

## Futuring the Southern Forest Tree Improvement Conference

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**Abstract:** The Southern Forest Tree Improvement Conference (SFTIC) was first held in 1951 as the Conference on Forest Genetics Research in the Southern Pines, while the precursor to the Committee on Southern Forest Tree Improvement (CSFTI) was formed at the close of that initial conference. The second and subsequent conferences were titled the Second (Third, etc.) Southern Conference on Forest Tree Improvement, with SFTIC being adopted by about the 12th conference in 1973. Early proceedings suggested that the committee and the conference would consider forest genetics broadly in terms of research questions and applications, while having a special focus on southern pine improvement. Over the decades, the conference grew and evolved to a large meeting on forest genetics of southern species and allied biotechnologies, while maintaining a focus on loblolly and slash pine improvement. This evolution seems natural, and it appears to have met the committee's initial expectation. However, recent decades have seen declines in conference attendance, apparently caused by competition among meetings, but possibly due to a reputation of being a meeting on southern pine improvement, and not forest genetics more broadly. Given the current, urgent need for genetics information in forest management, specifically to address climate change and invasive species, SFTIC clearly has the potential to reverse this trend. We will explore options on re-branding and re-positioning SFTIC to better reflect the initial and our continuing aspiration to be the go-to conference on forest genetics and tree improvement— south-wide and beyond.

### Background and Context

The Southern Forest Tree Improvement Conference (SFTIC), as we now know it, was first held in January of 1951 as the Conference on Forest Genetics Research in the Southern Pines (Haig, 1951). The conference was organized by the precursor of the soon to be formed Committee on Southern Forest Tree Improvement (CSFTI). The second conference was titled the Second Southern Conference on Forest Tree Improvement, although C.E. Ostrom writing in the proceedings of that meeting (Ostrom, 1953) referred to the conference as the Southern (Forest) Tree Improvement Conference. In reviewing SFTIC proceedings (at <https://sftic.org/>) it appears that SFTIC was mostly adopted for the committee by the 10th conference (1969) and for the biennial conference by the 12th conference (1973).

The early SFTIC proceedings suggested that the committee and the conference would consider forest genetics broadly in terms of research questions and applications in forest management, while having a special focus on southern pine improvement (Haig, 1951). The imperative to genetically improve the southern pines was clear in the founding and early development of the committee and the conference (Haig, 1951), while there were concerns expressed about starting too late (Stone, 1951) and not having the resources to obtain success. Later proceedings clearly show the steady progression of southern pine improvement, and the growing demand for improved seedlings by forest landowners. The founding committee likely would have been amazed by the progress made in loblolly and slash pine genetic improvement and possibly a bit dismayed by the lack of improvement in the other southern pines and hardwoods.

