

# RHONDA BACHER

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Website: <http://rhondabacher.github.io>

## EDUCATION

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- University of Wisconsin-Madison** 2012 - 2017  
Ph.D. in Statistics  
Emphasis in Biostatistics  
Thesis Advisor: Christina Kendzierski, Ph.D.
- University of Florida** 2008 - 2012  
B.S in Statistics (Magna Cum Laude), B.S in Mathematics (Cum Laude)  
College of Agriculture and Life Sciences Honors Scholar  
Honors Thesis: "RNA-seq data: normal models and missing data"  
Thesis Advisor: Lauren McIntyre, Ph.D.

## PROFESSIONAL EXPERIENCE

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- Assistant Professor** January 2018 - present  
*Department of Biostatistics*  
*University of Florida*
- Postdoctoral Research Fellow** July 2017 - December 2017  
*Center for Predictive Computational Phenotyping*  
*University of Wisconsin-Madison*
- Bio-Data Science Trainee (NIH)** 2016 - 2017  
*Department of Biostatistics and Medical Informatics, University of Wisconsin-Madison*
- Research Assistant** 2015 - 2016  
*Center for Predictive Computational Phenotyping, University of Wisconsin-Madison*  
*An NIH Center of Excellence for Big Data Computing established by the Big Data to Knowledge Initiative*
  - Developed normalization method for single cell RNA-seq data as part of the Transcriptome-based Phenotyping Project  
Mentor: Christina Kendzierski, Ph.D.
- Biostatistics Trainee (NIGMS)** 2012 - 2015  
*Department of Biostatistics and Medical Informatics, University of Wisconsin-Madison*  
Performed four research rotations:
  - Mapping QTL for mouse growth curves, Spring 2014  
Mentor: Karl Broman, Ph.D.
  - Stochastic modeling of ribosomal profiling data, Fall 2013  
Mentor: Michael Newton, Ph.D.
  - Analysis of white matter lesions related to cognitive dysfunction and falls in the elderly, Spring 2013  
Mentor: Richard Chappell, Ph.D.
  - Evaluation of statistical methods for multiple condition analyses in RNA-seq experiments, Fall 2012  
Mentor: Christina Kendzierski, Ph.D.

## PUBLICATIONS

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1. **Bacher, R.** and Kendziorski, C. Design and computational analysis for single-cell RNA-sequencing experiments. *Genome Biology*. 17, 63 (2016).
2. **Bacher, R.\***, Chu, L.-F.\*, Leng, N., Thomson, J.A., Gasch, A., Stewart, R.M., Newton, M., and Kendziorski, C. SCnorm: robust normalization of single-cell RNA-seq data. *Nature Methods* 14.6 (2017): 584-586. [\* indicates co-first authors]
3. **Bacher, R.\***, Leng, N.\*, Chu, L.-F., Thomson, J.A., Kendziorski, C., and Stewart, R.M. Trendy: Segmented regression approach to reveal expression dynamics in high throughput profiling data with ordered conditions, submitted. [\* indicates co-first authors]  
(<http://www.biorxiv.org/content/early/2017/09/07/185413>)
4. Barry, C., Schmitz, M.T., Jiang, P., Schwartz, M.P., Duffin, B.M., Swanson, S., **Bacher, R.**, Bolin, J.M, Elwell, A.L., McIntosh, B.E., Stewart, R., Thomson, J.A. Species-Specific Developmental Timing is Maintained by Pluripotent Stem Cells Ex Utero. *Developmental Biology*. 423, 101-110 (2017).
5. Fischer, B.L., **Bacher, R.**, Bendlin, B.B., Birdsill, A.C., Ly, M., Hoscheidt, S.M., Chappell, R.J., Mahoney, J.E., Gleason, C.E. An Examination of Brain Abnormalities and Mobility in Individuals with Mild Cognitive Impairment and Alzheimer’s Disease. *Frontiers in Aging Neuroscience*. 9, 86 (2017).
6. Ye, S., **Bacher, R.**, Keller, M.P., Attie, A.D., and Kendziorski, C. Statistical Methods for Latent Class Quantitative Trait Loci Mapping. *Genetics* (2017): genetics-117.
7. Gasch, A.P., Yu, B., Hose, J., Escalante, L., Place, M., **Bacher, R.**, Kanbar, J., Ciobanu, D., Sandor, L., Grigoriyev, I.V., Kendziorski, C., Quake, S., McClean, M. Single-cell RNA-seq reveals intrinsic and extrinsic regulatory heterogeneity in yeast responding to stress. *PLoS biology* 15.12 (2017): e2004050.
8. Vermillion, K.L., **Bacher, R.**, Tannenbaum A.P., Swanson S., Callahan K.A., Jiang P., Stewart R.M., Thomson J.A., Vereide D.T. Novel spatial patterns of gene expression are revealed in the chick primitive streak by single-cell RNA-seq, submitted.
9. Keller, M.P., Simecek, P., Schueler, K.L., Rabaglia, M.E., Stapleton, D.S., Broman, A.T., Gatti, D.M. Vincent, M., Allen, S., **Bacher, R.**, Kendziorski, K., Broman, K.W., Yandell, B.S., Churchill, G.A., Attie, A.D. Genetic drivers of pancreatic islet function, submitted.

