PLANT SCIENCE BULLETIN

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A PUBLICATION OF THE BOTANICAL SOCIETY OF AMERICA

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FROM THE EDITOR

Greetings,

This summer finds us in the leadup to the BSA's first-ever hybrid meeting. It will be a learning experience for everyone, I'm sure. In this issue we include information about Botany 2022, as well as the first part of our spotlight on awards. If you are a student, be sure to check out the student section for a description of several upcoming events and resources.

In this issue, we will begin to list notices of death for members who have passed away, but whom do not yet have an In Memoriam article prepared. An obituary may be in preparation and will appear in a later issue. However, if you would be interested in preparing an In Memoriam for someone listed, please contact me at mackenzietaylor@creighton.edu. Similarly, if you become aware of the death of a member, please let me or the BSA staff know.

As always, *Plant Science Bulletin* depends on member submissions. If you have an idea for a potential article, please reach out!

Sincerely,

Mackenzie

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Introducing Sarah Sims: BSA's New Diversity, Equity, and Inclusion Outreach Programs Coordinator

We would like to welcome Sarah Sims (she/her/hers) in the newly created position of Diversity, Equity and Inclusion Outreach Programs Coordinator for the BSA! She comes to us from a background in art and history museums. Her career spans diversity, equity, accessibility, and inclusion programming and training; museum education; inquiry-based teaching; teacher, staff, and volunteer professional development; and trauma-informed practices. She has a decade of experience in the non-profit and culture sectors, including prior work with member societies. Sarah will spend the majority of her time working on our Botany and Beyond: PLANTS III grant as well as on other BSA diversity initiatives. We wanted to introduce Sarah to the BSA community!

Sarah, what motivated you to apply for the DEI position at the BSA?

Most of my professional experience has been within the field of museum education (art and history museums, specifically.) As my career grew, I sought out a lot of my own professional development. I've always been a big believer in the value of professional growth, and I specifically wanted to learn more about issues of diversity, equity, accessibility, and inclusion (DEAI); my own racial identity and how that affects my presence in work settings; as well as how institutions, programs, and groups are affected by the legacies of colonialism, white supremacy, and hetero patriarchy. These experiences with self-reflection and growth led me to seek involvement

in more DEAI projects, to take on formal responsibilities for implementing DEAI at the institutional level, and eventually to provide DEAI trainings for others. The more I've done this work, the more I've realized its broad application across different fields and job functions. I am a firm believer that no one person, discipline, or organization can be neutral—we all operate with lenses informed by biases. I really enjoy being able to connect with people whose content area expertise and job responsibilities are completely different from mine to help them understand how DEAI concepts not only fit into, but are essential to, their work. Plus, I have a soft spot for plants, so I was very excited when this opportunity came along for me to help support and implement DEAI in an entirely new (for me) field!

One of the first things you've been working on since starting here is the Botany and Beyond-Plants III grant. Can you briefly describe the grant and what it aims to achieve?

The Botany & Beyond PLANTS III (Preparing Leaders and Nurturing Tomorrow's Scientists) grant is funded by the National Science Foundation (DEB-2138730) and encompasses three programs that take place at or around the annual Botany conference. The first is a conference mentoring program for undergraduates that are underrepresented in science called PLANTS, which has been around for over a decade. The second program is a faculty professional development workshop called the Inclusive Teaching Initiative. And the third is a science identity workshop for undergraduates. All three programs aim to engage, support, and sustain a diverse community of emerging scientists; foster inclusive practices across the BSA and botanical sciences; increase plant awareness; and advance research and training for a more diverse, inclusive, and accessible 21st-century botanical science workforce. My position helps to coordinate and administer the various arms of the grant, and supports the three principal investigators.

Over the past couple of years, many organizations have launched DEAI initiatives that look strong "on paper." What do you think are the best ways to turn words into meaningful action?

I think you're right, and we often then see those efforts fizzle out after a given project is completed. In my experience, DEAI initiatives need to include plans for culture change and sustainability in order for the words on paper to be transformed into lasting, meaningful action.

Culture change could look like developing shared definitions and goals. The terms "diversity," "equity," "accessibility," and "inclusion" get thrown around a lot, but if you asked 10 different people what those words mean, theoretically and operationally within an organization, you would get 10 different answers. It's important for people to get on the same page. Being on the same page doesn't mean there isn't room for ongoing dialogue. But too often we use these terms without defining what we really mean, and we end up talking past each other. Having a common definition serves as a jumping off point for setting clear goals and a road map for reaching them.

I think that culture change also looks like ensuring everyone at the organization (all employees/volunteers/members, not just the one committee or one person hired to support DEAI work), are receiving ongoing support and professional development. A mentor once told me that "racial equity and other justice work is not a line with a starting and ending

point, but rather a circle: you're never done learning, and many times its useful to come back to old lessons and reflect again with each new life experience." Too often, there is only one anti-bias training for all staff, which also tends to be facilitated in a one-size-fits-all way. We need to give support more often and recognize that folks have different entry points into this work.

When it comes to sustainability, again, I think you have to look at the whole organization, not just the DEAI person. What are the specific ways that each person or department can advance DEAI? How do DEAI goals and measures get baked into standard operating procedures and policies? How is DEAI woven into the recruitment, hiring, and retention process? And where is DEIA showing up in the budget?

The BSA's Strategic Plan contains quite a few DEAI initiatives. Which of these are you most eager to work on?

Yes! The level that DEAI is infused into the BSA's current strategic plan was another reason I was so excited to apply for this job! I think the one that excites me the most is the strategy to offer DEAI leadership training opportunities to members, in support of the goal to become an anti-racist and anti-discriminatory society. As I've said, I believe that quality, ongoing professional development opportunities that meet people where they are is an essential component of real culture change. I've benefited so much from professional development in my career and have many experiences developing goals, promoting, and sourcing facilitators for such trainings.

Before we wrap up, tell us a little about yourself! What are your interests outside of work?

Well, normally I would answer with "plants and gardening!"—but I suppose that is now very much related to my work. I also love to run and hike, explore new restaurants with my spouse, and indulge my toddler's ever-changing obsessions (which currently include *The Princess Bride*, light sabers, and the upright bass).

And how can BSA members reach you?

I would love to hear from members via email at ssims@botany.org or phone at 314-577-9404 (although with hybrid work at home and the office, you'll get a faster response with email).

Demystifying the Manuscript Submission Process

Highlights from the Botany360 Workshops presented in May 2022

Navigating the peer review process in scientific journals can be mysterious. Standards for manuscript submission, peer review, and responding to reviewers aren't always formally taught and can be difficult to understand. Those navigating the review process for the first time often must rely on a network of mentors to maneuver a manuscript from submission to acceptance.

To shed some light, a panel of journal editors and authors (Brittany Sutherland, Briana Gross, Pamela Diggle, and myself) provided a behind-the-scenes look at the peer-review process and offered tips for the various stages of publication, from pre-submission through post-acceptance. These sessions focused on BSA-affiliated journals (*American Journal of Botany* and *Applications in Plant Sciences*) but are broadly applicable across most biological publications. The event recordings and supporting documents are available on the Botany360 homepage (https://botany.org/home/resources/botany360.html).

By Amy McPherson
Botanical Society of America
ORCID id: 0000-0001-7904-242X

PART 1: WHAT SHOULD HAPPEN BEFORE YOU SUBMIT YOUR PAPER TO A JOURNAL?