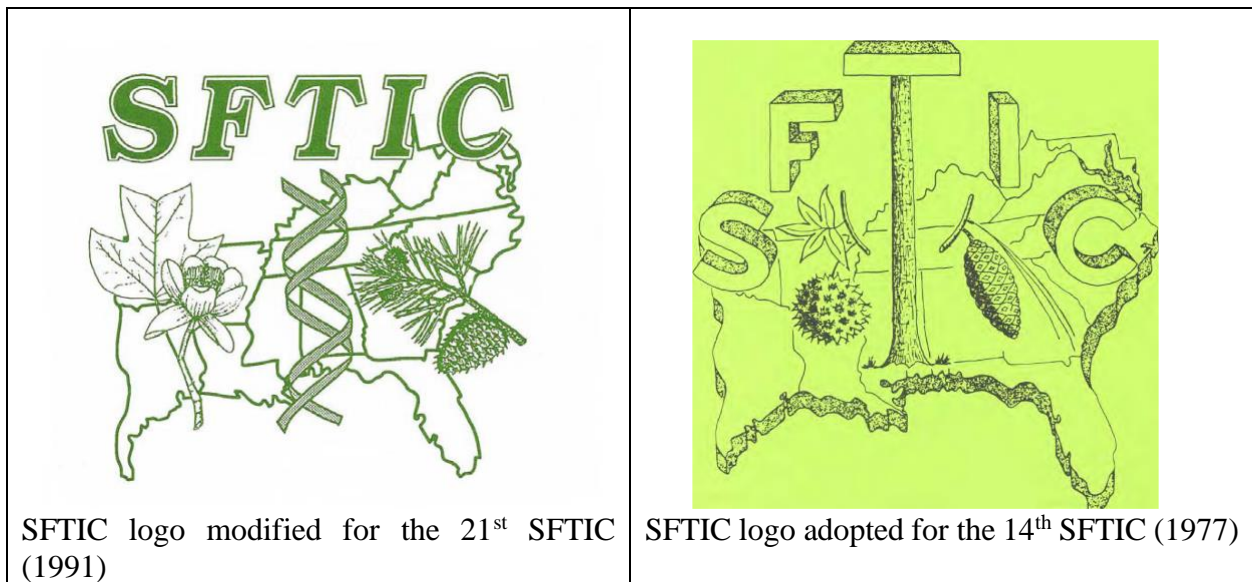
In the following sections we provide a brief history of the SFTIC committee and the biennial SFTIC conference, including their purposes and trends (conference attendance and topics discussed) over the decades. For additional context, we provide information on forest genetics and tree improvement associations initiated and conferences convened in the US and Canada over their respective histories. Following this, we move on to envisioning the future of the SFTIC conference and committee, providing recommendations for both as well as a summary of feedback received on this topic from an organized discussion session convened during the final day of the conference. One persistent point of discussion along these lines is how to coordinate scheduling the biennial SFTIC conference with other similar conferences in the US and Canada. Using available information on these conferences' schedules, we develop and present a putative SFTIC conference schedule that provides opportunities for joint meetings with these organizations while reducing the competition for meeting attendance.

### **History, Purpose, and Trends**

The first SFTIC was held January 9-10, 1951, in Atlanta as the Conference on Forest Genetics Research in the Southern Pines (Haig, 1951). An advisory committee on forest tree improvement was formed at the conclusion of the initial SFTIC. In its first meeting (June 20, 1951), the advisory committee revised its name to the Committee on Southern Forest Tree Improvement (CSFTI) (Kaufman, 1971). Early in committee deliberations it appears that a decision was made to hold a biennial conference, with committee meetings held at least annually. By the 10th conference (SFTICComm, 1969), held in Houston, the CSFTI became widely known as SFTIC (as approved by the committee in 1968, Kaufman 1971), while the general use of SFTIC for the conference appears to be associated with the 12th biennial meeting (Dinus, Thielges, & Wells, 1973). The original SFTIC logo (Fig. 1) was adopted for the 14th conference in Gainesville, FL, resulting from a design competition organized by the committee (SFTICComm, 1977). The current logo (Fig. 1) was adopted specifically for the 21st conference (SFTICComm, 1991) in Knoxville, TN, and then by default (or lack of action, otherwise), adopted for subsequent conferences.

Soon after SFTIC's formation, additional regionally-based forest genetics and tree improvement associations or committees organized in the US, with two of those remaining to date— Northern Forest Genetics Association (NFGA) and Western Forest Genetics Association (WFGA). The NFGA was formed in 1991 and consists of four previous forest tree improvement committees (FTIC) or associations (FTIA); namely Northeastern FTIC (1953-1990), Lake States FTIC (1953-

1976), Central States FTIC (1958-1978), and Northcentral States FTIA (1979-1990). The WFGA began in 1954 and currently includes the interests of the Rocky Mountain Forest Genetics Association that had formed in 1979. In Canada, the Canadian Forest Genetics Association (CFGGA) formed in 2000 and consists of two previous forest tree breeding committees (FTBC) and one tree improvement association (TIA). The earlier FTBC was initiated by the National Research Council in 1937 and operated until transitioning into the Canadian FTBC in 1953, which in 1973 transitioned into the Canadian TIA, and finally into the CFGGA in 2000. More recently, the North American Forest Genetics Society (NAFGS) organized convening their first conference in 2022 at the Asilomar Conference Center in California. This group (see <https://treegenesdb.org/nafgs>) was designed to have broad appeal to forest geneticists from tree breeding and species conservation to quantitative and population genetics to genomics and biotechnology, while being inclusive of species and issues across the three countries of North America.



