

Ted Toal

Department of Biochemistry and Molecular Medicine, University of California, Davis

One Shields Avenue, Davis, CA 95616

(530) 263-5986

twtoal@ucdavis.edu

Objective

Apply and further my knowledge, experience, and skill in analyzing genome-scale data to study of cancer, with the goal of further understanding and improved treatment.

Education

2010-2016 Ph.D., Integrative Genetics & Genomics grad. group, Univ. of Calif. Davis Dept. of Plant Biol. (GPA 3.8)

2002-2009 Self-directed biological sciences coursework (GPA 3.76)

1971-1975 B.S. Electrical Engineering and Computer Sci., Univ. of Colo. Boulder, Tau Beta Pi honors (GPA 3.66)

Research and Professional Experience

2016 Postdoctoral researcher. Advisor: Dr. Luis Carvajal-Carmona.

- Gastric tumor and normal genomic DNA analysis of Hispanic patients.
- Seeking cancer driver genes, mutation signatures, and tumor clonal structure in gastric tumors.
- Comparison of driver genes in Hispanic vs. European populations.
- Relating mutational signatures to chemotherapy efficacy.
- Use of clonal structure to predict number of driver genes active in a tumor.

2010-2015 Graduate student researcher. Advisor: Dr. Siobhan Brady. Dissertation title: Genetics and Genomics of Gravitropism and Cortex Layer Number in Tomato (*Solanum lycopersicum*) and *S. pennellii* Species.

- Main research topic: inference of gene regulatory networks controlling aspects of root architecture in tomato, with a focus on root growth angle.
- Computational work: development of RNA-seq pipeline to sequence a large number of libraries and add genotyping capability; becoming proficient in many aspects of statistics, including use of mixed effect linear models and ANOVA and standard statistical tests; differentially expressed gene calling, enrichments analysis, and correlation/partial correlation co-expression networks construction; becoming a highly skilled R programmer; extensive use of Perl and unix; pipeline development for genotyping using shallow sequencing; creating an algorithm for generating PCR genotyping primers from whole genomes; extensive familiarity with Arabidopsis, Tomato and *S. pennellii* genomes; developed R software for working with those genomes; sequence analysis work with tools such as Geneious and phylogenetic tree software; development of tools and software for measuring and analyzing phenotype data; assisted and tutored others in RNA-seq analysis and R programming.
- Wet-lab experience: growing tomato and Arabidopsis through their life cycles; greenhouse and growth chamber work caring for and crossing plants; use of SALK lines for testing Arabidopsis gene knockouts; extraction of DNA and RNA from plants; primer design; many PCRs and gels; qRT-PCR; sequencing of PCR product; cloning work, mini-preps, glycerol stocks, liquid cultures; sectioning and microscopy. I developed a detailed lab protocol document recording the protocols I learned.
- Other: managed an undergraduate assistant.

1976-2010 Software engineer and software development consultant, various employers and clients.

- Embedded systems software engineering.

Publications

- (in prep) **Toal TW**, et. al. "Regulatory Mechanisms Underlying Tomato Root Gravitropic Setpoint Angle and Gravitropic Reorientation Response.
- (in prep) **Toal TW**, et. al. "Indel Group in Genomes (IGG) Molecular Genetic Markers"
- 2015 Spiegelman Z, Ham Byung-Kook, Zhang Z, Toal TW, Brady SM, Zheng Y, Fei Z, Lucas WJ, Wolf S. "A phloem-mobile protein regulates the shoot-to-root ratio by mediating the auxin response in distant organs." *The Plant Journal* 83.5 (2015): 853-863.
- 2014 Taylor-Teeple M, Lin L, de Lucas M, Turco G, **Toal TW**, Gaudinier A, Young NF, Trabucco GM, Veling MT, Lamothe R, Handakumbura PP, Xiong G, Wang C, Corwin J, Tsoukalas A, Zhang L, Ware D, Pauly M, Kliebenstein DJ, Dehesh K, Tagkopoulos I, Breton G, Pruneda-Paz JL, Ahnert SE, Kay SA, Hazen SP, Brady SM. "An Arabidopsis gene regulatory network for secondary cell wall synthesis." *Nature* (2014).
- 2013 Ron M, Dorrity MW, de Lucas M, **Toal T**, Hernandez RI, Little SA, Maloof JN, Kliebenstein DJ, Brady SM. (2013) "Identification of Novel Loci Regulating Inter-specific Variation in Root Morphology and Cellular Development in Tomato." *Plant Physiol.* 2013 Jun;162(2):755-68.
- 2013 Moussaieff A, Rogachev I, Brodsky L, Malitsky S, **Toal TW**, Belcher H, Yativ M, Brady SM, Benfey PN, Aharoni A. (2013) "High Resolution Metabolic Mapping of Cell Types in Plant Roots." *Proc Natl Acad Sci U S A.* 2013 Mar 26;110(13).

Presentations/Posters

- 2013 **Ted Toal**, Mily Ron, Michael W. Dorrity, Miguel de Lucas, R. Ivan Hernandez, Stefan A. Little, Julin N. Maloof, Daniel J. Kliebenstein, Siobhan M. Brady. Novel Loci Regulating Tomato Root Morphology and Development. Genetics Graduate Group Annual Meeting and Colloquium, May 2013. Poster Presentation. **Best Poster Award**
- 2013 **Ted Toal** Mily Ron, Michael W. Dorrity, Miguel de Lucas, R. Ivan Hernandez, Stefan A. Little, Julin N. Maloof, Daniel J. Kliebenstein, Siobhan M. Brady. Novel Loci Regulating Tomato Root Morphology and Development. Western Section of the American Society of Plant Biologists Annual Meeting, Davis CA, Apr 2013. Poster presentation.
- 2013 **Toal, T.** Identification of Novel Loci Regulating Inter-specific Variation in Root Morphology and Cellular Development in Tomato. Asymmetric Cell Division Workshop, Nottingham, England, Mar 2013. Oral Presentation.

Community Service

- 2000 Instructor for senior citizen internet training program at Nevada County Library, Nevada City, CA.
- 2000-2002 Founding board member, Sierra Nevada Deep Ecology Institute.
- 1990-1993 Radio broadcaster, Food for Thought, program focused on overpopulation, KVMR Community Radio, Nevada City, CA.
- 1989-1994 Founding board member, Nevada County Land Trust, Nevada County, CA.
- 1984-1990 Editor, vice-chair, and chair of Sierra Nevada Group, Sierra Club, Nevada County, CA.