Center for Advanced Forestry Systems (CAFS): Evaluator's Report for 2008-09

(http://www.nsf.gov/eng/iip/iucrc/directory/tger.jsp)

North Carolina State University
Oregon State University
Purdue University
University of Georgia
University of Maine
University of Washington
Virginia Polytechnic Institute and State University

Attachment A: NSF/IUCRC Annual Surveys of Faculty & IAB Reps
Attachment B: Success Stories
Attachment C: CAFS Developmental Milestones

Submitted by Craig S. Scott
NSF Center Evaluator

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In 2008-09 the Center for Advanced Forestry Systems completed its 2nd year of operation as an IUCRC with North Carolina State University as the lead institution. The Center is a multi-university, interdisciplinary research center that addresses a variety of forestry issues through multifaceted approaches. Center research themes include combining traditional genetics, biotechnology and silviculture into integrated systems, with quantitative models to support decision-making and value enhancement. The Center is a fast growing collaborative research enterprise continues to evolve based on a long history of previous non-IUCRC industry/university collaborations at each of the university sites. The Center continues as the only tree genetics center that the NSF IUCRC Program currently funds.

CENTER TRANSITIONS

In 2003-2004, Oregon State University's Tree Genetic Engineering Research Center (TGERC) merged into Purdue University's Center for Tree Genetics (CTGr) – aka the Center for Advanced Forestry (CAF). In 2007, CAF was subsumed into North Carolina State University's new IUCRC, the Center for Advanced Forestry Systems (CAFS).

MEMBERSHIP

The Center for Advanced Forestry Systems is an increasingly important research entity. Industrial CAFS membership includes leading forestry industry firms from throughout the Nation. In 2008-09, the Center's industrial base, primarily paper, pulp and lumber interests, experienced a particularly severe economic crisis. This exacerbated an already difficult economic situation within the industry that had been declining for a period of years.

The center continues to work on expansion. The University of Georgia and the University of Maine became official CAFS site on February 15, 2009, bringing the number of center university sites to five. The University of Washington is also near an award letter. The addition of Maine, Georgia and Washington is greatly improving CAFS's industrial geographic representation.

COMPLIANCE WIH IUCRC MODEL

The Center remains faithful to the IUCRC Model. The Center for Advanced Forestry Systems is becoming an increasingly important research entity. Because of the nature of the technical field of tree genetic engineering, research proceeds at a somewhat slower and more deliberate pace than research in the typical IUCRC. As a result the Center holds annual rather than semi-annual meetings. These annual meetings are used to review and discuss research, budgets and intellectual property and to plan for overall development of the Center's research affiliations and programs.

The IUCRC Program's LIFE project evaluation approach is followed. LIFE Forms, which include an item on relevance, are used to assess new proposals, as well as interest in maintaining ongoing projects and in the possibility of revising them. Subsequent IAB discussions then focus on general research thrust and their budgetary implications.

CENTER ADMINISTRATION

The center director and each site director are to be commended for operating such smooth functioning center that is almost issue free. CAFS center management includes:

Center Director, Barry Goldfarb, NCSU, 919.515.4471, bgg@gw.fis.ncsu.edu
NCSU Site Director, Jose Stape: 919.513.4041, jlstape@ncsu.edu
Program Coordinator, Lisa Schabenberger, 919.513.7368, lisa_schabenberger@ncsu.edu

Oregon State University Site Director, Glenn Howe, 541-737-9001, glenn.howe@oregonstate.edu
Purdue University Site Director, Charles Michler, 765.496.6106, michler@purdue.edu
Outreach Coordinator, Liz Jackson, (765) 583-3501, jackson@purdue.edu
University of Georgia Site Director, Michael Kane, 706.542.3009, mkane@warnell.uga.edu
University of Maine – possible site director, Robert Wagner
University of Washington Site Director, David Briggs, 206 543-1581, dbriggs@u.washington.edu
Virginia Polytechnic Institute & State University Site Director, Thomas Fox, 540.231.8862, trfox@vt.edu.

Possible additions during 2009-10:

University of Florida - possible site director, John Davis jmdavis@ufl.edu
University of Idaho – site director to be named

The IAB Director remains to be selected by the newly elected IAB executive committee.

The center evaluator is Craig Scott, University of Washington: 425.466.6535, scottcs@u.washington.edu.

