

SCHATZ CENTER FOR TREE MOLECULAR GENETICS REPORT

JOHN CARLSON, DIRECTOR

SEPT 30, 2012

Through the endowments gifted by Dr. Schatz for post-doctoral fellows, visiting scholars, undergraduate research, and symposia, the prominence of the Schatz Center at Penn State has risen to national and international prominence in modern tree genetics research. Major research projects initiated in the Schatz Center have been awarded millions of dollars of external grant support, including: 1) sequencing of the Chinese chestnut genome (*Castanea mollissima*) for the discovery of genes for chestnut blight resistance, 2) the genomics of environmental stress responses in hardwood tree species to address forest health issues, 3) the analysis of gene networks that regulate flowering versus vegetative growth in trees, 4) the mapping of genes for ozone pollution tolerance in black cherry (*Prunus serotina*), 5) the mapping of genes for beech bark disease in American beech (*Fagus grandifolia*), 6) genomic characterization of the forest soil microbial communities and their relationship with above ground growth and stress resistance in trees, and 7) the discovery of microbial genes in the gut of the Asian longhorned beetle that are responsible for this serious exotic forest pest insect being able to efficiently digest wood. The director, Dr. Carlson, has garnered recognition for the accomplishments of the Schatz Center. In March, 2012, Dr. Carlson was presented the Alex and Jessie C. Black Faculty Award for Excellence in Research by the College of Agricultural Sciences at Penn State. Internationally, Dr. Carlson has been invited to give numerous lectures about research programs in The Schatz Center, as well as being offered a Visiting Professorship to help establish a Department of Bioenergy Science & Technology at Chonnam National University in South Korea. The visiting professorship has led to a major collaborative research project between the new department at Chonnam National University and The Schatz Center to sequence the genome of the emerging biodiesel crop plant *Camelina sativa*. International recognition for The Schatz Center is also in evidence by increased interest in the Schatz Visiting Scholars program. This year, between July 1, 2012, and June 30, 2013, The Schatz Center is hosting Professor Rita Laude, recently the Vice Provost of Research at the University of the Philippines at Los Banos; Dr. Catherine Bodelles, forest geneticist with INRA, France's national agricultural research agency; Professor Srinanan Widiyanto of the Bandung Institute of Technology in Indonesia and her graduate student; and Fulbright Scholar, Dr. Maria Genaleen Diaz, Assistant Professor in the University of the Philippines at Los Banos.

Dr. Beth Brantley leads strong Schatz Center programs at Penn State's Mont Alto campus as well. Dr. Brantley continues to host successful Schatz Tree Genetics Symposia at Mont Alto. The symposia in the summers of 2007, 2009, and 2011, brought together experts from across the US to discuss challenges and opportunities to address threats facing pine, chestnut, and walnut tree species. The Schatz Tree Genetics Symposium being planned for 2013 will focus on oak species. Dr. Brantley also supervises Mont Alto undergraduate student research projects and has led the past three biennial visits by Penn State forestry students with Gordon Schatz at Humboldt State University, which has been a life changing experience for all of the students involved.

Please follow our activities and achievements at the recently redesigned Schatz Center website - <http://sfr.psu.edu/research/centers/schatz>.



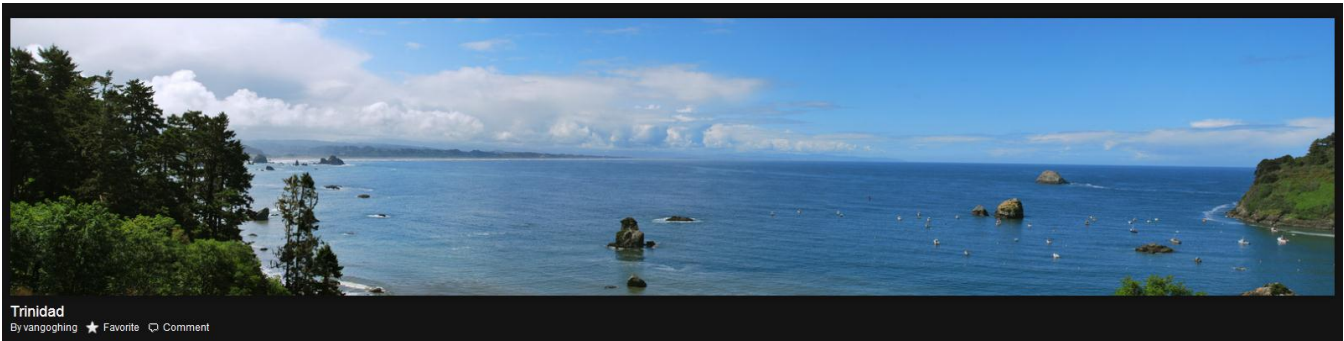
**Penn State Mont Alto
Students and Faculty
Visit with Gordon and Karen Schatz
June 4 - 7, 2012**



