

## CURRICULUM VITAE: **CHRISTOPHER L. BAKER, PH.D.**

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### **EDUCATION**

- 2010-2015 Postdoctoral Fellow, The Jackson Laboratory, Bar Harbor, ME  
Mentor: Kenneth Paigen Ph.D.  
Genetic and genomic dissection of *trans* quantitative control of mammalian hotspots
- 2004-2010 Ph.D. Genetics, Department of Genetics, Dartmouth Medical School, Hanover, NH  
Molecular and Cellular Biology Program  
Mentor: Jay C. Dunlap Ph.D.  
Thesis: Post-translational regulation of the *Neurospora crassa* circadian system using quantitative proteomics
- 2001-2004 B.S. Plant and Soil Science, College of Agriculture and Life Sciences, University of Vermont, Burlington, VT  
Mentor: Cardy A. Raper Ph.D. and Thomas J. Fowler Ph.D.  
Undergraduate Thesis: Mechanisms of self vs. non-self recognition in filamentous fungi  
Graduated with honors, *summa cum laude*

### **PROFESSIONAL EXPERIENCE**

- 2016-present Assistant Professor, The Jackson Laboratory, Bar Harbor, ME
- 2016-present Graduate Faculty, School of Biomedical Sciences and Engineering, The University of Maine, Orono, ME
- 2015-2016 Associate Research Scientist, The Jackson Laboratory, Bar Harbor, ME  
Laboratory: Kenneth Paigen Ph.D.

### **PUBLICATIONS**

Google citation indices: <https://scholar.google.com/citations?user=DpPqyOUAAA&hl=en>

1. Powers NR, Parvanov ED, **Baker CL**, Walker M, Petkov PM, Paigen K. **2016**. The meiotic recombination activator PRDM9 trimethylates both H3K36 and H3K4 at recombination hotspots in vivo. *PLoS Genetics*, 12(6):e1006146. doi:10.1371/journal.pgen.1006146
2. Narasimhan V, Hunt K\*, Mason D\*, **Baker CL\***, *et al.* [35 authors]. **2016**. Health and population effects of rare gene knockouts in adult humans with related parents. *Science*, 352(6284):474-7. doi: 10.1126/science.aac8624 \*equal contribution
3. **Baker CL**, Petkova P, Walker M, Flachs P, Mihola O, Trachtulec Z, Petkov PM, Paigen K. **2015**. Multimer formation explains allelic suppression at PRDM9 hotspots. *PLoS Genetics*, 11(9): e1005512. doi:10.1371/journal.pgen.1005512

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4. Walker M, Billings T, **Baker CL**, Powers N, Tian H, Saxl RL, Choi K, Hibbs MA, Carter GW, Handel MA, Paigen K, Petkov PM. **2015**. Affinity-seq detects genome-wide PRDM9 binding sites and reveals the impact of prior chromatin modifications on mammalian recombination hotspot usage. *Epigenetics & Chromatin*, 8:31: doi: 10.1186/s13072-015-0024-6
5. Sun F, Fujiwara Y, Reinholdt R, Hu, J, Saxl RL, **Baker CL**, Petkov PM, Paigen K, Handel MA. **2015**. Nuclear localization of PRDM9 and its role in meiotic chromatin modifications and homologous synapsis. *Chromosoma*: 1-19.
6. **Baker CL**, Kajita S, Walker M, Saxl RL, Raghupathy N, Choi K, Petkov PM, Paigen K. **2015**. PRDM9 drives evolutionary erosion of hotspots through haplotype-specific initiation of meiotic recombination. *PLoS Genetics*, 11(1): e1004916. doi:10.1371/journal.pgen.1004916
7. Larrondo LF, Olivares-Yanez C, **Baker CL**, Loros JL, Dunlap JC. **2015**. Decoupling circadian clock protein turnover from circadian period determination. *Science*, 347(6221):1257277.
8. Bubier JA, Jay JJ, **Baker CL**, Bergeson SE, Ohno H, Metten P, Crabbe JC, Chesler EJ. **2014**. Identification of a QTL in *Mus musculus* for alcohol preference, withdrawal, and Ap3m2 expression using integrative functional genomics and precision genetics. *Genetics*, 197(4):1377-93.
9. **Baker CL**, Walker M, Kajita S, Petkov PM, Paigen K. **2014**. PRDM9 binding organizes hotspot nucleosomes and limits Holliday junction migration. *Genome Research*, 24(5):724-732.



