhabditis elegans*."

**Universidad de Chile, Santiago, Chile, S.A.,** Center for Advanced Studies in Ecology and Biodiversity Research, Millennium Science Initiative. November 23, 2001.

"Why do organisms seem to evolve gradually? How the genomics revolution may shed light on the fossil record."

**Paleontological Research Institution,** Ithaca, NY. November 3, 2001.

## SELECTED ACADEMIC PRESENTATIONS

"Gene network evolution" **Society for Molecular Biology and Evolution,** Annual Meeting, Halifax, **Nova Scotia, Canada,** June 27, 2007

"*cis*-regulatory sequence evolution across the metazoa" **Center for Bioinformatics and Computational Biology,** University of Maryland, College Park (center seminar) April 5, 2007

"Bayesian clustering for time course microarray data" **Second Workshop on Monte Carlo Methods.** Cambridge, MA. August 27, 2004.

"Natural selection and the evolution of gene regulation" **Evolution 2004.** Society for the Study of Evolution, Annual Meeting, Fort Collins, CO. June 28, 2004.

"Accelerated regulatory and protein evolution in duplicate genes" **Radcliffe Institute for Advanced Study, Harvard University.** Function, Pathways, Phylogenies, and Populations *Workshop in Computational Biology.* May 20, 2003.

## SELECTED ACADEMIC PRESENTATIONS (Continued)

"Evo-devo genomics: measuring regulatory sequence evolution through development" **Boston Area-Wide Evolution and Development Seminar Series**. March 6, 2003.

"Being a mammal: a functional genomic analysis of positive selection." **New England Molecular Evolutionary Biologists, Annual Meeting (NEMEB)**. *Woods Hole Oceanographic Institution*, MA. November 9, 2002.

## AWARDS AND HONORS

**Faculty Mentor, Howard Hughes Medical Institute (HHMI) Undergraduate Research Program**, 2008-2011

**Faculty Mentor, Philip Merrill Presidential Scholars Program (University of Maryland)**, 2010-2011

**Invited Host/Interviewer, Richard Dawkins Public Lecture**, University of Maryland, College Park. April 6, 2011

**Invited Guest, The Kojo Nnamdi Show**, Darwin's Birthday: The Evolution of Evolution, WAMU 88.5 FM, Washington, DC. February 5, 2009.

**Invited Seminar, Princeton University, Department of Ecology and Evolutionary Biology**, Princeton, New Jersey, September 25, 2008.

**Invited Seminar, Department of Biology**, University of Maryland, Baltimore County, May 1, 2008

**Invited Colloquium Speaker, Bioinformatics Colloquium, George Mason University**, February 23, 2008

**Searle Scholar Nominee (1 of 2) University System of Maryland**. September 21, 2007.

**Invited Lecture 17<sup>th</sup> Algorithmics and Biology Seminar**, Banyuls-sur-Mer, **France**. October 27, 2005

**Invited Review, Trends in Genetics. The evolution of noncoding DNA**. October, 2005

**Co-chair, Committee on Bioinformatics Education Complex Systems Bioinformatics SIG**, 2004-2005

**Invited Lecturer in Computational Biology, Tsinghua University and Beida University**, Beijing, **China**, 2004

**Invited Tutorial Complex Systems Bioinformatics Conference 2004, Stanford University**, CA. 2004

**Biotechnology Institute Fellow Minority and Indigenous Fellows Program, BIO 2004**, San Francisco, CA. 2004

**Invited Biotech Industry Panel Member Bio-IT Leading Indicator Panel "Industry Expert" for IDC, Inc.**, 2004

**Invited Lecture, Gordon Research Conference on Evolutionary and Ecological Functional Genomics**, Aug. 2003

**Winner, Best Talk, NEMEB 2002 New England Molecular Evolutionary Biologists Meeting**. November 2002

**Invited Public Lecture Paleontological Research Institution**, Ithaca, NY. November 2001

**Invited Lecture, Center for Advanced Studies in Ecology and Biodiversity Research, University of Chile**, Santiago, **Chile**, 2001