Publishing your work is vital to science. You publish to share your work with other researchers, the public, the funders who support research, and government agencies—and to move science forward and to advance your career, among other reasons.

If you need advice on writing the paper, there are lots of resources available (see, e.g., Heard, 2022; and supporting resources for the workshop). But as you collect and analyze your data and begin thinking of the story you want to tell, and who will be an author and what the order of authors will be, decide on a data management plan; begin organizing your references; and start thinking about possible journals.

Keeping your Data Organized

Take it from early career researcher Brittany Sutherland: **Keeping your data organized saves you time and effort!** Her sage advice, gleaned from experience, is to clearly and consistently label all files and data columns; keep metadata with original data; and don't

touch the raw data. Also, back up your data frequently in a different physical location and consider the many options for depositing your data in a public repository (e.g., Dryad, Zenodo, FigShare). Not only is it a good thing to do for reasons of transparency and replicability, but it may also be required by the journal you are submitting your paper to or the funding organization supporting your research.

As well as managing your data, you will need to organize your references. It's likely that you will accumulate thousands of papers quickly, so have a system in place early on. There are many reference managers available, some of which are free, subsidized by your university, or available at minimal cost (see, e.g., Dr. Sutherland's slides and Perkel [2020]).

Selecting a Journal

Many people decide on where to submit their manuscript after they have collected and analyzed the data, and before they have started to write the paper. The website Jane (Journal/Author Name Estimator, https://jane.biosemantics.org/) can help identify a number of possible journals. Authors must weigh several criteria, including:

- The reputation/prestige of the journal (often based on the journal's Impact Factor or H5-index, or the recommendation of an advisor)
- The appropriateness of the journal (does your study topic fit within its aims and scope? is it the journal your peers read and cite and/or where interested people will find it?)
- The speed of publication;
- The cost; and
- The community (is it important to you to support a Society journal that re-invests in its members?).

It's also important to avoid "predatory journals" (see Culley, 2018).

The Editor-in-Chief of *Applications in Plant Sciences (APPS)*, Briana Gross, spoke about maximizing your publication power by choosing the right fit for your research. If you're working with a novel method, protocol, or software package, or have developed a new genomic resource, you may want to consider publishing a separate, stand-alone manuscript in a methods journal such as *APPS*. There are numerous advantages for doing so:

- *APPS* is a fully open-access Society journal, with professional copyediting, indexing, and support throughout the publishing process
- It offers competitive Article Processing Charges (APCs), with discounts for BSA members and waivers for authors from eligible countries, as well as transformational deals between the publisher Wiley and institutions worldwide
- The BSA helps promote your research on social media and through other outreach once it is published.

Once you've chosen a journal, it is important to consult the author guidelines that are available on the journal's website. The guidelines will help you shape your manuscript and ensure that you are satisfying requirements needed for consideration and eventual acceptance (as well as saving time, possible frustration, and effort later in the process). They will also indicate whether the journal editor wants to see a cover letter, and what should be included

in the cover letter—your first opportunity to make a case for your manuscript to be sent out for review. You are also strongly encouraged to suggest appropriate reviewers, in the cover letter and/or in the manuscript submission system. This is a huge help to the editors, as long as you do not suggest people who may have a conflict of interest (e.g., co-authors, collaborators, or lab members).

PART 2: WHAT HAPPENS AFTER YOU SUBMIT YOUR PAPER TO A JOURNAL?

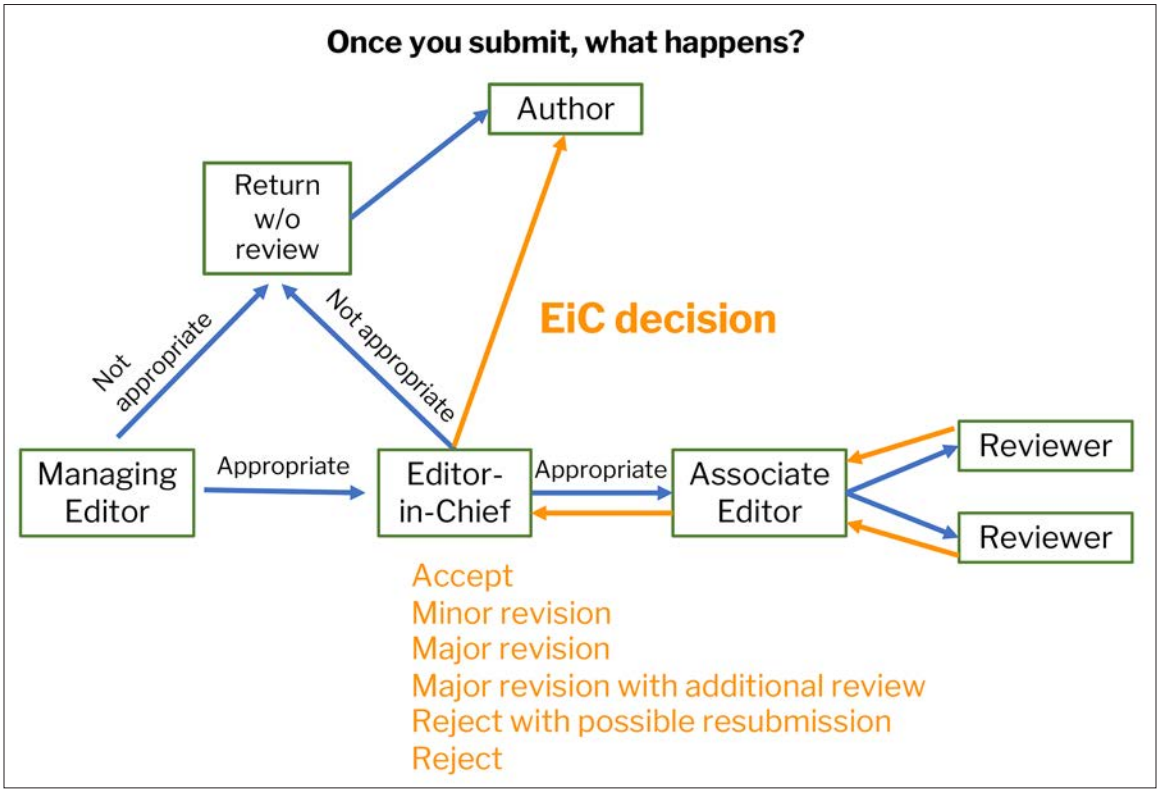
An electronic manuscript submission system (e.g., Editorial Manager, ScholarOne, OJS, eJournal Press, Bench Press) may be your first direct contact with a journal editorial office. The systems may be easy or frustrating to navigate, but they're designed to help curate and structure the ever-important metadata of your article. **Keep in mind that there are people on the other end of the system who are there to help when you need it—so don't be afraid to reach out.** Once the required items have been uploaded and submission questions have been answered, you should receive confirmation that the paper arrived safely. If you do not receive confirmation, double-check that you have approved the submission.

The titles and numbers of editors may vary from journal to journal, but there is some universality in the process. A paper is submitted to a journal and is given an initial evaluation: Is the subject matter appropriate for the journal? Are all the pieces there (figures, tables, cover letters, author agreements)? If no, the paper may be returned to the author. If yes, the manuscript moves to the next stage.