**Fig. 1. Current (1991) and original (1977) SFTIC logos**

The purpose of the SFTIC committee as approved in 1953 consisted of four functions (Ostrom, 1953) as follows (and as modified in 2011). First, to advise and assist those interested in the improvement of southern forest trees in arranging and conducting research and development programs (to advise and assist those interested in the improvement of southern forest tree species). Second, to provide a clearing house for information on forest tree improvement (no change). Third, to provide for or assist in coordination in the conduct of a South-wide program of tree improvement research and development (to provide for and to assist with conducting south-wide programs in tree improvement). Fourth, to foster and encourage the advancement of knowledge of southern forest tree genetics (to foster and encourage the advancement of knowledge, training and education related to southern forest tree genetics). It seems that the SFTIC conference directly supports the fourth purpose (advancing knowledge, through the biennial meeting) and to some degree the second purpose (providing information, through the conference proceedings), but it's not clear how the committee supports the first (advising and assisting tree improvement) and third (coordinate south-wide tree improvement) purposes. Clearly a reassessment of the SFTIC

committee's purpose is needed to either revise the purpose to better reflect the committee's activities or implement activities that more fully meet the purpose.

The SFTIC committee's make-up consists of a specified formula including four groups: Group A—forestry schools, state forestry agencies, forest industry; Group B—US Forest Service (NFS, S&PF and R&D); Group C—technical specialists; and Group D—tree Improvement cooperatives (Squillace, 1983). The committee's current roll includes 23 members across these four groups, with more than one-third being technical specialists (e.g., geographic variation, pathology, entomology, pollen management). The original committee, consisting of 12 members, formed four sub-committees to report on progress in specific areas of concern (Ostrom, 1953)—Geographic Source of Seed, P.C. Wakeley, chair; Genetic Control of Seed, Floyd Cossitt, chair; Tree Selection and Breeding, Keith Dorman, chair; and Progeny Testing, E.G. Wiesehuegel, chair. Over the years' there are records of numerous temporary sub-committees formed (e.g., Squillace, 1983) to address specific topics (e.g., pathology, cone and seed insects, seed certification).

As described by I.T. Haig (Haig, 1951), the purpose of the SFTIC conference was to consider forest genetics broadly in terms of research questions and applications in forest management, while having a preferential focus on tree improvement of southern pines. The first conference attracted about 80 registrants, surprising the organizers and demonstrating the need for such a meeting (Stone, 1951). Conference attendance rose steadily through the mid- and late-1970s peaking at 229 for the 14th conference in 1977 (Table 1). Over the first 11 biennial meetings, conference attendance averaged 140, then 180 during the next 15 meetings, dropping to 100 and 80 in the most recent two biennium. For this biennium's conference, the 37th SFTIC, the number of registered attendees (74) was quite close to the average (80) of the previous five conferences.

Early conferences (1950s-70s) emphasized tree improvement topics, including the prospects for tree improvement (with a focus on loblolly and slash pines), seed source studies (provenance tests) to determine geographic variation (i.e., Southern Pine Seed Source Study, SPSSS) (Wakeley, 1959; Wells, 1969), polyploids and inter-species hybrids, early flowering induction techniques, data on genetic variation, heritability in species and traits, progeny test design (plot types, family sizes, etc.), genotype x environment interactions, early selection (age-age correlations), evidence of progress (realized genetic gain), seed orchards (cone yield and seed quality) and clonal propagation (grafting and rooting cuttings). In the mid-1970s and 1980s the conference topics evolved to include isozyme markers for pollination studies, fusiform rust and other diseases to varying degrees, wood quality (pulpwood vs. saw timber, juvenile vs. mature wood), long-term breeding strategies and maintaining population sizes, and BLUP development and implementation for breeding value estimation. Into the 1980s new biotech approaches arrived with tissue culture, genetic transformation, and DNA markers (RFLPS, RAPDs) leading the way. Other topics becoming more apparent, including clonal performance and potential deployment strategies, full-sib family deployment through supplemental mass pollination, and short-rotation traits and practices to maximize woody biomass production.