In August of 2008, four IAB members were nominated by the directors to serve on the CAFS Executive Committee (CE) based on their interest in CAFS and their knowledge of forestry research. At the February 2009 IAB more nominations were sought and the executive committee was formed. The role of the EC are not yet defined, but could include: Serving as a sounding board for the Director and Site Directors on research and administration issues, before they are brought to the full membership; Serving as a conduit for the IAB to the Director and Site Directors on issues of concern and/or other suggestions; Providing input in a timely way (outside of regularly scheduled annual meetings) to issues, including budget adjustments, location and content of annual meetings; preliminary approaches to additional universities and prospective members, and possibly; Responsibility for conduct of the business meeting portion of the annual meeting. Duties and activities of the EC will continue to evolve.

MISSION

CAFS's major goal is to increase the economic value and utility of plantation forests, thereby enabling foresters to more efficiently produce greater volumes of high-quality wood materials.

Primary missions are to:

- Genomics of tree form, flowering and wood quality
- Genes to ecosystems: Effects of gene and genotypes on stand structure, and interactions of genotypes with silviculture
- Ecopsysiology of trees and stands
- Process models for trees and stands.

Primary themes:

- Interactions of genotypes and silviculture, practices and process modeling.
- Genomics and transgenics of key traits.
- Develop new transgenic science and technology for gene insertion technologies.
- Partner with industries to demonstrate effectiveness and value in the field.
- Transfer information and technology through research collaborations with other universities and industry.

Programmatic goal:

- Integrating research at multiple scales
- Uncovering funding principles of multi-species investigations.
- Synergistic interactions among US agencies and companies
- Train students to work in fields related to the new Center's research areas.

Research and field trials remain the over-riding CAFS priorities. Key research themes are:

- Genetic control of flowering.
- Environmental analysis of transgenic plantations.
- Use of gene transfer for enhancing desirable traits such as insect, herbicide and drought resistance into economically valuable tree species.

Issues facing the Center that have financial ramifications:

- Increasing responsiveness of center faculty for requests from NSF for center success stories will be important for the coming years.
- A way should be developed to help faculty and students located far away from an annual meeting site receive some travel stipend?
- An answer is needed for the question: How can the expanded center take best advantage of each site's strengths in order to better leverage industry dollars and technologies?
- Develop short- and long-term strategies for seeking large grants for applied research in tree genomic sciences.

Center strengths include:

1) Highly rated, industrially-relevant research focus that has considerable potential for substantial benefit to sponsors;

2) Solid and relatively stable base of industry with common interests, needs and expectations;

3) Insightful guidance of the NSF/IUCRC's program managers;

4) Talented, dedicated and innovative core of research and administrative faculty and graduate students, and;

5) Sound center operation made possible by professional collaborative efforts by the center director and by site directors and a quality support staff.

Bottom line: In 2008, most ratings of CAFS by industry were above the national mean for the 40 National Science Foundation IUCRCs. In summary, the center is recognized as a quality organization that is meeting the needs of a vital and growing forestry industry. Industry interest in the center's research is widespread and strong.

Attachment A

NSF/IUCRC OUCOME SURVEYS

In the fall of 2008, online outcome surveys were administered to IAB representatives and center research faculty as part of the NSF/IUCRC Program's Center Evaluation Program.

CAFS IAB Survey 2008

[Response Rate: 40%]

IAB REP VIEWS OF CENTER RESEARCH PROGRAM

	Mean	
CF/QRP:	4.4	Capabilities of faculty and quality of the research program (1=Not Satisfied; 2=Slightly Satisfied; 3=Somewhat Satisfied; 4=Quite Satisfied; 5=Very Satisfied)
BRT:	4.0	Breadth of the research topics covered (1=Not Satisfied; 2=Slightly Satisfied; 3=Somewhat Satisfied; 4=Quite Satisfied; 5=Very Satisfied)
FOR:	3.9	Focus of research (1=Not Satisfied; 2=Slightly Satisfied; 3=Somewhat Satisfied; 4=Quite Satisfied; 5=Very Satisfied)
RST:	3.7	Relevance of research to my organization's needs (1=Not Satisfied; 2=Slightly Satisfied; 3=Somewhat Satisfied; 4=Quite Satisfied; 5=Very Satisfied)

ITEM: How can the center improve its research program? What features of the research program would your organization definitely want to see continued?

Offer more research choices rather than a limited number of choices from each site center

To early in the process to have much comment

Continue / increase funding

Greater emphasis on regional topics of interest to land owners

The annual meeting is very good. Perhaps between annual meetings an update via conference call

By continually discussing opportunities with the end users of the research. Collaborative approach to research.

