# CV

**Education**

- Ph.D. Plant Biology, University of Illinois at Urbana-Champaign - **2012**
  Advisor: Dr. Andrew Leakey
- B.S. Integrative Biology, Minor: Chemistry, University of Illinois at Urbana-Champaign - **2007**

**Grants and Awards**

- PI: NSF- Postdoctoral Fellowships in Biology- Develop a systems level model of resource allocation and partitioning in *Brassica rapa* to predict growth across multiple genotypes and environments. Plant Genome Research Program ($216,000) - **2014-17**
- Collaborator: Genotyping by Sequencing and Detection of eQTLs in a Recombinant Inbred Line Population of Brassica rapa. TACC Lonestar4 Super Computer Cluster (260,000 Units). - **2013-14**
- PI: National Science Foundation Graduate Research Fellowship ($135,000) - **2009-12**
- Co-PI: Project Leader, ASPB Education Foundation Grant- Plants iView ($19,983) - **2011-12**
- Co-PI: Project Leader, UIUC Public Engagement Grant- Plants iView ($12,500) - **2011-12**
- Outstanding Teaching Award- UIUC Department of Plant Biology ($400) - **2012**
- Govindjee Award for Excellence in Biological Science ($1000) - **2011**
- PI: Francis M. and Harlie M. Clark Research Grant ($1,000) - **2010**
- PI: Francis M. and Harlie M. Clark Research Grant ($1,000) - **2009**
- Distinction- School of Integrative Biology. Thesis Title: "How will elevated [CO2] alter soil and plant water status of the C3-crop soybean and the C4-crop maize?" Published as part of Hussain et al. (2013). - **2007**

- Total Academic Awards: **$386,883**

### Publications

- Baker RL, Leong WF, Brock MT, **Markelz RJC**, Covington MF, Devisetty UK, Maloof JN, Welch S, Weinig C (**Accepted**) Modeling development and quantitative trait mapping reveal independent genetic modules for leaf size and shape. New Phytologist.
- **Markelz RJC**, Vosseller LN, Leakey ADB (**2014**) Elevated CO2 concentration induces transcriptional reprogramming of respiration and a stimulation of dark respiration as Arabidopsis thaliana leaves transition from sinks to sources. Plant, Cell, and Environment. 37:2542-2552. paper
- **Markelz RJC**, Lai LX, Vosseller LN, Leakey ADB (**2014**) The stimulation of leaf respiration and transcriptional reprogramming by elevated CO2 concentration is diminished, but not eliminated, under limiting nitrogen supply. Plant, Cell, and Environment. 37:886-898. paper
- Hussain MZ, VanLoocke A, **Markelz RJC**, Leakey ADB, Ort DO, Bernacchi CJ (**2013**) Future carbon dioxide concentration decreases canopy evapotranspiration and soil water depletion by field-grown maize. Global Change Biology. 19:1572–1584. paper
- Walters KR, Rupassara SI, **Markelz RJC**, Leakey ADB, Muir W, Pittendrigh B (**2012**) Methamphetamine causes anorexia in Drosophila melanogaster, exhausting metabolic reserves and contributing to mortality. The Journal of Toxicological Sciences. 4:773-790. paper
- Gillespie KM, Xu F, Richter KT, McGrath JM, **Markelz RJC**, Ort DR, Leakey DB, Ainsworth EA (**2012**) Greater Antioxidant and Respiratory Metabolism in Field-Grown Soybean Exposed to Elevated O3 Under Both Ambient and Elevated CO2 Concentrations. Plant, Cell, and Environment. 35:164-184. paper
- **Markelz RJC**, Strellner RS, Leakey ADB (**2011**) Impairment of C4 photosynthesis by drought is exacerbated by limiting nitrogen and ameliorated by elevated [CO2] in maize. Journal of Experimental Botany. 62:3235-3246. paper
- Leakey ADB, Ainsworth EA, Bernard SM, **Markelz RJC**, Ort DR, Placella S, Rogers A, Smith MD, Sudderth EA, Weston DJ, Wullschleger SD, Yuan S (**2009**) Gene expression profiling – opening the black box of plant ecosystem responses to global change. Global Change Biology. 15:1201-1213. paper

### Presentations

- **Markelz RJC**, Baker RL, An N, Devisetty UK, Covington MF, Welch S, Weinig C, Maloof JN. Systems genetics in *Brassica rapa* reveals genotype to phentype connections from high-throughput phenotyping data. ASPB Annual Meeting, Minneapolis, MN - **2015**