For the *American Journal of Botany* (*AJB*), this means the submission goes to the Editor-in-Chief (EiC), Pamela Diggle, who will read the abstract and consider whether the topic will likely be of interest to readers, addresses a timely topic, and clears the bar for making a significant contribution to the field. A well-written abstract will make the case, but the *cover letter* can also convince the Editor of the paper's appropriateness. If after reading the abstract and cover letter, it is still not clear, the Editor may read part of the manuscript introduction or the conclusion. If the answer is no, the paper will be returned without review. While this is disappointing for the author, it does mean they can turn the paper around for another journal. If the answer is yes, the EiC will send the paper to an Associate Editor (AE) with appropriate subject-area expertise (the author is free to request a particular AE).

The AE decides whether they agree that the paper potentially meets or exceeds journal standards and that the research is within their area of expertise. If the answer is no on either account, they will return the manuscript to the EiC: If the issue is with appropriateness or standards, the AE will often provide feedback for the author to consider whether resubmitting to *AJB* or sending to another journal. If yes, the AE will begin thinking of potential reviewers and sending out invitations (your suggestions can be helpful!). Up until this point, your paper has likely not been read in detail: **Most of the critical decisions have been made based on the title, abstract, and cover letter.** Make these count!

The Reviewers read the title and abstract of the paper in the invitation letter and accept or decline to review the paper, within a given



Decision process for manuscripts submitted to a journal (courtesy of Pamela Diggle, Editor-in-Chief of the American Journal of Botany*).*

timeframe. They do not see your cover letter, but once they accept the invitation, they have access to your paper, figures, appendices, and they may request access to the data underlying the research (see data management, above). After their evaluation, they provide comments and a recommendation to the AE.

When the reviews (usually two) are received, the AE reads the comments and makes a recommendation to the EiC, with suggestions, based on the reviews and their own reading of the paper. The EiC reads all the reviews and recommendations and makes a decision that is conveyed to the author. The AE and Reviewers receive a copy of the decision letter.

Author Receives the Decision Letter Containing the Reviews, What Happens Next?

It's human nature to be nervous, so our advice is to take a deep breath. Reviewers are, as a rule, trying to help make your science as clear and impactful as possible, but it's hard to receive criticism of your own work. Read the reviews carefully, set them aside for a day or two if necessary, ask for clarification if needed, and revise as you see fit. When you are ready to submit your revision, prepare a detailed response to reviewers, providing line numbers and explanations of what changes were made (or why a change was not made). Make it easy for the AE and, if necessary, the reviewers to understand what you have done.

The revised manuscript is again checked for completeness, and a Similarity Check is run for the manuscript through iThenticate against other published articles. If all looks good, the manuscript goes back to the AE (sometimes also reviewers), who makes a recommendation to the EiC, potentially with comments for the authors. When everyone is satisfied, a tentative accept/provisional acceptance decision is made and the paper goes to the Content Editor, who inspects the paper for journal requirements (figure/table formatting, confirmation that data have been deposited, funding sources are acknowledged, etc.) This is also a good time to try to take an objective look at the title, key words, and abstract: will interested people be able to find my paper among the many thousands of papers published every day? Is the title clear, brief, and informative? If I place my key words in a search engine, would I find appropriate papers? Does my abstract reinforce my main takeaways, while remaining within the word limit?

When all the minor issues are resolved, you will receive an acceptance letter and be given an opportunity to post your accepted article online as-is. Whether you choose this option or not, your paper will be placed in the copyediting queue; once queries have been resolved, the paper will be formatted and you will receive page proofs with a short (usually 3-day) turnaround time before the article appears in Early View, then slotted into an issue of *AJB*. Congratulations!

Discoverability and Accessibility

A lot of hard work goes into doing the research and writing up the results. A point that long-time *AJB* Managing Editor Amy McPherson stressed was that understanding how people and machines—in the form of search engines and other algorithms/Artificial Intelligence, and screen readers or other assistive devices—interact with your paper can ensure that your research is accessible and discoverable.

For accessibility, it's worth considering from the outset that the structure of your paper, including the text, headings, tables, and figures, affects how someone relying on a screen reader will be able to comprehend what you're trying to convey. It's worth your time to write clearly, in a well-structured format; create images that are useful, but not overly complicated or heavily reliant on color alone; and structure tables clearly and as simply as possible.

As a researcher, author, and reviewer (and maybe an editor), you want your work to be discoverable and you need acknowledgment for your contributions. One of the ways you can ensure this is through persistent digital identifiers, or PIDs. It's highly recommended when you start publishing that you sign up for an ORCID, or Open Researcher and Contributor ID (https://orcid.org/). This is a unique number that you own and control and that distinguishes you from every other researcher; it also allows you to connect with all your professional information, including publications, grants, affiliations, peer review, etc. As part of publishing in a journal, you may also be asked to assign CRediT, the Contributor Roles Taxonomy (https://casrai.org/credit/), to your list of authors. Because you settled authorship early on (hint; see above), this just confirms to the reader the roles of everyone

involved. As a reviewer of manuscripts, you may also be given the opportunity to receive credit through Publons, a Reviewer Recognition Service (https://publons.com/), which is integrated with the Web of Science, ORCID, and scholarly journals and allows you to track and demonstrate service to the scholarly community.

Another way you can make your work discoverable is to promote it! This can be done through presenting talks and posters at conferences, through social media (e.g., "Science Twitter"), Public Information Officers at your institution, newsletters, blogs, and podcasts. When you publish with a BSA journal, your article will be promoted on social media via Twitter (@Botanical_), Facebook (@BotanicalSocietyofAmerica), and Instagram (@botanicalsocietyofamerica). We have over 54,000 followers on these platforms.

Other ways to attract attention to your article are through graphical abstracts—a concise visual representation of the presented research; Plain Language Summaries—jargon-free, short summaries for the general public; abstracts in languages in addition to English; and submitting an image for the cover of the journal.

Research Integrity and Ethics

No discussion of publishing is complete without touching on research integrity and ethics. The topics may be covered in one's scientific training, but then again, it's worth being reminded that the submission of a manuscript to a journal is both an ethical and a legal undertaking. Issues of concern include intellectual copyright; plagiarism; redundant publishing; fabrication, falsification, or obfuscation of data; and misappropriation of information. The Committee on Publication Ethics, COPE (https://publicationethics.org/), is available as a resource for authors, editorial offices, and publishers worldwide, and Wiley offers guidance for authors as well (https://authorservices.wiley.com/ethics-guidelines/index.html).

The Botany360 publishing sessions wrapped with a few pieces of advice: **The publishing process is not meant to be scary or mysterious. Behind the electronic systems are people who want to work with you.**

- Always be respectful—it's a small world.
- Don't be afraid to ask questions, including if you're worried a step in the process is taking too long.
- If you are really pleased with the feedback you received, don't be shy about expressing that; if you are concerned that some of the feedback was not constructive, point that out, too.
- Share your science with the broader community.
- Go out there and make a difference in the world!

And send your next paper to a Society journal!

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To find out more about the free Botany360 webinars currently available online, see the Membership News article in this issue on p. 130---or go to https://botany.org/home/resources/botany360.html!

LATEST NEWS ON *APPLICATIONS IN PLANT SCIENCES* AND *AMERICAN JOURNAL OF BOTANY*

APPS Special Issue Call for Papers: "Resilient Botany: Innovation in the Face of Limited Mobility and Resources"

Proposal Submission Deadline: September 16, 2022

We are pleased to announce a call for papers for a special issue of *APPS*, "Resilient botany: Innovation in the face of limited mobility and resources." This special issue aims to showcase a collection of articles describing how botanists have creatively leveraged resources at hand to continue their research in the face of restricted mobility, limited funding, and disrupted supply chains. Our intent is for the issue to span diverse topics and scales across botanical research; we welcome novel laboratory, field, herbarium techniques, new software, and mini-reviews.

