

# RICK MASONBRINK

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## EDUCATION

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**Northwest Missouri State University** 2006  
BS Biology with Cellular-Molecular emphasis Overall GPA: 3.31/4  
Advisor: Dr. Phillip Lucido

**University of Missouri** 2012  
PhD Biology Overall GPA: 3.84/4  
Thesis: Investigating the effects of minichromosomes in maize  
Advisor: Dr. James Birchler

## GRANTS

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**NSF National Plant Genome Initiative Postdoctoral Research Fellowship** \$207,000  
Investigating Centromere Evolution in Diploid and Polyploid Gossypium 2013-2016

## WORK EXPERIENCE

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**Iowa State University Genome Informatics Facility** November 2017 - present  
*Research Scientist IV*

- Dr. Andrew Severin
- My responsibilities include researching, investigating, developing, evaluating and implementing methods to analyze many different type of omics data. Emphasis is placed upon extracting meaningful information to understand and solve biological problems.
- I was tasked with developing cyber-infrastructure through the creation of pipeline, scripts, and tutorials.
- I managed day to day activities of bioinformatics core that included engaging clients, assisting personnel, billing, and resource monitoring.

**Accdon LLC** April 2015 - present  
*Contract English and Science Editor*

- Managing Editors: Lindsey Gendall MA. and Dr. Rong Han
- Edited 31 English and 28 Science papers

**Iowa State University** July 2016 - November 2017  
*Postdoctoral Research Associate*

- Principal Investigator: Dr. Andrew Severin and Dr. Thomas Baum
- Genome evolution and genomics web portal development in soybean cyst nematode
- Abalone genome evolution
- Seriola genome evolution and genomics web portal development

**Iowa State University** July 2013 - June 2016  
*Postdoctoral Research Fellow*

- Principal Investigator: Dr. Jonathan Wendel
- Centromere evolution in diploid and polyploid *Gossypium*

- Cyto-nuclear coevolution in *Gossypium*
- Mentored graduate students Josef Jareczek, Justin Conover, high school teacher Richardson Gileau, and undergraduate student Samantha Snodgrass in molecular and bioinformatic techniques

**University of Missouri**  
*Research Assistant*

June 2007 - May 2012

- Principal Investigator: Dr. James Birchler
- Investigating the effects of minichromosomes in maize
- Mentored multiple undergraduate and graduate students in molecular and cytological techniques

**University of Missouri**  
*Teaching Assistant*

January 2006 - May 2007

- Class: General Genetics
- Teaching Advisor: Dr. John David

**University of Missouri**  
*Teaching Assistant*

August 2006 - December 2006

- Class: General biology for non-majors
- Teaching Advisor: Dr. Gerald Summers

**Northwest Missouri State University**  
*Undergraduate Research*

January 2006 - July 2006

- Analysis of genetic drift using RAPD PCR analysis on isolated populations of freshwater mussels
- Research Advisor: D. Jeff Thornsberry

## ACCOMPLISHMENTS

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### Publicly available pipelines and scripts

- <https://github.com/remkv6/GossypiumCentromeres> – Enrichment scripts for repeat analyses
- <https://github.com/remkv6/SCNBase> – Genomics database development
- [https://github.com/remkv6/SCN\\_Genome\\_Paper](https://github.com/remkv6/SCN_Genome_Paper) – Initial nematode genome investigation
- <https://github.com/ISUgenomics/commonscripts> – Scripts for common genomics analyses
- <https://github.com/remkv6/Ddipsaci> – Genome annotation of *D. dipsaci*
- <https://github.com/ISUgenomics/Dovetail2SCNGenome> – Assembly and annotation of SCN genome
- <https://github.com/ISUgenomics/bioinformatics-workbook> – A home for bioinformatics tutorials
- [https://github.com/ISUgenomics/elk\\_genomics](https://github.com/ISUgenomics/elk_genomics) – Rocky mountain elk genome assembly, annotation, and comparative analyses
- [https://github.com/ISUgenomics/SingleCellRNAseq\\_RyanSmith](https://github.com/ISUgenomics/SingleCellRNAseq_RyanSmith) – Analyses of single-cell RNAseq
- <https://github.com/ISUgenomics/Heterodera-glycines-Spliced-Leaders> – Pipeline to identify spliced leaders
- [https://github.com/ISUgenomics/RedAbaloneGenomePaper\\_GBE\\_2018](https://github.com/ISUgenomics/RedAbaloneGenomePaper_GBE_2018) – Red abalone genome assembly and annotation

### Genome portal web development

- <https://scnbase.org/> – Soybean cyst nematode genomic and effector resource
- <https://serioladb.org/> – *Seriola* genomic resource

## SKILLS

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## Scripting languages

- Proficient in Unix scripting/bash and python, and basic knowledge of perl, markup, R, and latex

