

# Megan J. Bowman, Ph.D.

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## CURRICULUM VITAE

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### EDUCATION

Ph.D.	University of Wisconsin-Madison Plant Breeding and Plant Genetics	Madison, WI July 2007-June 2012
B.S	Michigan State University Plant Biology	East Lansing, MI August 2003-May 2007

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### RESEARCH EXPERIENCE

2016-Present	Bioinformatics Research Scientist, Van Andel Research Institute Bioinformatics and Biostatistics Core, Grand Rapids, MI
2013-2016	Visiting Research Associate, Department of Plant Biology, Michigan State University, East Lansing, MI (Supervisor: Dr. Kevin Childs)
2012-2013	Postdoctoral Research Molecular Biologist, USDA-ARS Coastal Plains Water, Soil and Plant Research Center, Florence, SC (Supervisor: Dr. B. Todd Campbell)
2012	Visiting Research Scholar, Agricultural University of Krakow, Krakow, Poland (Advisor: Dr. Dariusz Grzebelus)
2007-2012	Graduate Research Fellow, University of Wisconsin-Madison, Madison, WI (Advisor: Dr. Philipp Simon)
2005-2007	Undergraduate Research Assistant, MSU DOE Plant Research Laboratory, Michigan State University, East Lansing, MI (Advisors: Dr. Colleen Doherty and Dr. Michael Thomashow)

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### TEACHING AND MENTORING EXPERIENCE

2016	Van Andel Institute Bioinformatics and Biostatistics Core Seminars: <ul style="list-style-type: none"><li>• Experimental Design for RNA Sequencing Experiments</li><li>• ChIP-Seq: From the bench to data visualization</li><li>• Single Cell RNA-sequencing: Web lab and experimental design considerations</li><li>• Single Cell Sequencing: Bioinformatics and Biostatistics Approaches</li></ul>
2016	Innovation Central Academy for Modern Engineering Summer Intern Mentor
2016	Van Andel Research Institute, Undergraduate Summer Intern Research Mentor
2015	MSU-NSF Plant Genomics Summer Research Program Mentor
2013	Summer Program for Research Interns, South Carolina Governor's School for Math and Science Mentor
2009-2012	UW-Madison Biology 152 Independent Student Project Mentor

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**PUBLICATIONS****Peer Reviewed Manuscripts:**

- Martin K, Zhou W, **Bowman MJ**, Shih J, Au KS, Dittenhafer-Reed K, Sisson K, Koeman J, Weisenberger D, Cottingham S, DeRoos S, Devinsky O, Winn ME, Cherniack A, Shen H, Northrup H, Krueger D, MacKeigan J. The Genomic Landscape of Tuberos Sclerosis Complex. **Nature Communications**, 2017 8:15816
- Dues DJ, Schaar CE, **Bowman MJ**, Johnson BK, Winn ME, Van Raamsdonk J. Uncoupling of Oxidative Stress Resistance and Lifespan in Long-lived isp-1 mitochondrial mutants in *Caenorhabditis elegans*. **Accepted at Free Radical Biology & Medicine**.
- Hirsch CN, Hirsch CD, Brohammer AB, **Bowman MJ**, Soifer I, Barade O, Shem-Tove D, Baruche K, Lu F, Hernandez AG, Fields CJ, Wright CL, Koehler K, Springer NM, Buckler E, Buell CR, de Leon N, Kaeppler SM, Childs KL, Mikel MA. Draft Assembly of Elite Inbred Line PH207 Provides Insights into Genomic and Transcriptome Diversity in Maize. **Plant Cell**, 2016 28: 2700-2714  
**Featured in Plant Cell "Best of 2016: Top Topics in The Plant Cell"**
- Harlow ML, Maloney K, Roland J, Navarro M, Easton MK, Kitchen-Goosen SM, Boguslawski E, Madaj ZB, Johnson BK, **Bowman MJ**, D'Incalci M, Winn ME, Turner L, Hostetter G, Galmarini C M, Aviles P, Grohar PJ. Lurbinctedin inactivates the Ewing sarcoma oncoprotein EWS-FLI1 by redistributing it within the nucleus. **Cancer Research**, 2016 76:6657-6668
- Iorizzo M, Ellison S, Senalik D, Zeng P, Satapoomin P, Huang J, **Bowman MJ**, Iovene M, Sanseverino W, Cavagnaro P, Yildiz M, Macko-Podgorni A, Moranska E, Grzebelus E, Grzebelus D, Ashrafi H, Zheng Z, Cheng S, Spooner D, Van Deynze A, Simon P. A high-quality carrot genome assembly provides new insights into carotenoid accumulation and asterid genome evolution. **Nature Genetics**, 2016 48:657-666.
- Bowman MJ**, Willis DK, and Simon PW. Real-time quantitative PCR analysis identified phytoene synthase 1 and 2 as candidate genes regulating carotenoid biosynthesis in orange carrots. **Journal of the American Society of Horticultural Science**, 2014 139:63-68.
- Bowman MJ**, Park, W, Bauer, P, Udall, J, Page, J, Raney, J, Scheffler, B, Campbell, BT. RNA-seq transcriptome profiling of upland cotton (*Gossypium hirsutum*) root tissue under water deficit stress. **PLoS One**, 2013, 8(12): e82634.
- Bowman MJ** and Simon PW. Quantification of the relative abundance of plastome to nuclear genome in leaf and root tissues of carrot (*Daucus carota L.*) using quantitative PCR. **Plant Molecular Biology Reporter**, 2013, 1-8.
- Iorizzo M, Senalik D, Cavagnaro P, Grzebelus D, **Bowman MJ**, Matvienko M, Ashrafi H, Van Deynze A, and Simon PW. De novo assembly and characterization of the carrot transcriptome reveals novel genes, new markers, and genetic diversity. **BMC Genomics** 2011, 12:389.