More information is available here: https://cms.botany.org/home/publications/apps/apps-call-for-papers-advances-in-plant-imaging-across-scales.html, or contact apps@botany.org with questions.

APPS Special Issue Call for Papers: "Advances in Plant Imaging across Scales"

Proposal Submission Deadline: August 5, 2022

Proposals are now being accepted for a special issue of *APPS* "Advances in Plant Imaging across Scales." The goal of this special issue is to explore how new imaging

technologies are enabling novel research into plant form and function, genomics, ecology, and evolution. The issue will highlight novel imaging and image processing techniques targeted to plants at any scale of organization. We encourage the submission of new tools, techniques, protocols, software/pipelines, and reviews of imaging techniques or image processing.

More information is available here: https://botany.org/home/publications/apps/apps-call-for-papers-advances-in-plant-imaging-across-scales.html, or contact apps@botany.org with questions.

New and Upcoming *APPS* Special Issues

The March–April issue of *APPS* explores "Methodologies in Gametophyte Biology." Guest editors Sally Chambers, Jerald Pinson, and Susann Wicke have curated a diverse group of papers that provide a valuable resource for understanding this minute, sometimes cryptic, and often overlooked part of the plant life cycle. Despite their obscurity, gametophytes are vital to our understanding of biodiversity and to the successful implementation of conservation strategies. See the full issue here: https://bsapubs.onlinelibrary.wiley.com/toc/21680450/2022/10/2.

Be on the lookout for two more *APPS* special issues publishing later this year: "Advances, Applications, and Prospects in Aquatic Botany" and "Meeting the Challenge of Exceptional Plant Conservation: Technologies and Approaches."

APPS Virtual Issue: Methods for Plant Leaf Measurements

The editors at *APPS* have curated a collection of articles showcasing the diverse methods to measure and analyze living and preserved leaves published in the journal. The featured papers include well-known and established methods, like Easy Leaf Area, and new approaches leveraging machine learning and 3D reconstruction of cellular layers. View the issue here: https://bsapubs.onlinelibrary.wiley.com/doi/toc/10.1002/(ISSN)2168-0450.leafmethods.

AJB/APPS Virtual Issue: Exploring Angiosperms353 Collection

This virtual issue brings together papers from the *American Journal of Botany* and *Applications in Plant Sciences* that focus on studies using the Angiosperms353 toolkit for target sequence capture in flowering plants. The heart of the collection is two special issues, each titled "Exploring Angiosperms353: a Universal Toolkit for Flowering Plant Phylogenomics." Additional articles published in the two journals that relate to this topic are being added on a continual basis. The universal nature of Angiosperms353 is creating new opportunities for systematists and evolutionary biologists. This collection of articles shares the many ways in which the toolkit is already being used, celebrates new discoveries, and improves our understanding of its properties and limitations. View the issue here: https://bsapubs.onlinelibrary.wiley.com/doi/toc/10.1002/(ISSN)1537-2197.angiosperms353.

BOTANICAL SOCIETY OF AMERICA'S AWARD WINNERS (PART 1)

Distinguished Fellow of the Botanical Society of America

The Distinguished Fellow of the Botanical Society of America is the highest honor our Society bestows. Each year, the award committee solicits nominations, evaluates candidates, and selects those to receive an award. Awardees are chosen based on their outstanding contributions to the mission of our scientific Society. The committee identifies recipients who have demonstrated excellence in basic research, education, public policy, or who have provided exceptional service to the professional botanical community, or who may have made contributions to a combination of these categories.

Dr. Pamela Diggle

University of Connecticut

Dr. Pamela Diggle is a world-class scientist, teacher, mentor, Editor, and leader in the field of botany, and has provided invaluable service to the Botanical Society of America (BSA) throughout her impressive career. She is a world leader in plant morphology, development and evolution ("devo-evo") and is a recognized authority on the integration of developmental ideas into plant reproductive biology. Her research focuses on the evolution of morphological diversity among plants with particular emphasis on understanding how features of development shape the dynamics of evolutionary change. Her approaches range from analyses of developmental responses of individuals to contrasting environmental conditions, to understanding how development has evolved over time in groups of closely related plants, and to understanding differences across all of flowering plants.

Dr. Diggle's classic work on labile sex expression in the Tomato genus (*Solanum*) demonstrated that plants can regulate whether they produce hermaphroditic or male flowers, depending on the extent of fruit production within a single blooming period. This remarkable developmental plasticity in sex expression is now known to be a general phenomenon across flowering plants. Dr. Diggle has also made important contributions to several other outstanding problems in plant biology, including how plant architecture influences sexual dimorphism in gender dimorphic species, the role of development in shaping phe-

nological responses to temperature variation (particularly warming due to climate change), and the ecological importance of preformation of meristems in alpine species. Her work is regularly funded by the US National Science Foundation (NSF), including for "microMORPH: Microevolutionary Molecular and Organismic Research in Plant History," meetings that bring together faculty and graduate students to focus on plant morphology and related areas.

Dr. Diggle is currently the Editor-in-Chief of the BSA's flagship journal, the *American Journal of Botany* (term 2015-2025). Since she assumed the Editorship, several positive changes to the journal are evident that enhance the profile of botany, its relevance, and diversity. She has spearheaded several initiatives, including the "On the Nature of Things" essays, the recently formalized series of invited reviews and topic-specific special issues, and the increased diversity and international representation of Associate Editors—all actions that have noticeably raised the journal's impact (and its impact factor). In addition, Dr. Diggle has been actively involved with the BSA in other areas, serving on several committees, and on the Board, first as Council Representative, then as Secretary, and lastly as President-Elect, President, and Past-President. She has offered workshops for authors, held focus groups with grad students and postdocs, and reached out to BSA sections to encourage members to contribute to their Society journals. Dr. Diggle is widely respected as having sound judgment, an even-handed approach to problems, and loyalty to the institutions and societies she has worked for. BSA has greatly benefited from her service and expertise over the years.

BSA *Impact* Award

The Botanical Society of America Impact *Award recognizes a BSA member or group of members who have significantly contributed to advancing diversity, accessibility, equity, and/or inclusion in botanical scholarship, research and education.*

Dr. Ann Sakai
University of California Irvine

It is a pleasure and an honor to announce that the first recipient of the BSA's *Impact* Award is Dr. Ann Sakai, Professor Emeritus from the University of California Irvine. In addition to being an excellent scientist, with research interests in evolutionary ecology and conservation biology, Dr. Sakai has been steadfast in promoting diversity and inclusivity during her entire career. Dr. Sakai attended SACNAS for several years on behalf of the BSA, reaching out to underrepresented students and promoting our botanical community and the PLANTS program to early career researchers while also judging countless talks at those meetings. Ann also served as BSA's first Director-at-Large for Human Diversity on the BSA Board of Directors.

Notably, along with a dedicated team, Dr. Sakai directed the NSF-funded PLANTS (Preparing Leaders and Nurturing Tomorrow's Scientists) outreach program for its first 11 years beginning in 2011. The PLANTS program provides undergraduates from diverse backgrounds with travel grants and mentors so that they can attend the national meetings of several societies focused on the plant sciences. This experience provides these students the opportunity to explore their academic and research interests in the plant sciences and to broaden their career opportunities.