## Software proficiencies

- Assembly: PriceTI, Mira, Lastz, Abyss, Cap3, Trinity, and Falcon, Canu, Flye, Miniasm, Shasta
- Annotation: GeneMark, Augustus, Braker, Busco, Repeatmodeler, Repeatmasker, BLAST, rmBLAST, Trinotate, TRF, Blobtools, CEGMA, Hmmer, Interproscan, Redtandem, RNAmmer, TMHMM, Maker, Mikado, Spades, Class2, Cufflinks, Stringtie, etc
- Aligners: Blasr, Bowtie, BWA, Gmap, Gsnap, Hisat2, Star, etc
- Expression: RSEM, Subread, Deseq
- Comparative genomics: Exonerate, iADhore, Synchro, Bedtools, CD-Hit, GATK, MEME, Bcftools, Mummer, DNAsp, MEGA, Mummer, Orthofinder, etc
- Phylogenetics: Guidance, Mafft, Prank, Rnammer, Astral, ClustalW, Muscle, Raxml
- Visualization: Circos, Cytoscape, String, Photoshop, etc
- Other: Seqtk, Aspera, Astral, Bamtools, Bioawk, Biopieces, Cdbfasta, Fastqc, Fastx-toolkit, Gawk, Genometools, Gffread, Jellyfish, Picard Tools, Samtools, SRA-Toolkit, Tabix, Transdecoder, Trimmomatic, Sickle, Vcftools, BLAT, Emboss, Mirdeep, Targetp, Signalp, Tassel, Macs2, Chlorop, etc

## Lab proficiencies

- light microscopy, fluorescence microscopy, scanning electron microscopy, confocal microscopy, flow cytometry, plant transformation, molecular cloning, chromatin immunoprecipitation, maize and cotton pollinations, quantitative PCR, fluorescence in-situ hybridization, immunostaining

## PUBLICATIONS

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- Maier T., **Masonbrink R.**, Vijayapalani P., Gardner M., Howland, A.D., Mitchum M. G., Baum T. (2021) Esophageal gland RNA-seq resource of a virulent and avirulent population of the soybean cyst nematode *Heterodera glycines*. *Molecular Plant-microbe Interactions*, 34(9), 1084-1087.
- **Masonbrink R.**, Maier T., Hudson M., Severin A., Baum T. (2021) A chromosomal assembly of the soybean cyst nematode genome. *Molecular Ecology Resources*, 21(7), 2407-2422.
- **Masonbrink R.**, Alt D., Bayles D., Boggiatto P., Edwards W., Tatum F., Williams J., Wilson-Welder J., Zimin A., Severin A., Olsen S. (2021) A pseudomolecule assembly of the rocky mountain elk genome. *PloS One*, 16(4), e0249899.
- Kwon K., **Masonbrink R.**, Maier T. R., Severin A. J., Baum T. J., Mitchum M. G. (2021). Genes related to vitamin B and plant defense suppression may contribute to virulence of *Heterodera glycines* on resistant soybean. *Journal of Nematology*, 53, 19.
- Stromberg Z. R., **Masonbrink R.**, Mellata M. (2020). Transcriptomic Analysis of Shiga Toxin-Producing *Escherichia coli* during Initial Contact with Cattle Colonic Explants. *Microorganisms*, 8(11), 1662.
- Lopez C., Zhao Y., **Masonbrink R.**, Shao Z. (2020). Modulating pathway performance by perturbing local genetic context. *ACS Synthetic Biology*, 9(4), 706-717.
- Mimeo B., Lord E., Veronneau P., **Masonbrink R.**, Yu Q., Eves-van den Akker S. (2019). The draft genome of *Ditylenchus dipsaci*. *Journal of Nematology*, 51.
- **Masonbrink R.**, Maier, T. R., Muppirala, U., Seetharam, A. S., Lord, E., Juvale, P. S., ... Mimeo, B. (2019). The genome of the soybean cyst nematode (*Heterodera glycines*) reveals complex patterns of duplications involved in the evolution of parasitism genes. *BMC genomics*, 20(1), 119.
- **Masonbrink R.**, Maier, T. R., Seetharam, A. S., Juvale, P. S., Baber, L., Baum, T. J., Severin, A. J. (2019). SCNBase: a genomics portal for the soybean cyst nematode (*Heterodera glycines*). *Database*, 2019(1), baz111.

