Center for Genome Research & Biocomputing
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FINAL REPORT (September 14, 2009)
COMPUTATIONAL AND GENOME BIOLOGY INITIATIVE

1. **What was accomplished in 2008-2009?** Several goals were articulated in the previous report.

A. New Graduate Students in MCB Program

We continued to attract and elevate the profile of graduate students in computational and genome biology in the MCB Graduate Program. Six new students were admitted into the MCB PhD graduate program Fall 2008 and one transfer student was admitted for Spring 2009. Two students, Sanjuro Jogdeo and Henry Priest, were provided CGBI-funded GRA positions for 2008-2009. Both students have chosen CGBI faculty to be their major professor. Sanjuro Jogdeo's major professor is James Carrington, and Henry Priest's major professor is Todd Mockler.

B. Continue Renovation of MCB Curriculum

Substantial progress on continued MCB Graduate curriculum renovation, formation of new courses, and final instructional plans for the CGBI faculty to teach in the MCB Graduate Program was made.

a. MCB Curriculum Renovation Implementation. The MCB curriculum, including the changes that were implemented, is as follows:

Summer 2008	Fall 2008	Winter 2009	Spring 2009
	*MCB511 Research Perspectives (3)	*MCB555 Genome Expression (4)	*MCB556 Cell & Developmental Biology (4)
	*MCB525 Techniques in Molecular & Cellular Biology (3)	*MCB668 Bioinformatics & Programming (2+2)	*MCB557 Scientific Skills & Ethics (3)
	*MCB554 Genome Structure, Organization & Maintenance (4)	MCB605 Reading & Conference (1) (Journal Club)	MCB605 Reading & Conference (1) (Journal Club)
	MCB605 Reading & Conference (1) (Journal Club)	*MCB610 Internship (3)	*MCB610 Internship (3)
	*MCB610 Internship (3)	MCB599 ST: Assoc. Genetics & Breeding (3)	MCB564 Receptors & Signal Transduction (3)
	MCB620 DNA Fingerprinting (1)		MCB651 Molecular Basis of Plant Pathology (3)
	MCB621 Genetic Mapping (1)		
	MCB 622 Mapping Quantitative Trait Loc. (1)		

* = MCB Core Curriculum courses

b. Changes to the MCB curriculum in 2008-2009:
   i. The course MCB557 Scientific Skills and Ethics was reactivated in Spring 2009 and will be offered alternate years.

c. CGBI Faculty Teaching in the MCB Graduate Program:
   i. M. Freitag – Co-teaches MCB 554 (Genome Structure, Organization and Maintenance); Instructor for MCB 511 (Research Perspectives), helped organize and presented at the Bioinformatics Symposium and Workshop.
   ii. T. Mockler - Co-teaches MCB555 (Genome Expression); Co-teaches MCB/MB668 (Bioinformatics and Programming), helped organize and presented at the Bioinformatics Symposium and Workshop.
   iii. J. Chang – Co-teaches MCB554 (Genome Structure, Organization and Maintenance), helped organize and presented at the Bioinformatics Symposium and Workshop.
   iv. D. Denver –Co-teaches MCB554 (Genome Structure, Organization and Maintenance), and MCB669 (Genome Evolution), and helped organize and presented at the Bioinformatics Symposium and Workshop. Also co-teaches the externally funded, year-long HHMI undergraduate lab course.
   v. S. Givan – Co-teaches MCB/MB668 (Bioinformatics and Programming), presented at the Bioinformatics Symposium and Workshop.
   vi. S. Giovannoni – Teaches MCB/MB668 (Bioinformatics and Programming) and MCB669 (Genome Evolution)

d. The CGBI faculty along with the MCB Director organized a highly successful Bioinformatics Symposium and Workshop held on June 17-18, 2009. Funding for the workshop was obtained through a Graduate School RFP with the goal of enhancing the graduate student experience at OSU, and with support from the CGRB. We had two outside speakers along with approximately 15 OSU faculty and graduate student speakers. The symposium and workshop had 135 participants, including undergraduate and graduate students, post-doctoral fellows and research staff, and faculty members from OSU, UO and industry. The workshop will be held each year in the foreseeable future.

C. Expansion of High-Throughput Sequencing (HTS) Facility and Computational Infrastructure

Several significant expansions to the CGRB HTS facility and computational infrastructure were realized during 2008-09, including a doubling of the space dedicated to the computational infrastructure, and a $100,000 renovation of wet-bench and computational infrastructure associated with the CGRB. This was funded by a BUC grant from the Research Office.

D. New Grant Funding

In addition to the BUC grant, a NIH Shared Instrumentation Grant proposal was submitted by CGBI and CGRB faculty to acquire a new high-throughput sequencing system. Most significantly, however, was the grant total currently held by the new CGBI faculty (Mockler, Freitag, Chang and Denver) rose to $9,000,000 in competitive funding. This is a 15% increase compared to the previous year, and a genuinely impress accomplishment for these assistant professors.

E. Final Comments on the Achievements of CGBI Initiative

The goals stated in the original proposal, and achieved during the life of the CGBI, are as follows:
1. *Dramatically strengthening and reinvigorate interdisciplinary bioscience at OSU through development of a key, enabling area of science in which we are presently underrepresented*. The principal tool was the hiring of five young faculty in four departments, and the development of new core facilities for research in the CGRB. The latter include a successful High-Throughput Sequencing facility, and a heavily utilized Computational Facility. More information on the faculty and core facilities is available at two websites:

http://cgbi.cgrb.oregonstate.edu/ (CGBI site)
http://corelabs.cgrb.oregonstate.edu/ (CGRB Core Facilities site)

The current CVs for each of the CGBI faculty are attached.

2. S*ignificantly increase external grant funding and fundraising potential in computational and genome biology.* Given the priority that major funding agencies now place on computational and genome-enabled science, we projected a goal of $1,800,000/yr in grant funding to new CGBI faculty after year 5. We exceeded this goal, as 2008-2009 external (competitive) total grant value reached ~$9,000,000. This averages to approximately $2,500,000 in annual grant value to the CGBI faculty, a remarkable achievement in the current funding climate. What these numbers do not show, however, is the collateral impact these faculty have had on other faculty programs, resulting in a "rising tide" effect for computational and genome biology across campus.

3. *Increase the quantity of critical courses and quality of education in computational and genome biology.* We proposed to broaden the impact and relevance of the MCB program to non-MCB students, enforce an interdisciplinary view of molecular bioscience, and prepare students with the skills necessary to function as modern bioscientists in both the public and private sectors. The MCB Ph.D. curriculum was dramatically revised to de-emphasize reductionist science and promote system-wide science that employs computation and other integrative approaches. As detailed above and in prior reports, each core course was revamped with new content and name changes, several new courses, including MCB/MB668 (Bioinformatics and Programming) and MCB669 (Genome Evolution), were developed, and core course requirements for MCB Ph.D. students were revised. Ten new Ph.D. students with research interest in computational and genome biology were recruited with CGBI Fellowships. Additionally, funding (Howard Hughes Medical Institute) for a new undergraduate course in molecular and genomic methods was developed and taught in 2008-2009, and a highly successful Bioinformatics Workshop with over 100 registrants was held in summer, 2009.

In summary, the CGBI leveraged a $1.5 million investment from the Provost's Initiative fund to significantly affect the molecular biosciences research and education community at OSU. It has been an honor to guide this initiative, and as always, support from the Provost, Deans, Chairs and VP Research has been greatly appreciated.

F. CGBI Budget Year 5

Cumulative revenues & resources	Provost fund (RDR313)				CGRB Wakeham (RDR302)				CGRB (RDR072)			
FY08-09 initiative funding	300,000											
Carryover from Prior year	165,218				109,464				108,674			
Revenues & resources total:		**465,218**				**109,464**				**108,674**		
Expenditures	**Budget**	**Y-T-D Exp**	**Encumb**	**Avail Bal**	**Budget**	**Y-T-D Exp**	**Encumb**	**Avail Bal**	**Budget**	**Y-T-D Exp**	**Encumb**	**Avail Bal**
CGBI initiative new faculty												
Salary + OPE	203,443	175,217	0	28,226								
Services & supplies (startup obligation)	261,725	117,068	0	144,657	109,464	546	0	108,918				
Equipment upgrade	0	96,816	0	(96,816)								
Other service & supplies	50	222	0	(172)								
Sub total:	465,218	389,323	0	75,895	109,464	546	0	108,918	0	0	0	0
GRA stipends									108,674	36,798	0	71,876
Total:	**465,218**	**389,323**	**0**	**75,895**	**109,464**	**546**	**0**	**108,918**	**108,674**	**36,798**	**0**	**71,876**

Final Progress Report prepared by:

James C. Carrington
Director, Center for Genome Research and Biocomputing

CURRICULUM VITAE

JEFFREY H. CHANG

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EDUCATION AND EMPLOYMENT

Education:

Institution and location	Degree	Years	Field of Study
University of California, Davis	PhD	1999	Genetics
University of Minnesota, Minneapolis/St. Paul	B.S.	1993	Genetics and Cell Biology

Employment:

3/06-	Assistant Professor, Department of Botany and Plant Pathology, Computational and Genome Biology Initiative, Oregon State University, Corvallis, OR
9/99-2/06	Postdoctoral Fellow, Department of Biology, University of North Carolina, Chapel Hill, NC (Research Director: Jeffery L. Dangl)
9/93-9/99	Graduate Research Assistant, Center for Engineering Plants for Resistance Against Pathogens (CEPRAP), University of California, Davis, CA (Research Director: Richard Michelmore)
1/91-8/93	Undergraduate Research Assistant and Laboratory Assistant, Department of Agronomy, University of Minnesota, St. Paul, MN (Research Director: David Somers)

TEACHING, ADVISING AND OTHER ASSIGNMENTS

1. Instructional Summary

CRN	Term	Years	# enrolled students
Credit courses			
BI212	Winter	07-09	950~1000
MCB554	Fall	06-08	25~35
MCB637x	Spring	07	12
Guest lectures Credit courses			
BI213	Spring	08 (4 lectures) -09 (2 lectures)	950~1000
BOT550	Fall	06-08	4~13
BOT651	Spring	06-07	~12
MCB511	Fall	06-07	~10
Non-credit courses			
Genomics, Bioinformatics, and Systems Biology Symposium and Workshop (June 17th – 18th, 2009): Program organizer and participant			
LifeScience Club – prepare for, apply to, and succeed in graduate school (Oct, 2008): Program participant			
Curriculum Development			
Courses Developed: MCB637x (Spring 2007)			
Curriculum committee service: BPP curriculum committee (April, 2008 – present)			
OSU Professional Science Master's Workshop – Bioinformatics PSM program (Dec, 2008)			
MCB Graduate Program Workshop (Dec, 2006)			

Graduate and Undergraduate Students and Postdoctoral Trainees:

Advisee		Start Date	End Date	Degree conferred
Undergraduate students				
Stout, Jamye		06/09	08/09	n/a
Smith, Alison		03/09	present	
Lilley, Ryan		08/08	present	
Pankow, Rebecca		03/08	present	
Nielson, Mike		05/07	05/08	
Thireault, Caitlin		04/07	present	
Chu, Ashley		04/06		09/06
*Sandberg, Eva		10/06		06/07
Graduate Students (program; degree pursued)				
Thesis advisor to:				
Cumbie, Jason	MCB; PhD	Fall, 07	present	
Thomas, William	MCB; PhD	Fall, 06	present	
Kimbrel, Jeffrey	MCB; PhD	Fall, 06	present	
Rotation Students (program)				
Cumbie, Jason	MCB	Fall, 07		
Cuperus, Josh	MCB	Spring, 07		
Hartney, Sierra	BPP	Fall, 06		
Thomas, William	MCB	Fall, 06		
Graduate committee member (program)				
Whalen, Joe	PSM	Fall, 08	present	
Carini, Paul	Micro	Fall, 07	present	
Cuperus, Josh	MCB	Fall, 07	present	
Gupta, Rashmi	Micro	Fall, 07	present	
Smith, Daniel	MCB	Fall, 06	present	
Sandoz, Kelsi	MCB	Fall, 06	present	
Hartney, Sierra	BPP	Fall, 06	present	
Wilder, Cara	Micro	Fall, 06	present	
Montgomery, Taiowa	MCB			Aug, 08
Sweat, Teresa	MCB			March, 07

*co-advisor with Dr. Melodie Putnam and Dr. Jennifer Kraus

2. Student and Participant/Client Evaluation

BI212: Winter quarter[+]			
Year	2009	2008	2007
# respondents^	775(83%)	693 (74%)	680 (75%)
Category* 1	4.1	4.0	3.9
Category* 2	4.3	4.2	4.2
Category* 3	4.2	4.0	3.6
Category* 4	4.3	4.1	3.7
Category* 5	4.3	4.1	4.1
Category* 6	4.2	4.1	4.1
Category* 7	3.9	3.8	3.8
Category* 8	4.1	4.1	4.3
Category* 9	4.0	3.9	3.9
Category* 10	3.8	4.0	3.9
Category* 11	4.3	4.3	4.5
Category* 12	4.1	4.0	3.6

MCB554: Fall quarter+			
Year	2008	2007	2006
# respondents^	24 (83%)	20 (83%)	11 (40%)
Category* 1	4.9	4.5	5.3
Category* 2	5.2	4.6	4.9
Category* 3	4.9	4.6	5.1
Category* 4	5.0	4.2	5.2
Category* 5	5.0	4.3	5.0
Category* 6	4.8	5.0	5.0
Category* 7	4.7	4.1	5.3
Category* 8	4.9	4.2	5.5
Category* 9	5.1	5.0	5.2
Category* 10	5.0	4.4	5.3
Category* 11	5.2	4.8	5.6
Category* 12	4.9	4.1	5.3

^Number of responding students (% enrolled students responding).
+Scores ranking is from Very Poor (1) to Excellent (6). Median score is presented.
*1 The course as a whole was:, 2 The instructor's contribution to the course was:, 3 Clarity of course objectives or outcomes was:, 4 Clarity of student responsibilities and requirements was:, 5 Course organization was:, 6 Availability of extra help when needed was:, 7 Instructor's use of various instructional techniques…was:, 8 Instructor's interest in my learning was:, 9 Instructor's ability to stimulate my thinking…was:, 10 Instructor's timely feedback to tests…was:, 11 Instructor's ability to develop a welcoming classroom environment…was:, 12 Instructor's evaluation of student performance…was:.