I have not been involved with the CAFS long enough to make any meaningful suggestions.

Perhaps there's a way to improve the input from members to the scientists in the process of "dreaming up" and formulating the projects. The work needs to be relevant beyond addressing questions of interest to researchers.

Would like to have a summary report on all the projects that are being run on an annual basis to see what other projects could add value.

Expand into growth and yield modeling.

Would be good to continue incorporating genetics into growth & yield modeling. Basic genomics research is also of interest.

IAB VIEWS OF THE BENEFITS OF CENTER MEMBERSHIP

	Mean	

ER&D	3.0	Enhanced R&D via tech awareness (see scale below) (1=No Impact; 2=Slight Impact; 3=Moderate Impact; 4=High Impact; 5=Very High Impact)
ECom	3.1	Enhanced commercialization via new products, processes, services, sales (see scale below) (1=No Impact; 2=Slight Impact; 3=Moderate Impact; 4=High Impact; 5=Very High Impact)
EPNet	3.5	Enhanced professional networking (see scale below) (1=No Impact; 2=Slight Impact; 3=Moderate Impact; 4=High Impact; 5=Very High Impact)

ITEM: If your organization has benefited technically from its participation in the center, please describe how (e.g. brief description of research advance or product/process improved, etc.) and, where possible, try to quantify benefit (e.g. dollars saved, months saved, waste/scrap reduced, etc.). NOTE: This information is helpful for member recruitment and continuing government sponsorship.

I see the center as having longer term benefits rather than short-term - play a critical role in bridging gaps that are otherwise not being met.

Benefits derived from Center projects of interest to us will not be realized in the short term. It is difficult to answer many of these questions because NSF seems to be seeking positive gain right now. Potential and likely value of future benefits is huge, likely ranging in billions of dollars region wide.

We only get exposure to this type of research through the center. The ability to do so and network with peers is the primary benefit we get.

My organization has benefited by having scientists from several universities become more involved in knowledge generation of pre-competitive aspects for our Company products.

Obtained licenses from fine hardwood breeding program.

We have together with one of the people developed a transformation protocol for our species.

n/a (x2)

IAB REP VIEWS OF CENTER ADMINISTRATION & OPERATIONS

	Mean	
CAOps	3.7	Center administrative operations (1=Not Satisfied; 2=Slightly Satisfied; 3=Somewhat Satisfied; 4=Quite Satisfied; 5=Very Satisfied)

IMPCOpps? How can the center improve its administration and operations program? Please put CHECKS next to any issues that can be improved:

	% Checking Area
Communication	41%
Planning & Development of research program	18%
Management of projects	5
Project selection	18%
Proposals and publications	23%
Technology transfer	18%
Intellectual property	0%
Fundraising	10%
Other (see below):	23%

Provide a newsletter describing activities would help folks be aware of what is going on.

Limit administration; let the researchers work.

Offer outreach as research results become publications.

Publish quarterly or semi-annual newsletter updating research for those who are not close to all projects. Nothing elaborate.

Produce an annual report detailing all the research projects.

	Mean	
LMR	4.5	Likelihood of membership renewal (1= Definitely Not; 2=Probably Not; 3=Uncertain; 4=Probably Yes; 5=Definitely Yes)

CAFS Faculty & Research Scientist Survey: 2008

[Response Rate: 88%]

FACULTY SATISFACTION WITH CENTER

	Mean	
QCR	4.4	Quality of center research program (1=Not Satisfied; 2=Slightly Satisfied; 3=Somewhat Satisfied; 4=Quite Satisfied; 5=Very Satisfied)
RCR	4.6	Relevance of C1 research program to my professional goals. (1=Not Satisfied; 2=Slightly Satisfied; 3=Somewhat Satisfied; 4=Quite Satisfied; 5=Very Satisfied)
CAO	4.0	During the past year, how satisfied were you with center administrative operations (1=Not Satisfied; 2=Slightly Satisfied; 3=Somewhat Satisfied; 4=Quite Satisfied; 5=Very Satisfied)
BRI	4.4	Next year I will submit my best research idea in a center funded proposal. (1=Definitely Not; 2=Probably Not; 3=Uncertain; 4=Probably Yes; 5=Definitely Yes)

ITEM: How can the center improve its research program? What features of the center's research program do you definitely want to see continued into the future?

The balance between broad research topics and regional focus is important to forestry and should be continued.