## Preprints:

- Bowman MJ**, Pulman JA, Liu TL, Childs KL. A modified GC-Specific MAKER structural genome annotation method reveals improved and novel gene predictions of high and low GC content in *Oryza sativa*. Biorxiv. <https://doi.org/10.1101/115345>
- Edger PP, Smith RD, McKain MR, Cooley AM, Vallejo-Marin M, Yuan Y, Bewick AJ, Ji L, Platts AE, **Bowman MJ**, Childs KL, Schmitz RJ, Smith GD, Pires JC, Puzey JR. Subgenome dominance in an interspecific hybrid, synthetic allopolyploid, and a 140 year old naturally established neo-allopolyploid monkeyflower. Biorxiv. <https://doi.org/10.1101/094797>

## Submitted Manuscripts:

- Senchuk, M, Dues D, Schaar C, Johnson B, **Bowman MJ**, Winn, ME, Van Raamsdonk J. Activation of DAF-16/FOXO by reactive oxygen species promotes longevity in long-lived mitochondrial mutants in *C. elegans*. **Under consideration at Nature Communications.**
- Thomas J, **Bowman, MJ**, Vega, A, Ram Kim, H, Mukherjee, A. Comparative transcriptome analysis provides key insights into gene expression pattern during the formation of nodule-like structures in *Brachypodium*. **Under review at BMC Plant Biology.**
- Bowman MJ**, Pulman JA, Liu TL, Childs KL. A modified GC-Specific MAKER structural genome annotation method reveals improved and novel gene predictions of high and low GC content in *Oryza sativa*. **Submitted to BMC Bioinformatics.**
- Edger PP, Smith RD, McKain MR, Cooley AM, Vallejo-Marin M, Yuan Y, Bewick AJ, Ji L, Platts AE, **Bowman MJ**, Childs KL, Schmitz RJ, Smith GD, Pires JC, Puzey JR. Subgenome dominance in an interspecific hybrid, synthetic allopolyploid, and a 140 year old naturally established neo-allopolyploid monkeyflower. **Under review at Plant Cell.**
- Peacock, JD, Pridgeon MG, Tovar EA, Essenburg CJ, **Bowman MJ**, Madaj Z, Koeman J, Dodd RD, Cardona DM, Chen M, Kirsch DG, Maina F, Dono R, Winn ME, Graveel CR, Steensma MR. Genomic MET amplification occurs early in NF1-related MPNST progression and is a potent therapeutic target. **Submitted to Cancer Research.**

## Book Chapters:

- Simon PW, **Bowman MJ**, Tanumihardjo SA. (2013). Horticultural crops as a source of carotenoids. *Carotenoids and Human Health*. Springer. Sherry A. Tanumihardjo, editor.