## SOFTWARE

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1. SCnorm: An R-package to normalize single-cell RNA-seq data (developed by **Rhonda Bacher**). Available at: <https://bioconductor.org/packages/devel/bioc/html/SCnorm.html>
2. OscillationViz: An R/Shiny application designed for collaborators to interactively explore relationships of simulated sinusoidal/oscillating gene expression (developed by **Rhonda Bacher**). Available at: <https://github.com/rhondabacher/Oscillating-genes>
3. Trendy: An R-package that can be used to perform breakpoint analysis on microarray or RNA-seq expression data with ordered conditions (co-developed by **Rhonda Bacher**). Available at: <https://github.com/rhondabacher/Trendy>
4. Trendy R/Shiny: An R/Shiny application that allows users to interactively explore results from the Trendy package and extract gene patterns of interest (developed by **Rhonda Bacher**). Available at: <https://github.com/rhondabacher/Trendy>

## AWARDS AND HONORS

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Outstanding poster award <i>SAGES (Symposium on Advances in Genomics, Epidemiology and Statistics)</i>	2017
Travel grant award <i>iBRIGHT (Integrative Biostatistics Research for Imaging, Genomics, &amp; High-throughput Technologies in Precision Medicine) Conference</i>	2015
Travel grant award <i>8th International Purdue Symposium on Statistics, to attend session "Interactions Between Omics and Statistics: Analyzing High Dimensional Data"</i>	2012
Travel grant award <i>Department of Statistics, University of Florida, to attend the 53rd Drosophila Research Conference in Chicago, IL</i>	2012
Outstanding poster award <i>University of Florida Annual Microbiology and Cell Science Undergraduate Research Symposium</i>	2012
Mu Sigma Rho Honor Society, University of Florida	2012
Phi Beta Kappa Honor Society, University of Florida	2012
Anderson Scholar with Distinction, University of Florida	2010
Florida Academic Scholars Award, Florida Bright Futures Scholarship Program, State of Florida	2008 - 2012
Bob McCord Scholarship Foundation Award, Key West High School	2008 - 2010
Academic Excellence Award, Key West High School	2008

## JOURNAL REFEREE

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Genome Biology, Nature Methods, Nature Communications, Nucleic Acids Research, Genome Research, PLOS Computational Biology

## NATIONAL PRESENTATIONS

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International Chinese Statistical Association - Symposium on Single Cell Sequencing Invited talk, Chicago, IL	June 2017
Symposium on Advances in Genomics, Epidemiology, and Statistics Annual Meeting Contributed poster, Philadelphia, PA	June 2017
Systems Genetics Short Course at the Jackson Lab Evening colloquium, Bar Harbor, ME	October 2016
International Biometric Society Eastern North American Region (ENAR) Annual Meeting Contributed poster, Austin, TX	March 2016
Program in Quantitative Genomics (PQG) Conference Contributed poster, Boston, MA	November 2015
Integrative Biostatistics Research for Imaging, Genomics, & High-throughput Technologies in Precision Medicine (iBRIGHT) Conference Contributed poster, Houston, TX	October 2015
International Biometric Society Eastern North American Region (ENAR) Annual Meeting Contributed poster, Miami, FL	March 2015

International Purdue Symposium on Statistics Contributed poster, West Lafayette, IN	June 2012
Annual Drosophila Research Conference Contributed poster, Chicago, IL	March 2012