Gordon Schatz, Beth Brantley (fac), Kelly Ketterman, Maddie Erickson, Jennie Diehl, Tosh Rung, Craig Houghton (fac).

*Many thanks to Dr. John Carlson for allowing Penn State Mont Alto students
to use the University Park travel fund in 2012!*

Day 1 (Kelly Ketterman, author)



On our first full day in California our group ate breakfast at Los Bagels in Arcata, picked out our lunch at the North Coast Co-op, and then drove to Trinidad where we were given the opportunity to tour the beach house of Karen and Gordon Schatz. It was amazing being 75 feet above sea level and seeing the fishing boats in the water below. The view was incredible! Just off in the distance, the ever faithful fog belt was slowly moving in which provided great photographs of the surreal landscape.

Following the tour of the Schatz's beautiful beach home, we traveled to see the redwoods at Prairie Creek State Park. After fording a flooded road, our group settled down on a nearby picnic table and ate lunch with Karen and Gordon. When we finished lunch Gordon discussed with us the history of the land. The site where we were was an old logging landing. Off in the distance on a mountain Gordon pointed out where the trees were cut. When we started our trek via trail into the old growth forest Gordon informed our group about how he had a hand in designing some of the trail.

Then it happened... We were amongst giants! There were huge redwood trees, colossal ferns, and hanging lichens and moss which made us feel like we had stepped back into prehistoric time. I felt tinier than I have ever felt in the woods. Along the way Karen pointed out several of the native wildflowers along the trail. It was a photographers dream as I tried to capture every moment, every plant, and every tree.



After our adventure in the old growth forest Gordon and Karen took us to the Redwood National Forest. There our group saw a very significant tree, the corkscrew tree. We climbed inside this massive twisting giant and got our picture taken.

We then traveled to another part of that forest where the famous 'Big Tree' is located. Words can barely describe this tree and pictures barely give it justice. Being next to this 350 foot tree I felt and looked miniscule.



When we exited the forest we gathered around Gordon and Karen's van and tried to catch a glimpse of Venus transitioning across the Sun.

The 3D-like glasses Gordon provided gave us that once in a lifetime look at the Sun and the tiny planet as it passed by.

After our moments of awe we traveled to the beach south of Trinidad. It was there we kicked off our boots and ran through the sand so our toes could experience the chilly Pacific Ocean. Karen took us along the water's edge in search of her favorite stones, agates and jade. I wasn't lucky enough to find an agate my own, but searching for them was still very enjoyable. Karen was kind enough to give us gifts of our very own jade and agates!



When we finished our stroll on the beach we set off in search of dinner at the Chinese buffet. There we shared a meal and conversations with Karen and Gordon and discussed the adventures that tomorrow would bring.



Day 2 (Tosh Rung and Jennie Diehl, authors)

The second day was spent touring the L.W. Schatz Demonstration Tree Farm at Maple Creek in Korb, California. Gordon Schatz and Karen Schatz were kind enough to be the hosts, tour guides, and advisors to our group for the many sights and sounds of Humboldt County, California!

First, our group traveled to the Schatz' family homestead, where we were immediately greeted with a beautiful view of mountainous scenery. The feel of northern California forests is one that cannot be matched to anything in our previous experiences. All of our senses were overloaded as we observed an environment without equal in beauty, grandeur and mystery. As we wandered through the forest our group could not help wondering what the many new plants were that surrounded us. Our hosts were kind enough to grant us these questions with informed and interesting answers!