Ann was tireless in her dedication to the program and her hands-on support of each and every student (over 100) that came to BOTANY through the PLANTS program. Scholars in the PLANTS program say that from the very first morning meeting with the rest of the PLANTS cohort, Dr. Sakai "set a tone of inclusivity and welcomeness" that has become a signature of the program. Not only did she support students during the meetings, making sure they had what they needed, attending their talks, and introducing them to other botanists, she provided support and encouragement as they subsequently developed their interests and career goals. She kept in touch with many of them throughout the years, helping to edit their CVs and their grant proposals, writing letters of recommendation and tracking their career paths. The personal connection, feeling

that she has been "in their corner" throughout their botanical journey, has been as important for many students as the program itself.

According to one of the 2011 PLANTS recipients, who is currently an Associate Professor, "Ann is quite literally changing the makeup of our BSA meetings and the field of botany as a whole, one undergraduate at a time"—and thus is fully deserving of the BSA's first-ever *Impact* Award.

BSA EMERGING LEADER AWARD

The Emerging Leader Award of the Botanical Society of America is given annually in recognition of creative and influential scholarship as well as impact in any area of botany reflecting the breadth of BSA. Awardees have outstanding accomplishments and also have demonstrated exceptional promise for future accomplishments in basic research, education, public policy, exceptional service to the professional botanical community, or a combination of these categories.

Dr. Karolina Heyduk
University of Hawai'i

Dr. Karolina Heyduk is currently Assistant Professor in the School of Life Sciences at the University of Hawai'i at Mānoa and the Director of the Joseph F. Rock Herbarium. Her research integrates plant ecophysiology, evolutionary biology, and genomics to understand the ways plants adapt to harsh environments, with a particular focus on photosynthetic pathway evolution, especially Crassulacean acid metabolism (CAM).

Karolina's research requires a high level of computational skills, a thorough understanding of the biology and metabolism involved, and the ability to conduct experiments that are meaningful in terms of the ecology and physiology of the species under investigation. Such an integrated approach is rare in plant science research. She has been influential in her early adoption of target sequence capture, a method that allows researchers to "efficiently plumb the depths of the nuclear genome for a range of comparative purposes." Dr. Heyduk developed protocols and an accompanying probe set for target

sequence capture in palms, which are now universally known as "Heyduk baits." She has received numerous grants (including for funding that will improve the herbarium's infrastructure and utility), has an impressive list of publications, serves on the editorial boards of *Applications in Plant Sciences* and *Annals of Botany,* and has been invited to give talks at institutions around the world.

Dr. Heyduk is recognized as an exceptional community builder, uplifting those whose voices have been marginalized, excluded, or entirely absent from the conversation through her work in the classroom, collections management, research, and service. She recruits students from diverse backgrounds, particularly Pacific Islanders and Native Hawaiians, to participate in research and herbarium activities. Through her interactions on Twitter, she is the "rare scientist who is simultaneously rigorous in their scholarly sharing and their advocacy for inclusivity and awareness." She is active on BSA's Early Career Development Committee, tasked with providing opportunities for early career members; has been a longtime mentor in the PLANTS program; and is co-organizing a symposium and colloquium at Botany 2022 on colonialism in botany and Indigenous perspectives. Although Karolina is early in her career, she is already making a huge difference as a leader in the community.

BOTANICAL SOCIETY OF AMERICA

Charles Edwin Bessey Teaching Award

(BSA in association with the Teaching Section and Education Committee)

Dr. Stefanie (Steffi) Ickert-Bond

University of Alaska Museum of the North and University of Alaska Fairbanks

Dr. Stefanie (Steffi) Ickert-Bond (University of Alaska Museum of the North and University of Alaska Fairbanks) is a well-respected botanist with a passion for fieldwork, collections, and natural history, combined with skills in active learning and evidence-based pedagogy—as well as a conviction for offering equitable access to science learning. Long before the Covid pandemic hit, she created online courses that allowed students to participate in hands-on, two-way communicative learning from any location.

In early March 2020, she offered her course "BIOL F195-F02; Introduction to Alaska's Flora" to be made freely available on the "BotanyDepot" website, thereby offering a lifeline to botany educators around the world who suddenly found themselves scrambling to build virtual experiences and online resources to teach systematic botany, plant anatomy, and local floristic courses. The course materials are a series of short video modules, grouped into topics, plus additional reading materials and fun, creative activities that are designed to deepen students' understanding of the concepts—and encourage them to go outside and explore the plants in their area. In the "Learning Glass" presentations, Dr. Ickert-Bond speaks to the camera while drawing, labeling, and describing aspects of plant form and structure. She guides the viewer through complex aspects by creating a basic foundation, a step-by-step pedagogical scaffolding—and then proceeds to add clear examples and visual explorations. She is continuing to build new course content, including for winter bud identification and for fundamentals of museum studies.

Dr. Ickert-Bond is a trailblazer in botany education, not only in teaching, but also in diversity and inclusion in botany education. As one person from the nomination committee wrote, "Through inclusive pedagogy that uses innovative technology combined with an artistic and creative vision to engage students in critical learning about plants, habitats and biodiversity science, Dr. Steffi Ickert-Bond embodies the action and spirit of the Bessey Award."

Donald R. Kaplan Memorial Lecture

This award was created to promote research in plant comparative morphology, the Kaplan family has established an endowed fund, administered through the Botanical Society of America, to support the Ph.D. research of graduate students in this area.

Lena Hileman, University of Kansas, Patterns and processes of floral diversification in the wildflower genus Penstemon.

The BSA Developing Nations Travel Grants

Maribel Arenas-Navarro, Universidad Nacional Autónoma de México, Mexico

João Iganci, Federal University of Pelotas, Brazil

Funmilola Mabel OJO, Olusegun Agagu University of Science and Technology

Yesenia Madrigal Bedoya, Universidad de Antioquia, Colombia

Sebastián Martínez-Salazar, Universidad De Antioquia, Colombia

Malka Saba, Quaid-i-Azam University, Islamabad, Pakistan

Olubunmi Sharaibi, Lagos State University, Ojo Campus, Nigeria

Hugo A. Valdebenito, Universidad San Francisco de Quito / Herbarium QUSF, Ecuador

Aleena Xavier, Indian Institute of Science Education and Research Bhopal, India

The BSA Professional Member Travel Grants

Irene Cobo Simón, University of Connecticut
Kyra N. Krakos, Maryville University
Benjamin Lee, Carnegie Museum of Natural History
Ellie Mendelson, Arnold Arboretum of Harvard University
Maria Cristina Rengifo Faiffer, Michigan Technological University
Mathew Sharples, Independent/Contractor
Carolina Siniscalchi, Mississippi State University
Qiang Sun, University of Wisconsin-Stevens Point
Brittany Verrico, University of Vermont
Cheng-Chiang Wu, National Taiwan University

Botany Advocacy Leadership Grant

This award organized by the Environmental and Public Policy Committees of BSA and ASPT aims to support local efforts that contribute to shaping public policy on issues relevant to plant sciences. To learn more about the winning projects, go to https://botany.org/home/awards/special-funds-and-awards/botany-advocacy-leadership-grant.html.

Sara E. Hansen, PhD Student**,** Earth and Ecosystem Science, Central Michigan University
Rhea Ewing, Visual artist, RheaEwing.com
Anna K. Monfils, Professor and Director of CMU Herbarium, Department of Biology, Central Michigan University
For the proposal: Creating Inclusive Resources for Botanical Science Education

BSA Public Policy Award

The Public Policy Award was established in 2012 to support the development of tomorrow's leaders and a better understanding of this critical area.