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## AWARDS

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| 2013      | Cotton Incorporated Postdoctoral Fellowship                                      |
| 2010-2012 | UW-Madison Gabelman-Seminis Wisconsin Distinguished Graduate Fellowship          |
| 2011      | Young Scientist Award, International Symposium on Carotenoids Travel Scholarship |
| 2011      | International Vilas Research Travel Award  |
| 2007      | Bessey Award for Undergraduate Excellence in Plant Biology                       |

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## INVITED TALKS

- Bioinformatics approaches to complex questions in genomics. Texas A&M University Supercomputing Facility, Texas A&M University, May 26<sup>th</sup>, 2015
- Improving MAKER gene annotations in grasses through the use of GC specific hidden markov models. Presentation, Applied Bioinformatics and Computational Solutions for Genomics Seminar Series, Michigan State University, April 22<sup>nd</sup>, 2015
- Adventures in the plant sciences, from the UP and beyond. Women in STEM Conference, Northern Michigan University, Marquette, MI, May 16<sup>th</sup>, 2014

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## POSTERS AND PRESENTATIONS (FIRST AUTHOR ONLY)

- A modified MAKER structural genome annotation method reveals novel gene predictions of high and low GC content in rice. Poster, Genome Informatics, October 28<sup>th</sup>-31<sup>st</sup>, Cold Spring Harbor, NY.
- Improving MAKER gene annotations in grasses through the use of GC specific hidden markov models. Poster, XXIII Plant and Animal Genome Meeting. January 10<sup>th</sup>-14<sup>th</sup> 2015, San Diego, CA.
- Expansion of maker standard gene sets of cereal genomes through protein homology and nucleotide content. Poster, National Association of Plant Breeders Meeting. August 5<sup>th</sup> -8<sup>th</sup> 2014, Minneapolis, MN
- Expansion of MAKER standard gene sets through protein homology and nucleotide content. Poster, American Society of Plant Biologists Meeting. July 12<sup>th</sup> -16<sup>th</sup> 2014, Portland, OR
- Drought stress related gene expression patterns and sub-genome localization of five aquaporin genes in upland cotton (*Gossypium hirsutum*). Poster, National Association of Plant Breeders Meeting. June 2<sup>nd</sup>-5<sup>th</sup> 2013, Tampa, FL
- Tissue specific transcriptome changes during water deficit stress in tetraploid cotton. Poster, National Cotton Council Cotton Beltwide Conference. January 7<sup>th</sup>-10<sup>th</sup> 2013, San Antonio, TX
- Gene expression analysis and genetic mapping of the Rp (reduced pigment) mutant in carrot (*Daucus carota*). Poster, ASPB Plant Biology 2011. August 8<sup>th</sup>, 2011, Minneapolis, MN
- Microarray analysis of gene expression changes associated with the accumulation of carotenoid pigments in the storage root of carrot (*Daucus carota*). Talk, The 16<sup>th</sup> International Symposium on Carotenoids. July 15<sup>th</sup> – 22<sup>nd</sup>, Krakow, Poland.
- Analysis of carotenoid pigment accumulation during leaf and root development of the Rp(reduced pigment) mutant in carrot (*Daucus carota*). Presentation, 34<sup>th</sup> International Carrot Conference, Kennewick, WA, 27 July 2010
- Quantification of the ratio of plastid to chromosomal genome in leaf and root tissue of carrot (*Daucus carota*) using real time quantitative PCR. Poster, XVIII Plant and Animal Genome Conference. January 11<sup>th</sup>, 2010, San Diego, CA
- Understanding molecular mechanisms of carotenoid biosynthesis using real time quantitative PCR. Presentation, 33<sup>rd</sup> International Carrot Conference. Anaheim, CA, January 20<sup>th</sup>, 2009
- Expression analysis of the carotenoid biosynthetic pathway in carrot (*Daucus carota*) using quantitative real time PCR. Poster, XVII Plant and Animal Genome Conference. January 12<sup>th</sup>, 2009, San Diego, CA
- Mutant screen for upstream components of the cold response pathway in *Arabidopsis thaliana*. Poster, Undergraduate Arts and Research Forum. Poster, Michigan State University, April 13<sup>th</sup>, 2007