SCHOLARSHIP AND CREATIVE ACTIVITY

1. Publications:

Referred Journal Articles (16):

W. J. Thomas, C. A. Thireault, J. A. Kimbrel, and J. H. Chang (2009). Recombineering and stable integration of the *Pseudomonas syringae* pv *syringae* 61 *hrp*/*hrc* cluster into the genome of the soil bacterium *Pseudomonas fluorescens* Pf0-1. Plant J. In press.

D. J. Studholme, S. G. Ibanez, D. MacLean, J. L. Dangl, J. H. Chang, and J. P. Rathjen (2009). A draft genome sequence and functional screen reveals the repertoire of type III secreted proteins of *Pseudomonas syringae* pathovar *tabaci* 11528. BMC Genomics. In press.

E. G. Bakker, B. Montgomery, T. Nguyen, K Eide, J. H. Chang, T. C. Mockler, A. Liston, E. W. Seabloom, and E. T. Borer. (2009). Strong population structure characterizes weediness gene evolution in the invasive grass species *Brachypodium distachyon*. Molecular Ecology. 18(12):2588-2601.

Z. L. Nimchuk, E. J. Fisher, D. Desveaux, J. H. Chang, and J. L. Dangl (2007). The AvrPphE (HopX) family of *Pseudomonas syringae* type III effectors require a catalytic triad and a novel N-terminal domain for function. Mol. Plant Microbe Interact. 20(4):346-357.

S. R. Grant, E. J. Fisher, J. H. Chang, and J. L. Dangl (2006). Subterfuge and Manipulation: Type III Effector Proteins of Phytopathogenic Bacteria. Annu. Rev. Microbiol. 60:425-449.

J. H. Chang, J. Urbach, T. Law, L. W. Arnold, A. Hu, S. Gombar, S. Grant, F. Ausubel, and J. L. Dangl (2005). A high-throughput, near saturating screen for type III effector genes from *Pseudomonas syringae*. Proc. Natl. Acad. Sci. U S A: 102(7):2549-2554.

M. Lindeberg, J. Stavrinides, J. H. Chang, J. R. Alfano, A. Collmer, J. L. Dangl, J. T. Greenberg, J. W. Mansfield, D. S. Guttman (2004). Proposed Guidelines for a Unified Nomenclature and Phylogentic Analysis of Type III Hop Effector Proteins in the Plant Pathogen *Pseudomonas syringae*. Mol. Plant Microbe Interact. 18(4):275-282.

J.H. Chang, A.K. Goel, S.R. Grant, and J.L. Dangl (2004). Wake of the Flood: Ascribing functions to the wave of type III effector proteins of phytopathogenic bacteria. Curr. Opin. Microbiol. 7(1): 11-18.

A. U. Singer, D. Desveaux, L. Betts, J. H. Chang, Z. Nimchuk, S. R. Grant, J. L. Dangl and J. Sondek (2004). Crystal Structures of a Novel Type III Effector and its Chaperone Reveal Residues Required for Both Pathogen Virulence and Host Resistance. Structure. 12(2):1669-1681.

J. H. Chang, Y. S. Tai, A. J. Bernal, D. T. Lavelle, B. J. Staskawicz, and R. W. Michelmore (2002). Functional Analyses of the *Pto* Resistance Gene Family in Tomato and the Identification of a Minor Resistance Determinant in a Susceptible Haplotype. Mol. Plant Microbe Interact. 15(3): 281-291.

Z. Nimchuk, L. Rohmer, J. H. Chang, and J. L. Dangl (2001). Knowing the dancer from the dance: R-gene products and their interactions with other proteins from host and pathogen. Curr. Opin. Plant Biol. Aug;4(4):288-294.

J. H. Chang, C. M. Tobias, B. J. Staskawicz, and R. W. Michelmore (2001). Functional studies of the bacterial avirulence protein avrPto by mutational analysis. Mol. Plant Microbe Interact. 14(4): 451-459.

J. H. Chang, J. P. Rathjen, A. J. Bernal, B. J. Staskawicz, and R. W. Michelmore (2000). *AvrPto* enhances growth and necrosis caused by *Pseudomonas syringae* pv. *tomato* in tomato lines lacking functional *Pto* or *Prf* genes. Mol. Plant Microbe Interact. 13(5): 568-571.

J. P. Rathjen, J. H. Chang, B. J. Staskawicz, and R. W. Michelmore (1999). Constitutively active *Pto* induces a *Prf*-dependent hypersensitive response in the absence of *avrPto*. EMBO J. 18: 3232-3240.

C. M. Tobias, G. E. D. Oldroyd, J. H. Chang, and B. J. Staskawicz (1999). Plants Expressing the Pto Disease Resistance Gene Confer resistance to Recombinant PVX Containing the Avirulence Gene, AvrPto. Plant J. 17(1): 41-50.

S. R. Scofield, C. M. Tobias, J. P. Rathjen, J. H. Chang, D. T. Lavelle, R. W. Michelmore, and B. J. Staskawicz (1996). Molecular Basis of Gene-for-Gene Specificity in Bacteria Speck Disease of Tomato. Science. 274: 2063-2065.

Manuscripts submitted:

The International Brachypodium Initiative* (2009). Genome sequence analysis of the model grass *Brachypodium distachyon*: insights into grass genome evolution. Science.

*J. A. Kimbrel and J. H. Chang as co-authors

Manuscripts in preparation:

D. F. Garvin, Z. J. Blankenheim, N. McKenzie, J. P. Vogel, N. Huo, T. C. Mockler, J. Wright, J. T. S. Cheema, J. Dicks, D. Hayden, Y. Gu, C. Tobias, J. H. Chang, A. Chu, J. Trick, T. P. Michael, M. Bevan, J. W. Snape (2009). Molecular Mapping in the Model Grass *Brachypodium distachyon*.

W. J. Thomas, J. C. Cumbie R. C. Pankow, C. A. Thireault, and J. H. Chang (2009). Development and application of AutoSPOTS an open-source program for automated enumeration and analysis of effector-mediated suppression of callose deposition

2. Invited presentations:

University of California, Davis; Department of Plant Pathology (Oct, 2007). Type III Effectors of Mutualistic Bacteria

Pseudomonas 2007 Conference; Seattle Washington (Aug, 2007). Comparing the collection of functional type III effector genes across the *P. syringae* species

Plant and Animal Genome Conference VIII; San Diego, CA (Jan, 2005). Identification and Comparison of Type III Effector Genes from *Pseudomonas syringae* pathovars.

Swiss Society of Microbiology, Lugano, Switzerland (March, 2004). Micro-organisms and integrated plant defenses.
Sainsbury Laboratory Lecture Series; John Innes Centre, Sainsbury, England (March, 2004). Identification and comparison of type III effectors from multiple *Pseudomonas* pathovars.
Massachusetts General Hospital, Department of Molecular Biology Lecture Series, Harvard University; Harvard Massachusetts (Aug, 2002). A high-throughput, near saturating screen for identifying type III effector genes of *Pseudomonas syringae* pathovars.

3. Research Grants

Current:

07/10/09-07/10/11
PI: Jeffrey H. Chang
Agency: ARF; Competitive Grants Program
Title: "Determining the transcriptome changes of pathogenic bacteria grown in plant-mimicking conditions"
Amount awarded: $12,500

02/15/08-02/15/12
PI: Jeffrey H. Chang
Agency: "Functional Genomics of Type III Effectors from Rhizobia and their Effects on Soybean Compatibility"
Amount awarded: $790,000

01/01/07-12/31/09
PI: Todd Mockler
Co-PIs: Todd Michael, Samuel Hazen, and Jeffrey H. Chang
Agency: JGI
Title: "Deep EST sequencing the transcriptome of the experimental model grass *Brachypodium distachyon*"
Amount requested: NONE; Competitive grant proposal and JGI provides service in kind.

Expired:

09/01/07-08/31/08
PI: Jeffrey H. Chang
Agency: ARF; Competitive Grants Program
Title: "Sequencing the Genomes of 16 Plant-Beneficial Bacteria"
Amount awarded: $12,500

COMMUNITY CONTRIBUTION AND SERVICE

Community contribution

Assisted Johnson, Mills, and Arp research groups with microbial genome sequencing and analysis
Development of *Brachypodium distachyon* as a model grass – empirical validation of gene models and annotation of defense genes.
Obtained RERF funding to upgrade flow cytometer in the Department of Microbiology.
Flow Cytometry facility: Helped cover cost of on-site training for the facility's new MoFlo operator.
Contributed $40,000 towards the purchase of a Solexa 1G Genetic Analyzer.
Purchased three 2X Intel Xeon X5355 (Quad Core) RHEL 5 machines for the CGRB computing cluster.

1. University Service

Teaching and Learning Initiative Contributor – (June, 2009; College of Agricultural Sciences).

Search Committee – Assistant Professor of Environmental Microbiology (Spring, 2009; Dept. of Microbiology).
Search Committee – Plant Systems Biologists: Metabolic Engineering (Spring, 2008).
OSU Biobased Economy Symposium (April, 2007).
Bio-PUG (2007 – present); student-led programming club.
Co-developed the Host-Microbe Interactions and Molecular Pathogenesis (HMIP; 2006) and Genome Biology (2007) MCB tracks.
Developed CONNEX: services include advising and connecting undergraduate students to research opportunities (Jan, 2006-present; over 50 participants).

2. Service to the Profession:

Grant review panel:
NSF; Prokaryotic Molecular and Cellular Biology

Grant reviews (Ad hoc reviewer):
Pierce's Disease Grant Management
NSF
BARD (Israel Binational Agricultural Research and Development Fund)
USDA

Journal reviews (Ad hoc reviewer):
Journals:
BMC Genomics
BMC Microbiology
Cellular Microbiology
Current Biology
Environmental Microbiology
Molecular Plant Pathology
MPMI
PLoS Biology
PLoS ONE
PLoS Pathogens
PNAS
The Plant Journal
The Plant Cell

AWARDS

National and International Awards
NRSA Postdoctoral Fellowship, 2001

University and Community Awards:
Finalist for College of Science's Lloyd Carter Award for Outstanding & Inspirational Teaching (Graduate teaching), 2008
Jastro-Shields Research Scholarship, 1998
Jastro-Shields Research Scholarship, 1997
Graduated cum laude with B.S., 1993

CURRICULUM VITAE

DEE DENVER

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Denver Lab website: http://denverlab.cgrb.oregonstate.edu/

ACADEMIC APPOINTMENTS

2006-present	Assistant Professor, Department of Zoology and Center for Genome Research and Biocomputing, Oregon State University, Corvallis, OR USA
2005-2006	Visiting Lecturer, Institute of Molecular Biosciences, Massey University, Auckland, New Zealand

EDUCATION AND PROFESSIONAL PREPARATION

2005	Allan Wilson Centre Postdoctoral fellow, Massey University, Auckland, New Zealand. Advisor: David M. Lambert
2002-2005	NIH NRSA Postdoctoral Fellow, Indiana University, Bloomington, IN, USA. Advisor: Michael Lynch
2002	Ph.D., Molecular Biology and Biochemistry, University of Missouri-Kansas City, Kansas City, MO USA. Advisor: W. Kelley Thomas
1996	B.S., Biological Sciences, University of Missouri-Columbia, Columbia, MO USA

RESEARCH GRANT SUPPORT

Active

2009-2012	USDA AFRI 2009-01916. Co-PI. The Douglas-fir climate change transcriptome observatory. Total = $454,545; Denver portion = $145,776.
2009-2010	OHSU Medical Research Foundation. PI. Genome-wide analysis of the oxidative stress-induced mutation spectrum. Total and Denver portion = $30,000.
2008-2010	NSF DEB 0717167. Consultant. Self-dependence of the mutation rate. Total = $315,080. Denver portion = $15,000.
2008-2010	NSF DEB 0743871. Co-PI. Evolutionary paths of compensatory mutation in genetic pathways. Total = $204,039; Denver portion = $107,407.
2006-2011	NIH R01 GM072639-01A2. Co-PI. Evolutionary causes and consequences of mutational variation. Total = $1,431,827; Denver portion = $746,284.

Pending

2009-2014	NIH R01 GM087678-01A2. PI. Mutational and evolutionary consequences of mitochondrial dysfunction. Total = $1,805,361. Denver lab portion= $1,376,618. [Note: JIT requested, Council Sep 11-12, 2009]
2010-2012	NIH ARRA Administrative supplement request for R01 GM072639-01A2. Co-PI. Total = $988,021. Denver portion = $512,270.
2010-2015	NSF DEB 0954250. PI. CAREER: The evolution of nematode mitochondrial genomes and undergraduate biology labs. Total and Denver lab portion = $950,229.

