

# Laura S. Burrack

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## EDUCATION:

- Harvard University, Boston, MA** **2002 – 2008**  
*Ph.D. in Microbiology and Molecular Genetics*  
Advisor: Darren E. Higgins, Ph.D.
- Macalester College, St. Paul, MN** **1998 – 2002**  
*B.A. Biology Major, Chemistry Core, summa cum laude, Phi Beta Kappa*

## TEACHING EXPERIENCE:

- Gustavus Adolphus College, Saint Peter, MN** **2015 – Present**  
*Assistant Professor of Biology*
- Courses to be taught during 2015-2016 academic year: BIO101: Principles of Biology, BIO218: Fundamentals of Microbiology, BIO344: Special Topics - Cancer Biology, BIO380: Microbiology
- Grinnell College, Grinnell, IA** **2013 – 2015**  
*Assistant Professor of Biology, Two-year term*
- Courses taught: BIO150: Introduction to Biological Inquiry (Genes, Drugs and Toxins), BIO251: Molecules, Cells and Organisms, BIO370: Advanced Cell Biology, BIO380: Molecular Biology, BIO395: Special Topics - Cancer Biology
- University of Minnesota, Minneapolis, MN** **2010**  
*Instructor*
- Taught genomics section (four class periods) of graduate-level advanced genetics course (GCD8131) including lectures, exam writing, and grading.
- Minneapolis Community and Technical College, Minneapolis, MN** **2009**  
*Instructor*
- Taught microbiology lecture course (BIOL2230) and three sections of microbiology laboratory course (BIOL2231) as a substitute for last month of course.
- Simmons College, Boston, MA** **2007**  
*Microbiology and General Biology Laboratory Instructor*
- Taught one section of the microbiology laboratory (BIOL-123L) and one section of the general biology laboratory (BIOL-113L).
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- Harvard University, Boston, MA** **2003 – 2004**  
*Teaching Assistant*
- Led sections for a graduate-level genetics course (GENETICS 201) for two semesters, including reviewing lecture material, assisting students with practice problems, and answering questions. Graded problem sets and exams.

## RESEARCH EXPERIENCE:

### University of Minnesota, Minneapolis, MN

2008 – 2013

*Post-doctoral fellow with Dr. Judith Berman*

Project: Investigation of flexibility in centromeres and kinetochores

- Developed *C. albicans* as a model to explore the consequences of kinetochore size variation and changes in centromere position.
- Determined how kinetochore size alters centromere structure, chromosome segregation efficiency, and the requirements for specific kinetochore proteins.
- Studied mechanisms of neocentromere formation and function.

### Harvard University, Boston, MA

2003 – 2008

*Doctoral dissertation research with Dr. Darren E. Higgins*

Project: Characterization of host cell factors involved in the vacuolar biology of *Listeria monocytogenes* infection

- Screened for host factors important for intracellular infection in *Drosophila* and human cells using RNA interference (RNAi).
- Examined interactions between bacterial virulence factors and host vesicular trafficking pathways.

### Cold Spring Harbor Laboratory, Cold Spring Harbor, NY

2001

*Undergraduate Researcher in the laboratory of Dr. Bruce Stillman*

Project: Analyzed complex formation and function of the scMcm (minichromosome maintenance) proteins involved in the initiation of DNA replication in *Saccharomyces cerevisiae*.

### 3M Corporation, St. Paul, MN

2001

*Internship, Proteomics Group*

Project: Developed sample handling product to remove albumin from human serum using affinity chromatography and FPLC.

### Harvard University, Cambridge, MA

2000

*Howard Hughes Medical Institute Summer Intern in the laboratory of Dr. Tom Maniatis*

Project: Characterized protein-protein interaction domains of two proteins involved in the regulation of anti-bacterial peptide production by the *Drosophila* immune response.

### Research mentoring experience

#### Grinnell College, Grinnell, IA

2014 – 2015

- Mentored research experience for one second-year student through HHMI program during the spring semester 2014. Mentoring two full-time student mentored advanced projects (MAPs) during summer and fall semester 2014.

#### University of Minnesota, Minneapolis, MN

2009 – 2013

- Served as the primary, day-to-day advisor for undergraduates and junior scientists conducting research in the Berman laboratory.
- Assist undergraduates and junior scientists in obtaining funding via research proposals and communicating their work in lab meeting and at poster sessions.
- Mentored a total of four undergraduates and four junior scientists.

#### Harvard University, Boston, MA

2005 – 2006

- Mentored a Harvard University undergraduate conducting her honors thesis in the Higgins laboratory.

## PUBLICATIONS:

Anderson, M.Z., Wigen, L.J., **Burrack, L.S.**, and Berman, J. (2015) Real-Time Evolution of a Subtelomeric Gene Family in *Candida albicans*. *Genetics* **200**(3): 907-919.