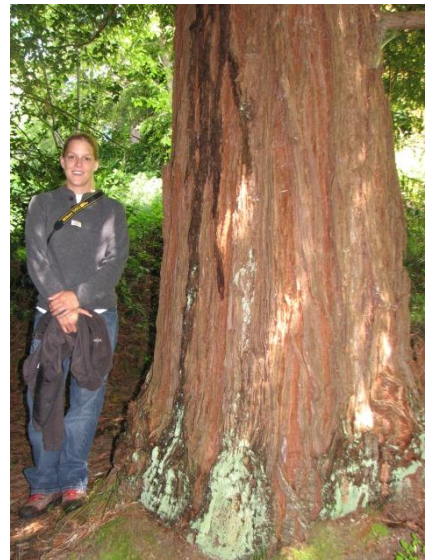


We observed the many interesting and informative practices of the Schatz home life. We found even the smallest things captivating, and the surprises continued as we were still in awe of the natural beauty of the scenery on the roadway and the forest around us. The family collects and actively uses rain water for use with domestic animals, as well as for garden and fruit tree irrigation.

We walked through the family garden and fruit trees, and were surprised to learn that lemon (*Citrus limon*) and kiwifruit (*Actinidia deliciosa*) grow very well in northern California. We noticed a fruit tree and lichen interaction. Northern California is full of lichen and moss relationships with trees.

Gordon pointed out a redwood on their property he planted 31 years ago. The tree had grown at least 50 feet in height and was greater than 30 inches in diameter! This example showed our group the enormous growth potential for coast redwoods.

As we walked through the L.W. Schatz Demonstration Tree Farm, we learned interesting native plants in the area. As the coast redwood (*Sequoia sempervirens*) is a main focal point of the tree farm, Gordon wanted us to see several examples of different life stages.





We observed redwoods competing with other species of trees, as well as weathering storm damage, shifting ground, and bear damage. The adaptable nature of the coast redwood became apparent as we learned about the genetics and interactions with the environment.

We observed the local forest environment as we walked upward in elevation. One of our favorite plants was the redwood sorrel (*Oxalis oregana*), a shamrock-shaped, creeping ground plant. A new tree for us was the Monterey pine (*Pinus radiata*). This tree was interesting to observe in a near-pure stand because it provided diversity to the surrounding forest, as

well as cover for a new age class of coast redwoods.

On our tour we observed two astonishing realities of the Humboldt County forest. First, there was significant bear damage on many of the young coast redwood trees. Bear pose a real and applicable threat to trees in this environment.

Second, the tree farm requires its own water tank for fire response. The local fire department does not have the resources available to protect a tree farm of this size from wildfire.



Last on our tour for the day, we made the trip up to the rock overlook. We were greeted with one of the greatest vistas we have ever had the pleasure of seeing. A wide panoramic view of mountainous terrain greeted us; with tiny farm fields and farms just barely visible in the distance. Beyond the mountains, the sea was just barely visible as a streak of light blue against the dark blue of the sky. Time seemed to disappear as we sat at this vista and stared. This was a truly magnificent ending to a day full of new sights, sounds, and an excellent tour of intensive management of coast redwoods in their natural range.



Day 3 (Madeline Erickson, author)

On the third and final day of our trip to the California redwoods, we visited the Arcata Community Park in Arcata, California. The park is one of the largest city parks in the United States, with approximately 600 acres filled with hiking trails and of course, coast redwoods (*Sequoia sempervirens*). The area which is now the city park was logged during the 1880's logging boom in the Pacific Northwest, with gigantic stumps scattered throughout the park. In the lower portion of the park, huge redwoods still stand tall in the forest, shading the forest floor below them.



We hiked through the park with Gordon and Karen, taking some of Gordon's favorite mountain biking trails in the forest. The trails allowed us to see more of the majestic redwoods and the unique ecosystem of coastal California. We saw many species of wildflowers, including wild flag iris, western trillium and red columbine. I enjoyed having the many photo opportunities throughout our travels, fueling my love of nature photography and the enjoyment of the natural world. The botany and scenery of the California coast was amazing and something to remember for a lifetime.

Gordon and Karen taught us many things throughout the week, but I think the most important and lasting lesson is to respect the world we live in, and learn to manage it responsibly for the enjoyment of many generations to come. This was truly the trip of a lifetime and one I will surely remember!



Our sincere thanks to Gordon and Karen Schatz for a wonderful visit to the redwoods!
We cannot thank you enough for your kindness and generosity to the "eastern visitors"!
We have wonderful memories and photos to share!