Through the 1990s and 2010s, SFTIC conference topics continued to evolve, especially towards genetic mapping various species, QTL mapping and marker-assisted selection (MAS), transcriptomics for differential gene expression studies and genetic marker development (e.g. EST-

Table 1. Information on Southern Forest Tree Improvement Conferences (1951 through 2023)

SFTIC #	Year	Host(s)	Location		Number of Attendees
			City	State	
1	1951	USDA-Forest Service (USDA-FS) Southern Region (Region 8)	Atlanta	GA	80
2	1953	USDA-FS Region 8	Atlanta	GA	n/r <sup>1</sup>
3	1955	USDA-FS Southern Forest Experiment Station (SFES)	New Orleans	LA	115
4	1957	School of Forestry, University of Georgia (UGA)	Athens	GA	215
5	1959	School of Forestry, North Carolina State University (NCSU)	Raleigh	NC	n/r
6	1961	School of Forestry, University of Florida (UF)	Gainesville	FL	n/r
7	1963	USDA-FS Institute of Forest Genetics	Gulfport	MS	155
8	1965	Continental Can Co.; Georgia Forestry Research Council	Savannah	GA	135
9	1967	Department of Forestry, University of Tennessee (UT-K); Division of Forestry Relations, Tennessee Valley Authority	Knoxville	TN	n/r
10	1969	Texas Forest Service (TFS)	Houston	TX	n/r
11	1971	USDA-FS Southeastern Area, State & Private Forestry	Atlanta	GA	n/r
12	1973	Division of Continuing Education, Louisiana State University (LSU); USDA-FS SFES	Baton Rouge	LA	150
13	1975	School of Forest Resources and Division of Continuing Education, NCSU	Raleigh	NC	176
14	1977	School of Forest Resources & Conservation, UF; USDA-FS Southeastern Forest Experiment Station (SEFES)	Gainesville	FL	229
15	1979	Department of Forestry, Mississippi State University (MSU); USDA-FS SFES	Starkville	MS	204
16	1981	Department of Forestry and Extension Division, Virginia Polytechnic Institute & State University (VA Tech)	Blacksburg	VA	199
17	1983	School of Forest Resources, UGA; USDA-FS SEFES	Athens	GA	203
18	1985	USDA-FS Southern Institute of Forest Genetics (SIFG); University of Southern Mississippi, Gulf Park	Long Beach	MS	169
19	1987	Texas Forest Service; Texas Agricultural Research Station	College Station	TX	173
20	1989	Westvaco Corp.; Clemson University	Charleston	SC	208
21	1991	Department of Forestry, UT-K; Tennessee Division of Forestry	Knoxville	TN	161

22	1993	Institute of Paper Science & Technology (IPST); Georgia Forestry Commission; USDA-FS Region 8; Cooperative Extension Service, UGA	Atlanta	GA	176
23	1995	NCSU-Industry Cooperative Tree Improvement Program (NCSU-ICTIP)	Asheville	NC	145
24	1997	School of Forest Resources and Conservation, UF	Orlando	FL	200
25	1999	School of Forestry, Wildlife & Fisheries, LSU	New Orleans	LA	166
26	2001	Warnell School of Forest Resources, UGA	Athens	GA	122
27	2003	Department of Forestry, Oklahoma State University (OSU)	Stillwater	OK	94
28	2005	Department of Forestry & Environmental Resources, NCSU	Raleigh	NC	131
29	2007	Western Gulf Forest Tree Improvement Program (WGFTIP), TFS; Inland Empire Tree Improvement Cooperative (joint meeting with the Western Forest Genetics Association, WFGA)	Galveston	TX	118
30	2009	Department of Forest Resources & Environmental Conservation, VA Tech	Blacksburg	VA	64
31	2011	USDA-FS SIFG; Department of Forestry, MSU	Biloxi	MS	109
32	2013	ArborGen, LLC; School of Agricultural, Forest & Environmental Sciences, Clemson University (Clemson)	Clemson	SC	79
33	2015	Department of Forestry, University of Arkansas-Monticello (UAM); Weyerhaeuser Corp.	Hot Springs	AR	84
34	2017	Cooperative Forest Genetics Research Program (CFGRP), UF	Melbourne	FL	83
35	2019	Department of Forestry and Forestry Cooperative Extension, University of Kentucky (UKY); USDA-FS Southern Research Station (SRS)	Lexington	KY	89
36	2021	Warnell School of Forestry and Natural Resources, UGA	Athens	GA	73
37	2023	US Department of Energy (USDE), Oak Ridge National Laboratory (ORNL); Department of Entomology & Plant Pathology, UT-K	Knoxville	TN	74