Tsai, H-J., Baller, J.A., Liachko, I., Koren, A., **Burrack, L.S.**, Hickman, M.A., Thevandavakkam, M.A., Rusche, L.N., and Berman, J. (2014) ORC binding, nucleosome depletion patterns and a primary sequence motif can predict origins of replication in a genome with epigenetic centromeres. *mBio*. **5**(5):e01703-14.

**Burrack, L.S.**, Clancey, S.E.A., Chacón, J., Gardner, M.K., and Berman, J. (2013) Monopolin recruits condensin to organize centromere DNA and repetitive DNA sequences. *Mol Biol Cell*. **24**(18): 2807-2819.

**Burrack, L.S.** and Berman, J. (2012) Neocentromeres and epigenetically inherited features of centromeres. *Chromosome Res*. **20**(5): 607-619.

**Burrack, L.S.** and Berman, J. (2012) Flexibility of centromere and kinetochore structures. *Trends Genet*. **28**(5): 204-212.

**Burrack, L.S.**, Applen, S.E., and Berman, J. (2011) The Requirement for the Dam1 Complex Is Dependent upon the Number of Kinetochore Proteins and Microtubules. *Curr Biol*. **21**(10): 889-896.

Roy, B., **Burrack, L.S.**, Lone, M.A., Berman, J. and Sanyal, K. (2011) CaMtw1, a member of the evolutionarily conserved Mis12 kinetochore protein family, is required for efficient inner kinetochore assembly in the pathogenic yeast *Candida albicans*. *Mol Microbiol*. **80**: 14-32.

Koren, A., Tsai, H.J., Tirosh, I., **Burrack, L.S.**, Barkai, N., and Berman, J. (2010) Epigenetically-inherited centromere and neocentromere DNA replicates earliest in S-phase. *PLoS Genet*. **6**: e1001068.

**Burrack, L.S.**, Harper, J.W., and Higgins, D.E. (2009) Perturbation of vacuolar maturation promotes listeriolysin O-independent vacuolar escape during *Listeria monocytogenes* infection of human cells. *Cell Microbiol*. **11**: 1382-1398.

**Burrack, L.S.** and Higgins, D.E. (2007) Genomic approaches to understanding bacterial virulence. *Curr Opin Microbiol*. **10**(1): 4-9.

Agaisse, H.\*, **Burrack, L.S.\***, Philips, J.A., Rubin, E.J., Perrimon, N., and Higgins, D.E. (2005) Genome-wide RNAi screen for host factors required for intracellular bacterial infection. *Science*. **309**: 1248-1251. (\*These authors contributed equally.)

Gründling, A., **Burrack, L.S.**, Bouwer, H.G., and Higgins, D.E. (2004) *Listeria monocytogenes* regulates flagellar motility gene expression through MogR, a transcriptional repressor required for virulence. *Proc Natl Acad Sci USA*. **101**: 12318-12323.

## PRESENTATIONS:

**Burrack, L.S.**, Clancey, S.E.A., Hutton, H.F., Matter, K.J., Plemmons, A., Saha, A., Turman, B., Peterson, K., Sajani, A., and Berman, J. Neocentromere formation and chromosome segregation efficiency in *Candida albicans*. Oral and Poster Presentations. Centromere Biology Gordon Research Conference. Waltham, MA. 2014

**Burrack, L.S.**, Applen, S.E., Hutton, H.F., Matter, K.J, and Berman, J. Neocentromere formation and chromosome segregation efficiency in *Candida albicans*. Poster Presentation. EMBO Workshop: Structure, function and regulation of centromeres and kinetochores. Barcelona, Spain. 2012.

**Burrack, L.S.**, Applen, S.E., Hutton, H.F., Matter, K.J, and Berman, J. *Candida albicans* as a model for chromosome instability and centromere flexibility. Poster Presentation. Model Organisms to Human Biology (GSA). Washington, DC. 2012.

**Burrack, L.S.**, Applen, S.E., Hutton, H.F., Matter, K.J, and Berman, J. Flexibility of kinetochore size and position in *Candida albicans*. Oral and Poster Presentations. Chromosome Dynamics Gordon Research Conference. West Dover, VT. 2011.

**Burrack, L.S.**, Applen, S.E., and Berman, J. The requirement for the Dam1 complex is dependent upon the number of kinetochore-microtubule attachments. Poster Presentation. Midwest Yeast Meeting. Evanston, IL. 2010.

**Burrack, L.S.** and Berman, J. Neocentromeres in *Candida albicans*. Oral Presentation. European Human Genetics Conference. Gothenburg, Sweden. 2010.

