

Anthony C. Bryan

EDUCATION

University of Arizona, Dept. of Molecular and Cellular Biology, Tucson, AZ

- Ph.D., Molecular and Cellular Biology, 2011

Emory University, Atlanta, GA

- B.S., Biology, 2000

Oxford College of Emory University, Oxford, GA

- A.A., 1998

PROFESSIONAL RESEARCH INTERESTS

Molecular and cellular biologist experienced in deciphering signaling pathways, validating targets from GWAS analyses and applying various molecular techniques to research problems in plant-environment interactions, genomics, bioenergy crop production and agricultural crop sustainability. I am interested in utilizing my expertise to continue research in crop sustainability with the goal of uncovering products, methods or technologies that can be employed in the agricultural industry. With cross-discipline research the name of the game, I am dedicated to interacting across scientific fields to provide immediate deliverables to work towards enhanced crop sustainability.

RESEARCH EXPERIENCE

Oak Ridge National Laboratory, BioScience Division, Oak Ridge, TN

Postdoctoral Research Associate, Drs. Wellington Muchero & Jay Chen 2012-present

- Coordinated research projects within the BioEnergy Science Center including verifying traits from both transgenic and naturally occurring plants using single cell and whole plant analyses.
- Successfully submitted 7 invention disclosures through ORNL and 3 patent applications currently under review for use of plant material (transgenic and natural genotypes) with phenotypes associated with altered cell wall chemistry to be utilized as licensable materials for biofuel production.
- Utilized high-throughput sequencing of 1000 genotypes from naturally occurring trees to associate various plant phenotypes with specific alleles and validate the functions of these alleles.
- Validated the function of a novel receptor in *Populus* that mediates microbial-plant interactions and led efforts to design screens and develop new technologies to determine receptors involved in plant-microbe interactions.
- Used molecular techniques including qPCR, RNAseq, microscopy, metabolomics and histology to determine function of novel regulators of cell wall chemistry and plant-microbe interactions.

University of Arizona, Dept. of Molecular and Cellular Biology, Tucson, AZ

Graduate Student with Dr. Frans Tax, 2004-2011

Social Networks of Receptor-Like Kinases Regulating Cell Identity in *Arabidopsis thaliana*

- Functionally characterized a subfamily of receptor-like protein kinases in *Arabidopsis* utilizing genetic screens, molecular analyses, histochemical analyses and developmental phenotyping.
- Identified a novel plant receptor, with collaborators, that perceives small peptides, PEPs, involved in signaling stress responses.
- Utilized cloning methods to create gene fusions to reporter markers for expression and functional analysis.

- Utilized histological analysis from embedded samples and confocal imaging on prepared samples for microscopy and phenotype profiling.

University of Arizona, Dept. of Molecular and Cellular Biology, Tucson, AZ

Teaching Assistant, 2006-2011

- Contributed as both lecturer and assistant to conduct courses including Molecular Biology, Cell Biology, Genetics and Molecular Genetics.
- Created and graded testing materials.
- Held office hours and conducted review sessions.
- Voted mentor of the year for my performance as lecturer and teaching assistance.

University of Arizona, Dept of Ecology and Evolutionary Biology, Tucson, AZ

Research Assistant, 2001-2004 Dr. Richard Jorgensen

- Conducted research in the molecular evolution of genomes in both *Mus musculus* and *Arabidopsis thaliana*.
- Investigated selective pressures on natural populations of house mouse with emphasis on evolution of gene expression affecting various phenotypes.
- Conducted bioinformatics and experimental analyses to determine presence and function of alternative splicing in *Arabidopsis thaliana*.

Emory University, Dept of Biochemistry and Molecular Biophysics, Atlanta, GA

Research Assistant, 2000-2001, Dr. Gerald Shadel

- Utilized both genetic and biochemical screens to determine novel nuclear-encoded factors regulating mitochondrial transcription and translation in *Saccharomyces cerevisiae*.
- Utilized, Yeast-Two-Hybrid, co-immunoprecipitations and genetic screens to determine protein interactions.
- Used cloning methods to create libraries for screening.