10. Billings T, Parvanov ED, **Baker CL**, Walker M, Paigen K, Petkov PM. **2013**. DNA binding specificities of the long zing finger recombination protein PRDM9. *Genome Biology*, 14:R35
11. **Baker CL**, Loros JJ, and Dunlap JC. **2012**. The circadian clock *Neurospora crassa*. *FEMS Microbiology Reviews*, 36(1):95-110.
12. **Baker CL** and Dunlap JC. **2009**. Circadian Rhythms: Phosphorylating the CLOCK. *Cell Cycle*, 9(2):231-2.
13. Mehra A, **Baker CL**, Loros JJ, and Dunlap JC. **2009**. Post translational modifications in circadian rhythms. *TiBS*, 34(10):483-90.
14. Mehra A, Shi M, **Baker CL**, Colot HV, Loros JJ, Dunlap JC. **2009**. CK2 and temperature compensation in *Neurospora*. *Sleep and Biological Rhythms*, 7(3)162-171.
15. **Baker CL**, Kettenbach AN, Loros JJ, Gerber SA, and Dunlap JC. **2009**. Quantitative proteomics reveals a dynamic interactome and phase-specific phosphorylation in the *Neurospora* circadian clock. *Molecular Cell*, 34(3):354-63.
16. Mehra A, Shi M, **Baker CL**, Colot HV, Loros JJ, and Dunlap JC. **2009**. A role for Casein Kinase 2 in the mechanism underlying circadian temperature compensation. *Cell*, 137(4):749-60.
17. Larrondo LF, Colot HV, **Baker CL**, Loros JJ, and Dunlap, JC. **2009**. Fungal Functional Genomics: Tunable Knockout-Knockin-expression and tagging strategies. *Eukaryotic Cell*, 8(5)800-4.
18. Loros JJ, Dunlap JC, Larrondo LF, Shi M, Belden WJ, Gooch VD, Chen CH, **Baker CL**, Mehra A, Colot HV, Schwerdtfeger C, Lambreghts R, Collopy PD, Gamsby JJ, Hong CI. **2007**. Circadian output, input, and intracellular oscillators: insights into the circadian systems of single cells. *Cold Spring Harb Symp Quant Biol*, 72:201-14.

19. Dunlap JC, Loros JJ, Colot HV, Mehra A, Belden WJ, Shi M, Hong CI, Larrondo LF, **Baker CL**, Chen-Hui C, Schwerdtfeger C, Collopy PD, Gamsby JJ, Lambreghts R. **2007**. A circadian clock in *Neurospora*: How genes and proteins cooperate to produce a sustained, entrainable, and compensated biological oscillator with a period of about a day. *Cold Spring Harb Symp Quant Biol*, 72:57-68.
20. Pogue AM, Liu Q, **Baker CL**, Dunlap JC, Loros JJ. **2006**. The *Neurospora* checkpoint kinase 2: a regulatory link between the circadian and cell cycles. *Science*, 313(5787):644-9.

### **MANUSCRIPTS IN PREPARATION**

1. **Baker CL**, Ananda G, Walker M, Ji B, Spruce C, Rausch D, Choi K, Petkov PP, Carter G, Paigen K. Genetic control of the mammalian epigenetic landscape in germ cells. *Manuscript in preparation*.
2. Mihola O, Pratto F, **Baker CL**, Brick K, Linhartova E, Flachs P, Sedlacek R, Paigen K, Petkov PM, Camerini-Otero D, Trachtulec Z. The *Prdm9* hybrid sterility gene is dispensable for male mice with high recombination rate.