AWARDS AND HONORS

2009	University of Missouri-Kansas City Alumni Achievement Award.
2007-present	*C. elegans* mutation rates featured in widely used undergraduate textbooks, e.g.: - Pierce, B. A. *Genetics: A Conceptual Approach*. 3rd Ed. W. H. Freeman & Co. (2008), pgs. 480-481 - Freeman, S. and J. C. Herron. *Evolutionary Analysis*. 4th Ed. Pearson Prentice Hall (2007), pgs. 148-149
2007	Featured as a "Scientist to Watch" by *The Scientist* magazine.
2006-present	Associate Investigator, Allan Wilson Centre for Molecular Ecology and Evolution, Massey University, Auckland, New Zealand.
2005	Postdoctoral Panelist for NIH Open Access Meeting (one of two outstanding NIH NRSA postdoctoral fellows selected).
2004	Interviewed for "Evolution, Mutation May Occur Faster than Thought", a National Public Radio *All Things Considered* story focusing on Denver et al. *Nature* 2004 (Aug. 4, 2004).
2000	Outstanding Presentation in Biological Sciences Award. Midwest Regional AAAS Meeting, Omaha, Nebraska.

DENVER LAB SCIENTISTS AND STUDENTS

Postdoctoral Fellows
Peter C. Dolan, 2007-2009
Leslie A. Dyal, 2006-2007

Research Associates
Dana K. Howe, Laboratory Manager & Scientist, 2006-present
Larry J. Wilhelm, Bioinformaticist, 2007-present

Graduate Students
Michael Raboin, 3rd Year MCB PhD student, 2008-present
Bobby Babra, 2007-2009

1st Year MCB rotation students supervised
Sanjuro Jogdeo, Fall 2008
Jason Cumbie, Winter 2008
Michael Raboin, Fall 2007
Bobby Babra, Spring 2007

Undergraduate Students
Caroline Hilburn, 4th Year Biochem./Biophys. major, 2006-present
Danika Kusuma, 2nd Year Biology major, 2008-present
Robin Leung, 3rd Year Mathematics major, 2008-present
Edward Piper, 4th Year Engineering and Japanese double major, 2007-2008
Stephanie Weitz, 4th Year Biology major, 2006-2008
Ashley Timko, B.S. Biology 2008, 2007-2008, now a technician with American Red Cross
Samantha C. Lewis, B.S. Zoology 2008, now a 2nd Year Ph.D. student at UC-Riverside

CURRICULUM ADVANCEMENT AND TEACHING

Curriculum Advancement

2008-2009	Developed a new Genomics Research lab section for the BI211-213 series where students will participate in the HHMI National Genome Research Initiative – a phage genome will be sequenced and analyzed by a lab section of 12-15 undergraduates.
2006-2007	Wrote and administered OSU Category II proposal for new MCB program graduate course (MCB669: Genome Evolution). Received approval in June, 2007 – instructed for the first time in Spring 2008.

Teaching

Oregon State University

Fall-Spring 2008/9	Course Coordinator and Instructor: BI211-213 Genomics Research Laboratory (HHMI National Genome Research Initiative program)
Spring 2007	Course Coordinator and Instructor: MCB 669 Genome Evolution (graduate).
Fall 2007-2008	Instructor: MCB 554 Genome Structure and Maintenance (graduate).
Fall 2007-2008	Single lectures for MCB525 Techniques in Molecular and Cellular Biology (graduate).
Fall 2006-2008	Single lectures for MCB511 Research Perspectives in Molecular and Cellular Biology (graduate).
Fall 2006	Course Coordinator and Instructor: BI 445/545 Evolution (undergraduate/graduate).

Prior to OSU

2005	Course Coordinator and Instructor (Massey U.): Genomes, Genetic Analysis & Bioinformatics (undergraduate)
2003-2004	Assistant Lecturer (IU): Evolution (undergraduate), Evolution of Genes and Genomes (graduate)
1997-2000	Laboratory Teaching Assistant (UMKC): General Biology I, General Biology II, Introductory Microbiology (all undergraduate)

SCIENTIFIC SERVICE

Oregon State University

2009-present	CGRB Seminar Committee
2008-present	CGRB Scientific Advisory Board
2007-present	College of Science advisor for Pre-Veterinary Medicine majors
2007-present	Dept. Zoology Curriculum Subcommittee
2006-present	PhD student committees: Kaitlin Bonner (Zoology); Matthew Parks (Bot. Plant Path.); Christine Schnitzler (Zoology); Daniel Smith (MCB); Josef Uyeda (Zoology); Larry Wilhelm (Microbiology)
2009	Co-Organizer for MCB Genomics, Bioinformatics and Systems Biology Symposium and Workshop
2009	faculty reviewer for OSU Oregon Sports Lottery scholarship candidates
2007	Dept. Zoology Graduate Review Subcommittee
2007	Dept. Zoology Graduate Admission Subcommittee

External

2007	Undergraduate mentor for the Undergraduate Diversity Mentoring Program at the 2007 Society for Molecular Biology and Evolution Meeting in Halifax, Canada.
2006-present	External research grant reviewer for NSF, USDA, BARD (Israel) and Horizon (Netherlands).
2002-present	Manuscript referee for *BMC Evolutionary Biology*, *Genetics*, *Genome Biology and Evolution*, *Genome Research*, *Journal of Invertebrate Pathology*, *Molecular Biology and Evolution*, *Molecular Phylogenetics and Evolution*, *Nature Methods*, *PLoS Genetics*, *Science*, *Trends in Genetics*, *Wormbook*.
1999-present	Member: Society of Nematologists, Society for the Study of Evolution, American Association for the Advancement of Science, Genetics Society of America, Society for Molecular Biology and Evolution.
2003-2004	NSF FIBR Grant Postdoctoral Affiliate, IU – *Recombination and the evolution of sex in Daphnia pulex*.
1999-2002	Guest Speaker, Antioch Middle School, North Kansas City, MO and Olathe High School South, Olathe, KS.

INVITED SEMINARS

2009 University of Missouri-Kansas City, School of Biological Sciences seminar series.
2009 University of Florida, Department of Zoology seminar series.
2009 University of Oregon, Center for Ecology and Evolutionary Biology seminar series.
2008 Windsor University (Canada), GLIER seminar series.
2007 Portland State University, Department of Biology seminar series.
2006 EMBO Workshop: On the Study of Evolutionary Biology with *Caenorhabditis elegans* and Related Species. Oerias, Portugal.
2005 Massey University, College of Sciences seminar series.
2004 Georgia Institute of Technology, School of Biology seminar series.
2002 Missouri Western State College, Department of Biology seminar series.

SCIENTIFIC MEETING PRESENTATIONS

2008 *C. elegans* Development & Evolution Meeting, Madison, Wisconsin. Oral presentation.
2007 Society for Molecular Biology and Evolution Meeting, Halifax, Canada. Poster.
2005 Society for Molecular Biology and Evolution Meeting, Auckland, New Zealand. Oral presentation.
2004 Society for Molecular Biology and Evolution Meeting, State College, Pennsylvania. Oral presentation.
2003 14th International *C. elegans* Meeting, Los Angeles, California. Poster.
2003 Society for Molecular Biology and Evolution Meeting, Newport Beach, California. Oral presentation.
2001 International Evolution Meeting, Knoxville, Tennessee. Oral presentation.
2001 13th International *C. elegans* Meeting, Los Angeles, California. Oral presentation.
2000 International Evolution Meeting, Bloomington, Indiana. Oral presentation.
2000 Midwest Regional AAAS Meeting, Omaha, Nebraska. Oral presentation.
1999 12th International *C. elegans* Meeting, Madison, Wisconsin. Poster.
1999 New Biology of Aging Conference. Kansas City, Missouri. Poster.

PEER-REVIEWED PUBLICATIONS

In Review or Revision

- Howe, D. K., C. F. Baer and D. R. Denver. High rate of large deletions and natural variation in *Caenorhabditis briggsae* mitochondrial genome mutation processes. *Genome Biology and Evolution* (in review).
- Raboin, M. J., A. F. Timko, D. K. Howe, M.-A. Félix, D. R. Denver. Evolution of pseudogenes in *Caenorhabditis* mitochondrial genomes. *Molecular Biology and Evolution* (in review).
- Baer, C. F. and D. R. Denver. Spontaneous mutations ossify gene expression in *Caenorhabditis elegans*. *PLoS ONE* (in review).
- Subramanian, S., D. R. Denver, C. D. Millar, T. Heupink, A. Aschrafi, S. Emslie, C. Baroni and D. M. Lambert. Mitogenomic rates for the study of recent evolutionary events. *Trends in Genetics* (in revision).

Published or In Press

Published as a result of OSU research

2009. Denver, D. R., P. C. Dolan, L. J. Wilhelm, W. Sung, J. I. Lucas-Lledó, D. K. Howe, S. C. Lewis, K. Okamoto, W. K. Thomas, M. Lynch, C. F. Baer. A genome-wide view of *Caenorhabditis elegans* base substitution mutation processes. *Proceedings of the National Academy of Sciences USA* (in press).
2009. Lewis, S. C., L. A. Dyal, C. F. Hilburn, S. Weitz, W.-S. Liau, C. W. LaMunyon and D. R. Denver. Molecular evolution in *Panagrolaimus* nematodes: origins of parthenogenesis, hermaphroditism and the Antarctic species *P. davidi*. *BMC Evolutionary Biology* 9: 15. "Highly Accessed" designation.
2008. Jordan, I. K., L. S. Katz, D. R. Denver and J. T. Streelman. Natural selection governs local, but not global, evolutionary gene coexpression networks in *Caenorhabditis elegans*. *BMC Systems Biology* 2: 96.

2008. Dolan, P. C. and D. R. Denver. *TileQC*: a tile-based system for the quality control of Solexa data. *BMC Bioinformatics* 9: 250. "Highly Accessed" designation.
2008. Howe, D. K. and D. R. Denver. Muller's Ratchet and compensatory mutation in *Caenorhabditis briggsae* mitochondrial genome evolution. *BMC Evolutionary Biology* 8: 62.
2007. Baer, C. F., M. M. Miyamoto, and D. R. Denver. Mutation rate variation in multicellular eukaryotes: causes and consequences. *Nature Reviews Genetics* **8**: 619-631.
2007. Vergin, K., H. J. Tripp, L. J. Wilhelm, D. R. Denver, M. S. Rappe, and S. J. Giovannoni. High intraspecific recombination rate in a native population of *Candidatus* Pelagibacter ubique (SAR11). *Environmental Microbiology* 9: 2340-2350.

Published as a result of work prior to OSU
2006. Denver, D. R., M. Durbin, C. Steding, S. Feinberg, and M. Lynch. The relative roles of three DNA repair pathways in preventing *Caenorhabditis elegans* mutation accumulation. *Genetics* 174: 57-65.
2005. Denver, D. R., K. Morris, J. T. Streelman, S. Kim, M. Lynch, and W. K. Thomas. The transcriptional consequences of mutation and natural selection in *Caenorhabditis elegans*. *Nature Genetics* 37: 544-548. Faculty of 1000 selection.
2005. Denver, D. R., S. Feinberg, S. Estes, W. K. Thomas, and M. Lynch. Mutation rates, spectra, and hotspots in mismatch repair-deficient *Caenorhabditis elegans*. *Genetics* 170: 107-113.
2004. Denver, D. R., K. Morris, M. Lynch, and W. K. Thomas. High mutation rate and predominance of insertions in the *Caenorhabditis elegans* nuclear genome. *Nature* 430: 679-682. Faculty of 1000 selection.
2004. Denver, D. R., K. Morris, A. Kewalramani, K. E. Harris, A. Chow, S. Estes, M. Lynch, and W. K. Thomas. Abundance, distribution, and mutation rates of homopolymeric nucleotide runs in the genome of *Caenorhabditis elegans. Journal of Molecular Evolution* 58: 584-595.
2004. Estes, S., P. C. Phillips, D. R. Denver, W. K. Thomas, and M. Lynch. Mutation accumulation in populations of varying size: the distribution of mutational effects for fitness correlates in *Caenorhabditis elegans*. *Genetics* 166: 1269-1279.
2003. Denver, D. R., S. L. Swenson, and M. Lynch. An evolutionary analysis of the helix-hairpin-helix superfamily of DNA repair glycosylases. *Molecular Biology and Evolution* 20: 1603-1611.
2003. Denver, D. R., K. Morris, and W. K. Thomas. Phylogenetics in *Caenorhabditis elegans*: an analysis of divergence and outcrossing. *Molecular Biology and Evolution* 20: 393-400.
2000. Denver, D. R., K. Morris, M. Lynch, L. Vassilieva, and W. K. Thomas. High direct estimate of the mutation rate in the mitochondrial genome of *Caenorhabditis elegans*. *Science* 289: 2342-2344.

PUBLICATIONS NOT PEER-REVIEWED

2008. Hilburn, C. F. and D. R. Denver. A survey of western Oregon soil nematodes. *The Catalyst* 2: 4-5.

CURRICULUM VITAE

MICHEAL FREITAG

Department of Biochemistry and Biophysics
Center for Genome Research and Biocomputing
Oregon State University
2011 ALS Building
Corvallis, OR 97331-7305
Phone: 541-737-4845
Fax: 541-737-0481
http://www.cgrb.oregonstate.edu/faculty/freitag
http://oregonstate.edu/dept/biochem/faculty/freitag.html

RESEARCH OBJECTIVE

To understand how gene silencing mechanisms shape the genomes and epigenomes of eukaryotes. Current research topics include: (1) Assembly, maintenance and evolution of centromeres in filamentous fungi; (2) connections between heterochromatin, cell division and circadian clocks; and (3) control and function repeat-induced point mutation (RIP).