<sup>1</sup> n/r, number of attendees was not reported

based SSRs), and eventually genome sequencing, genome-wide marker development (e.g., GBS, SNPs), genome-wide association studies (GWAS), genomic prediction and selection (GS), and candidate gene (CG) discovery based on gene expression and QTL- or GWAS-based map positions. These topics culminated in the promise of more efficient tree improvement using a

combination of MAS and GS to improve selection efficiency and shorten the generation time and CGs for applications in cis-genic genetic transformation for engineering improved trees. SFTIC conferences in the 2010s and 2020s further evolved to include topics beyond tree improvement per se, such as resistance breeding for invasive pests, gene conservation for threatened species, restoration genetics of diminished species and ecosystems, seed orchards and seed collections for minor species, and adaptation to climate change. Now, 72 years since the founding of SFTIC, the promise of the early aspirations from the committee (Haig, 1951), summed up by keynote speaker Scott Pauley<sup>1</sup> in 1955, has been and is clearly being met—genetically selected southern pines for planting and a continuing discussion of forest genetics broadly.

### **Envisioning the future of SFTIC**

The current realization is that forest management in the south and beyond needs forest genetics and tree improvement now-- and in many ways, more than ever (e.g., Wheeler et al. 2015). Three major forces, all on the increase, are in play in this regard: habitat fragmentation, invasive species (pests, pathogens, and plants), and climate change. As we have seen through a review of the topics covered by SFTIC, forest geneticists and tree breeders have a good track record for delivering on practical needs in southern forestry, and at this juncture, SFTIC has the potential to be the must-go-to conference for forest geneticists, tree breeders, and related professionals and practitioners. To achieve this, the focus of the committee and conference should be on solving practical problems in (i) tree improvement, (ii) gene conservation, (iii) species and ecosystem restoration, (iv) resistance to invasive pests and pathogens, and (v) adaption to climate change.

With this vision in mind for SFTIC, we can list several recommendations for future conference organizers—stay with the basics and focus on solving practical problems, while embracing change in people, organizations, funding, and technology. Continue to consider forest genetics broadly and the increasing urgency to address many species, traits, and environments. Emphasize forest genetics and tree breeding and biotechnology with applications in gene conservation, tree improvement, and species restoration as situations demand. Consider trait improvement for wood production and carbon sequestration, species restoration and climate change, including resistance and tolerance to abiotic and biotic stress.

Further recommendations are more organizational in nature that will serve to encourage interest and subsequent growth in conference attendance and diversity, such as committing to biennial meetings in June of odd years, determining hosts for the next two conferences (e.g., now for 2025 and 2027), and considering a name change for the conference. Two name change suggestions that

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<sup>1</sup> Quote from Scott Pauley (Pauley, 1955), “If at the end of the next fifty years all of the forest nursery stock produced in the South is grown from seed derived from wild trees of proved genetic superiority, I think this Committee will have served its purpose with notable success. There is, however, good reason to believe that within fifty years the utilization of the best wild seed available in the southern pine region will be looked upon as an antiquated practice. Surely by that time the logical procedure of combining superior genotypes within a species by controlled crossing will have long since occurred. By the utilization of the seed orchard technique as a means of making such crossings, there is good reason to believe that not only can the genetic quality of the seed be improved over that of the best wild stock, but the cost of production may actually be reduced through increased facility of collection.”

may better align with the conference's evolving content while maintaining SFTIC continuity and brand recognition include Southern Forest Genetics and Tree Improvement Conference (SFGTIC) and Southern Forest Genetics Conference (SFGC). Both are minor variations from SFTIC, but more significant changes should be considered being more descriptive of the current and anticipated content of the conference.

