

SETH DEBOLT

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Professor, Department of Horticulture, University of Kentucky (present)
Director, Distillation, Wine and Brewing Program, University of Kentucky (present)
Pillar lead, NSF Kentucky EPSCoR – Powering the Kentucky bioeconomy (present)

Associate Professor, University of Kentucky 2011

Assistant Professor, University of Kentucky, 2008

EDUCATIONAL BACKGROUND

- Postdoctoral Associate, Carnegie Institute for Science (Stanford University)
- Ph.D., Plant Biology-Viticulture, (University of Adelaide-University of California, Davis)
- Honors in Environmental Chemistry (The University of Sydney)
- B.S. Agriculture (The University of Sydney)
- Associate Diploma, The Writers Studio

RESEARCH PROGRAM

The DeBolt lab research program is focused on several interrelated questions:

- 1) Characterization of genes and the proteins they encode involved in cell wall synthesis.
- 2) One of my laboratories central interests is the identification of chemical signals that modulate plant pathways, particularly focused on cell wall and cell surface signals.
- 3) Wine, brewing and distillation. My interest in key chemical components in quality. Discovered the tartaric acid pathway in wine grapes.

TEACHING PROGRAM

Director, Distillation, Wine and Brewing (DWB) Undergraduate Certificate Program, University of Kentucky. Seek to advance career opportunities to undergraduates from across the diverse University landscape in DWB.

SUPPORT FOR RESEARCH PROJECTS

- **Extramural funding**- Dr. DeBolt receives funding to support scholarly and student activities by the National Science Foundation, Department of Energy, Department of Agriculture, Altria

GRADUATE STUDENT ADVISING

Dr. DeBolt has graduated four PhD students and three Masters students in the past 5 years with seven more currently seeking doctoral degrees.

STUDENTS AND POST DOCS OCCUPYING FACULTY POSITIONS

1. **Darby Harris:** *Western North Carolina University*- Biology Department
2. **Venugopal Mendu:** *Texas Tech University*- Plant and Soil Science Department where he continues the work he started on cellulose biosynthesis
3. **Ye Xia:** *The Ohio State University*. She continues her research on endophytes and chemical genetics
4. **Carloalberto Petti:** *Ireland Institute of Technology, Carlow*. Lecturer

UNDERGRADUATE RESEARCH STUDENT ADVISING

DeBolt lab has employed over 30 undergraduate and high school research scholars since 2009, many of whom are in graduate school (Medical, Dental, Optometry, PhD, Masters, Veterinary) or working in industry (wine, distiller, biotech).

PUBLICATIONS

Of 54 published papers with H index of 18 (ISI Web of Science) over the past 10 years, some examples of scholarly work are:

1. Jonathan S. Griffiths, Rekha Kushwaha^o, Kreshimir Sola, Patricia Lam, Catalin Voiniciuc, Gill Dean, Shawn Mansfield, Seth DeBolt, and George W. Haughn (2015) Cellulose Synthase complexes of *Arabidopsis thaliana* seed coat epidermal cells deposit cellulose in a circular pattern required for both extrusion and adherence. *Plant Physiology* 10.1104/pp.15.00478. Epub 2015 Apr 29.
2. Petti C, Hirano K, Stork J, DeBolt S (2015) Mapping of a cellulose deficient mutant named dwarf-1 in *Sorghum bicolor* to the Green Revolution gene GA20-oxidase reveals a regulatory association between gibberellin and cellulose biosynthesis. *Plant Physiology* DOI: pp.00928.2015.
3. Petti C^o, Kushwaha R^o, Tateno M^o, Stork J^o, Harman-Ware AE, Crocker M, Awika J and DeBolt S* (2014) Mutagenesis breeding for increased 3-deoxyanthocyanidin accumulation in leaves of *Sorghum bicolor* (L.) Moench: a source of natural food pigment *Journal of Agricultural and Food Chemistry* (accepted)
4. Ye X^o, Stork J^o, Lei L, Wallace I, Brabham C^o Strickland J, Ladak A, Gu Y, DeBolt S (2014) Acetobixan, an inhibitor of cellulose synthesis identified by microbial bioprospecting *PLoS ONE* 9(4): e95245. doi:10.1371/journal.pone.0095245
5. Brabham C, Lei L, Gu Y, Barrett M and DeBolt S (2014) Mechanism of indaziflam herbicidal action: a potent cellulose biosynthesis inhibitor *Plant Physiology* 166(3):1177-85
6. Sethaphong L, Haigler CH, Kubicki JD, Zimmer J, Bonetta D, DeBolt S, Yingling YG (2013) Tertiary model of a plant cellulose synthase *Proc Natl Acad Sci USA*, 110 (18) 7512-7517 <http://www.pnas.org/content/early/2013/04/16/1301027110.abstract>
7. Banjeree J*, Magnani R*, Nair M*, Dirk L, DeBolt S, Maiti I and Houtz R (2013) Calmodulin Mediated Signal Transduction Pathways in *Arabidopsis* are Fine-Tuned by Methylation. *Plant Cell* 26, 4493-4511.
8. Harris DM^o, Corbin K^{o+}, Wang T, Gutierrez R, Bertolo AL, Petti C^o, Smilgies DM, Estevez JM, Bonetta D, Urbanowicz B, Ehrhardt DW, Somerville C, Rose JCK, Hong M and DeBolt S* (2012) Cellulose microfibril crystallinity is reduced by mutating C-terminal transmembrane region residues CESA1^{A-V903} and CESA3^{T-1942} *Proc Natl Acad Sci USA*, 109, 4098-103
9. Mendu, V^o, Shearin, T^o, Campbell E Jr., Stork J^o, Jae J, Crocker M, Huber G and DeBolt S* (2012) Global Bioenergy Potential From High Lignin Agricultural Residue *Proc Natl Acad Sci USA*, 109(10):4014-9
10. Schrick K, DeBolt S, Bulone V (2012) Deciphering the molecular functions of sterols in cellulose biosynthesis *Frontiers in Plant Physiology* 3:84. doi: 10.3389/fpls.2012.00084
11. Mendu V^o, Griffiths J, Persson, S, Stork J^o, Voiniciuc C, Downie AB, Haughn G, DeBolt S* (2011) Subfunctionalization of cellulose synthases in seed coat epidermal cells mediate secondary radial wall synthesis and mucilage attachment *Plant Physiol* 157(1):441-53
12. DeBolt S* (2010) Copy number variation shapes genome diversity in *Arabidopsis* over immediate family generational scales *Genome Biology and Evolution* 2: 441-453.