**Functional Genomics Travel Award Evolution 2001**, Annual Conference, **NSF Biocomplexity Initiative**

**Certificate of Distinction in Teaching, Harvard University, Introductory Biological Sciences**, 2000

**Certificate of Distinction in Teaching, Harvard University Vertebrate Reproduction**, 2000

**National Science Foundation (NSF) Graduate Fellowship Honorable Mention**, 2000

**NIH Genetics Training Grant, Harvard University**, 1999-2001

**NIH Field Research Traineeship, Cornell University, Yutaje Biological Station**, Amazonas, **Venezuela**, 1996

## JOURNAL REFEREE

Genetics

Bioinformatics

Genome Research

Trends in Genetics

Nature Biotechnology

Molecular Biology and Evolution

Biology Letters, Royal Society

PLoS ONE

Artificial Intelligence in Medicine

Journal of Theoretical Biology

## GRANT REVIEW

National Science Foundation (NSF), United States of America  
United Kingdom Biotechnology and Biological Sciences Research Council (BBSRC)  
United States Civilian Research & Development Foundation (CRDF)  
Maryland Industrial Partnerships (MIPS) Program (funding for joint academic-commercial R&D collaborations)

## GRANT & FELLOWSHIP HISTORY

December 2007

National Science Foundation, Cyber-Enabled Discovery and Innovation Program Pre-Proposal  
"Gene assembly and new sequencing technology" – \$1,212,585  
Co-Principal Investigator with M. Pop and S. Salzberg (not invited)

July 2007

National Science Foundation, Biological Databases and Informatics Program  
"A Framework for discovering associations from the annotated biological web" – \$802,429  
Co-Principal Investigator with L. Raschid, P. Srinivasan (not funded)

## PROFESSIONAL MEMBERSHIP

Genetics Society of America (GSA)  
Society for the Study of Evolution (SSE)  
Society for Molecular Biology and Evolution (SMBE)  
Society for Integrative and Comparative Biology (SICB)  
American Association for the Advancement of Science (AAAS)  
Society for Advancement of Chicanos and Native Americans in Science (SACNAS)

## PROFESSIONAL SERVICE (University of Maryland, College Park)

### GRADUATE PROGRAMS

**Biology** Graduate Program, *Department of Biology*

**Molecular and Cellular Biology** (MOCB) Graduate Program, *Department of Cell Biology and Molecular Genetics*  
**Computational Biology, Bioinformatics and Genomics** (CBBG), *College of Computer, Mathematical, and Natural Sciences*

**Behavior, Ecology, Evolution and Systematics** (BEES) Graduate Program, *Department of Biology*

**Biological Sciences** Graduate Program (BISI), *College of Computer, Mathematical, and Natural Sciences*

### ACADEMIC COMMITTEES

**Bioinformatics Faculty Search Committee**, Center for Bioinformatics and Computational Biology (2008 – 2010)

**Biology Faculty Search Committee**, Department of Biology (2007– 2010)

**College Undergraduate Program Committee** (2007 – 2010)

**Steering Committee, Graduate Program** in Behavior, Ecology, Evolution and Systematics (2007– 2010)

### DOCTORAL COMMITTEES

David Sturgill, (2010-2011), Computational Biology, Bioinformatics and Genomics (Chair: Brian Oliver - NIH)

Kevin Nyberg, (2008 – 2010), Department of Biology (Chair: Alexa Bely)

Alison Heffer, (2008 – 2010), Department of Cell Biology and Molecular Genetics (Chair: Leslie Pick)

Qinwen Liu (2007 – 2010), Department of Cell Biology and Molecular Genetics (Chair: Eric Haag)

Holly J. Mortensen (2007 – 2010), Department of Biology (Chair: Sarah Tishkoff)

Kristin Kaercher (2007), Department of Biology (Chair: Sarah Tishkoff)

