(Ripening cocoa fruit.
An international research project in the Schatz Center - page 4.)

The Louis W. Schatz Center for Tree Molecular Genetics

Pennsylvania State University

2004 Progress Report

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This report covers activities in *The Louis W. Schatz Center for Tree Molecular Genetics* at Pennsylvania State University for the period of July 1 to December 30, 2004. Activities are described for each endowment supported under the *Schatz Center for Tree Molecular Genetics*.

Construction on the new 92,000 square feet School of Forest Resources Building at University Park, where the Schatz Center will be featured and have its permanent home, is progressing well. The completion date is still slated for December of this year. We look forward to a grand opening ceremony in 2006. The official Ground Breaking Ceremony was held on October 29, 2004. A description of the ceremony is available at http://live.psu.edu/story/8700. The Schatz Center is expected to occupy it's new lab in early Spring, 2006. In the mean time the Schatz Center continues to enjoy the university's best research facilities. In November (2004), the Schatz Center relocated from the Wartik Lab to the new Life Sciences Building (LSB - see accompanying photograph) which was designed by the same architects in charge of the Forest Resources Building . The LSB is headquarters for the Huck Institutes for the Life Sciences, which serves more than 500 scientists at Penn State. The LSB provides centralized research laboratory space, classrooms, and laboratory facilities for four university-wide research centers including the *Plant Science* in which the Schatz Center is temporarily located. A fifth center, proposed by the Schatz Center Director JEC, was also approved. This center became the Institute for Genomics, Proteomics, and Bioinformatics, for which the Wartik Lab is currently being renovated, resulting in the Schatz Center move to the LSB.


LSB - The Life Sciences Building

Schatz Center Endowment for Library Collections:
The Schatz library fund has permitted the university's main library to obtain subscriptions to important publications in forestry, plant science, and molecular genetics such as the Canadian Journal of Forest Research and Genome, which are now available on line to all Penn State faculty, staff, and students. The Schatz Center Director (JEC) is currently the Chair of the college's library committee, and continues to work for improvements in access to resources that enhance tree genetics research at Penn State.

The Schatz Visiting Scholars Program is hosting it's first international research scholars, Dr. Kyung-Nak Hong and Dr. Mahn Jo Kim. Both Hong and Kim are from the Institute for Forest Genetics in South Korea. Dr. Hong's specialty is genetic diversity in Asian oak species. Dr. Kim conducts research on tree improvement in forest and nut cultivars of Asian chestnut species. Both of their areas of interest are directly relevant to the mission of the Schatz Center and ongoing tree genetics research programs at Penn State. Dr. Kim is being hosted by Dr. Kim Steiner, Professor of Forest Biology at Penn State and member of the Schatz Center. Mahn Jo Kim is learning about our collaborative programs with the American Chestnut Foundation and establishing a germplasm exchange program with researchers at Penn State and other US

institutions. Kyung-Nak Hong is developing a genetics component to the award winning maple ecology program of Schatz Center member Marc Abrams, as well as collaborating with the Director, Carlson, on oak paternity analysis studies. The College of Forestry and Natural Resources at the University of the Philippines, the Royal Forestry Department in Thailand, and The Institut Teknologi Bandung in Indonesia are also developing collaborative research projects with the Schatz Center at Penn State, which will be facilitated by the Visiting Scholars Program. The Director continues to travel to major international meetings to publicize the Schatz Center at Penn State and our Visiting Scholars Program.

Our two Schatz Post-Doctoral Fellows - Dr. Abdoulaye Traore and Dr. Haiying Liang – continue to make great strides forward in their research. Dr. Traore continues to push forward with our tree micropropagation research. He has developed a protocol for the multiplication of Douglas-fir shoots in tissue culture, starting with buds from genotyped trees. Funds from the Pennsylvania Department of Agriculture support a graduate student to work with Dr. Traore on rooting of micropropagated shoots. Our first manuscript on the Douglas-fir micropropagation system was submitted in December, and recently accepted for publication in the HortScience Journal. We hope to provide a clonal propagation system for use by the local Christmas tree industry that approaches the efficiency and usefulness of the coast redwood system that we saw during our visit with Gordon Schatz last Spring.