The center must be able to use and integrate the members' expertise to avoid too much overlapping of basic research. The annual planning/working meeting is needed to get people connected and develop such a logistic and long-term agenda for the center.

Conduct more collaborative research projects among members.

Add growth and yield modeling.

Increase collaborative work among the sites.

IMPCOpps? How can the center improve its administration and operations program? Please put CHECKS next to any issues that can be improved:

	% Checking Area
Communication	14%
Planning & Development of research program	43%
Management of projects	0%
Project selection	14%
Proposals and publications	29%
Technology transfer	14%
Intellectual property	0
Fundraising	29%

ITEM: How can the center improve its administration and operations program?

1. Center Director and administrative support from lead institution. 2. NSF Center Evaluator

The communication and initial selection/management of the members and projects.

Attachment B

Success Story

Plantation Productivity, Forest Nutrition, Soils and Silviculture

Global demand for forest products is continuing to increase and at the same time the land base used for forest production is shifting from natural forests to plantations. Plantation management is also undergoing changes with the recognition that the potential exists in many areas to produce more wood and generate greater value than currently realized. Integrated management of site (nutrients and water) and genetic resources is essential if more, higher valued forest products are to be grown in a cost effective and environmentally sustainable manner.

The NSF Center for Advanced Forestry Systems (CAFS) is changing how plantations are managed in the United States. Research supported by CAFS has demonstrated that leaf area is the primary factor affecting the photosynthetic capacity of a forest plantation. The leaf area in a forest depends on the genetic makeup of the trees and the effective uptake of water and nutrients from the soil. We have documented the debilitating effects of chronic soil nutrient limitations on leaf area and plantation productivity and the opportunities that exist to enhance productivity through nutrient additions. We have shown that the potential productivity of plantations in many areas of the United States are much higher than previously thought if limiting soil nutrients are supplemented through fertilization. We have developed site-specific forest fertilization prescriptions that are currently used by the industrial members of CAFS to fertilize more than one million acres of pine plantations annually in the southeast US. This results in more than 30 million more tons of wood being produced every year which has a value of more than $450,000,000. This information has been disseminated to land managers through decision support systems and prescription guidelines created by CAFS that enables them to implement optimal silvicultural regimes that enhance stand growth and value.

In the last 5 years, CAFS has published more that 50 papers and reports dealing with plantation productivity, forest nutrition, soils, and silviculture. We have also graduated more than 20 PhD and MS students who now work as scientists, educators, and natural resource managers in industry, governmental agencies and academia in the United States and throughout the world.

Attachment C

CAFS Developmental Milestones
Subsequent to NSF Involvement

5/1998 TGE Center Technical Meeting, Portland, Oregon. Preparation for a planning grant: Alex Schwarzkopf and Craig Scott, the NSF Evaluator, presented a summary of the IUCRC Program.

11/1998 TGERC Annual meeting, University of Washington Urban Horticultural Center, Seattle, Washington. Introduction to NSF I/UCRC Centers & LIFE forms (Schwarzkopf, Scott); Operational requirements of NSF I/UCRC Centers (Schwarzkopf); Evaluator role in I/UCRC Center function (Scott); Discussion of changes in TGERC from "conversion" to NSF/I/UCRC (Strauss); Presentation of LIFE form results (Meilan).

5/1999 TGERC Proposal submitted to NSF

11/1999 TGERC Annual meeting (Technical & IAB Meeting), LaSells Stewart Center, Oregon State University, Corvallis Oregon:

Major issues at the IAB meeting were: 1) the amount and nature of public concern about genetically altered products and their potential impacts on the environment, and 2) a new 26% indirect cost rate on sponsors' fees to be applied by OSU to all OSU cooperative research centers that that would take effect when NSF support ceases.

1/1999 Letter to Wilson Hayes, OSU Vice Provost, from John Trobaugh TGERC IAB Chair (The Timber Company), on behalf of the IAB, protesting the possible imposition of overhead charges on TGERC sponsor dues.

1/2000 Steven Strauss announced a 50% reduction in the 26% indirect cost rate that was to have been imposed by OSU on sponsors' fees when NSF support ceases.

8/2000 Center Director and Center Evaluator meet to discuss Center-related issues

11/2000 TGERC Annual meeting (Technical & IAB Meeting), Seattle, Washington:

Meeting proceeded by short course entitled "Gene School II" chaired by Meilan and Bradshaw. Included within the Meeting was a report entitled "Flowering Control in Euculypts" by Simon Southerton of Australia's Commonwealth Scientific and Industrial Research Organization (CSIRO).