## PROFESSIONAL SERVICE (University of Maryland, College Park) (Continued)

### DOCTORAL RESEARCH SUPERVISION

**Ph.D. Advisor**, Kawther Abdilleh, Molecular and Cellular Biology, University of Maryland (Fall 2007 – 2012)

**Ph.D. Advisor**, Harlan J. King, Molecular and Cellular Biology, University of Maryland (Spring 2009 – 2010)

**Ph.D. Co-Advisor** (w/ Douglas Erwin), Sarah Tweedt, Behavior, Ecology, Evolution, and Systematics, University of Maryland & Smithsonian Institution (2011)

**Rotation Ph.D. Advisor**, Harlan J. King, Molecular and Cellular Biology (2008)

**Rotation Ph.D. Advisor**, Chen Cao, Molecular and Cellular Biology (2007)

### UNDERGRADUATE RESEARCH SUPERVISION

Brian Moore, laboratory research assistant (Fall 2008 – 2011)

Umair Zia, laboratory research assistant (2010 – Winter 2011)

Jin Yoo, laboratory research assistant (Fall 2009 – Winter 2010)

Christopher Burnette, laboratory research assistant (Winter 2009)

Sarah Moore, laboratory research assistant (Spring 2008 – 2010)

Ashley Thompson, laboratory research assistant (Fall 2007 – June 2008)

Vedrana Hodzic, laboratory research assistant (Summer & Fall 2007)

Aala Salimian, laboratory research assistant (Summer 2007)

*Undergraduate Thesis Committee*, Nikhil Joshi (2007)

### HIGH SCHOOL STUDENT RESEARCH SUPERVISION

Rajiv Padharia, summer research assistant (Summer 2008 - 2010)

Rebeca Casillas, summer research assistant, *Diversity mentor* (Summer 2008 – 2010)

### TEACHING

#### *University of Maryland, College Park, Department of Biology*

"Principles of Evolution" Spring, 2008, 2009, 2010, 2011 (undergraduate course)

"Key Ideas in Evolutionary Biology" Fall 2007, 2008, 2009, 2010 (graduate seminar)

#### *Post-Doctoral*

Lecturer in Computational Biology, Tsinghua and Beida University, Beijing, China, Summer, 2004.

Invited Workshop, "Introduction to Evolutionary and Functional Genomics", *International Conference on Computational Systems Bioinformatics*, Stanford, California, 2004.

#### *Pre-Doctoral*

Teaching Fellow, Introductory Biological Sciences, Harvard University, 2003

Teaching Fellow, Vertebrate Reproduction, Harvard University, 2002 & 2001

Teaching Fellow, Genetics and Genomics, Harvard University, 2000

Teaching Fellow, Introductory Biological Sciences, Harvard University, 1999

### PRE-DOCTORAL RESEARCH EXPERIENCE

1997-1999      **Laboratory Research Assistant – Insect Pathology, Cornell**  
*Department of Entomology, Cornell University, Ithaca, NY*  
*Supervisor: Ann Hajek, Ph.D.*

Summer 1996:    **Field Research Assistant – Plant Medicinal Biochemistry, Amazon**  
*Instituto Venezolano de Investigaciones Cientificas, Caracas, Venezuela / Cornell University*  
*Supervisors: Fabian Michangeli, M.D./Ph.D., Eloy Rodriguez, Ph.D.*

## **PRE-DOCTORAL RESEARCH EXPERIENCE (Continued)**

Summer 1995: **Biotechnology – Quality Control Officer**  
*Alexion Pharmaceuticals Inc., New Haven, CT.*  
*Supervisor: Bernadette Alford, Ph.D.*

## **LANGUAGES**

English, Spanish, French.

## **COMMUNITY/VOLUNTEER ACTIVITY**

Undergraduate Minority Student Mentor, NSF Diversity Initiative, Evolution 2004, Fort Collins, CO., 2004  
Member, Minority Biomedical Scientists at Harvard, 2001-2003  
Undergraduate Minority Student Mentor, NSF Diversity Initiative, Evolution 2001, Knoxville, TN., 2001  
Member, Society for the Advancement of Chicanos and Native Americans in Science, 1996-present  
Public Educator, Ithaca Rape Crisis, Ithaca, NY, 1995-1997