EDUCATION AND AWARDS

Ph. D. Biochemistry and Molecular Biology 1996
Oregon Graduate Institute of Science & Technology, Portland, OR
2nd Annual Quantum Society Student Achievement Award, OGI Science & Technology (1995)
Best Oral Presentation, Mycological Society of America Annual Meeting and
Travel Award to MSA Annual Meeting, San Diego (1995)

M. S. Forest Products 1990
Oregon State University, Corvallis, OR
South Santiam Fellowship (1989)

Dipl. Forstwirt (B. S. Forestry) 1987
Georg-August-Universität, Göttingen, Germany
Competitive IAESTE travel grant to Turkey (Tree Genetics, 1984)
Competitive IAESTE travel grant to Australia (Silviculture, 1986)

PROFESSIONAL EXPERIENCE

Assistant Professor of Biochemistry and Biophysics 2006 - present
Department of Biochemistry and Biophysics
Center for Genome Research and Biocomputing
Oregon State University

Adjunct Investigator 2006 - present
Departamento de Microbiologia
Centro de Investigación Científica y Educación Superior de Ensenada (CICESE)
Ensenada, B.C. Norte, Mexico

Visiting Scientist Aug.-Sep. 2009
CNRS Centre de Biologie et d'Ecologie Tropicale et Méditerranéenne
Université de Perpignan Via Domitia
Perpignan, France

Postdoctoral Research Associate 1996 - 2006
University of Oregon (Institute of Molecular Biology)
Mentor: Eric U. Selker
Research: DNA methylation, repeat-induced point mutation and heterochromatin formation

Graduate Research Assistant (Ph.D.) 1990 - 1996
Department of Biochemistry and Molecular Biology
Oregon Graduate Institute of Science & Technology
Advisor: Matthew S. Sachs
Research: Transcriptional and translational control of gene regulation

Graduate Research Assistant (M.S.) 1987 - 1990
Oregon State University (Dept. Forest Products)
Advisor: Jeffrey J. Morrell; Research: Biological control of wood-destroying fungi
Forest engineer 1987
Australian Newsprint Mills Ltd., Maydena, Tasmania, Australia

Research Assistant 1986
Universität Göttingen (College of Forestry – Quantitative Silviculture)
Advisor: Horst Kramer
Research: Silviculture field trials, data management.

Research Assistant (Diplomarbeit) 1984 - 1986
Universität Göttingen (College of Forestry - Technical Mycology)
Advisor: Aloys Hüttermann
Research: Extracellular enzymes of ligninolytic basidiomycete fungi

EXTRAMURAL FUNDING

NIH subcontract from 1P01 GM068087 to Jay Dunlap ($44,000) 1 Sep 2009 – 31 Aug 2010
"Functional Analysis and Systems Biology of Filamentous Fungi", ChIP-Seq of transcription factors

Université de Perpignan Via Domitia, (€ 4,500/$6,800) Aug-Sep 2009
Teaching epigenetics classes and summer research on epigenomics of *Schistosoma mansoni*
(at the CNRS Centre de Biologie et d'Ecologie Tropicale et Méditerranéenne, Perpignan, France)

DOE/USDA ($1,200,000) DE-FG02-08ER6466 Co-PI 1 Sep 2008 to 31 Aug 2010
Title: "Epigenomics of Development in *Populus*"
(with Stephen Strauss, OSU Forest Science, and Todd Mockler, OSU Botany and Plant Pathology)

American Cancer Society ($719,000) RSG-08-030-01-CCG PI 1 Jan 2008 to 31 Dec 2011
Title: "Centromere Assembly and Maintenance"

Medical Research Foundation of Oregon, Seed Grant ($30,000) PI 1 Dec2006 – 30 Nov 2007
Title: "Centromeres of Filamentous Fungi: DNA Structure and Epigenetic Modifications"

Post-doctoral fellowship:
Individual National Research Service Award (National Institutes of Health) 1996 - 2000
Title: "Identification of signals for *de novo* methylation of DNA"

INTRAMURAL FUNDING

OSU RERF equipment proposal, co-written with Drs. Michael Gross and Adrian Gombart ($15,000) 2009
(Purchase of a high-throughput Bioruptor cell disruption device for the Department of Biochemistry and Biophysics, housed in previous Freitag lab space, ALS2034)

OSU Graduate School Bioinformatics Workshop ($15,000) 2009
(with Barbara Taylor, Jeff Cheng, Dee Denver, Scott Givan, Todd Mockler)

FUNDING PENDING

USDA	Co-PI (with Frances Trail, Michigan State University), "Dissection of the Life Cycle Gene Network of a Plant Pathogenic Fungus"	$1,000,000
NIH	Co-PI (with Deborah Bell-Pedersen, Texas A&M University), (competitive supplement to DBP 3R01 GM058529-10; score: 30) "Molecular Genetic Analysis of Fungal Circadian Rhythms"	$389,000
NIH	Co-PI (with Jay Dunlap, Dartmouth Medical School), (administrative supplement to JCD 2P01 GM068087; score: 20) Functional Analysis and Systems Biology of Filamentous Fungi	$418,000

FUNDING SOUGHT (BUT NOT AWARDED)

NIH (2008; Co-PI with Roderick Dashwood, OSU; "Epigenomics of metabolic syndrome")
Australian Research Council (2008; Co-PI; "Recombination in Neurospora")
NSF (2007; American Cancer Society grant for same topic "Assembly and Maintenance of Centromeres")
HHMI Young Investigator competition (2008)
NSF IGERT (2007, 2008)

SERVICE

Service to scientific community

Neurospora Policy Committee (2008-2012)
Program Co-chair of international "Neurospora 2010" meeting in Asilomar, CA.
Symposium organizer for X. Fungal Biology Conference (6-10 Dec. 2009, Ensenada, Mexico)

Editorial:
Academic Editor, PLoS One (2008-2011)
Editorial Board of "Fungal Genetics Reports" (2006 - present)

Year	number of papers handled	
2006	5	all FGR
2007	2	all FGR
2008	6	3 (PLoS), 3 (FGR)
2009	6	4 (PLoS), 2 (FGR) [July]

Ad-hoc reviews:
Applied and Environmental Microbiology
BMC Genomics
Eukaryotic Cell
Fungal Genetics and Biology
Genetics
Genome Biology
Journal of Genetics
Molecular Microbiology
Molecular Biology and Evolution
Mycologia
Nucleic Acids Research
Proceedings of the National Academy of Sciences

Year	number of papers handled
2006	11
2007	12
2008	14
2009	6 (July)

Grant proposal review:
Ad hoc: Health Research Council of New Zealand (2009)
Pacific Northwest Regional Centers of Excellence, Developmental Research Projects (2009)

Consulting service:
Consultant (*pro bono*), LUX Biotechnology, Edinburgh, Scotland 2001 - 2007

External teaching:
Invited lectures: "Epigenetics and Epigenomics" (taped for online and classroom use) Sept. 2009
Université de Perpignan Via Domitia

External Student Committees [year of defense]:
Diego Delgado (Microbiologia, CICESE, Dra. R. R. Mouriño-Pérez) [2009]
Rosa Ramirez Cota (Microbiologia, CICESE, Dra. R. R. Mouriño-Pérez) [2008]
Cheng Wu, PhD (EBS, OHSU OGI School of Science and Engineering, Dr. Matthew S. Sachs) [2006]
Silvia. L. Ramos-Garcia (Microbiologia, CICESE, Dra. R. R. Mouriño-Pérez) [2006]

Service at OSU

OSU Radiation Safety Committee	2009 - 2011
OSU Genomics, Bioinformatics and Systems Biology Symposium and Workshop	17-18 June 2009
Department of Biochemistry and Biophysics, Space Committee	2009 - present
Department of Biochemistry and Biophysics, Grad. Stud. Admissions Committee	2008 - present
OSU Professional Science Masters Annual Workshop, Bioinformatics Group	4-5 Dec. 2008
Department of Biochemistry and Biophysics, Curriculum Committee	2006 - present
Molecular and Cellular Biology Graduate Program, Curriculum Workshop	12-13 Dec. 2006

Graduate Student Committees [year of first meeting, preliminary exam]:
Ruoqing (Julia) Zhu (Forest Science, M.S. – Dr. Steven Strauss)
Angela Poole (MCB, Ph.D. – Dr. Virginia Weiss)
John Clarke (MCB, Ph.D. – Dr. Emily Ho) [2007, 2008]
Lindsey Shorey (EMT, Ph.D. – Dr. David Williams) [2007, 2008]
Megan Stewart (BB, Ph.D. – Dr. Joseph Beckman) [2007, 2008]
Xu Jun (BB, Ph. D. – Dr. Michael Gross) [2008]
Hillary Bevers (Microbiology, Ph. D. – Dr. Morrie Craig) [2007]
David Ly (Genetics, M.S. – Dr. Ling Jin [2007; graduated 2009])
Sangeet Lal (BB, Ph.D. – Dr. Jeffrey Greenwood) [2006, 2008]
Justin Hall (BB, Ph.D. – Dr. Elisar Barbar) [2006, 2008]
Hui Nian (BB, Ph.D. – Dr. Rod Dashwood) [2006, 2008]
Patricia Khuu (BB, Ph.D. – Dr. Pui-Shing Ho) [2007; graduated 2008]
Yao Yin (MCB, non-thesis M.S. – Dr. Steve Giovannoni) [graduated 2007]
Ann Ketter (MCB, non-thesis M.S. – Dr. John Fowler) [2006; graduated 2008]

Undergraduate Thesis Committees [year of exam]:
Georgi Mitev (Biochemistry, Honor College – PI Bruce Geller) [2009]

Committee work during Graduate Student training:
Oregon Graduate Institute of Science & Technology

Radiation Safety Committee (Student Member)	1992 - 1995
Student Council (President 1994)	1992 - 1995

Mentoring

Graduate students:

Joseph Whalen (MCB, M.S.), 2007-2009
(Joseph received a Supplemental Laurels Fellowship in Winter 2009)
Erin Bredeweg (MCB; Ph.D.) 2008-
Kyle Pomraning (MCB; Ph.D.) 2008-
Pallavi Phatale (BPP; Ph.D.) 2008-
Pallavi received a 2009 Anita Summers Graduate Student Travel Award (BPP, OSU), and poster awards from the Genetics Society of America and from the American Society of Microbiologists (25th Fungal Genetics Conference, Asilomar, CA)

Undergraduate students:

Kayly Lemke (Biochemistry, Scripps College, CA) – summer 2009 (transposons in Neurospora)
Greg Ekberg (Microbiology, OSU), 2008 – present (centromere proteins)
Miguel Williams, volunteer researcher (B.S.), 2008 (PCR on Fusarium spp., phylogenetics)
Eva Schopf (Univ. Hohenheim, Germany), internship fall '07 (Gibberella cytology, Neurospora RIP)
Hannah Wilson (Univ. Oregon, Eugene), summer research '07 (Gibberella cytology, transformation)
Paul Donegan (Bioeng., OSU), HHMI/URISC, spring/summer '07 (RIP, PCR / bisulfite sequencing)
Tilman Schauwecker (Furtwangen Univ.) internship, fall-spring '06/07 (mapping of RIP mutants)
Grant Farr (Chem., OSU) HHMI '06, volunteer '06/7 (Neurospora and Gibberella cytology)
Thomas Lew (Biol., Stanford Univ.) HHMI '06 (Neurospora microtubule-binding proteins)
Colin Sexton (Che. Engineering, OSU), summer workstudy and genetics projects, 2006-2007
Serita Holte (Psychology, OSU) workstudy student, media prep., genetics, DNA isolations, '06-present

Graduate student rotations:

Henry Priest (MCB, OSU), winter '08/'09 (Poplar epigenomics)
Samantha Waters (BB, OSU), winter '07/'08 (Autonomous replicating plasmids in fungi)
Joseph Mendoza (BB, OSU), winter '06/'07 (CenH3 from filamentous fungi)
Eric Smith (BB, OSU), fall '06 (Neurospora centromere assembly)

Postdoctoral Associates:

Kristina M. Smith, Ph.D. June 2007 to June 2009 Centromeric chromatin and light regulation
Kristina received the prestigious 2009 Perkins Award from the Neurospora community for her work on telomeric silencing, centromeric chromatin and light-inducible transcription factors

Sabbatical visitors and visiting scientists:

Meritxell Riquelme, CICESE, Ensenada, Mexico	July - Aug. '09	(Neurospora exocyst)
Jason Stajich, UC Riverside	June '09	(Sordaria genome)
Meritxell Riquelme, CICESE, Ensenada, Mexico	March '08	(Neurospora exocyst)
Céline Cousseau, Université de Perpignan, France	Summer '08	(Schistosoma epigenomics)
E. Blythe Nilson UBC Okanagan, Canada	Sept. '07 to June '08	(Neurospora centromeres)
Gabriela Roca, University of Edinburgh, UK	Sept. '07 to Jan. '08	(Neurospora mitosis)

Faculty Research Assistant:

Lanelle Connolly Dec. '06 to present

Teaching

(scores: course as a whole/contribution of instructor; scale: 1 = very poor, 6 = excellent)

2009/10 (assignments)

Department of Biochemistry and Biophysics, BB492, Biochemistry Core	Spring 2010
Department of Biochemistry and Biophysics, BB592, Biochemistry Core	Spring 2010
Mol. Cell. Biology, MCB554, nine lectures on DNA, chromatin, epigenetics	Fall 2009
Mol. Cell. Biology, MCB511, class coordinator	Fall 2009

2008/09

Department of Biochemistry and Biophysics, BB492, Biochemistry Core — Spring 2009
(team-taught with Dr. Victor Hsu) scores: /

Department of Biochemistry and Biophysics, BB592, Biochemistry Core — Spring 2009
(team-taught with Dr. Victor Hsu) scores: /

Department of Biochemistry and Biophysics, BB651, Epigenetics — Winter 2009
scores: /

Mol. Cell. Biology, MCB555, four lectures on translation — Winter 2009

Mol. Cell. Biology, MCB554, seven lectures on DNA, chromatin, epigenetics — Fall 2008