- a. Cited 34 times since release (Google scholar): Impact factor 4.8
13. Stork J°, Harris D°, Williams B+, Griffiths J, Haughn G, Beisson F, Li Y, Mendu V°, DeBolt S* (2010) CELLULOSE SYNTHASE9 serves a non-redundant role in secondary cell wall synthesis in the radial wall of Arabidopsis epidermal testa cells *Plant Physiology* 153: 580-589.
 - a. 2011 2/190 (Plant Science); Most highly cited plant journal.; Impact factor 7.084
 14. Harris D°, Bulone V, Ding H and DeBolt S* (2010) Tools for analyzing cellulose biosynthesis *Plant Physiology* 153: 420-426.
 - a. 2011 2/190 (Plant Science); Most highly cited plant journal.; Impact factor 7.084
 15. Gu Y, Deng Z, Paredez AR, DeBolt S, Wang Z, Somerville C (2008) Arabidopsis Prefoldin6 is involved in delivery of tubulin to cytosolic chaperonin. *Proc. Natl. Acad. Sci. USA.* 105, 1109-1115.
 16. DeBolt S, Ristic R, Iland PG, Ford CM (2008) Altered light interception reduces grape berry weight and modulates organic acid biosynthesis during development. *HortScience* 43: 957-961.
 17. Goodin MM, Chakrabarty R, Banerjee R, Yelton S, DeBolt S (2007) Update on live cell imaging: New Gateways to Discovery. *Plant Physiology* 145: 1100-1109.
 18. DeBolt, S., Gutierrez, R., Ehrhardt, D.W., Somerville, C (2007) Non-motile cellulose synthase rosettes repeatedly accumulate within localized regions at the plasma membrane in Arabidopsis hypocotyl cells following 2,6-dichlorobenzonitrile (DCB) treatment. *Plant Physiology* 145: 334-338.
 19. DeBolt, S., Gutierrez, R., Ehrhardt, D.W., Melo, C.V., Cutler, S., Ross, L., Somerville, C and Bonetta D. (2007) Morlin, a novel inhibitor of cortical microtubule dynamics and cellulose synthase movement. *Proc. Natl. Acad. Sci. USA.* 104: 5854-5859.
 20. DeBolt, S., Cook, D.R. & Ford, C. M. (2006) L-Tartaric acid synthesis from vitamin C in higher plants. *Proc. Natl. Acad. Sci. USA* 103: 5608-5613.

HONORS AND AWARDS

- Cooperative Research Center for Cotton Honors Scholarship: 2000
- Joyce Winifred Rouse Prize For Agricultural Chemistry, The University of Sydney; 2001
- Cooperative Research Center for Viticulture Travel Grant Award: 2004
- Earl J Scherago Travel Grant Award, Plant and Animal Genome XIII: 2005
- Robyn van Heeswijck Distinguished Lecture Award; University of Adelaide, Sept 21st 2012 (The Robyn van Heeswijck Lecture is named in honor of the former Senior Lecturer whose life and world class research was cut short after a courageous battle with cancer. This award recognizes early career researchers that share her passion and commitment to plant science industries)
- Bobby Pass Excellence in Grantsmanship Award: University of Kentucky (An award given every three years based on grantsmanship). 2008-2012 recipient
- Wethington Research Award: 2010-2015
- Thomas Poe Cooper Distinguished Research Award 2015

PROFESSIONAL SOCIETIES

- American Society of Plant Biology
- American Chemical Society