**Burrack, L.S.**, Applen, S.E., and Berman, J. The Dam1 Complex, a Group of Fungal-Specific Kinetochore Proteins, is Essential for Viability in *Candida albicans*. Oral Presentation. 10<sup>th</sup> ASM Conference on Candida and Candidiasis. Miami, FL. 2010.

**Burrack, L.S.** and Berman, J. Loops, Rings, and Chromosome Segregation: Analysis of Centromere Structure in *Candida albicans*. Poster Presentation. Annual Meeting: American Society of Cell Biology. San Diego, CA. 2009.

**Burrack, L.S.**, Harper, J.W., and Higgins, D.E. Identification of Human Cell Factors Involved in the Vacuolar Biology of *Listeria monocytogenes* Infection. Poster Presentation. Boston Bacterial Meeting. Boston, MA. 2007.

**Burrack, L.S.**, Harper, J.W., and Higgins, D.E. Identification of Human Cell Factors Involved in the Vacuolar Biology of *Listeria monocytogenes* Infection. Poster Presentation. Annual Meeting: American Society for Cell Biology. San Diego, CA. 2006.

**Burrack, L.S.**, Agaisse, H., Perrimon, N., and Higgins, D.E. Identification of Host Factors Involved in the Vacuolar Biology of *Listeria monocytogenes* Infection. Poster Presentation. Microbial Pathogenesis and Host Response Meeting. Cold Spring Harbor Laboratory. Cold Spring Harbor, NY. 2005.

**Burrack, L.S.**, Agaisse, H., Perrimon, N., and Higgins, D.E. Identification of Host Factors Involved in the Vacuolar Biology of *Listeria monocytogenes* Infection. Oral Presentation. Boston Bacterial Meeting. Cambridge, MA. 2005.

Gründling, A., **Burrack, L.S.**, Bower, H.G.A., Higgins, D.E. Mechanism of Temperature-Dependent Regulation of Swimming Motility in *Listeria*. Poster Presentation. Boston Bacterial Meeting. Cambridge, MA. 2004.

Gründling, A., **Burrack, L.S.**, Bower, H.G.A., Higgins, D.E. Mechanism of Temperature-Dependent Regulation of Swimming Motility in *Listeria*. Poster Presentation. General Meeting: American Society for Microbiology. New Orleans, LA. 2004.

## FELLOWSHIP AND GRANT FUNDING:

<b>Grinnell College</b> <i>Committee for Faculty Scholarship Funds Grant</i> <i>Mentored Advanced Project for Undergraduate Training</i>	<b>2013 – 2015</b>
<b>American Cancer Society</b> <i>Postdoctoral Fellowship</i>	<b>2012 – 2013</b>
<b>N.I.H. Ruth L. Kirschstein Individual National Research Service Award</b> <i>Postdoctoral Fellowship</i>	<b>2008 – 2011</b>
<b>Howard Hughes Medical Institute</b> <i>Pre-doctoral Fellowship</i>	<b>2002 – 2007</b>

## HONORS AND AWARDS:

University of Minnesota Outstanding Postdoctoral Scholar Award 2011.

Bernard N. Fields Prize (Outstanding Dissertation, Department of Microbiology and Molecular Genetics, Harvard Medical School). 2008.

National Science Foundation Fellowship Honorable Mention. 2002.

O.T. and Kathryn Walter Award in Biology (Macalester College). 2002.

Barry M. Goldwater Scholarship. 2001.

National Merit Scholar. 1998 – 2002.

## PROFESSIONAL TRAINING:

<b>Introduction to Computer Programming in Biology</b> - Semester-long course in computer programming for biologists. Included Perl and Matlab programming languages as well as instruction in designing efficient code.	<b>2012</b>
<b>HHMI Scientific Teaching Program, Minneapolis, MN</b> - Course combined discussion and hands-on experiences to develop skills for teaching science using inquiry-based and interactive methods.	<b>2011 – 2012</b>
<b>Preparing Future Faculty Program, University of Minnesota, Minneapolis, MN</b> - Course covered a variety of topics including classroom management and teaching methods, course design, and strategies for obtaining an academic position. Practice teaching with feedback from fellow students and instructors was also included.	<b>2009</b>
<b>Molecular Mycology Course, Marine Biological Laboratory, Woods Hole, MA</b> - Intensive lecture and hands-on laboratory course taught by leading researchers in the fungal pathogenesis field.	<b>2008</b>

**PROFESSIONAL SERVICE:**

<b>Biology Department Seminar Series, Grinnell College</b> <i>Co-coordinator</i>	<b>2014 – 2015</b>
<b>Early Career Faculty Group, Grinnell College</b> <i>Science division term-faculty liaison</i>	<b>2014 – 2015</b>
<b>Associate Faculty member for Faculty of 1000</b>	<b>2009 – 2013</b>
<b>Editor for the BBS Bulletin, Harvard University</b>	<b>2004 – 2007</b>