Mol. Cell. Biology, MCB511, class coordinator — Fall 2008

Department of Biochemistry and Biophysics, BB507/607, Graduate Seminar — Fall, Spring 2008/09

High-throughput sequencing interest group, twice monthly meetings — Fall – Spring 2008/09

Epigenetics Journal Club, twice monthly meetings — Spring – Fall 2009

2007/08

Department of Biochemistry and Biophysics, BB492, Biochemistry Core — Spring 2008
(team-taught with Dr. Victor Hsu) scores: 3.9/4.3

Department of Biochemistry and Biophysics, BB592, Biochemistry Core — Spring 2008
(team-taught with Dr. Victor Hsu) scores: 5.8/5.9

Department of Biochemistry and Biophysics, BB507/607, Graduate Seminar — academic year 2007/8

CICESE, Ensenada, Baja California Norte, Mexico, Neurospora Genetics Workshop — Nov., 2007

Mol. Cell. Biology, MCB555, four lectures on translation — Winter 2007

Mol. Cell. Biology, MCB554, seven lectures on DNA, chromatin, epigenetics — Fall 2007

Mol. Cell. Biology, MCB511, class coordinator — Fall 2007

2006/07

Department of Biochemistry and Biophysics, BB492, Majors Biochemistry — Spring 2007
(team-taught with Dr. Victor Hsu) scores: 3.6/3.9

Department of Biochemistry and Biophysics, BB592, Graduate Students Biochemistry — Spring 2007
(team-taught with Dr. Victor Hsu) scores: 4.0/4.3

Department of Biochemistry and Biophysics, BB507/607, Graduate Seminar — academic year 2006/7

CICESE, Ensenada, Baja California Norte, Mexico, Neurospora Genetics Workshop — Dec. 6-8, 2006

Mol. Cell. Biology, MCB511, Guest lecture — Fall 2006

Before 2006:

Lectures on chromatin remodeling and gene silencing — 2002 - 2005
University of Oregon (Dept. of Biology, Dr. Eric U. Selker)

Lectures on genetics and molecular biology of fungi — 1994
Oregon State University (Dept. of Botany and Plant Pathology, Dr. Nancy Weber)

Seminar classes — 1990 – 1995
Oregon Graduate Institute of Science & Technology

Teaching Assistant — 1986 – 1987
Universität Göttingen (College of Forestry – Quantitative Silviculture)

INVITED PRESENTATIONS (SINCE 2003)

Université de Perpignan Via Domitia (September 2009)
"Chromatin of filamentous fungi: RIP, Centromeres and Circadian Rhythms"

Universität Bochum, Germany (August 2009)
"Chromatin of filamentous fungi: RIP, Centromeres and Circadian Rhythms"

University of Calgary Health Sciences Center, Calgary, Alberta, CDN (May 2009)
"ChIP-sequencing: Centromeres and Circadian Rhythms"

Oregon State University, Corvallis, OR - Department of Botany and Plant Pathology (April 2009)
"Chromatin of filamentous fungi: RIP, Centromeres and Circadian Rhythms"

Oregon Health & Sciences University, Portland, OR - CROET (April 2009)
"Chromatin of filamentous fungi: Centromeres and Circadian Rhythms"

25th Fungal Genetics Conference (March 2009), Asilomar, CA
"Centromere assembly and maintenance of *Neurospora crassa*"
"Repeat-induced point mutation in *Fusarium graminearum*"
Mycological Society of America Annual Meeting (August 2008), State College, PA
"Centromere and kinetochore proteins of filamentous fungi"
PBoFF Symposium (April 2008) Texas A&M University, College Station, TX
"Low-cost, massively parallel sequencing approaches to study the biology of filamentous fungi"
Neurospora 2008 (March 2008), Asilomar, CA
"Centromeres of filamentous fungi"
CICESE (14 November 2007), Ensenada, Baja California Norte, Mexico.
"Centromeres of filamentous fungi"
24th Fungal Genetics Conference (March 2007), Asilomar, CA
"Genome defense by repeat-induced point mutation: an evolutionary dead end?"
Asilomar Chromatin and Chromosome Conference (December 2006), Asilomar, CA
"*Centromeres of filamentous fungi"*
CICESE (December 2006), Ensenada, Baja California Norte, Mexico.
"Centromeres of filamentous fungi: RIP and epigenetics"
"Control and function of RIP (repeat-induced point mutation)"
SUNY Buffalo (September 2005), Buffalo, NY.
"*Control of DNA methylation and heterochromatin formation*"
Oregon State University (August 2005), Corvallis, OR.
"Epigenetic Control of Heterochromatin Formation"
Ludwig-Maximilian-Universität, (January 2005), Munich, Germany.
"Control of DNA methylation and heterochromatin formation in Neurospora"
Biozentrum Basel (January 2005), Basel, Switzerland.
"RIP, DNA methylation and heterochromatin formation in Neurospora"
Texas A&M University (September 2004), College Station, TX.
"Control of DNA methylation and heterochromatin formation in Neurospora"
CICESE (August 2004), Ensenada, Baja California Norte, Mexico.
"Gene silencing, DNA methylation and heterochromatin formation in Neurospora"
Gordon Conference on Cellular and Molecular Fungal Biology (June 2004), Holderness, NH.
"Control of DNA methylation and heterochromatin formation in Neurospora"
Neurospora 2004 (March 2004), Asilomar, CA
"HP1 is essential for DNA methylation in Neurospora"
FASEB conference on Chromatin and Transcription (July 2003), Snowmass Village, CO
"Connections between DNA methylation and RIP"
22nd Fungal Genetics Conference (March 2003), Asilomar, CA
Workshop organizer and co-chair (invited), "Transposable Elements and Epigenetics".
"Genome defense by mutation and the methylated component of the Neurospora genome"
22nd Fungal Genetics Conference (March 2003), Asilomar, CA
Workshop on "Regulation of Primary Metabolism" (chaired by Dr. M. Hynes)
"Putative chromosome remodeling factors in Neurospora crassa*"*

PUBLICATIONS (including accepted; 14 since 2006; 6 under review [see below])

2009

J. J. Coleman, S. D. Rounsley, M. Rodriguez-Carres, A. Kuo, C. C. Wasmann, J. Grimwood, J. Schmutz, M. Taga, G. J. White, S. Zhou, D. C. Schwartz, **M. Freitag**, L.-J. Ma, E. G. J. Danchin, B. Henrissat, P. M. Coutinho, D. R. Nelson, D. Straney, C. A. Napoli, M. Gribskov, M. Rep, S. Kroken, I. Molnár, C. Rensing, J. C. Kennell, J. Zamora, M. L. Farman, E. U. Selker, A. Salamov, H. Shapiro, J. Pangilinan, E. Lindquist, C. Lamers, I. Grigoriev, D. M. Geiser, S. F. Covert, E. Temporini, H. D. Van Etten. The genome of *Nectria haematococca*: Contribution of supernumerary chromosomes to gene expansion. **PLoS Genetics** (online end of September 2009)

S. L. Ramos-Garcia, R. W. Roberson, **M. Freitag**, S. Bartnicki-García and R. R. Mouriño-Pérez,. Cytoplasmic bulk flow propels nuclei in mature hyphae of *Neurospora crassa*. **Eukaryotic Cell** (online 14 August 2009, EC.00062-09v1)

C. Cosseau, A. Azzi, K. M. Smith, **M. Freitag**, G. Mitta and C. Grunau (2009). Native chromatin immunoprecipitation (N-ChIP) and ChIP-Seq of *Schistosoma masoni*: critical experimental parameters. **Mol. Biochem. Parasitology** 166: 70-76 (online 9 March 2009, doi:10.1016/j.molbiopara.2009.02015)

Z. A. Lewis, S. Honda, T. K. Khlafallah, J. K. Jeffress, **M. Freitag**, F. Mohn, D. Schübeler and E. U. Selker (2009). Relics of repeat-induced point mutation direct heterochromatin organization in *Neurospora crassa* **Genome Research** 19: 427-437.

K. R. Pomraning, K. M. Smith and **M. Freitag**. (2009) Genome-wide high throughput analysis of DNA methylation in eukaryotes. **Methods** 47: 142-150 (doi:10.1016/j.ymeth.2008.09.022).

2008

K. M. Smith, G. O. Kothe, C. B. Matsen, T. K. Khlafallah, K. K. Adhvaryu, M. Hemphill, **M. Freitag**, M. R. Motamedi and E. U. Selker. (2008) The fungus *Neurospora crassa* displays telomeric silencing mediated by multiple sirtuins and by methylation of histone H3 lysine 9. **Epigenetics & Chromatin** 1:5 (doi: 10.1186/1756-8935-1-5).

D. W. Lee, **M. Freitag**, E. U. Selker and R. Aramayo (2008) A cytosine methyltransferase homologue is essential for sexual development in *Aspergillus nidulans*. **PLoS ONE** 3: e2531. doi: 10.1371/journal.pone.0002531.

C. M. Freitag, Y. Cabrera, M. Williams, M. Freitag J. J. Morrell (2008) Fungi colonizing exposed durable wood in Hilo, HI. **Inoculum** 59(4): 29.

M. Uchida, R. R. Mouriño-Pérez, **M. Freitag**, S. Bartnicki-García and R. W. Roberson (2008) Microtubule Dynamics and the Role of Molecular Motors in *Neurospora crassa*. **Fungal Genetics and Biology** 45: *683-692*.

D. J. Jacobson, N. B. Raju, **M. Freitag** (2008) Evidence for the absence of meiotic silencing by unpaired DNA in *Neurospora tetrasperma*. **Fungal Genetics and Biology** 45:351-362.

2007

M. Riquelme, S. Bartnicki-Garcia, J. M. González-Prieto, E. Sánchez-León, J. A. Verdín-Ramos, A. Beltrán-Aguilar and **M. Freitag** (2007) Spitzenkörper localization and intracellular traffic of GFP-labeled CHS-3 and CHS-6 chitin synthases in living hyphae of *Neurospora crassa*. **Eukaryotic Cell** 6: 1853-1864. [Published online July 20, 2007, doi:10.1128/EC.00088-07].

L. Connolly and **M. Freitag** (2007) Construction of genomic libraries from *Neurospora crassa* with an improved BigEasy™ 2.0 linear cloning system. **eLucidations**, 7: 8-12. *(not peer-reviewed)*

C. Freitag, **M. Freitag** and J. J. Morrell (2007) Detecting fungal DNA in treated and non-treated wood. **Proceedings of the International Research Group on Wood Preservation** (paper prepared for the 38th International Meeting in Jackson Hole, WY). *(not peer-reviewed)*

D. D. Perkins, **M. Freitag**, L.A. Shrode, E.U. Selker and D.J. Ebbole. (2007) Recurrent locus-specific mutation resulting from a cryptic ectopic insertion in Neurospora. **Genetics** 175:527-544.

2006

B. Grimaldi, P. Coiro, P. Filetici, E. Berge, J. Dobosy, **M. Freitag**, Selker, E.U. and P. Ballario. (2006) The *Neurospora crassa* WC-1-dependent blue light response requires acetylation of histone H3 lysine 14 by NGF-1. **Mol. Biol. Cell**. 17:4576-4583.

2005

M. Freitag and E. U. Selker (2005). Expression and Visualization of Red Fluorescent Protein (RFP) in *Neurospora crassa*. **Fungal Genetics Newsletter** 52:14-17.

J. E. Galagan, S. E. Calvo, C. Cuomo, L.-J. Ma, J. Wortman, S. Batzoglou, S.-I. Lee, M. Bastürkmen, C. C. Spevak, J. Clutterbuck, V. Kapitonov, J. Jurka, C. Scazzocchio, M. Farman, J. Butler, S. Purcell, S. Harris, G. H. Braus, O. Draht, S. Busch, C. D'Enfert, C. Bouchier, G. H. Goldman, D. Bell-Pedersen, S. Griffiths-Jones, J. H. Doonan, J. Yu, K. Vienken, A. Pain, **M. Freitag**, E. U. Selker, D. B. Archer, M. Á. Peñalva, B. R. Oakley, M. Momany, T. Tanaka, T. Kumagai, K. Asai, M. Machida, W. C. Nierman, D. W. Denning, M. Caddick, M. Hynes, M. Paoletti, R. Fischer, B. Miller, P. Dyer, M. S. Sachs, S. A. Osmani and B. W. Birren (2005). Sequencing of *Aspergillus nidulans* and comparative analysis with *A. fumigatus* and *A. oryzae*. **Nature** 438:1105-1115.

M. Freitag and E. U. Selker (2005). Controlling DNA methylation: Many roads to one modification. **Current Opinions in Genetics and Development** 15:191-199.

2004

M. Freitag, D. W. Lee, G. O. Kothe, R. J. Pratt, R. Aramayo and E. U. Selker (2004). DNA methylation is independent of RNA interference in Neurospora. **Science** 304:1939.

M. Freitag, P. C. Hickey, N. Raju, E. U. Selker and N. D. Read (2004). GFP as a tool to analyze the organization, dynamics and function of nuclei and microtubules in *Neurospora crassa*. **Fungal Genetics and Biology** 41:907-920.

M. Freitag, P. C. Hickey, T. K. Khlafallah, N.D. Read and E. U. Selker (2004). HP1 is essential for DNA methylation in Neurospora. **Molecular Cell** 13:427-4343.