### **EXTERNAL FUNDING**

F32GM101736-01 (CL Baker, PI) 2012-2014 (salary support)  
 National Institute of General Medical Sciences, NIH  
 Ruth I. Kirschstein National Research Service Award  
 Title: Genetic Dissection of Quantitative Control of Recombination

### **AWARDS AND HONORS**

2016 PALM (Promoting Active Learning and Mentoring) Fellowship.  
*NSF funded fellowship to promote long-term mentorship to improve undergraduate education.*

2014 Outstanding Oral Presentation, 28<sup>th</sup> International Mammalian Genome Conference

2013 Outstanding Oral Presentation, 27<sup>th</sup> International Mammalian Genome Conference

2012-2014 Ruth I. Kirschstein National Research Service Award  
*Individual postdoctoral fellowship*

2010-2012 T32 Postdoctoral Fellowship, The Jackson Laboratory  
*Institutional competitive fellowship*

2010 John W. Strohbehn Award for Excellence in Biomedical Research, Dartmouth Medical School  
*awarded to a single graduating Ph.D.*

2009 Rosaline Borison Memorial Fellowship

2008 Society for Research on Biological Rhythms (SRBR) Excellence Award  
*student travel award*

2007 Albert J. Ryan Fellow, Albert J. Ryan Foundation

2006-2008 National Institute for Health Pre-doctoral Training Grant, Dartmouth Medical School

2003 & 2004 Hughes Endeavor for Life Science Excellence Grant (HELIX), University of Vermont  
*competitive undergraduate research award*

2003 Class of 1939 Scholarship, a merit based award, University of Vermont

2003 James E. Ludlow Endowed Scholarship Award, University of Vermont

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2002 & 2003 Holzer Memorial Scholarship, a merit based award, University of Vermont

### **INVITED PRESENTATIONS**

1. Time of Our Life Symposium. July 13-14th, 2017. Hanover, NH. Genetic control of the epigenetic landscape.
2. 44<sup>th</sup> Annual Maine Biological and Medical Science Symposium. April 28-29<sup>th</sup>, 2017. Mount Desert Biological Laboratory. Non-Mendelian inheritance, meiotic drive, and genetic recombination.

### **CONFERENCE PRESENTATIONS**

1. The Allied Genetics Conference. July 13-17<sup>th</sup>, 2016. Orlando, FL. Natural genetic variation controls chromatin state in male germ cells.
2. The 28<sup>th</sup> International Mammalian Genome Conference. October 25-29<sup>th</sup>, 2014. Bar Harbor, ME. PRDM9 drives evolutionary erosion of hotspots. **Selected as outstanding presentation**
3. The 27<sup>th</sup> International Mammalian Genome Conference. September 15, 2013. Salamanca, Spain. Genome-wide analysis of PRDM9-dependent chromatin modification. **Selected as outstanding presentation**
4. The Center for Genome Dynamics Advisory Board Meeting. June 25, 2013. Bar Harbor, ME. Genome-wide analysis of PRDM9-dependent chromatin modification.