### LOCAL PRESENTATIONS

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Center for Predictive Computational Phenotyping Third Annual Retreat Contributed poster, Madison, WI	June 2017
Center for Predictive Computational Phenotyping Second Annual Retreat Contributed poster, Madison, WI	June 2016
Computation and Informatics in Biology and Medicine Training Program Contributed poster, Madison, WI	October 2015
Bioinformatics Lab Meeting, Thomson Lab at the Morgridge Institute for Research	October 2015
NSF Conference on Complex Systems Contributed poster, Madison, WI	June 2015
Center for Predictive Computational Phenotyping First Annual Retreat Contributed poster, Madison, WI	June 2015
Genomic Sciences Program Annual Retreat Contributed poster, Madison, WI	May 2015
Biostatistics Trainee Seminar, Department of Biostatistics and Medical Informatics, University of Wisconsin	May 2014
Biostatistics Trainee Seminar, Department of Biostatistics and Medical Informatics, University of Wisconsin	December 2013
Biostatistics Trainee Seminar, Department of Biostatistics and Medical Informatics, University of Wisconsin	May 2013
Biostatistics Trainee Seminar, Department of Biostatistics and Medical Informatics, University of Wisconsin	December 2012
University of Florida High Performance Computing Center, Gainesville, FL <i>Training session talk "Using SAS in a cluster environment"</i>	May 2012
University of Florida Annual Microbiology and Cell Science Undergraduate Research Symposium, Contributed Poster, Gainesville, FL	April 2012

### PROFESSIONAL SOCIETY MEMBERSHIPS

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International Biometric Society (ENAR)

### TEACHING EXPERIENCE

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Teaching Assistant, Department of Biostatistics and Medical Informatics University of Wisconsin-Madison	Spring 2017
<ul style="list-style-type: none"> <li>• <i>STAT 877 - Statistical Methods for Molecular Biology</i></li> </ul>	
Tutor, Department of Biostatistics and Medical Informatics University of Wisconsin-Madison	Fall 2015 - Summer 2016
<ul style="list-style-type: none"> <li>• <i>STAT 609 - Mathematical Statistics I</i></li> <li>• <i>STAT 849 - Theory and Application of Regression and Analysis of Variance I</i></li> <li>• <i>Qualifying Exam</i></li> </ul>	

Private Tutor, University of Wisconsin-Madison	Fall 2014 - Spring 2016
<ul style="list-style-type: none"> <li>• <i>STAT 309 - Mathematical Statistics I (undergraduate)</i></li> <li>• <i>STAT 310 - Mathematical Statistics II (undergraduate)</i></li> <li>• <i>STAT 371 - Introductory Applied Statistics for the Life Sciences</i></li> <li>• <i>STAT 571 - Statistical Methods for Bioscience I</i></li> </ul>	
Grader, Department of Statistics, University of Wisconsin-Madison	Fall 2014, Fall 2015
<ul style="list-style-type: none"> <li>• <i>STAT 371 - Introductory Applied Statistics for the Life Sciences</i></li> <li>• <i>STAT 324 - Introductory Applied Statistics for Engineers</i></li> </ul>	
Teaching Assistant, Department of Biostatistics and Medical Informatics University of Wisconsin-Madison	Summers 2013 - 2015
<ul style="list-style-type: none"> <li>• <i>Assisted undergraduate students in R training during the Summer Institute for Training in Biostatistics (SIBS) program</i></li> </ul>	

## SERVICE

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Chair, Council for Emerging and New Statisticians <i>Standing committee of twelve members of ENAR's Regional Advisory Board</i>	May 2017 - present
Member, Council for Emerging and New Statisticians <i>Standing committee of twelve members of ENAR's Regional Advisory Board</i>	May 2015 - May 2017
Session Chair, ENAR <i>Annual Meeting, Austin, TX</i>	Spring 2016
Organizer, Weekly Student Seminar <i>Department of Statistics, University of Wisconsin-Madison</i>	Spring 2015
Member, Statistics Social Committee <i>Department of Statistics, University of Wisconsin-Madison</i>	Fall 2014 - Spring 2015
Organizer, Weekly Statistical Genetics Student Reading Group <i>Department of Biostatistics, University of Wisconsin-Madison</i>	Fall 2014
Cofounder, Statistics Club <i>University of Florida</i>	Fall 2011 - Spring 2012

## COMPUTING SKILLS

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R, R/Shiny, R package construction, Grid/Distributed computing systems (HTCondor), Git, C, Perl, LaTeX, Linux, Shell Scripting, HTML, SAS