- **Markelz RJC** Systems genetics in *Brassica rapa* provides rapid candidate gene identification from high-throughput phenotyping data. UC Davis Postdoctoral Research Symposium– Big Data Session. - **2015**
- **Markelz RJC**, Devisetty UK, Covington MF, Maloof JN. Systems genetics of crowding tolerance in *Brassica rapa*. Plant Animal Genome, San Diego, CA. Poster Presentation. - **2015**
- **Markelz RJC**. Linking systems modeling and computer vision to study plant competition in *Brassica rapa*. UC Davis Plant Cell Biology Retreat. Marconi Historic Park, CA. Oral Presentation. - **2014**
- An N, Palmer CM, Baker RL, Brock MT, **Markelz RJC**, Price K, Maloof JN, Welch SM, and Weinig. Proximal Sensing: Experiences from Arabidopsis and *Brassica rapa*. Agronomy Society of America Annual Meeting, Long Beach, CA. Oral Presentation by SM Welch. - **2014**
- **Markelz RJC**. Systems biology of plant competition in *Brassica rapa*. National Science Foundation, Arlington, VA. Oral Presentation. - **2014**
- Baker RL, Brock MT, Covington MF, Das S, Devisetty UK, Fung LW, Greenham K, Lou P, Maloof JN, **Markelz RJC**, McClung CR, Nozue K, Palmer CM, Weinig C, and Welch SM. National Science Foundation, Arlington, VA. Agroecological annotation of gene function and computational analysis of gene networks. Poster Presentation. - **2014**
- **Markelz RJC**, Devissety UK, Covington MF, Maloof JN. Expression and physiological quantitative trait mapping in *Brassica rapa* in response to crowding. ASPB Annual Meeting. Portland, OR. Poster Presentation. - **2014**
- **Markelz RJC** Quantitative genetic databases and eQTL mapping in *Brassica rapa*. UC Davis Postdoctoral Seminar Series. Davis, CA. Oral Presentation. - **2013**
- **Markelz RJC** Connecting genotype to phenotype in Brassica rapa using statistical and computational techniques. UC Davis Plant Cell Biology Retreat. Asilomar, CA. Oral Presentation. - **2013**
- **Markelz RJC**, Vosseller LN, Leakey ADB: Elevated CO2 concentration induces transcriptional reprogramming of respiration and a stimulation of dark respiration as Arabidopsis thaliana leaves transition from sinks to sources. Keystone Symposium: Plant Abiotic Stress and Sustainable Agriculture. Taos, NM. Poster Presentation. - **2013**
- **Markelz RJC** The stimulation of leaf respiration and transcriptional reprogramming by elevated CO2 concentration is diminished, but not eliminated, under limiting nitrogen supply. ASPB Annual Meeting. Austin, TX. Oral Presentation and Poster Presentation. - **2012**
- **Markelz RJC**, Lai LX, Leakey ADB. The stimulation of leaf respiration and transcriptional reprogramming by elevated CO2 concentration is diminished, but not eliminated, under limiting nitrogen supply. World Crop FACE Workshop, Tsukuba, Japan. Poster Presentation. - **2012**
- Peery R, Segura M, **Markelz RJC**, Kelly R, Gray S, Leisner C, Han J, Slattery R, Hug B, Leakey ADB. Plants iView: an outreach program in plant biology for middle school students. University of Illinois Public

Engagement Symposium: Transforming Our Society. Champaign, IL. Poster Presentation. - **2012**

- **Markelz RJC**, Lai LX, Leakey ADB. The stimulation of leaf respiration and transcriptional reprogramming by elevated CO2 concentration is diminished, but not eliminated, under limiting nitrogen supply. 8th Okazaki Biology Conference, Japan. Poster Presentation. - **2012**
- **Markelz RJC**, Lai LX, Leakey ADB. Limiting N supply diminishes, but does not eliminate, the stimulation of leaf respiration by elevated [CO2]. UIUC Plant Biology Departmental Fall Welcome. Poster Presentation. - **2011**
- **Markelz RJC**, Strellner RS, Leakey ADB. Impairment of C4 photosynthesis by drought is exacerbated by limiting nitrogen and ameliorated by elevated [CO2] in maize. Institute for Genomic Biology Fellows Symposium. Poster Presentation. - **2011**
- Boyd RA, **Markelz RJC**, Leakey ADB. Are there genes essential for the stimulation of respiration and growth when plants are grown at elevated CO2 concentrations? Plant respiration and climate change. Oxford, United Kingdom. Poster Presentation. - **2010**
- **Markelz RJC**. How will drought alter maize photosynthesis under limiting N availability and elevated [CO2]? Graduate Students in Ecology and Evolutionary Biology Symposium, University of Illinois Urbana-Champaign, Urbana, Illinois. Oral Presentation. - **2010**
- Leakey ADB, Boyd R, **Markelz RJC**. Adapting crops to global climate change. Darwin 200: A South American celebration. Punta del Este, Maldonado, Uruguay. Oral Presentation. - **2009**
- **Markelz RJC**, Strellner RS, Leakey ADB. How will limiting N availability alter the response of C4 photosynthesis in maize under elevated [CO2] and drought under open-air field conditions? ASPB Annual Meeting. Honolulu, Hawaii. Poster Presentation. - **2009**
- Leakey ADB, Sun J, **Markelz RJC**, Ort DR. Stimulated photosynthesis alters sugar and amino acid contents, lowers osmotic potential and improves water status of soybean leaves grown under free-air CO2 enrichment. ASPB Annual Meeting. Merida, Mexico. Poster Presentation. - **2008**
- **Markelz RJC**. How will elevated [CO2] alter soil and plant water status of the C3-crop soybean and the C4-crop maize? Proctor and Gamble Student Research Competition. Oral Presentation. - **2007**