Major issues at the IAB meeting were: 1) discussion of intellectual property, research conduct, confidentiality of results and publicity; .2) Review of membership projections, sponsor dues and implications for NSF support; 3) TGERC research directions, and; 4) summary/discussion of LIFE form numeric results and project-specific comments.

GMO Situation in the world

7/2001 Symposium on ecological and societal aspects of transgenic plantations http://www.fst.orst.edu/tgerc/iufro2001/eco_symp_iufro.htm) (Skamania Lodge)

11/2001 TGERC Annual meeting (Technical & IAB Meeting), Corvallis, Oregon:

Meeting proceeded by short course entitled "Gene School II" chaired by Meilan and Bradshaw. Included within the Meeting was a report entitled "Flowering Control in Euculypts" by Simon Southerton of Australia's Commonwealth Scientific and Industrial Research Organization (CSIRO).

Major issues addressed at the IAB meeting were: 1) funding problems amidst consolidations; 2) Review of membership projections, sponsor dues and implications for NSF support; 3) TGERC research directions; 4) the possibilities for affiliate memberships; 5) new funding or operations models; 6) the distractions of public controversies and the need for and implications of public interactions, and; 7) summary/discussion of LIFE form numeric results and project-specific comments.

11/2002 TGERC Annual meeting (Technical & IAB Meeting), Corvallis, Oregon:

Major issues addressed at the IAB meeting were: 1) funding problems and center continuation as an NSF/IUCRC, and 2) Review of membership projections, sponsor dues and implications for NSF support.

3/22003 Purdue Planning Grant submitted to NSF.

11/2003 TGERC Annual meeting (Technical & IAB Meeting), West Lafayette, Indiana:

8/1/2004 Official start date of Purdue University's Center for Tree Genetic Research (CTGr) NSF/I/UCRC.

10/2004 CTGr Annual meeting (Technical & IAB Meeting), Corvallis, Oregon.

Eight projects were presented at the technical meetings. The center essentially held two center meetings under an almost transparent umbrella of the Center for Tree Genetics (CTG). Topics at the CTGr IAB meeting included: possible collaborating relationships with Kasetsart University of Thailand; interest in mechanisms for funding seed proposals; center growth goals (the national center concept) and the possible addition of Virginia Polytechnic Institute and State University and North Carolina State University; activating/tagging direction, and; nomination of a new CTGr IAB chair (new chair to be from Purdue).

10/2005 CTGr Annual meeting (Technical & IAB Meeting), West Lafayette, Indiana.

1/2006 CTGr Directors' Planning Meeting of current Center administrators (Michler, Meilan & Scott) and NCSU's Tom Fox and Virginia Polytechnic Institute and State University's Barry Goldfarb, (Arlington, Virginia).

9/2006 CTGr Annual meeting (Technical & IAB Meeting) and CAFS Planning Meeting, Atlanta, Georgia): Schools represented – North Carolina State University, Purdue University, Virginia Tech and Oregon State University.

2/2008 CAFS Technical and IAB Meeting (Portland, Oregon). Topics addressed included: Center structure and function; IAB executive committee approved (selection of IAB chair to follow); voting process (proportional to dues); How to foster strong participation @ center meetings.

2/2009 University of Georgia received I/UCRC funding as CAFS's fifth university site in FY 09. The University of Maine's proposal is being reviewed @ NSF. The University of Washington received an award letter just before the meeting and will participate fully next year. Both Florida and Idaho made brief presentations and are preparing to submit a proposal.

2/2009 CAFS Technical and IAB Meeting (Charleston, South Carolina). 68 total members, including: 21 large, 35 small, 12 governmental agencies & not-for-profit, 28 full and 40 associates. 8 new proposals presented; 6 continuation presentations. The new CASF sites (Georgia and Maine) made presentations about their research capabilities. Florida and Idaho made capability presentations as potential new sites. Topics addressed at the IAB meeting included: Executive committee (structure, function, nominations and appointment by acclamation); project voting (satisfaction with last year's funding allocations, ideas for obtaining greater voting participation); membership agreement – minor modification needed [to reflect new sites without naming them in the standard agreement - no re-signing should be needed]; open and closed discussion of potential new sites (Florida and Idaho). Both of the aforementioned schools received approval from the IAB to go forward with their proposals.

Next meeting: Indianapolis, Spring 2010.