

Plant Physiology's Best Paper Award 2002

I am pleased to announce the Editorial Board's choice for the Best Paper published in *Plant Physiology* in 2002. The winner of this year's award is Dr. Carolyn Schultz for research performed while a senior research fellow with the Cooperative Research Centre (CRC) for Bioproducts in the laboratory of Professor Tony Bacic at the Plant Cell Biology Research Centre in the School of Botany at the University of Melbourne. The paper, titled "Using Genomic Resources to Guide Research Directions. The Arabinogalactan Protein Gene Family as a Test Case," was published in the August issue of *Plant Physiology* (Schultz et al. [2002] *Plant Physiol* **129**: 1448–1463).

Carolyn is now a lecturer at the Department of Plant Science on the Waite Campus at the University of Adelaide. She was an undergraduate of the University of Adelaide, Australia, and then decided to broaden her horizons to complete her graduate program with Professor Gloria Coruzzi at New York University. She obtained her MS (1991) and PhD (1993) degrees working on the molecular and genetic analysis of aspartate aminotransferase (AspAT) in that noted model "weed" Arabidopsis. Carolyn devised a genetic screen to look for mutants that were missing a particular isoenzyme of AspAT, thereby attempting to define the role of an enzyme *in vivo* rather than *in vitro*. This led to groundbreaking work in the field. Following a chance encounter at an international meeting with Professor Adrienne Clarke, she was enticed to return "down under" to establish a molecular biology team within the CRC for Bioproducts. Her boundless energy and insatiable desire to share her molecular genetics skills with others led to a now well-established collaboration with Professor Tony Bacic. The Plant Cell Biology Research Centre, through a long-standing collaboration between Professor Adrienne Clarke and Professor Tony Bacic, had established a broad multidisciplinary program on the structure, function and biosynthesis of arabinogalactan-proteins (AGPs).

Carolyn's background in molecular genetics and Arabidopsis heralded new opportunities to extend the Centre's work into Arabidopsis. AGPs, the only group of cell surface proteoglycans in plants, have long been implicated in plant growth and development. Carolyn's skills in molecular genetics and bioinformatics enabled the Centre to adapt a systematic, genome-wide based analysis of AGPs. This approach can be used by others who wish to take advantage of genomics data and technologies to further their research aims. Carolyn and her coworkers started with a careful analysis of the Arabidopsis genome sequence, and developed a Hidden Markov model for a poorly conserved 88 aa domain. They considered the presence of N secretion signals and C terminal GPI anchor domains in organizing the gene family. Next, they considered what was known about gene expression from ESTs and public domain array data and organized the bioinformatics data into a simple and useful table describing the family. Describing gene space in this manner can be deceptively powerful. In analyzing the expression results more carefully they noted that AGP gene expression is induced by aluminum stress, apparently in a fairly specific manner, and made observations regarding a subfamily's tissue specific gene expression. These observations can be pursued in a hypothesis driven manner to understand the biological significance, if any. This is what data mining should do. The customized software program Carolyn developed in collaboration with her partner, Michael Rumsewicz, made it possible to view the ratio data from microarrays for all the Arabidopsis Functional Genomics Consortium experiments and as many genes as desired in a single sheet (see website http://www.adelaide.edu.au/sciences/plant/research/biochem_groups/cs_bioinformatics.html). Analyses described in the paper have allowed these researchers to make decisions regarding priority targets for future research. Furthermore, these resources will be a repository of information for other researchers to mine.

Congratulations, Carolyn!

Natasha V. Raikhel, Editor-in-Chief of *Plant Physiology*

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