**Teaching**

- Guest Instructor- BIS180L- Undergraduate Bioinformatics Lab. Genetic Networks 1: Clustering, Genetic Networks 2: Co-expression, **2015**
- Guest Lecturer- Plant Biology 220: Plant Developmental Biology. QTL mapping with -omics scale data - **2015**
- Co-instructor and Discussion Leader of General Education Class- Integrative Biology 107: Global Warming, Biofuels, and Food - **2011** *List of*

*Teachers Ranked Excellent by Their Students; Outstanding Teaching Award Department of Plant Biology*

- Teaching Assistant- Integrative Biology 440: Plants and Global Change. Developed science communication module- Graduate students and undergraduates created Podcasts for primary climate change literature. - **2009**

### Short Courses and Workshops

- Merging Crop Models and Genetics, University of Florida - **2015**
- Pathway Tools for Metabolic Modeling, SRI International - **2015**
- Summer Institute in Statistical Genetics, University of Washington - **2014**
- Computing in the Cloud: What Every Computational Life Scientist Should Know, NIMBioS, University of Tennessee - **2014**
- Frontiers and Techniques in Plant Science- Cold Spring Harbor Laboratory - **2010**

### Mentoring

- Lakshmi Pabbisetty (Biology, UC Davis) - **2015-**
- Neije Mukherjee-Roy (Microbiology, UC Davis) - **2015-**
- Amanjot Kaur (Biotechnology, UC Davis) - **2014-**
- Christina Day (Biology, UC Davis) - **2014-**
- James Ta (Junior Specialist, UC Davis) - **2014-2015**
- Tiffany Ho (Genetics, Bioinformatics, UC Davis) - Graduate Student at Cornell University - **2014-2015**
- Shweta Dash (Biology, UC Davis) - **2015**
- Kamalpreet Sahota (Religious Studies, Biology- UC Davis) – Graduate Student at Touro University - **2013-14**
- Navi Singh (Biology- UC Davis) - **2013-14**
- William Landel (Plant Biology- UC Davis) - **2013**
- Kisha Thayapran (High School Student) - UC Davis Young Scholar - **2013**
- Natalia Rodriquez (High School Student - Puerto Rico) RAP2 Program **2012**
- Lauren Vosseller (Molecular and Cellular Biology- University of Illinois) - Co-Author, Graduate Student University of Illinois- Chicago - **2010-12**
- Alexander Petit (History- University of Illinois) - James Scholar Program
- Brian Zehr (IB- University of Illinois)- India rural eye-care network - **2010-11**
- Ryan Boyd (IB- University of Illinois) - Graduate student at Washington State University - **2009-10**
- Reid Strellner (IB- University of Illinois) - Co-author, Graduate student at Northwestern University - **2008-10**
- Derek Haselhorst (IB- University of Illinois) - Graduate Student at University of Illinois- Urbana - **2008**

**Professional and Volunteer Service**

- **Manuscript Reviewer**: eLife; American Journal of Botany; Journal of Experimental Botany; Photosynthesis Research; Plant, Cell, and Environment- **2009-**
- **Technical Editor**: Bioinformatics Data Skills, Vince Buffalo, O'Reilly Publishing - **2013-2015**
- **Organizer and Leader of Graduate Student Grant Writing**: Plants iView - Middle School Plant Science Outreach ; successfully obtained funding from ASPB and UIUC. **2011-2012**
- **Creator**: Plant Carbon Allocation Relay Race for K-12 Science Teachers Workshop for Ecosystem Ecology - **2012**
- The Art of Science 2.0 - I collaborated with an artist to blend disciplines and create art by visualizing biological processes using confocal microscopy. - **2012**
- **Presenter**: Microscopy Outreach Event- Mahomet Seymour Junior High School Science Club - **2012**
- **Organizer**: National Pollinator Week - **2010 and 2011**
- **Chair**: Plant Biology Graduate Student Association - **2010-11**
- Roots and Shoots, University of Illinois Branch - **2010**
- **Departmental Colloquium Coordinator**: Plant Biology Graduate Student Association - **2009-10**
- **Threatened Species Survey**, Grampians National Park, Victoria, Australia - **2008**
- International Impact, fund raising and school building project for small Ecuadorian Indigenous communities - **2005-07**

**Unpaid Science Consulting**

- Justin Gillis- NY Times Science Reporter **2011** HARVEST Article
- LI-COR Environmental **2011**