### **POSTER PRESENTATIONS**

1. Chromatin and Epigenetics. May 3-6<sup>th</sup>, 2017. EMBL Heidelberg, Germany. Genetic control of epigenetic landscape in germ cells.
2. The 29th International Mammalian Genome Conference. November 8-11th, 2015. Yokohama, Japan. Multimer formation explains allelic suppression of PRDM9 recombination hotspots.
3. The Biology of Genomes. May 5-9th, 2015. Cold Spring Harbor, NY. Poster. Multimer formation explains allelic suppression of PRDM9 recombination hotspots.
4. Gordon Research Conference: Meiosis. June 1-6<sup>th</sup>, 2014. New London, NH. PRDM9 drives evolutionary erosion of hotspots through haplotype-specific initiation of meiotic recombination.
5. Gordon Research Seminar: Meiosis. June 2-3, 2012. New London, NH. Poster presentation: PRDM9 dependent Histone H3 Lysine 4 trimethylation and DNA binding at human hotspots.
6. The 10<sup>th</sup> International Conference on Systems Biology 2009. August 30 – September 4, 2009. Stanford, CA. Quantitative proteomics investigation of the *Neurospora* circadian system.
7. Society for Research on Biological Rhythms 20<sup>th</sup> Anniversary Meeting. May 17-21, 2008. Sandestin, FL. Analysis of protein interactions in the *Neurospora crassa* circadian clock.
8. Neurospora 2008 Asilomar Meeting. March 27-30, 2008. Asilomar, CA. Characterization of the *Neurospora crassa* circadian clock interactome.
9. Albert J. Ryan Foundation Annual Meeting. May 2007. Holderness, NH. Multisite phosphorylation of a *Neurospora* circadian clock protein.

### **TRAINING AND MENTORSHIP**

#### *Predocctoral Students*

Christopher L Baker CV  
August 2017

2017-current Candice Byers

Summer student/interns

2017 Naomi Bronkema (Swarthmore College)

**TEACHING EXPERIENCE**

- 2016-current Instructor, Mammalian Genetics II, Tufts/GSBSE/The Jackson Laboratory, Bar Harbor, ME (*seminar course for first year graduate students. I teach one lecture on epigenetics and chromatin*)
- 2016 Instructor, Colby College Genomics Course, The Jackson Laboratory, Bar Harbor, ME (*two week course focusing on learning genomics, both laboratory and computational modules*)
- 2014-current Teaching Assistant and Instructor, Genetics I and Genetics II, The Jackson Laboratory, Bar Harbor, ME (*college level introductory genetics course for JAX employee's*)
- 2013 Instructor, Topics in Biomedical Research, College of the Atlantic, Bar Harbor, ME
- 2013 Guest Lecturer, Genomics and Bioinformatics, Middlebury College, Middlebury VT  
course instructor Jeremy Ward, Ph.D.
- 2012 Instructor, Cutting Edge Techniques, The Jackson Laboratory summer student program, Bar Harbor, ME
- 2006 Teaching Assistant, Molecular Genetics of Prokaryotes and Lower Eukaryotes, Dartmouth College, Hanover, NH
- 2002 Teaching Assistant, CDAE Department course on computer applications, University of Vermont, Burlington, VT

**ADDITIONAL TRAINING**

- 2014 The Jackson Laboratory, Bar Harbor, ME  
The Whole Scientist Course (one-week course)
- 2012 The Jackson Laboratory, Bar Harbor, ME  
Short Course on Medical and Experimental Mammalian Genetics (two-week course)
- 2011 The Jackson Laboratory, Bar Harbor, ME  
Short Course on Systems Genetics (one-week course)

**SERVICE COMMITTEES**

- 2017-current Research Animal Facility Advisory Committee, The Jackson Laboratory
- 2006-07 Molecular and Cellular Biology Graduate Committee, Dartmouth College
- 2003-04 Dean's Student Advisory Committee, University of Vermont

**PROFESSIONAL MEMBERSHIP**

American Association for the Advancement of Science  
Genetic Society of America

International Mammalian Genome Society

**SCIENTIFIC COMMUNITY SERVICE**

- 2017 University of Maine Student Symposium Judge, Cross Insurance Center, Bangor, ME
- 2015 Science Fair Judge, Connors Emmerson Elementary School, Bar Harbor, ME
- 2011 Maine State Science Fair Judge, grades 9-12, Bar Harbor, ME
- 2012-current Guest Speaker for science lessons at local elementary and middle schools
- 2009 Vermont State Science Fair Judge, grades 6-12, Norwich University, VT
- 2006 School-to-Career Mentor, service for high school students, NH
- Ad hoc reviewer: PLoS One, Philosophical Transactions B