Brendan Kosnik, Arkansas State University
Zack Quirk, University of Washington

Donald R. Kaplan Award in Comparative Morphology

This award was created to promote research in plant comparative morphology, the Kaplan family has established an endowed fund, administered through the Botanical Society of America, to support the Ph.D. research of graduate students in this area.

Yesenia Madrigal Bedoya, University of Antioquia (Colombia)
For the Proposal: A morpho-anatomical characterization of the vegetative-to-reproductive meristematic transition in terrestrial and epiphytic neotropical orchids

The BSA Graduate Student Research Award

The BSA Graduate Student Research Awards support graduate student research and are made on the basis of research proposals and letters of recommendations. Within the award group is the Karling Graduate Student Research Award. This award was instituted by the Society in 1997 with funds derived through a generous gift from the estate of the eminent mycologist, John Sidney Karling (1897-1994), and supports and promotes graduate student research in the botanical sciences.

The J. S. Karling Graduate Student Research Award

Jessie Pelosi, University of Florida
For the Proposal: Beyond the genome: methylomics of the alternation of generations

The BSA Graduate Student Research Awards

Sam Anderson, University of Wisconsin Madison
For the Proposal: The Forgotten Forest Layer: A multivariate gradient analysis and physiological comparison of understory shrubs in northern mesic forests

Juan Angulo, City University of New York
For the Proposal: The evolution of dioecy and its consequences on plant diversification: phylogenetic and comparative studies on neotropical *Miconia* section *Cremanium* (Melastomataceae)

Derek Denney, University of Georgia
For the Proposal: Evaluating selection induced by climate change on water-use efficiency in *Boechera stricta*

Trinity Depatie, University of South Carolina
For the Proposal: Understanding the Genetic Basis of Personate Flowers in *Penstemon*

Erin G. Eichenberger, North Carolina State University
For the Proposal: Population vital rates and pollinator community of an endangered Southeastern prairie perennial, *Echinacea laevigata* (Boynton & Beadle) Blake

Rosemary Glos, Michigan State University
For the Proposal: Trichome-mediated defense in *Mentzelia* (Loasaceae)

Kaleb Goff, North Carolina State University
For the Proposal: A functional trait perspective on alpine plant community responses to rapid climate change in a xeric mountain range

Hansika Herath, University of Kentucky
For the Proposal: Intraspecific variation of acquired thermotolerance in the liverwort *Marchantia inflexa*

Hossein Madhani, University of Nevada, Las Vegas
For the Proposal: The role of immune system incompatibilities in the evolution of isolating barriers within an ongoing adaptive radiation

Kathleen Madsen, Ohio University
For the Proposal: The Fitness Consequences of Gypsum Endemsim

Sylvie Martin-Eberhardt, Michigan State University
For the Proposal: Insect signaling by anthocyanins in the carnivorous plant *Sarracenia purpurea*

Sebastián Martínez-Salazar, Universidad de Antioquia
For the Proposal: Molecular basis underlying nectar spur development in tropaeolaceae

Jared B. Meek, Columbia University
For the Proposal: Towards a comprehensive phylogeny of North American *Delphinium* (Ranunculaceae)

Nicole Mitidieri Rivera, University of Wisconsin-Madison
For the Proposal: Evolutionary pathways to becoming a fig: a phylogenetic comparative approach

Oluwatobi Oso, Yale University
For the Proposal: Developmental Anatomy and Evolution of Overwintering Buds in *Viburnum*

Evan Perkowski, Texas Tech University
For the Proposal: The influence of nitrogen fixation and soil nutrient availability on leaf and whole plant acclimation to elevated CO2

Rebecca Rooney, University of Minnesota - Duluth
For the Proposal: Coordination of Phloem Function and Anthocyanin Accumulation in Young and Senescing Leaves of *Quercus rubra*

Kyle Rosenblad, University of California, Berkeley
For the Proposal: Climate change and evolutionary potential in a montane meadow-dependent species

Catherine Sherry, North Carolina State University
For the Proposal: How Does Fire Kill Trees? Impacts of Stem Heating on Plant Hydraulics

Abrianna Soule, Michigan State University
For the Proposal: Evolution of the chemical defense of aspen (*Populus tremuloides*) and specialist herbivores (*Chrysomela*) across latitude

Kailin Sun, Ludwig-Maximilians University, Munich
For the Proposal: Phylogeny and biogeography of the genus *Myricaria*

Keana Tang, University of Kansas
For the Proposal: Fossil flowers and their role in uncovering the evolutionary and biogeographic history of Lauraceae

Piotr Tuczapski, University of Georgia
For the Proposal: Specificity of mycorrhizal symbionts in four sympatric *Lepanthes* species (Orchidaceae) and the possible role of symbionts in driving orchid diversification

Mackenzie Urquhart-Cronish, University of British Columbia
For the Proposal: Testing the influence of historical range expansion on contemporary plant mating system evolution

Alyson Van Natto, Queen's University
For the Proposal: Evolutionary genomic consequences of invasion of *Mimulus guttatus* into New Zealand

Susana Vega Betancur, Universidad de Antioquia
For the Proposal: Understanding the diversity of spikemosses in the Neotropics: taxonomy of *Selaginella* (Selaginellaceae) for Antioquia, Colombia

Leah Veldhuisen, University of Arizona
For the Proposal: Facilitation & Phylogenetic Structure of Montane Plant Communities

Christopher Waters, Tennessee Technological University
For the Proposal: Documenting effective pollinator species and metabarcoding pollinator environmental DNA across the range of *Physaria globosa* (Brassicaceae)

Katherine Wolcott, University of Miami
For the Proposal: 3D pollination biology of *Theobroma cacao* and its relatives, *Ayenia euphrasiifolia, Guazuma microphylla, Herrania umbratica* (Byttnerioideae)

Rieka Yu, University of Missouri - St. Louis
For the Proposal: Differences in pollinators as drivers of plant population genetic change in disturbed landscapes

The BSA Undergraduate Student Research Awards

The BSA Undergraduate Student Research Awards support undergraduate student research and are made on the basis of research proposals and letters of recommendation.

Caroline Bendickson, The University of Alabama in Huntsville
For the Proposal: Building a Molecular-based Phylogeny for the Genus *Trillium* Using Angiosperms353 Bait Capture Sequencing

Cesar Galan, Cornell University
For the Proposal: Travel to Harvard University Herbaria Collections; Access to Additional Sample Specimens

Jack Hatajik, University of Pittsburgh
For the Proposal: Mapping the population dynamics of the invasive *Alliaria petiolata* (garlic mustard) in response to climate

Isabeau Lewis, Queen's University
For the Proposal: Kin discrimination and plastic responses in growth and flowering in a clonal plant

Nicholas Rocha, Cornell University
For the Proposal: The Attractiveness of visual traits of *Calochortus venustus* to insect pollinators

Erika Sipos, Hobart and William Smith Colleges
For the Proposal: A Phylogenetic and Biogeographical Study of Parsonsia (Apocyanceae)

The BSA Young Botanist Awards

The purpose of these awards is to offer individual recognition to outstanding graduating seniors in the plant sciences and to encourage their participation in the BSA.