SKILLS AND TECHNIQUES

- | | | |
|---|---|--|
| <ul style="list-style-type: none"> • RNA and DNA extraction and electrophoresis • qPCR, and PCR • Northern blot • transcriptome analysis (RNAseq) • Cloning & Recombinant DNA methods • Plant, fungal and bacterial transformations • <i>Arabidopsis</i> and <i>Populus</i> protoplast system • Plant, fungal and bacterial tissue culture • Aseptic technique | <ul style="list-style-type: none"> • Plastic embedding and histological analysis • Protein extraction, Western blot, immunoprecipitation and SDS gels • Yeast-Two-Hybrid • Light/phase & confocal microscopy • Biological trait screening and discovery • Designing and conducting genetic screens in both plant and fungal systems | <ul style="list-style-type: none"> • Computational skills: Microsoft Office (Word, Excel, PowerPoint, Outlook), QCapture Pro, ImageJ, CLC Workbench, Vector NTI • Bioinformatics programs: BLAST, PyhML-phylogeny prediction, Align-MAFFT, clustal |
|---|---|--|

MANAGEMENT & MENTORING

- Mentored 4 Undergraduate students and 1 Masters student
- Coordinated projects utilizing resources and personnel across multiple institutions

PROFESSIONAL ACTIVITIES

- BioEnergy Science Center Student, Postdoc and Junior Scientist Council member 2014-2015
- ORNL Professional Development Chair, ORNL Postdoc Association, 2013-2014
- Siemens Teachers as Researchers (STARs) Mentor, 2013-2014

HONORS, AWARDS & FELLOWSHIPS

- Best poster award, Western American Society of Plant Biology Symposium, 2009
- Mentor of the year award, Molecular and Cellular Biology, University of Arizona, 2008
- NIH Training Grant Fellowship, Molecular and Cellular Biology, University of Arizona, 2004-2006

INTELLECTUAL PROPERTY

1. Non-provisional patent filed: A Key gene A, regulating plant cell-wall recalcitrance and sugar release.
2. Non-provisional patent filed: Allelic variants regulating cellulose, lignin, biosynthesis and biomass sugar yield.
3. Non-provisional patent filed: An EPSP enzyme which regulates phenylpropanoid, tyrosine and tryptophan pathways.
4. Invention disclosure S-138,062 A Prefoldin-like protein regulates cell wall biosynthesis and recalcitrance in *Populus*.
5. Invention disclosure S-138, 061 A Serine Hydroxymethyltransferase regulates cell wall biosynthesis and recalcitrance in *Populus*.
6. Invention disclosure S-138, 051 A Prolyl 4-Hydroxylase Alpha Subunit enzyme regulates cell wall biosynthesis and recalcitrance in *Populus*.
7. Invention disclosure S-138, 043 A Laccase enzyme regulating cell wall biosynthesis and recalcitrance in *Populus*.
8. Invention disclosure S-124, 967 An EPSP enzyme which regulates Phenylpropanoid, Tyrosine and Tryptophan pathways.
9. Invention disclosure S-124, 857 A Heavy Metal Transporter enhancing woody quality for Biofuels production.
10. Invention disclosure S-124, 856 An Amino Acid Transporter enhancing lignin quality and sugar release.

PUBLICATIONS

1. Payyavula RS, Bali G, Jawdy S, Yee KL, Bryan AC, Engle NL, Sykes R, Weston D, Rodriguez Jr M, Gunter L, Decker S, Chen JG, Davis MF, Ragauskas A, Tschaplinski TJ, Tuskan GA, Kalluri UC. (2015) KORRINGA-like genes are important in cellulose biosynthesis and carbon allocation and partitioning in *Populus* plants. *J Exp Bot. In press*
2. Muchero W, Guo J, Difazio SP, Chen JG, Ranjan P, Slavov GT, Gunter LE, Jawdy S, Bryan, AC, Sykes R, Ziebell A, Klapste J, Porth I, Skyba O, Unda F. (2015) High-resolution Genetic Mapping of Allelic Variants Associated With Cell Wall Chemistry in *Populus*. *BMC Genomics* 16 (1):24
3. Ma C, Guo J, Kang Y, Doman K, Bryan AC, Tax FE, Yamaguchi Y, Qi Z. (2014) AtPEPTIDE RECEPTOR2 mediates the AtPEPTIDE1-induced cytosolic Ca(2+) rise, which is required for the suppression of Glutamine Dumper gene expression in *Arabidopsis* roots. *J Integr Plant Biol.* 56(7):684-94.