K. A. Borkovich, L. A. Alex, O. Yarden, **M. Freitag**, G. E. Turner, N. D. Read, S. Seiler, D. Bell-Pedersen, J. Paietta, N. Plesofsky, M. Plamann, U. Schulte, G. Mannhaupt, F. E. Nargang, A. Radford, C. Selitrennikoff, J. E. Galagan, J. C. Dunlap, J. J. Loros, D. Catcheside, H. Inoue, R. Aramayo, M. Goodrich-Tanrikulu, M. Polymenis, E. U. Selker, M. S. Sachs, G. A. Marzluf, I. Paulsen, R. Davis, D. J. Ebbole, A. Zelter, E. Kalkman, R. O'Rourke, F. Bowring, J. Yeadon, C. Ishii, K. Suzuki, W. Sakai, R. Pratt (2004). Lessons from the genome sequence of *Neurospora crassa*: Tracing the path from genomic blueprint to multicellular organism. **Microbiology and Molecular Biology Reviews** 68:1-108.

2003

E. U. Selker, N. A. Tountas, S. Cross, B. S. Margolin, J. G. Murphy, A. P. Bird and **M. Freitag** (2003). The methylated component of the *Neurospora crassa* genome. **Nature** 422:893-897.

J. E. Galagan, S. E. Calvo, K. A. Borkovich, E. U. Selker, N. D. Read, W. FitzHugh, L.-J. Ma, S. Smirnov, S. Purcell, B. Rehman, T. Elkins, R. Engels, S. Wang, C. B. Nielsen, J. Butler, D. Jaffe, M. Endrizzi, D. Qui, P. Ianakiev, D. Bell-Pedersen, M. A. Nelson, M. Werner-Washburne, C. P. Selitrennikoff, J. A. Kinsey, E. L. Braun, A. Zelter, U. Schulte, G. O. Kothe, G. Jedd, W. Mewes, C. Staben, E. Marcotte, D. Greenberg, A. Roy, K. Foley, J. Naylor, N. Stange-Thomann, R. Barrett, S. Gnerre, M. Kamal, M. Kamvysselis, C. Bielke, S. Rudd, D. Frishman, S. Krystofova, C. Rasmussen, R. L. Metzenberg, D. D. Perkins, S. Kroken, C. Cogoni, G. Macino, D. Catcheside, W. Li, R. J. Pratt, S. A. Osmani, C. P. C. DeSouza, N. L. Glass, M. J. Orbach, J. A. Berglund, R. Voelker, O. Yarden, M. Plamann, S. Seiler, J. Dunlap, A. Radford, R. Aramayo, D. O. Natvig, L. A. Alex, G. Mannhaupt, D. J. Ebbole, **M. Freitag**, I. Paulsen, M. S. Sachs, E. S. Lander, C. Nusbaum and B. Birren (2003). The genome sequence of the filamentous fungus *Neurospora crassa*. **Nature** 422:859-868.

H. D. Folco, **M. Freitag**, A. Ramon, E. D. Temporini, M. E. Alvarez, I. Garcia, C. Scazzochio, E. U. Selker and A. L. Rosa (2003), Histone H1 is required for proper regulation of pyruvate decarboxylase gene expression in *Neurospora crassa*. **Eukaryotic Cell** 2:341-350 (the first two authors contributed equally).

2002 and earlier (total of 12)

E. U. Selker, **M. Freitag**, G. O. Kothe, B. S. Margolin, M. R. Rountree, C.D. Allis and H. Tamaru (2002). Induction and maintenance of non-symmetrical DNA methylation in *Neurospora*. **Proc. Nat. Acad. Sci. (USA)** 99:16485-16490.

M. Freitag, R. L. Williams, G. O. Kothe and E. U. Selker (2002). A cytosine DNA methyltransferase homologue is essential for repeat-induced point mutation in Neurospora crassa. **Proc. Nat. Acad. Sci. (USA)** 99:8802-8807.

M. Freitag, L. M. Ciuffetti and E. U. Selker (2001). Expression and visualization of Green Fluorescent Protein (GFP) in *Neurospora crassa*. **Fungal Genetics Newsletter** 48:15-19.

V. P. W. Miao, **M. Freitag** and E. U. Selker (2000). Short TpA-rich segments of the z-h region induce DNA methylation in *Neurospora crassa*. **J. Mol. Biol.** 300:249-273.

B. S. Margolin, **M. Freitag** and E. U. Selker (1997). Improved plasmids for gene targeting at the *his-3* locus of *Neurospora crassa* by electroporation. **Fungal Genetics Newsletter** 44:34-36.

M. Freitag, N. Dighde and M. S. Sachs (1996). A UV-induced mutation in *Neurospora* that affects translational regulation in response to arginine. **Genetics** 142:117-127.

M. Freitag and M. S. Sachs (1995). A simple dot blot assay to measure hygromycin B phosphotransferase activity in whole cell extracts of *Neurospora crassa*. **Fungal Genetics Newsletter** 42:26-28.

Z. Luo, **M. Freitag** and M. S. Sachs (1995). Translational regulation in response to changes in amino acid availability in *Neurospora crassa*. **Mol. Cell. Biol.** 15:5235-5245.

M. Freitag and J. J. Morrell (1992). Changes in selected enzyme activities during growth of pure and mixed cultures of the white-rot decay fungus *Trametes versicolor* and the potential biocontrol fungus *Trichoderma harzianum*. **Canadian Journal of Microbiology** 38:317-323.

M. Freitag and J. J. Morrell (1992). Decolorization of the polymeric dye Poly Red-478 by wood inhabiting fungi. **Canadian Journal of Microbiology** 38:811-822.

M. Freitag, J. J. Morrell and A. Bruce (1991). Biological protection of wood: status and prospects (review). **Biodeterioration Abstracts** 5:1-13.

M. Freitag and J. J. Morrell (1990). Wood sandwich test of potential biological control agents for basidiomycetous decay fungi. **Material und Organismen** 25:63-70.

Manuscripts under review

K. M. Smith, G. Sancar, S. Li, C. M. Sullivan, E. L. Bredeweg, H. Priest, R. F. McCormick, A. Tag, T. Lamb, T. Thomas, C. Sancar, J. C. Carrington, J. E. Stajich, M. Brunner, D. Bell-Pedersen and **M. Freitag.** Light signaling networks revealed by genome-wide mapping of direct targets for WHITE COLLAR-2 (under review at **Molecular Cell**).

H.-C. Lee, L. Li, W. Gu, Z. Xue, S. K. Crosthwaite, Z. A. Lewis, **M. Freitag**, E. U. Selker, C. Mello and Y. Liu. Origin and biogenesis of microRNAs and dicer-independent small interfering RNAs: Multiple mechanisms for small RNA production in fungi (under review at **Nature**).

L.-J. Ma, K. A. Borkovich, J. J. Coleman, M.-J. Daboussi, A. Di Pietro, M. Dufresne, **M. Freitag**, M. Grabherr, B. Henrissat, S. Kang, J. Park, M. Rep, W.-B. Shim, C. Woloshuk, X. Xie, J.-R. Xu, J. Antoniw, S. E. Baker, B. H. Bluhm, A. Breakspear, D. Brown, R. Butchko, S. Chapman, R. Coulson, P. M. Coutinho, E. G. J. Danchin, A. Diener, L. Gale, D. Gardiner, S. Goff, K. E. Hammond-Kosack, K. Hilburn,

A. Hua-Van, W. Jonkers, K. Kazan, C. D. Kodira, M. Koehrsen, L. Kumar, Y.-H. Lee, L. Li, J. Manners, D. Miranda-Saavedra, M. Mukherjee, G. Park, J. Park, S.-Y. Park, R. Proctor, A. Regev, M. C. Ruiz-Roldan, D. Sain, S. Sakthikumar, S. Sykes, D. C. Schwartz, G. Turgeon, I. Wapinski, O. Yoder, S. Young, Q. Zeng, S. Zhou, J. Galagan, C. A. Cuomo, and H. C. Kistler. *Fusarium* comparative genomics reveals lineage-specific chromosomes related to pathogenicity (under review at **Nature**).

B. J. Bowman, M. Draskovic, **M. Freitag**, E. J. Bowman. Structure and distribution of organelles and the cellular location of calcium transporters in *Neurospora crassa* (accepted with minor changes at **Eukaryotic Cell**).

D. L. Delgado-Alvarez, Laurie G. Smith, O. A. Callejas-Negrete, **M. Freitag**, R. W. Roberson, N. Gómez, R. R. Mouriño-Pérez. F-actin localization and dynamics determined by live cell imaging in *Neurospora crassa* (submitted to **Eukaryotic Cell**)

M. G. Roca M., H.-C. Kuo, A. Lichius, **M. Freitag** and N. D. Read. Nuclear dynamics, mitosis and cytoskeleton during the early stages of colony initiation in *Neurospora crassa* (submitted to **Eukaryotic Cell**).

Manuscripts in preparation

M. Freitag, S. Honda, A. Kobsa (Hagemann) and E. U. Selker. A *Neurospora* mutant defective in Repeat-Induced Point mutation (RIP) and DNA methylation carries a missense mutation in histone H3 (to be submitted to Current Biology).

M. Nowrousian, J. Stajich, I. Engh, E. Espagne, J. Kamerewerd, F. Kempken, H.-C. Kuo, H. D. Osiewacz, S. Pöggeler, N. Read, S. Seiler, K. M. Smith, D. Zickler, U. Kück and **M. Freitag**. Next-generation sequencing of the 40 Mb genome of the filamentous fungus *Sordaria macrospora* (to be submitted to PLoS Genetics).

P. Phatale, K. M. Smith, J. Mendoza and **M. Freitag**. Evolution of the centromeric foundation proteins CenH3 (CenpA) and CKP-1 (CenpC) in filamentous fungi (to be submitted to Genetics).

K. M. Smith, C. Sullivan, K. R. Pomraning, L. Connolly and **M. Freitag**. Maintenance of centromeric chromatin of Neurospora depends on heterochromatic modifications (to be submitted to Genes and Development).

CURRICULUM VITAE

TODD C. MOCKLER

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EDUCATION AND EMPLOYMENT INFORMATION

Education:

2002 Ph.D., Molecular Biology, University of California, Los Angeles
1993 B.A., Molecular Biology, Wesleyan University, Middletown, Connecticut

Position Held:

Assistant Professor, Oregon State University, Corvallis, OR, 2006 - present
Postdoctoral Research Associate, Salk Institute, La Jolla, CA, 2002 - 2006

Appointment: 0.75 FTE

FTE Distribution: 0.75 FTE College of Agricultural Sciences

Principal Duties in Present Position:

Plant Genomics Research
Molecular and Cellular Biology Program Graduate Teaching
Advising Undergraduate and Graduate Students
Botany and Plant Pathology Teaching

Other OSU Program and Department Affiliations:

Molecular and Cellular Biology Program, Graduate Faculty
Center for Genome Research and Biocomputing, Graduate Faculty
Computational and Genome Biology Initiative, Faculty
Genetics Program, Graduate Faculty

TEACHING, ADVISING, AND OTHER ASSIGNMENTS

Instructional Summary

a. Credit Course

I currently teach two lecture courses.

1. *MCB 555, Genome Expression and Regulation (4 cr).* One of the core required courses for first year MCB graduate students. Within this course I teach a module on transcriptional regulation.
2. *MCB 668/699, Bioinformatics and Genomics (4 cr).* This course covers key concepts from the bioinformatics and genomics revolution including genome sequencing technologies, database mining methods, sequence alignments, fundamental theories of computational biology, bioinformatics algorithms, and concepts of programming for bioinformatics.

I am currently developing a third course, BOT 332 Laboratory Techniques in Plant Biology (3 cr), which I will teach for the first time in the Spring quarter of 2010.

Credit courses:

Course #	Name of Course	Term/Year	# of students	% Responsibility
MCB 555	Genome Expression and Regulation	Winter 2008	23	25
MCB 668/699	Bioinformatics and Genomics	Winter 2008	24	33
MCB 555	Genome Expression and Regulation	Winter 2009	26	25
MCB 668/699	Bioinformatics and Genomics	Winter 2009	24	33

b. Non-Credit Courses and Workshops

Workshops:

- Member of the organizing committee for the "Bioinformatics, Genomics and Systems Biology Workshop" that was held June 17-19th, 2009 at OSU.

Continuing education:

- Academy for Lifelong Learning. Oregon State University Alumni Association. Plant Genomics and Biofuels. Corvallis, OR. (guest speaker) 2009

Curriculum Development

As one of the five new faculty hires in the CGBI, I was charged with collaborating on efforts to integrate and emphasize training in computationally intensive, genome-centered biology into the MCB curriculum. Beginning with the 2007-2008 academic year, several core courses in the MCB graduate program were substantially updated and reorganized. The revised MCB core curriculum now provides an introduction to the principles and results of high-throughput genomics experiments and their analysis and interpretation via the tools of computational biology and bioinformatics. It introduces students to fundamental concepts in probability and statistics. The recent integration, redesign, and creation of MCB courses were an important first step towards building a modern genome biology training program. One of the key changes involved the course MCB 668/699, for which I am one of the instructors. The course was dramatically changed to address key concepts from the bioinformatics and genomics revolution. Improved or new topics include genome sequencing technologies, database mining methods, sequence alignments, fundamental theories of computational biology, bioinformatics algorithms, and concepts of programming for bioinformatics. Students are introduced to fundamental tools of bioinformatics (Linux, Perl) and bioinformatics algorithms necessary to process and analyze large datasets generated from high-throughput genomics experiments. The name of MCB 668/669 was changed to “Bioinformatics and Genomics” to reflect its improvement.

Curriculum committee service:

- Participant in the Molecular and Cellular Biology Graduate Program Workshop, December 12-13, 2006.
- Member of the "Undergraduate Bioinformatics Curriculum Exploratory Committee" (2008 - ; Dr. Robert Mason, Chair), Biology Program, College of Science.

Students and Postdoctoral Trainees

I currently advise three Ph.D students and three undergraduates in my laboratory. I meet with these students weekly in a formal lab meeting and informally in ad hoc meetings as needed.