Christina Andreski, Plymouth State University, Advisor: Diana Jolles

Anais Barnes, Bucknell University, Advisor: Christopher Martine

Charles Boissavy, Oberlin College, Advisor: Michael Moore

Caroline Brose, Colorado College, Advisor: Rachel Jabaily

Emma Cooley, Fort Lewis College, Advisor: Ross McCauley

Carmen David, University of California, Davis, Advisor: Jennifer Gremer

Adalie Duran, Connecticut College, Advisor: Rachel Spicer

Norbaya Jameela Durr, Elmhurst University, Advisor: Kasey Pham

Josh Felton, Colorado College, Advisor: Rachel Jabaily

Tori Ford, University of Florida, Advisor: Makenzie Mabry

Stephanie Kate, San Francisco State University, Advisor: Jason Cantley

Kaitlin Schieuer, South Dakota State University, Advisor: Maribeth Latvis

Caroline Shaw, Abraham Baldwin Agricultural College, Advisor: Benjamin Gahagen

Edward J. Spagnuolo, Pennsylvania State University, Advisor: Peter Wilf

Sharon Haley Spiess, Abraham Baldwin Agricultural College, Advisor: Benjamin Gahagen

Kayla Warner, Barnard College, Columbia University, Advisor: Hillary Callahan

Adam Wilson, Creighton University, Advisor: Mackenzie Taylor

Talia Zeidner, Connecticut College, Advisor: Rachel Spicer

The BSA PLANTS Grant Recipients

The PLANTS (Preparing Leaders and Nurturing Tomorrow's Scientists: Increasing the diversity of plant scientists) program recognizes outstanding undergraduates from diverse backgrounds and provides travel grant.

Luigie Alequín, Haverford College, Advisor: Nathalie Nagalingum

Victoria Clements, Tennessee Technological University, Advisor: Shawn Krosnick

Adalie Duran, Connecticut College, Advisor: Rachel Spicer

Josh Felton, Colorado College, Advisor: Rachel Jabaily

Tori Ford, University of Florida, Advisor: Pam Soltis

Cesar Galan, Cornell University, Advisor: Alejandra Gandolfo

Mayra Hernandez, CSU Dominguez Hills, Advisor: Helen I. Holmlund

Amelie LeTierce, University of Massachusetts, Amherst, Advisor: Jessamine Finch

Karina Mendez, Chabot College, Advisor: Mackenzie Mabry

Aadia Moseley-McCloud, Howard University, Advisor: Janelle Burke

Austin Nguyen, University of Kansas, Advisor: Kelly Matsunaga

Inti Quinchiguango Archuleta, SUNY Environmental Science and Forestry, Advisor: Suzy Strickler

The BSA Student and PostDoc Travel Awards

Winners were selected by lottery

Juan Angulo

Andrea D. Appleton

Antigone Burke

Robert P. Comito

Diana Gamba

Elyssa Garza

Michelle Gaynor

Samuel Lockhart

Jess Shamik

Caroline Siegert

Meredith Zettlemoyer

Vernon I. Cheadle Student Travel Awards

(BSA in association with the Developmental and Structural Section)
This award was named in honor of the memory and work of Dr. Vernon I. Cheadle.

Benjamin Ajayi, University of Lagos, Advisor: Professor Akeem Babalola
For the Presentation: Dumpsite aftereffects on structural and functional integrity of three crop weeds

Kelly Pfeiler, University of Kansas, Advisors: Kelly Matsunaga & Brian Atkinson,
For the Presentation: Anatomically preserved cheirolepidiaceous pollen cones from the Cretaceous of western North America. Co-authors: Brian Atkinson, Kelly Matsunaga

Keana Tang, University of Kansas, Advisor: Brian Atkinson
For the Presentation: Crown group Lauraceae in the Late Cretaceous: new evidence from fossil flowers. Co-authors: Kelly Matsunaga, Brian Atkinson

Elizabeth Wilson, William Jewell College, Advisor: Nathan Jud
For the Presentation: Revising the description and diagnosis of the Late Pennsylvanian medullosan *Neuropteris lindahli* White based on new fossil material. Co-author: Nathan Jud

Brandi Zenchyzen, University of Alberta, Advisor: Jocelyn Hall
For the Presentation: Exploring nectary diversity in Cleomaceae. Co-authors: Jaymie Martin, Stacie Weissner, Ainsley Lopushinsky, Ida John, Ishnoor Nahal, Jocelyn Hall

AWARDS FOR STUDENTS - GIVEN BY THE SECTIONS

Southeastern Section Student Presentation Awards

The following winners were selected from the Association of Southeastern Biologists meeting that took place at the end of March 2022.

Rachel A. Jessup, North Carolina State University
Ryan Long, Jacksonville State University

Bryological and Lichenological Section Student Travel Awards

Hansika Herath, University of Kentucky, Advisor: Nicholas McLetchie
For the Proposal: Testing for long-term acquired thermotolerance in the tropical plant *Marchantia inflexa*. Co-author: Nicholas McLetchie

Rho Kackley, Bard College at Simon's Rock, Advisor: Donald McClelland
For the Proposal: A Partial Checklist of the Bryophytes of Montserrat, West Indies

Evita Oļehnoviča, Daugavpils University, Advisor: Anna Mežaka,
For the Proposal: Bryophyte functional traits in black alder swamp forests along forest age chronosequence in Latvia. Co-authors: Anna Pastare-Skutele, Anna Mežaka, Ligita Liepiņa

Developmental & Structural Section Student Travel Awards

Cesar Galan, SIPS Plant Biology, Advisor: Alejandra Gandolfo
For the Presentation: Epidermal morphology of the subfamily Athrotaxoideae (Cupressaceae). Co-authors: Ana Andruchow Colombo, Maria Gandolfo

Vandana Gurung, University of Connecticut, Advisor: Pamela Diggle
For the Presentation: The curious case of CUC in corolla tube formation in *Mimulus*. Co-authors: Pamela Diggle, Yaowu Yuan

Sarita Munoz-Gomez, University of Connecticut, Advisor: Yaowu Yuan
For the Presentation: Creation of novel pigmentation patterns in monkeyflowers (*Mimulus*). Co-author: Yaowu Yuan

Deannah Neupert, Miami University, Advisor: Richard Moore
For the Presentation: The evolution of structural novelty: A morphological analysis of development in *Mimulus* and its implications for plant architecture and reproduction. Co-authors: Robert (Rob) Baker, Rich Moore, Jonathan Bauer

Ecological Section Student Travel Awards

Haley Branch, University of British Columbia, Advisor: Amy Angert
For the Presentation: Transgenerational plasticity and maternal effects alter drought responses in scarlet monkeyflower. Co-authors: Dylan Moxley, Amy Angert

Veronica Gibson, University of Hawaii at Manoa, Advisor: Celia Smith
For the Presentation: Integrated physiological response by four red algae species and analysis of benthic community structure across an environmental gradient of tidally-driven submarine groundwater discharge conditions. Co-author: Celia Smith

Jill Wilson, University of Georgia, Advisor: Megan DeMarche
For the Presentation: Herbarium specimens underestimate phenological shifts in wild populations. Co-authors: Megan DeMarche, Meredith Zettlemoyer

Economic Botany Section Student Travel Awards

Kristen Nolting, University of Georgia
For the Presentation: Do crops have reduced stress tolerance compared with their wild progenitors? Evidence from a comprehensive meta-analysis. Co-Authors: Emily Dittmar, Lisa Donovan, John Burke

Maya Shamsid-Deen (Allen), University of New Mexico
For the Presentation: A Germination of Freedom: How Blackdom, New Mexico Grew Its Roots through Dry-Farming Crops of the African Diaspora. Co-Authors: Gary Ivan Stafford, and Nokwanda Makunga

Genetics Section Student Travel Awards

Gracy Buckholtz, University of British Columbia, Advisor: Jeannette Whitton
For the Presentation: Tracking a Cryptic Invader: The Morphology and Genetics of Fraser River Estuary Cattails.