Other recommendations involving the content of the conference can be listed, specifically offering field tours and increasing workshops. Field tours of local/ongoing work can be beneficial to attendees, and they might be best placed in the middle of the conference to encourage wider participation and further facilitating networking for new and veteran attendees. This year's field tour of ORNL's woody biomass research center was outstanding but suffered low attendance (about 25% of conference registrants), likely due to it's being described as 'optional' and being placed on the morning after the conference concluded. Pre-conference meetings have been a regular part of SFTIC week over the years, especially with the North American Quantitative Forest Genetics (NAQFG) workshop and the annual meeting of the SFTIC committee. More recently, workshops on state agency needs and a short course of the basics of tree improvement (Tree Improvement 101) have been offered. Other ongoing and more topical ideas for workshop content include bioinformatics methods, tree propagation techniques, seed orchard management, and population genetics.

A final group of recommendations can be made around communications and attendee experiences. Having a social media presence is a must for timely engagement with the content and features of the conference, and possibly the committee's activities throughout the year. In addition, we recommend that SFTIC organizers continue student travel stipend opportunities, poster and speaker awards, industry-hosted career panels, graduate student mixers, and the SFTIC 5K. For the 36th SFTIC, the Schatz Symposium was added as the conference's closing session (SFTICComm, 2021). This symposium, designed as a plenary session with invited speakers, was funded as a collaboration with the Schatz Center for Tree Molecular Genetics at Pennsylvania State University. We encourage a continuation of this collaboration and the Schatz Symposium. We also encourage discussions on re-instating the Schatz student research awards that were offered in 2021, but not at this year's conference.

One persistent issue concerning the future of regional-based forest genetics and tree improvement groups (committees, associations, societies) has been coordinating conference schedules—specifically, keeping them local and often enough to effectively serve their constituents, while providing opportunities for exposure to a wide range of topics and issues. Given our geographic proximity to the NFGA (eastern US), we suggest holding a joint conference with them every other SFTIC, i.e., every 4 years. Joint conferences with the other groups are encouraged as opportunities arise. Maintaining SFTIC's June of every odd year schedule also coordinates well with the current schedule of meetings in terms of minimizing competing conferences happening at nearly the same time. As an example, we developed the following potential schedule of the US regional meetings and the NAFGS:

2023 SFTIC 37, Knoxville, TN, June 20-23, 2023 (this meeting)  
2024 NAFGS 2, Oaxaca, Mexico, June 10-14, 2024 (already scheduled)  
2025 SFTIC 38 jointly with WFGA & NFGA (hosted by Penn State University)  
2026 NAFGS 3, TBD, Canada  
2027 SFTIC 39 (hosted by Auburn University and Alabama A&M University)  
2028 NAFGS 4, TBD, United States  
2029 SFTIC 40 jointly with NFGA (Louisville, KY, hosted University of Kentucky and SRS)  
2030 NAFGS 5, TBD  
2031 SFTIC 41 (hosted by Mississippi State University and SRS)  
2032 NAFGS 6, TBD  
2033 SFTIC 42 jointly with NFGA (Columbia, MO, hosted by University of Missouri and NRS)

Finally, we offer some recommendations for the SFTIC Committee. Annual full committee meetings should be re-instated to provide continuity in the flow of information to constituents, communications with technical specialists, and coordinating with current conference organizers. This may encourage additional alternate-year biennial meetings or workshops such as those offered through the information exchange group (IEG) construct. For example, IEG-40 workshops have provided valuable meeting opportunities for SFTIC stakeholders over the years, with topics ranging from fusiform rust screening to genetic impacts on productivity of southern pine forests, as well as emergent issues in seed orchard management. Other committee functions could include regular monitoring of the SFTIC web site ([www.sftic.org](http://www.sftic.org)), inspecting and updating the SFTIC mailing list, and coordinating with other mailing lists (e.g., NAFGS).