- **Masonbrink, R.**, Purcell, C. M., Boles, S. E., Whitehead, A., Hyde, J. R., Seetharam, A. S., Severin, A. J. (2019). An annotated genome for *Haliotis rufescens* (red abalone) and resequenced green, pink, pinto, black, and white abalone species. *Genome Biology and Evolution*, 11(2), 431-438.
- Barnes, S. N., **Masonbrink, R.**, Maier, T. R., Seetharam, A., Sindhu, A. S., Severin, A. J., Baum, T. J. (2019). *Heterodera glycines* utilizes promiscuous spliced leaders and demonstrates a unique preference for a species-specific spliced leader over *C. elegans* SL1. *Scientific reports*, 9.
- Bagheri, H., Muppirala, U., **Masonbrink, R.**, Severin, A. J., Rajan, H. (2019). Shared data science infrastructure for genomics data. *BMC bioinformatics*, 20(1), 436.
- Udall, J.A., Long, E., Ramaraj, T., Conover, J.L., Yuan, D., Grover, C.E., Gong, L., Arick, I.I., Mark, A., **Masonbrink, R.** and Peterson, D.G., (2019). The genome sequence of *Gossypioides kirki* illustrates a descending dysploidy in plants. *Frontiers in Plant Science*, 10, 1541.
- **Masonbrink R.**, Severin A., Seetharam A. Comparative genomics of soybean and other legumes. *The Soybean Genome*. Springer, Cham, 2017. 83-93.
- Han, J., **Masonbrink R.**, Shan W., Song F., Zhang J., Yu W., Wang K. et al. (2016). Rapid proliferation and nucleolar organizer targeting centromeric retrotransposons in cotton." *The Plant Journal* 88(6), 992-1005.
- Gong, L., **Masonbrink R.**, Grover C., Renny-Byfield S., Wendel J.F. (2015) A cluster of recently inserted transposable elements associated with siRNAs in *Gossypium*." *The Plant Genome* 8(2).
- **Masonbrink R.**, Gallagher J., Jareczek J., Renny-Byfield S., Grover C., Gong L., Wendel J. (2014) CenH3 evolution in diploids and polyploids of three angiosperm genera. *BMC Plant Biology* Vol 14, 1588
- RT Gaeta, **Masonbrink R.**, Zhao C., Sanyal A., Krishnaswamy L., Birchler J.A. (2013) In vivo modification of a maize engineered minichromosome. *Chromosoma* Vol. 122, 221-232
- **Masonbrink R.**, Fu S., Han F., Birchler J. (2013). Heritable loss of replication control of a minichromosome derived from the B chromosome of maize. *Genetics* Vol. 193, 77-84.
- **Masonbrink R.**, Birchler J. A. (2012). The accumulation of multiple copies of maize minichromosomes. *Cytogenetic and Genome Research* Vol. 137, 50-59
- **Masonbrink R.**, Gaeta R., Birchler J.A. (2012). Multiple maize minichromosomes in meiosis. *Chromosome Research*, Vol. 20, 395-402
- Gaeta R., **Masonbrink R.**, Krishnaswamy L., Zhao C., Birchler J.A. (2011). Synthetic chromosome platforms in plants. *Annual Review of Plant Biology*, Vol. 62
- Gaeta R., Danilova T., Zhao C., **Masonbrink R.**, McCaw M., Birchler J.A. (2011). Recovery of a telomere-truncated chromosome via a compensating translocation in maize. *Genome*, Vol. 54, 184-195
- Birchler J.A., Krishnaswamy L., Gaeta R., **Masonbrink R.**, Zhao C. (2010). Engineered minichromosomes in plants. *Critical Reviews in Plant Sciences*, Vol. 29, 135-147
- **Masonbrink R** and Birchler J. A. (2010). Sporophytic nondisjunction of the maize B chromosome at high copy numbers. *Journal of Genetics and Genomics*, Vol. 37, 79-84

## ORAL PRESENTATIONS

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**Rick Masonbrink** The soybean cyst nematode genome. Seed World Webinar. 2019

**Rick Masonbrink**, Maier, T. R., Muppirala, U., Seetharam, A. S., Lord, E., Juvale, P. S., ... Mimee, B. (2018). The soybean cyst nematode genome. Plant and Animal Genome Conference, Soybean workshop. San Diego, CA

**Rick Masonbrink**, Maier, T. R., Muppirala, U., Seetharam, A. S., Lord, E., Juvale, P. S., ... Mimee, B. (2018). The genome of the soybean cyst nematode. Plant and Animal Genome Conference, Soybean workshop. San Diego, CA

**Rick Masonbrink**, Joseph Gallagher, Josef Jareczek, Simon Renny-Byfield, Corrinne Grover, Lei Gong, Jonathan Wendel (2014) CenH3 Evolution in Diploids and Polyploids of Three Angiosperm Genera. Plant and Animal Genome Conference, Cotton Workshop. San Diego, CA

**Rick Masonbrink**, Joseph Gallagher, Josef Jareczek, Simon Renny-Byfield, Corrinne Grover, Jonathan Wendel (2014) Centromere Evolution in Diploid and Polyploid Plants. Evolutionary Research Club. Iowa City, IA

**Rick Masonbrink**, Joseph Gallagher, Josef Jareczek, Jonathan Wendel (2014). Centromere Evolution in Diploid and Polyploid Plants: an Example from Gossypium PGRP Arlington, VA

**Rick Masonbrink**, Joseph Gallagher, Josef Jareczek, Jonathan Wendel (2014) Centromere Evolution in Diploid and Polyploid Plants: an Example from Gossypium Plant and Animal Genome Conference, Cotton Workshop San Diego, CA

**Rick Masonbrink**, Jonathan Wendel (2013). Centromere Evolution in Diploid and Polyploid Plants: an Example from Gossypium PGRP Arlington, VA

**Rick Masonbrink**, James Birchler (2011). The Distinct Behavior of Multiple Minichromosomes in Maize. Plant Talks. Columbia, Missouri

## REFERENCES

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