Current Graduate Students:

- Samuel Fox, Ph.D. expected 2011, MCB.
- Doug Bryant, Ph.D. expected 2011, Computer Science.
- Henry Priest, Ph.D. expected 2014, MCB.

Postdoctoral Trainees:

- Rongkun Shen (October 2006 - February 2008). Current position: Postdoc, OHSU, Portland, OR.

Undergraduate Student Researchers:

- Matthew Geniza (2008-), Jennifer Long (2007-), Jessica Murray (2008-), Henry Priest (2006-2008), Ashley Chu (2006-2007), Anne-Marie Dougherty (2006-2007), Jessica Ludgate (2006-2007).

Other Graduate Student Advisees:

- Jeff Kimbrel (Genetics; 2006-), Kyle Pomraning (MCB, 2008-), Pallavi Phatale (BPP; 2008-), Jill Franzosa (EMT; 2009-), Sagar Vidyasa (Horticulture; 2008-), Noah Fahlgren (MCB; 2006-), Josh Cuperus (MCB; 2007-), Shawn Butcher (Zoology; 2008-), Yang Bao (Forestry; 2006-2008).

Student Evaluation Summary (2008-2009 on a scale of 6.0)

Course	**MCB 555 Genome Expression and Regulation**		**MCB 668/699 Bioinformatics and Genomics**	
Term	**W08**	**W09**	**W08**	**W09**
Number of evaluation responses	3	15	6	18
The course as a whole, was:	4.0	4.6	4.8	5.1
The instructor's contribution to the course was:	4.3	4.9	5.5	5.7
Clarity of course objectives or outcomes was:	4.0	4.3	5.2	4.8
Clarity of student responsibilities and requirements was:	3.3	4.3	4.8	4.5
Course organization was:	4.0	4.4	5.2	4.4
Availability of extra help when needed was:	6.0	5.8	5.9	5.7
Instructor's use of various instructional techniques to accommodate differences in learning styles among students was:	3.3	4.5	5.3	5.4
Instructor's interest in my learning was:	5.0	5.1	5.5	5.5
Instructor's ability to stimulate my thinking more deeply about the subject was:	3.3	4.5	5.3	5.2
Instructor's timely feedback to tests and other work was:	4.5	5.0	5.0	5.0
Instructor's ability to develop a welcoming classroom environment for all participants was:	4.3	5.3	5.5	5.6
Instructor's evaluation of student performance in accordance with course objectives was:	4.5	5.6	5.0	5.2

SCHOLARSHIP AND CREATIVE ACTIVITY

Major Areas of Current Research:

Research in my laboratory is focused on three areas: 1) comparative analysis of plant diurnal and circadian gene expression regulation and promoter architecture; 2) alternative splicing and its regulation in plants; and 3) development of genomic tools for *Brachypodium distachyon*, a new model system for grass crop research.

PUBLICATIONS

a. Refereed Journal Articles:

Priest HD, Filichkin SA, and **Mockler TC**. Role of cis-regulatory elements in cell signaling. Invited review for ***Current opinion in Plant Biology***. *In press.*

Pandelova I, Betts MF, Manning V, Wilhelm LJ, Mockler TC, Ciuffetti LM. Transcriptional reprogramming induced by Ptr ToxA in wheat provides insights into the mechanisms of plant susceptibility. ***Molecular Plant,*** 2009 doi:10.1093/mp/ssp045

Bakker EG, Montgomery B, Nguyen T, Eide K, Chang J, **Mockler TC**, Liston A, Seabloom E, and Borer E. Strong population structure and worldwide selective sweeps characterize weediness gene evolution in the invasive grass species *Brachypodium distachyon*. ***Molecular Ecology*** 18: 2588-2601.

Bryant DW, Wong WK, **Mockler TC**. QSRA - a quality-value guided de novo short read assembler. ***BMC Bioinformatics*** 2009 10:69. doi:10.1186/1471-2105-10-69.

Zdepski A, Wang W, Priest HD, Ali F, Alam M, **Mockler TC**, and Michael TP. Daily transcriptional programs in papaya. ***Tropical Plant Biol.*** 2008 1:236–245

Loudet O, Michael TP, Burger B, Le Metté C, **Mockler T**, Weigel D, Chory J. A zinc knuckle protein that negatively controls morning-specific growth in *Arabidopsis thaliana*. ***Proc Natl Acad Sci U S A.*** 2008 Nov 4;105(44):17193-8.

Michael TP, Breton G, Hazen SP, Priest H, **Mockler TC**, Kay, SA and Chory J. A morning specific phytohormone gene expression program underlying rhythmic plant growth. ***PloS Biology***. September 2008, Volume 6, Issue 9, e225.

Cronn R, Liston A, Parks M, Gernandt D, Shen R, **Mockler T**. Multiplex Sequencing of Plant Chloroplast Genomes Using Solexa Sequencing-By-Synthesis Technology. ***Nucleic Acids Res***. 2008 Nov;36(19):e122. Epub 2008 Aug 27.

Garvin DF, Gu Y-Q, Hasterok R, Hazen SP, Jenkins G, **Mockler TC**, Mur LAJ, and Vogel JP. Development of Genetic and Genomic Research Resources for *Brachypodium distachyon*, a New Model System for Grass Crop Research. 2008. ***The Plant Genome*** [A Supplement to Crop Science] 48(S1) S69-S84.

Michael TP, **Mockler TC**, Breton G, McEntee C, Byer A, Trout JD, Hazen SP, Shen R, Priest HD, Sullivan CM, Givan SA, Yanovsky M, Hong F, Kay SA and Chory J. Network Discovery Pipeline Elucidates Conserved Time of Day Specific cis-Regulatory Modules. ***PLoS Genetics***. 2008 Feb 1;4(2):e14.

Mockler TC, Michael TP, Priest, HD, Shen R, Sullivan CM, Givan SA, McEntee C, Kay SA and Chory, J. THE DIURNAL PROJECT: Diurnal and Circadian Expression Profiling, Model-Based Pattern Matching and Promoter Analysis. ***Cold Spring Harb Symp Quant Biol.*** 2007 Jan 1;72:353-363.

Koussevitzky S, Nott A, **Mockler TC**, Hong F, Sachetto-Martins G, Surpin M, Lim J, Mittler R, Chory J. Signals from Chloroplasts Converge to Regulate Nuclear Gene Expression. ***Science*** 4 May 2007. Vol. 316. no. 5825, pp. 715 – 719.

Mockler TC, Chan S, Sundaresan A, Chen H, Jacobsen SE and Ecker JR. Applications of DNA tiling arrays for whole-genome analysis. ***Genomics.*** 2005 Jan;85(1):1-15.

Nemhauser JL, **Mockler TC**, Chory J. Interdependency of Brassinosteroid and Auxin Signaling in *Arabidopsis*. ***PLoS Biology***. 2004 Aug 24.

Mockler TC, Yu X, Shalitin D, Parikh D, Michael TP, Liou J, Huang J, Smith Z, Alonso JM, Ecker JR, Chory J, Lin C. Regulation of flowering time in *Arabidopsis* by K homology domain proteins. ***Proc Natl Acad Sci U S A***. 2004 Aug 24;101(34):12759-64.

Shalitin D, Yu X, Maymon M, **Mockler T**, Lin C. Blue light-dependent in vivo and in vitro phosphorylation of *Arabidopsis* cryptochrome 1. ***Plant Cell***. 2003 Oct;15(10):2421-9.

Mockler T, Yang H, Yu X, Parikh D, Cheng YC, Dolan S, Lin C. Regulation of photoperiodic flowering by *Arabidopsis* photoreceptors. ***Proc Natl Acad Sci U S A*** 2003 Feb 18;100(4):2140-5.

Shalitin D, Yang H, **Mockler TC**, Maymon M, Guo H, Whitelam GC, Lin C. Regulation of *Arabidopsis* cryptochrome 2 by blue-light-dependent phosphorylation. ***Nature***. 2002; 417(6890): 763-767.

Guo H, **Mockler TC**, Duong H, Lin C. SUB1, an *Arabidopsis* Ca2+-Binding Protein Involved in Cryptochrome and Phytochrome Coaction. ***Science***. 2001; 291(5503): 487-490.

Mockler TC, Guo H, Yang H, Duong H, and Lin C. Antagonistic actions of the *Arabidopsis* cryptochromes and phytochrome B in the regulation of floral induction. ***Development***. 1999; 126: 2073-2082.

Guo H, Yang H, **Mockler TC**, and Lin C. Regulation of flowering time by *Arabidopsis* photoreceptors. ***Science***. 1998; 279: 1360-1363.

Lin C, Yang H, Guo H, **Mockler TC**, Chen J, and Cashmore AR. Enhancement of blue-light sensitivity of *Arabidopsis* seedling by a blue light receptor cryptochrome 2. ***Proc. Natl. Acad. Sci. USA***. 1998; 95: 2686-2690.

Lollo C, Kwoh D, **Mockler TC**, Ley P, Guido M, Coffin C, Aleman R, Bartholomew R, and Carlo D. Non-viral gene delivery: vehicle and delivery characterization. ***Blood Coagul Fibrinolysis***. Dec. 8, 1997; Suppl 2: S31-8.

Mockler TC, DeRome M, O'Connor D, Coffin C, and Findeis M. Purification of Orosomucoid (Alpha1-Acid Glycoprotein) From Human Plasma and Conversion to Asialoorosomucoid. ***International Journal of Bio-Chromotography***. 1996; 2 (1): 9-16.

b. Chapters in Books:

Fox S, Filichkin, S, and **Mockler TC**. Applications of Ultra High Throughput Sequencing in Plants. ***Plant Systems Biology***. (ed D. Belostotsky), vol. 553 (Humana Press, 2009), pp 79-108.

c. Manuscripts in Review or Revision:

The *Brachypodium* Genome Initiative (I am one of four co-corresponding authors). Genome sequence analysis of the model grass *Brachypodium distachyon*: insights into grass genome evolution. *Submitted to* ***Science.***

Filichkin SA, Priest HD, Givan SA, Shen R, Bryant DW, Fox SE, Wong W-K and **Mockler TC**. Genome-wide mapping of alternative splicing in *Arabidopsis thaliana*. *Submitted to* ***Genome Research*** *- in revision.*

Priest HD, Bryant DW, Sullivan C, Givan SA, Shen R, and **Mockler TC**. TAU – an algorithm for reference guided assembly of transcription units from RNA-seq data. *Submitted to* ***Genome Biology****.*

Bryant DW, Shen R, Priest HD, Wong W-K and **Mockler TC**. SuperSplat – an algorithm for spliced alignment of RNA-seq microreads. *Submitted to* ***Genome Biology****.*

Garvin DF, McKenzie N, Vogel JP, **Mockler TC**, Blankenheim ZJ, Wright J, Cheema JJS, Dicks J, Huo N, Hayden DM, Gu Y, Tobias C, Chang JH, Chu A, Trick M, Michael TP, Bevan MW, and Snape JW. A Genetic Linkage Map of *Brachypodium distachyon*. *Submitted to* ***BMC Genetics****.*

Bao Y, Dharmawardhana P, **Mockler TC**, and Strauss SH. Genome scale transcriptome analysis of shoot organogenesis in poplar. *Submitted to* ***BMC Plant Biology***.

d. Manuscripts in Preparation:

Filichkin SA, Priest HD, Breton G, Givan SA, Kay S, Chory J, Michael TP, and **Mockler TC**. Diurnal and circadian transcript profiling defines functionally conserved noncoding elements between *Arabidopsis*, rice, and poplar. *In preparation.*

PROFESSIONAL MEETINGS AND SEMINARS

a. International Audiences:

Applications of next-generation sequencing to molecular analysis of plant transcriptomes. &th Canadian Plant Genomics Workshop. August 24-27, 2009. Sheraton Cavalier Hotel, Saskatoon, SK Canada.

High throughput sequencing reveals hidden complexity in plant transcriptomes. Meeting of the Gatsby Foundation Advisory Group, Schloss Elmau, Germany. Nov. 17, 2008.

b. National and Regional Audiences:

Applications of Next-Generation Sequencing to Molecular Analysis of Horticultural Crops. International Symposium on Molecular Markers in Horticultural Species. July 2009. July 29 – August 1, 2009, Corvallis, Oregon

Brachypodium distachyon Transcriptomics. Emerging Models Systems Minisymposium. ASPB Plant Biology 2009. July 18-22, 2009 Hawaii Convention Center, Honolulu, Hawaii.

Annotation of the *Brachypodium distachyon* transcriptome. Plant & Animal Genomes XVII Conference. January 2009. San Diego, CA.

Resources for transcriptome comparisons between *Brachypodium distachyon*, rice, and other grasses. Invited talk at Plant & Animal Genomes XVI Conference. January 2008. San Diego, CA.

Empirical Annotation of the *Brachypodium distachyon* Transcriptome. Plant & Animal Genomes XVI Conference. January 2008. San Diego, CA.

Bioinformatics and Genomics Resources for *Brachypodium distachyon*. Plant & Animal Genomes XV Conference. January 2007. San Diego, CA.

c. Departmental Audiences

Analyzing alternative splicing in plants using high-throughput sequencing (HTS). April 22, 2009. Washington State University. Pullman, WA.

Analyzing alternative splicing in plants using high-throughput sequencing (HTS). April 13, 2009. Michigan State University. East Lansing, MI.

Analyzing alternative splicing in plants using high-throughput sequencing (HTS). December 5, 2008. Iowa State University. Ames, IA.

Diurnal and circadian regulation of gene expression in plants. Pennsylvania State University. September 17, 2007.

d. Poster Presentations

A Universal Genome Array and Transcriptome Atlas for *Brachypodium distachyon*. Henry D. Priest, Sam A. Fox, Sergei A. Filichkin, Scott A. Givan, Todd P. Michael and **Todd C. Mockler**. ASPB Plant Biology 2009. July 18-22, 2009 Hawaii Convention Center, Honolulu, Hawaii.