On the final day of this year's conference, we asked participants seated at each lunch table to brainstorm ideas for improving SFTIC, namely, to grow the conference and ultimately the field (numbers and diversity) of forest genetics. We obtained written notes from 7 of the 9 tables and have summarized these results into Table 2. The notes indicate wide support for considering a SFTIC name change, with the next most mentioned ideas being south-north joint conferences, student engagement (e.g., representation, travel stipends, poster plenaries, presentation awards, early career research grants), social media presence, and conference swag. We also saw clear support for a new logo, standing up sub-committees, and regular communications from the SFTIC committee. Clearly some of these ideas mesh with our recommendations presented above, but there are some new perspectives provided as well. For a start, the SFTIC committee should take these ideas up in their meeting(s) this year and plan to report back to the full constituency in a timely manner.

### **Summary and Conclusions**

SFTIC has a long and successful history dating back to 1951. However, in the past 10 plus years, conference attendance has been falling to a level that is now only marginally sustainable. At the same time, the need and opportunity for forest genetics and tree improvement in many respects is rising. The needs fall along the lines of monitoring, understanding, and predicting the genetic consequences of emerging phenomena such as habitat fragmentation, invasive species, and climate change, and the impact of these consequences on forest management planning, implementation, and outcomes. The opportunities can be seen in tailoring traditional tree improvement methods for

the current situations, applying new genomic technologies to solve long-standing and emerging problems (e.g., seed sourcing for future climates) and merging candidate gene discovery with new biotechnologies (e.g., gene editing to engineer parental breeding lines with enhanced traits). Given the emerging needs and opportunities for forest genetics in forest management, we suggest that SFTIC can become the “go-to” conference for scientists, students, and practitioners to present their latest work in the field and learn from leaders across the region and beyond.

**Disclaimer:** The findings and conclusions presented here are those of the author(s) and should not be construed to represent any official USDA or US Government determination or policy.

Table 2. Summary table of working lunch discussion groups on ideas to improve SFTIC conference and committee.

Idea to consider	Discussion Group							
	1	2	3	4	5	6	8	9
Rename SFTIC <sup>1</sup>	Not necessary	SFGA, EFGA		SFTIC+	SFTIC Gen Conf	SFTIC+, SFTIC Cons Conf, ETIA		EFG Conf
New logo					Yes	Yes	Yes	
Stand up Sub-comms		Yes		Yes			Yes	
Regular info from SFTIC			Yes			Yes	Yes	
Forest Gen certificate	Yes <sup>2</sup>				Yes <sup>3</sup>	Yes <sup>4</sup>		
Pre-conf Workshops	Yes	Yes						Yes
Social media, SFTIC-toc				Yes	Yes	Yes	Yes	
Conf swag			Yes	Yes	Yes		Yes	
Invite vendors		Yes		Yes				
Invite granting agencies	Yes					Yes		
North-South joint meetings		Yes	Yes			Yes		Yes
Student reps, travel grants	Yes			Yes		Yes	Yes	Yes
Early career research grant	Yes						Yes	
Poster plenary, short talks	Yes						Yes	Yes

<sup>1</sup> SFGA (Southern Forest Genetics Association), EFGA (Eastern Forest Genetics Association), SFTIC+ (Southern Forest Tree Improvement Committee or Conference Plus), SFTIC Gen Conf (SFTIC Genetics Conference), SFTIC Cons Conf (SFTIC Conservation Conference), ETIA (Eastern Tree Improvement Association), EFG Conf (Eastern Forest Genetics Conference)

<sup>2</sup> USDA NIFA could possibly fund a multi-university effort (Tree Genetics and Improvement); needs to be SAF accredited

<sup>3</sup> SAF accredited certificate with three areas of emphases (1) genetics, seed sources; (2) tree improvement, breeding; and (3) seed orchard, nursery. Explore what this might look like as an undergraduate certificate or a graduate level course in Forest Genetics and Tree Improvement shared across participating SAF accredited university programs.

<sup>4</sup> SAF certified course in Forest Genetics and Tree Improvement

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