4. Racolta A, Bryan AC, Tax FE. (2014) The receptor-like kinases GSO1 and GSO2 together regulate root growth in arabidopsis through control of cell division and cell fate specification. *Dev Dyn.* 2014 243(2):257-78.
5. Bryan AC, Obaidi A, Weirzba M, Tax FE. (2012) XYLEM INTERMIXED WITH PHLOEM1, a Leucine Rich Repeat Receptor-like Kinase required for stem growth and vascular development in *Arabidopsis thaliana*. *Planta* 235(1):111-22.
6. Bryan, AC. Racolta, A., Tax, F. and S. Liljegren. The social network: receptor kinases and cell fate determination in plants. (2011) Chapter in "Receptor-like Kinases in Plants: From Development to Defense", Editors Birgit Kemmerling and Frans Tax, in the book series *Signaling and Communication in Plants* (ed. Frantisek Baluska).
7. Nodine MD, Bryan AC, Racolta A, Jerosky KV, Tax FE. (2011) A few standing for many: embryo receptor-like kinases. *Trends in Plant Science* 16(4):211-7.
8. Yamaguchi Y, Huffaker A, Bryan AC, Tax FE, Ryan CA. (2010) PEPR2 Is a Second Receptor for the Pep1 and Pep2 Peptides and Contributes to Defense Responses in *Arabidopsis*. *Plant Cell* 22:508-22.
9. Cutter AD, Payseur BA, Salcedo T, Estes AM, Good JM, Wood E, Hartl T, Maughan H, Stempel J, Wang B, Bryan AC, Dellos M. (2003) Molecular correlates of genes exhibiting RNAi phenotypes in *Caenorhabditis elegans*. *Genome Res.* 13:2651-2657.
10. Bryan AC, Rodeheffer MS, Wearn CM, Shadel GS. (2002) Sls1p is a membrane-bound regulator of transcription-coupled processes involved in *Saccharomyces cerevisiae* mitochondrial gene expression. *Genetics* 160:75-82.
11. Coelho PS, Bryan AC, Kumar A, Shadel GS, Snyder M. (2002) A novel mitochondrial protein, Tar1p, is encoded on the antisense strand of the nuclear 25S rDNA. *Genes Dev.* 16:2755-2760
12. Rodeheffer MS, Boone BE, Bryan AC, Shadel GS. (2001) Nam1p, a protein involved in RNA processing and translation, is coupled to transcription through an interaction with yeast mitochondrial RNA polymerase. *J Biol Chem* 276:8616-8622.

CONFERENCES & PRESENTATIONS

1. CROPS, Huntsville, AL 2015
2. DOE contractors meeting, Tysons Corner, VA 2015
3. The Annual DOE JGI User Meeting, Walnut Creek, CA 2014
4. BioEnergy Science Center (BESC) Annual Retreat, Chattanooga, TN 2014
5. 10th IUFRO Tree Biotechnology meeting, Asheville, NC 2013
6. BioEnergy Science Center (BESC) Annual Retreat, Chattanooga, TN 2013
7. Keystone Symposia: Receptors and Signaling in Plant Development and Biotic Interactions, Tahoe, CA 2010
8. Western American Society of Plant Biologists Symposium, Tucson, AZ 2009
9. NSF Plant Protein Phosphorylation-Dephosphorylation Symposium, Columbia, MO 2007
10. NSF Plant Protein Phosphorylation Workshop, Asilomar, CA 2006
11. NSF Plant Protein Phosphorylation Workshop, Sanibel, FL 2005
12. American Society of Plant Biologists Symposium, Seattle, WA 2005
13. NSF Plant Protein Phosphorylation Workshop, Snowbird, UT 2004