

Plant Resilience and Conservation: Solutions for a Changing Climate

Background:

As the global climate continues to undergo rapid transformation, the intricate relationships between plants, climate, and human activities are increasingly critical to understand. Unexpected transformations of ecosystems and plant responses are anticipated given the complexity and interconnection of the systems. Given the diversity of ecological systems, we recognize that changes will affect us all, but will differ in each geographic region depending on the type, severity, frequency and timing of extreme climate events. As an international scientific society that spans the breadth of the botanical sciences from cellular to whole organism to ecosystem, the Botanical Society of America (BSA) is uniquely suited to bring together a diverse convening of researchers and stakeholders, using our established framework for successfully hosting past virtual conferences, in order to catalyze the community around the theme of plant resilience and develop collaborative solutions for plants and people in a changing climate.

The Symposium:

We propose a virtual symposium to be held in the Fall of 2024. The purposes of this virtual symposium are 1) to bring together a diverse contingent of students, researchers, policy makers, agency staff, and other stakeholders, 2) to discuss and advance climate change knowledge solutions in the botanical/biological community, and 3) to identify and explore the most pertinent questions and areas for future research, in order to gain a better understanding of the complex suite of issues we are facing and how best to address them. It is our goal to design a symposium that builds new connections between botanical scientists, agencies with varying degrees of botanical expertise, and policymakers; and to address the effects of climate change on flora as well as to identify future needed research paths and collaborations. This international symposium will build on the foundation of numerous individual projects, allowing a synthesis to develop by identifying common themes, developing collaborations, and leveraging a global network to identify and address questions of large geographic scope.

This symposium will bring together hundreds of participants with a mix of invited and submitted talks. Our overall theme will be 'Plant Resilience and Conservation for a Changing Climate.' BSA is known for executing exceptional meetings with student and early career attendance rates of 40%, and we expect this online event to continue in this vein of attracting the next generation of scientists who are working on, or plan to work on, the most formidable environmental challenge of our time. Further, with the support of NSF, the Symposium will be free to attend and participate in, making it inclusive and accessible to a global group of botanical scientists and policymakers.

We are planning a 2 half-day virtual Symposium for the Fall of 2024 around two main topics:

Day 1 - Responses of plants and plant populations to shifts in climate factors.

We will invite and accept submitted talks from speakers in fields such as epigenetic modifications, physiological adaptations, stress tolerance mechanisms, reproductive traits, and other topics broadly related to plant adaptations and factors such as temperature, precipitation, seasonality, altitude, drought, and atmospheric composition.

Day 2 - Conserving endemic species in the face of habitat loss and long-term shifts in climate.

We will invite and accept submitted talks from speakers in fields such as managed relocation of species (assisted dispersal or assisted migration), climate-driven range shifts, seed banking for biodiversity, community-based conservation efforts, traditional ecological knowledge, and policy.

At the end of each session, our virtual conference platform and moderators will host a networking event with breakout groups/ “Virtual roundtables” organized to encourage structured discussions, foster new collaborations, and begin to work on next steps for the identified areas of importance.

Products and Broader Impacts:

This conference will have numerous positive impacts on the field of climate change, plant conservation and adaptation, and scientific policy including providing training and discussion opportunities for scientists at all career stages as well as forging new networks and collaborations. To increase the impact of the meeting and disseminate the work of our virtual symposium presenters, one of our products will be to publish a special issue of the *American Journal of Botany* on the theme of “Resilience in a Changing World.” Topics to be addressed include our two main topics described above as well as two additional topics, Ecosystem resilience (disturbance or restoration ecology, ecosystem services, as well as functional diversity) and Using plants to meet the challenge of climate change (carbon sequestration, climate-resilient crops, phytoremediation, bioenergy production, and urban greening).

We are particularly interested in enabling attendance at all these events by a diverse range of participants. A virtual conference will be much more accessible for early career researchers, students, and scientists at all stages who belong to groups underrepresented in science including those with disabilities. Our focus on diversity combined with NSF support will ensure that all members of our community and many in the broader global botanical and biological community learn about the meeting and have the opportunity to attend virtually without financial hardship. Closed captioning and Spanish language translation will also be utilized within the conference platform to reach the broadest possible audience. The registration page for the meeting will request information on career stage, location (country), and will have an option for attendees to indicate if they belong to one or more groups underrepresented in STEM. This information will be valuable for assessing the reach of the symposium.

All symposium abstracts will be published digitally online, which should increase accessibility of the meeting for people who cannot participate at that time frame, and for members of the public who may wish to read about the meeting content and proceedings. Journal articles in the special issue will be published open access ensuring the broadest possible dissemination and data-sharing.

Scientific Merit:

The Botanical Society of America (BSA) is the primary scientific society and professional home for botanists and plant scientists that supports the breadth and diversity of global botanical research and education. We are the leading Society dedicated to botany and its future with a mission to inspire and promote an inclusive global community committed to advancing fundamental knowledge and innovation in the botanical sciences for the benefit of people and the environment. Towards achieving that mission, the BSA publishes two highly regarded journals (*American Journal of Botany* and *Applications in Plant Sciences*), puts on an annual scientific conference (Botany Conference), professional development webinars and workshops, funds graduate student research, merit awards, and runs outreach scientific literacy programs in the K-12 environment (PlantingScience).

This proposed Symposium represents a key piece in BSA’s climate initiative to steer greater public awareness of the importance of plants in mitigating and adapting to climate change, and to promote plant literacy to better understand this challenging issue. Specifically, this symposium aims to provide policy makers with current science and connection to active researchers, to improve their capacity to

use this understanding in their decision-making and actions. To have greater impact, the proposed Symposium will be virtual and will be the first time we have offered it outside of the main Conference in July.

Research in the botanical sciences (broadly defined) is critical as we seek to address the challenges of climate change, invasive species, global food insecurity, biodiversity loss, and securing the overall health of the planet. Armstrong et al. (2023) considered how climate change impacts plant abundance, productivity, bioregions and ecosystems to be one of the 11 areas of critical global importance. Henkhaus et al. (2020) emphasize the importance of addressing plant awareness (to public and stakeholders) and cultivating a diverse and inclusive community of scientists who can accelerate discovery, research, and applied botanical sciences. An open, inclusive, accessible, and global virtual Symposium on plant resilience and conservation for a changing climate coupled with published open access articles on these topics will contribute to objectives specified in the Global Strategy for Plant Conservation, as well as to local, regional, federal agencies, and national climate initiatives.

Armstrong et al. 2023. One hundred important questions facing plant science: an international perspective. *New Phytologist* (2023) 238: 470–481 (<https://nph.onlinelibrary.wiley.com/doi/full/10.1111/nph.18771>) - 'present the top 100 most important questions facing plant science in 2022, ranging from how plants can contribute to tackling climate change, to plant-defense priming and epigenome plasticity'

Henkhaus N, Bartlett M, Gang D, et al. Plant Science Decadal Vision 2020–2030: Reimagining the Potential of Plants for a Healthy and Sustainable Future. *Plant Direct*. 2020; 00: 1-22. <https://doi.org/10.1002/pld3.252>.

Budget:

PI Heather Cacanindin:	\$12,422 (8% time)
Senior Personnel (3):	\$21,049 (5-10% time for each)
Virtual Conference Platform and Technology Support:	\$19,500
Moderators, Honorariums, Advertising:	\$5,000
Publication Open Access Fees:	\$15,680
Total Direct Cost:	\$74,151
10% Overhead (de minimus rate):	\$7,415
TOTAL:	\$81,566