Schatz post-doctoral fellow Haiying Liang is conducting research on tree genomics. Dr. Liang is completing characterization of our yellow-poplar (*Liriodendron tulipifera*) DNA library (http://www.greenbac.org) and preparing a publication that describes this new resource. She has isolated and sequenced several genes important in flowering (http://fgp.bio.psu.edu/fgp/) and in wood production in yellow-poplar. Dr. Liang assisted in the preparation of a grant proposal to the National Science Foundation, which was recently approved. This new grant will permit us to study extend the regulation of flowering in poplar (Populus species) at the whole genome level. The whole genome sequence or Populus trichocarpa (black cottonwood) was recently completed by the Department of Energy's genome sequencing lab in Walnut Grove, California. The project and results are described at the sequencing lab web site (http://genome.jgi-psf.org/Poptr1/Poptr1.home.html) and also at the web site of an international consortium on poplar in which the Schatz Center Director is active (http://www.ornl.gov/sci/ipgc/). The new grant to the Schatz Center recognizes the value of poplar as a model system for tree genetics, and also recognizes the value of the approach to studying floral biology created by the Floral Genome Project, in which Carlson participates (http://fgp.bio.psu.edu/fgp/index.html). The Schatz Center produced half of the DNA sequence data for the Floral Genome Project. The first manuscript on the Floral Genome Project DNA sequence data was just prepared by Dr. Carlson.

The Schatz Awards for Undergraduate Research are available to students at both the University Park and Mont Alto campuses to conduct research under the supervision of Penn State faculty associated with the Schatz Center. Each Schatz Scholar is awarded $1,000 for research, publication and travel expenses related to their project. Recruitment of undergraduate Schatz Scholars is an ongoing activity at both campuses. Currently 6 undergraduate students are working with the Schatz Post-doctoral Fellows on research projects in the Director's lab at University Park. Their activities will be described in the next newsletter.

Outreach activities in the Schatz Center - Dr. Carlson organized and hosted two conferences in 2004 concerning American chestnut research and restoration. The first conference was held at Asheville, NC, at the request of the US National Park Service. This conference ("Restoration Of Chestnut To Forest Lands Within The National Park System") featured talks covering all aspects of the biology, history and social context of the American chestnut as well as in-depth discussion of the approaches that Park Service can take in their future chestnut restoration programs. Over 100 people attended. A book is being prepared by Dr. Carlson which will contain manuscripts of all of the talks, and should be published by mid-2005. The second conference that Dr. Carlson hosted was the annual meeting of the USDA project on American chestnut blight resistance and restoration research in September. This meeting was attended by app. 50 researchers who provided updates on their research. A tour of the Schatz Center and of local chestnut field research sites was provided.

Other research projects in the Schatz Center include genomics of *Theobroma cacao*, the cocoa tree. This research is being conducted with Cocoa Biotechnology Research Center at Penn State. The Cocoa Biotechnology Center is directed by Dr. Mark Guiltinan in the Horticulture Department and is funded by the American Cocoa Research Institute. Dr. Guiltinan and Dr. Carlson are co-supervising a graduate student and a post-doctoral fellow, whose research projects involve discovering the genes in T. cacao that are responsible for flower and fruit development and for susceptibility to pathogens. The majority of cocoa beans are produced by small family-operated agro-forestry farms of 1 – 10 acres in tropical, lesser developed countries where biotechnology research is unaffordable. By providing Schatz Center facilities and expertise to cocoa research projects, we are helping Dr. Guiltinan to transfer the promise of tree molecular genetics to subsistence growers around the world who need help the most. Our first manuscript on cocoa molecular genetics was recently published in the journal Plant Cell Reports.

The Louis W. Schatz Program Support Fund for Forestry at Mont Alto was established in February 2004 to enrich the student experience at Penn State Mont Alto by providing funds to support the Forest Technology program. The program funds are accruing towards the planned purchase of new student transportation to replace the 1990 school bus used for field trips.

The Schatz Tree Genetics Colloquium at Mont Alto. Dr. Beth Brantley at Mont Alto and John Carlson at University Park are making good progress on slating a Board of Directors to help plan the colloquia. No funds will be spent until the board is complete. The full board will be reported in the next newsletter. A meeting of the board is being planned for later in 2006.

The Schatz Student Field Trip Funds are not being tapped in the 2004-05 academic year but are rather being allowed to accrue so that we can visit Gordon Schatz and Humboldt State University again in 2006. It costs more than the annual endowment earnings to visit with several students .

Dr. Schatz had hoped that the funds would be used for visits to Humboldt State University, so we hope to be able to visit the Schatz's and Humboldt State every other year.

The Louis and Merry Schatz Faculty Travel Funds are available to all faculty members in the School of Forest Resources to request. The funds are well known to the faculty and the School Director, but they are not always fully used. Faculty request support as needed. When the Faculty Travel Fund does not receive a request by years end, the Center Director may use it in part to offset some travel expenses to tree genetics research conferences during the year.