Diurnal and circadian transcript profiling defines functionally conserved key clock genes and cis-regulatory elements among Arabidopsis, rice, and poplar. Sergei A. Filichkin, Henry Priest, Todd P. Michael, Ghislain Breton, Steve Kay, Joanne Chory, and **Todd C. Mockler**. ASPB Plant Biology 2009. July 18-22, 2009 Hawaii Convention Center, Honolulu, Hawaii.

Brachypodium distachyon: a new model for the grasses. John Vogel, Klaus Mayer, Daniel Rokhsar, Jeremy Schmutz, **Todd Mockler**, Naxin Huo, Yong Gu, David Garvin, Michael Bevan. ASPB Plant Biology 2009. July 18-22, 2009 Hawaii Convention Center, Honolulu, Hawaii.

Profiling a killer: Effects of PtrToxB on gene expression in wheat. Iovanna Pandelova, **Todd Mockler**, Lynda Ciuffetti. Fungal Genetics Reports, Volume 56-Supplement, page 241. 25th Fungal Genetics Conference at Asilomar, March 17-22, 2009.

A Universal Genome Array and Transcriptome Atlas for *Brachypodium distachyon*. Henry D. Priest, Sam A. Fox, Sergei A. Filichkin, Scott A. Givan, Todd P. Michael and **Todd C. Mockler**. Genomics:GTL Awardee Workshop VII and USDA-DOE Plant Feedstock Genomics for Bioenergy Awardee Workshop 2009. Bethesda, Maryland February 8–11, 2009.

Epigenomics of development in *Populus*. Kyle R. Pomraning, Palitha D. Dharmawardhana, Henry D. Priest, Olga Shevchenko, Caiping Ma, Scott Givan, Elizabeth Etherington, Larry Wilhem, **Todd Mockler**, Steven Strauss and Michael Freitag. Genomics:GTL Awardee Workshop VII and USDA-DOE Plant Feedstock Genomics for Bioenergy Awardee Workshop 2009. Bethesda, Maryland February 8–11, 2009.

Deep Transcriptome Sequencing And Cataloging Of Constitutive And Alternative Splicing In *Arabidopsis*. Sergei A. Filichkin, Henry Priest, Rongkun Shen, Scott A. Givan, **Todd C. Mockler**. Plant & Animal Genomes XVII Conference. January 10-14, 2009. San Diego, CA.

Splicing Regulation and Transcriptome landscapes in plants. Samuel Fox, Sergei Filichkin, Henry Priest, Rongkun Shen, Scott Givan, Chris Sullivan and **Todd Mockler**. Center for Genome Research and Biocomputing Fall Conference. Redmond, OR. October 4-5, 2008.

Diurnal and circadian transcript profiling defines functionally conserved noncoding elements among *Arabidopsis*, rice, poplar, and papaya. Henry Priest, Sergei A. Filichkin, Anna Zdepski, Wenqin Wang, Ghislain Breton, Steve Kay, Joanne Chory, Todd P. Michael, and **Todd C. Mockler**. Center for Genome Research and Biocomputing Fall Conference. Redmond, OR. October 4-5, 2008.

Annotation of the *Brachypodium distachyon* Transcriptome. Henry Priest, Scott Givan and **Todd Mockler**. Center for Genome Research and Biocomputing Fall Conference. Redmond, OR. October 4-5, 2008.

Splicing Regulation and Transcriptome Landscapes in Plants. Samuel Fox, Sergei Filichkin, Henry Priest, Rongkun Shen, Scott Givan, Chris Sullivan and **Todd Mockler**. 19th Annual New Phytologist Symposium. Timberline Lodge, Mt. Hood, OR. September 17-20, 2008.

Diurnal and circadian transcript profiling defines functionally conserved noncoding elements among *Arabidopsis*, rice, poplar, and papaya. Henry Priest, Sergei A. Filichkin, Anna Zdepski, Wenqin Wang, Ghislain Breton, Steve Kay, Joanne Chory, Todd P. Michael, and **Todd C. Mockler**. Poster at the Annual Plant Genome Project Meeting. National Science Foundation. September 4-5, 2008. Arlington, VA.

Diurnal and circadian transcript profiling defines functionally conserved noncoding elements between *Arabidopsis*, rice and poplar. Sergei F. Filichkin, Todd P. Michael, Henry Priest, Ghislain Breton, Brenda Chow, Sam Hazen, Steve Kay, Joanne Chory and **Todd C. Mockler**. Poster at the Annual Plant Genome Project Meeting. National Science Foundation. September 6-7, 2007. Arlington, VA.

Comparative Genomic Studies of Diurnal and Circadian Regulation of Gene Expression. **Todd Mockler**, Scott Givan, Joanne Chory, Todd Michael, Steve Kay and Ghislain Breton. Poster at the Annual Plant Genome Project Meeting. National Science Foundation. September 6-7, 2006. Arlington, VA.

Iovanna Pandelova, **Todd Mockler**, Lynda Ciuffetti. Effect of ToxA treatment on wheat leaf gene expression. Fungal Genetics Newsletter, Volume 54-Supplement p 157. XXIV Fungal genetics Conference at Asilomar, March 20-25, 2007.

Todd Michael, **Todd Mockler,** Amanda Byer, Fangxin Hong, Samuel Hazen, Marcelo Yanovsky, Steve Kay, and Joanne Chory, Ambient temperature cycles or photoperiod diurnally regulate more than half of

the *Arabidopsis* transcriptome. 16th International Conference on *Arabidopsis* Research. Madison, WI. 2005.

Todd Mockler, Kristopher Irizarry, Dhavan Parikh, Jason Cheng, Chris Lee, and Chentao Lin. A bioinformatics approach to identifying *Arabidopsis* genes involved in photoreceptor signal transduction. The UCLA Bioinformatics Program Retreat. February 2002.

Todd Mockler, Kristopher Irizarry, Chris Lee, and Chentao Lin. A genome-wide study of *Arabidopsis* transcription factors and photoreceptor signal transduction. The Fifth Lake Tahoe Symposium on Molecular Diversity, Tahoe City, California. February 2001.

Hongwei Guo, **Todd Mockler,** and Chentao Lin (2000). SUB1, a novel calcium-binding protein, is involved in both blue light and far-red light signal transduction in *Arabidopsis*. ASPP Plant Biology 2000 Meeting, San Diego, July 2000.

Hongwei Guo, Hongyun Yang, **Todd Mockler**, Chentao Lin (1998). Enhancement of Blue-light Sensitivity of *Arabidopsis* Seedling and Regulation of Flowering Time by A Blue Light Receptor Cryptochrome 2. 9th International Meeting on *Arabidopsis* Research, Madison, Wisconsin. June 24-28, 1998.

Chentao Lin, Hongwei Guo, **Todd Mockler**, Hongyun Yang (1998). A Blue Light Receptor Cryptochrome 2 and Plant Development. Annual Meeting of the American Society of Plant Physiologists, Madison, Wisconsin. June 27-July 1, 1998.

Todd Mockler, Hongwei Guo, Hongyun Yang, and Chentao Lin (1998). Regulation of Flowering Time by *Arabidopsis* Photoreceptors. 6th Pacific Rim Biotechnology Conference, June 3-5, 1998. Hong Kong University of Science and Technology, Hong Kong.

Charles Lollo, Deborah Kwoh, **Todd Mockler**, Pat Ley, Claire Yang, Jose Gonzales, and C.R. Ill (1997). Nonviral Gene Delivery of Human Factor VIII: Vehicle Characterization and Plasmid Improvement. International Society on Thrombosis and Haemostasis. Florence, Italy. June 1997.

Deborah Kwoh, Chris Coffin, Jocelyn Jovenal, Pat Ley, **Todd Mockler**, and Charles Lollo (1997). Non-viral Gene Delivery: Correlation of Physical Measurements with Delivery and Biological Response. Conference on Delivery and Design of Genetic Medicines. Annapolis, Maryland. June 1997.

Todd Mockler, Chad Venne, Pat Ley, Charles Lollo, Richard Bartholomew, and Deborah Kwoh (1997). Characterization of Interpolyelectrolyte Complexes for Nonviral Gene Delivery In Vivo. Cold Spring Harbor Laboratory Conference on Regulation of Gene Expression in Health and Disease. Cold Spring Harbor, New York. April 1997.

Charles Lollo, **Todd Mockler**, Mark Guido, Pat Ley, and Deborah Kwoh (1995). Preparation of ASOR-Polylysine-pCMVLuc Complexes with Improved In Vivo Expression. Keystone Gene Therapy Conference. Steamboat Springs, Colorado. April 1995.

GRANT AND CONTRACT SUPPORT

a. Current Support

Project Title: Comparative Genomic Analysis of Diurnal and Circadian Gene Expression Regulation
PI: Todd C. Mockler (co-PIs Joanne Chory and Steve Kay)
Source: NSF Plant Genome Project
Period: 09/01/2006 – 08/31/2009
Amount: $1,192,225

Project Title: A Universal Genome Array and Transcriptome Atlas for *Brachypodium distachyon*
PI: Todd C. Mockler (co-PI Todd P. Michael)
Source: DOE - Plant Feedstock Genomics for Bioenergy Program
Period: 09/01/2008 – 08/31/2011
Amount: $1,200,000

Project Title: Variation in Diurnal Transcriptional Networks in Rice
PI: Todd C. Mockler (co-PI Sergei Filichkin)
Source: USDA – National Research Initiative
Period: 07/01/2008 – 06/31/2012
Amount: $364,330

Project Title: Epigenomics of Development in *Populus*
PI: Steve Strauss (co-PIs Todd Mockler and Michael Freitag)
Source: DOE - Plant Feedstock Genomics for Bioenergy Program
Period: 09/01/2008 – 08/31/2011
Amount: $191,700 (Mockler subaward)

Project Title: Systems Level Engineering of Plant Cell Wall Biosynthesis to Improve Biofuel Feedstock Quality
PI: Sam Hazen (co-PIs Todd Mockler and Steve Kay)
Source: DOE - Plant Feedstock Genomics for Bioenergy Program
Period: 09/01/2008 – 08/31/2011
Amount: $187,916 (Mockler subaward)

Project Title: Precise mapping of growth hormone effects by cell-specific gene activation response
PI: Sigal Savaldi-Goldstein
Source: BARD - United States - Israel
Period: 09/01/2009 – 06/30/2012
Amount: $150,000 (Mockler subaward)

Project Title: Arabidopsis 2010: Daily adaptation of transcriptional programs.
PI: Todd P. Michael
Source: NSF
Period: 1/01/10 - 12/31/13
Amount: $ 799,586 (Mockler subaward)

Project Title: Development of a Fast and Cost-Effective Method for Gene Discovery in Plants
PI: Todd C. Mockler
Source: Agricultural Research Foundation, Oregon State University
Period: 07/01/2007 – 06/30/2009
Amount: $12,500

b. Pending Support

Project Title: Circadian regulation of protein homeostasis during aging
PI: Jaga Giebultowicz
Source: NIH
Period: 01/01/2010 - 12/31/15
Amount: $1,133,030 (subaward)

Project Title: Characterization of healthy aging in a model organism
PI: Jaga Giebultowicz
Source: NIH
period: 01/01/2010 - 12/31/12
Amount: $245,012 (subaward)

PATENT AWARDS AND INVENTIONS

Lollo C, **Mockler TC**, and Kwoh D. Method of Preparing Polynucleotide-Carrier Complexes for Delivery to Cells. 1999; ***Unites States Patent*** **Number 5,994,316.**

Todd C. Mockler and James C. Carrington. Method and apparatus for modular synthesis of polynucleotides. **OSU Invention Disclosure Number OSU-08-11**. February 21, 2008

SERVICE

1. University Service

Departmental Committees:

- COSINe Advisory Group Representative for BPP (2009-present).
- Botany and Plant Pathology Faculty Search Committee (2008).
- BPP Infrastructure Committee - Computers (2007-present).

University Committees:

- Member of the Undergraduate Bioinformatics Curriculum Exploratory Committee, Biology Program, College of Science (2008-).
- Member of the Scientific Advisory Board, Center for Genome Research and Biocomputing (2008-present).

2. Service to the Profession

- Panel member for GenomeCanada's Competition in Applied Genomics in Bioproducts and Crops (2009).
- Member of the Program Committee of the American Society of Plant Biologists (2008-).
- Editorial Board member for the journal Molecular Plant (2007-).
- Reviewed manuscripts for the journals Bioinformatics, Nucleic Acids Research, Comparative and Functional Genomics, Functional Plant Biology, Cellular Biochemistry, Plant Cell, Plant Physiology, New Phytologist, Biology Direct, PloS Genetics, Nature, Functional and Integrative Genomics, RNA, and Developmental Biology.
- Reviewed grants for USDA, NSF, The State of Missouri, The State of California, and Genome Canada.

3. Professionally-Related Service to the Public

- Invited presentation: "Plant Genomics and Biofuels". January 27, 2009. Academy for Lifelong Learning. Oregon State University Alumni Association. Corvallis, OR.
- Taught an introduction to plant biology to Kindergartners at Mountain View School, Corvallis in 2008.
- Assisted with the Science Fair at Mountain View School, Corvallis in 2008.

AWARDS

1. University

- Phi Kappa Phi Emerging Scholar Award, 2009.
- UCLA Dissertation Year Fellowship, 2001-2002.

2. National

- NIH National Research Service Award Postdoctoral Fellowship, 2003-2006.
- NSF Integrated Bioinformatics Training Grant (NSF-IGERT), 2000-2001.
- NIH Biotechnology Training Grant, 1997-2000.
- Howard Hughes Undergraduate Research Fellowship, 1991-1993.