Mutant screen for upstream components of the cold response pathway in *Arabidopsis thaliana*.  
Poster, ASPB-Midwestern Section Meeting. Michigan State University, March 22<sup>nd</sup>,  
2007

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## COMMUNITY BIOINFORMATICS CONTRIBUTIONS AND SOFTWARE

### Software:

Advanced Repetitive Element Library Construction  
[http://weatherby.genetics.utah.edu/MAKER/wiki/index.php/Repeat\\_Library\\_Construction-Advanced](http://weatherby.genetics.utah.edu/MAKER/wiki/index.php/Repeat_Library_Construction-Advanced)

GC specific MAKER Structural Annotation Method  
[https://github.com/Childs-Lab/GC\\_specific\\_MAKER](https://github.com/Childs-Lab/GC_specific_MAKER)

### Genomics Resources:

Maize PH207 Genome and Annotation:  
[https://phytozome.jgi.doe.gov/pz/portal.html#!info?alias=Org\\_ZmaysPH207\\_er](https://phytozome.jgi.doe.gov/pz/portal.html#!info?alias=Org_ZmaysPH207_er)

Carrot Genome and SNPs:  
[https://phytozome.jgi.doe.gov/pz/portal.html#!info?alias=Org\\_Dcarota\\_er](https://phytozome.jgi.doe.gov/pz/portal.html#!info?alias=Org_Dcarota_er)

Switchgrass Repeat Library:  
[https://phytozome.jgi.doe.gov/pz/portal.html#!info?alias=Org\\_Pvirgatum\\_er](https://phytozome.jgi.doe.gov/pz/portal.html#!info?alias=Org_Pvirgatum_er)

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## PROFESSIONAL INVOLVEMENT

2015	Secretary, Michigan State University Postdoctoral Association
2012	Plant Breeding and Plant Genetics Curriculum Committee
2012	Horticulture Representative, Plant Sciences Graduate Student Council
2010	Leadership Committee, UW-Madison Biology Outreach Club
2007	President, Sigma Alpha Iota Alpha Lambda Chapter
2007	Co-Chairman, Michigan State University College of Natural Science Dean's Student Advisory Committee
2007	Plant Biology Undergraduate Representative, Michigan State University College of Natural Science Dean Search and Ratings Committee

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## PROFESSIONAL SOCIETY MEMBERSHIP

International Society for Computational Biology  
Association of Biomolecular Resource Facilities

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## PEER REVIEWER

New Phytologist, Gene, Plant Science

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## OUTREACH

2016 Innovation Central High School Hour of Code Speaker

2016 Volunteer and Science Presenter, Girl Scouts Shore to Shore, Grand Rapids, MI  
2014 Science Outreach Organizer, Science Night, Marble Elementary School, East Lansing, MI  
2008-2011 UW-Madison Biology Outreach Club  
2004-2007 Science Olympiad Volunteer

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## **SELECTED MEDIA COVERAGE**

“Why are carrots orange?” Interview, Christian Science Monitor, 10 May 2016  
“Carrot genome paints picture of domestication, could help improve crops” Featured on University of Wisconsin-Madison News, 9 May 2016  
“Carrot Genome Paints Colorful Picture of Domestication” Featured on UC Davis News, 9 May 2016

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## **PROFESSIONAL REFERENCES**

Dr. Matthew Steensma  
Assistant Professor, Program in Skeletal Disease and Tumor Microenvironment, Center for Cancer and Cell Biology  
Van Andel Research Institute  
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Dr. Kevin Childs  
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Dr. Philipp Simon  
Professor, Department of Horticulture, UW-Madison  
Research Leader, USDA-ARS Vegetable Crops Research Unit  
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Dr. Lina Quesada  
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North Carolina State University  
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