Trevor Faske, University of Nevada, Reno, Advisor: Thomas Parchman
For the Presentation: Determinants of mixed-ploidal variation and hybridization in big sagebrush (*Artemisia tridentata*) across the landscape. Co-authors: Alison Agneray, Bryce Richardson, Elizabeth Leger, Thomas Parchman

Talieh Ostovar, San Diego State University, Advisor: Amy Litt
For the Presentation: Impacts of allopolyploidy on gene expression in *Nicotiana* section *Repandae*. Co-authors: Jacob Landis, Elizabeth McCarthy, Jason Stajich, Elizabeth Waters, Amy Litt

Connor L. Purvis, Francis Marion University, Advisor: Jeremy Rentsch
For the Presentation: Regulation of the Dhurrin Biosynthetic Pathway in *Sorghum halepense* seedlings. Co-authors: Jeremy Rentsch, Elizabeth Jones

Alyson Van Natto, Queen's University, Advisor: Jannice Friedman
For the Presentation: Mating system and hybridization combine to effect range-wide genetic structure in a coastal endemic plant. Co-author: Chris Eckert

Physiological Section Student Travel Awards

Veronica L. Gibson, University of Hawaii at Manoa, Advisor: Celia Smith
For the Proposal: Integrated physiological response by four red algae species and analysis of benthic community structure across an environmental gradient of tidally-driven submarine groundwater discharge conditions. Co-author: Celia Smith

Thomas Hennessey, Western Carolina University, Advisor: Beverly Collins
For the Proposal: Restoring the Roan: Red Spruce Forest Understory Response to Canopy Gaps at Roan Mountain, NC.

Marissa Ochoa, University of California, Los Angeles, Advisor: Lawren Sack
For the Proposal: How does stomatal anatomy influence leaf conductance from minimum to maximum? Causal relationships and meta-analysis. Co-authors: Lawren Sack, Thomas N. Buckley, Christian Henry, Camila Medeiros, Ruihua Pan, Grace Patricia John

Phytochemical Section Student Travel Awards

Tomi Lois Adetunji, North-West University, South Africa, Advisor: Frances Siebert
For the Proposal: Sceletium tortuosum: A review on its phytochemistry, pharmacokinetics, biological, pre-clinical and clinical activities. Co-authors: Frances Siebert, Ademola Adetunji, Brian Harvey, J. Gericke, JH Hamman, Frank Van der Kooy

David Henderson, Washington University in St. Louis, Advisor: Jonathan Myers
For the Proposal: Testing the Role that Biotic Interactions Play in Shaping Elevational-Diversity Gradients: An Ecological Metabolomics Approach. Co-authors: Sebastian J. Tello, Brian Sedio, Jonathan Myers

Gordon Younkin, Cornell University, Advisor: Georg Jander
For the Proposal: Comparative transcriptomics of 48 *Erysimum* species guides discovery of cardiac glycoside biosynthetic genes. Co-authors: Martin Alani, Mahdieh Mirzaei, Georg Jander

Primarily Undergraduate Institutions (PUI) Section Student Travel Awards

Sarah Allen, Penn State Altoona

Jennifer Blake-Mahmud, Hope College

Cecilia Ezeanya, University of Ibadan

Elizabeth McCarthy, SUNY Cortland

Gregory J. Pec, University of Nebraska at Kearney

Qiang Sun, University of Wisconsin-Stevens Point

Susana Wadgymar, Davidson College

Yingying Xie, Purdue University

Pteridological Section & American Fern Society Student Travel Awards

Lacey E. Benson, San José State University, Advisor: Susan Lambrecht
For the Presentation: A morphometric analysis of western sword fern (*Polystichum munitum*) pinnae and pinnae scales across the coast redwood forest ecological gradient. Co-Author: Susan Lambrecht

Bertrand Black, University of Vermont, Advisor: Michael Sundue
For the Presentation: A phylogenetic revision of the Athyrium filix-femina clade (Athyriaceae) in the Americas. Co-Author: Michael Sundue

Alexandria Quinlan, National Taiwan University, Advisor: Li-Yaung Kuo
For the Presentation: Ferns on ferns: an exploration of low-trunk epiphytic fern gametophytes growing on tree ferns in Taiwan. Co-Authors: Li-Yaung Kuo, Jer-Ming Hu

Jacob Suissa, Harvard University, Advisor: William E. Friedman
For the Presentation: The hydraulic implications of rhizomatous growth and the homorhizic habit. Co-Authors: William Friedman, Andrews Agbleke

Zane Walker, Oregon State University, Advisor: Gar Rothwell
For the Presentation: A permineralized osmundaceous fern sporeling from the Lower Cretaceous of western Canada. Co-Authors: Gar Rothwell, Ruth Stockey

TAYLOR & FRANCIS

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Botany360 Event Recordings Now Available

Botany360 (https://botany.org/home/resources/botany360.html) is a series of programming that connects our botanical community during the 360 days outside of Botany conferences. The Botany360 event calendar is a tool to highlight those events. The goal of this program is to connect the plant science community throughout the year with professional development, discussion sessions, and networking and social opportunities. To see the calendar, visit www.botany.org/calendar.

By Amelia Neely

BSA Membership & Communications Manager

E-mail: ANeely@botany.org

We are excited to now offer the following event recordings from our Spring 2022 Botany360 events:

- **Ace It! - Write a Better Title**
  (March 2, 2022)
  Workshop presented by Dr. Bruce Kirchoff, University of North Carolina at Greensboro, and Dr. Eliezer Cocoletzi, University of Veracruz
  [https://www.youtube.com/watch?v=e2_CkFtBcI4]

- **Ace It! - Write a Better Abstract**
  (March 23, 2022)
  Workshop presented by Dr. Bruce Kirchoff, University of North Carolina at Greensboro, and Dr. Eliezer Cocoletzi, University of Veracruz.
  [https://www.youtube.com/watch?v=dbPGAr9_GyE]

- **De-mystifying the MS submissions process: Before you submit (Part 1)**
  (May 11, 2022)
  Part 1 of a two-part workshop to help navigate all stages of the peer review process. This workshop was presented by Dr. Briana Gross, University of Minnesota-Duluth, Editor-in-Chief, Applications in Plant Sciences, and Dr. Brittany Sutherland, George Mason University.)
  [https://www.youtube.com/watch?v=NIAM4TQK6iI]

- **De-mystifying the MS submissions process: Before you submit (Part 2)**
(May 18, 2022)
Part 2 of a two-part workshop to help navigate all stages of the peer review process. This workshop was presented by Dr. Pamela Diggle, University of Connecticut, Editor-in-Chief, American Journal of Botany, and Amy McPherson, Director of Publications, Botanical Society of America and Managing Editor, American Journal of Botany.
[https://www.youtube.com/watch?v=UBylHDG2mts]

- **So you want to get involved with section leadership...**
(June 5, 2022)
Presented by Kyra N. Krakos, Maryville University, 2022 Chair of the BSA Teaching and Outreach Section. A walkthrough of the roles, responsibilities, and benefits of being in section leadership: Have you thought about section leadership? How does one get elected? What is involved in the different positions? How can it benefit your professional development? During this session the group walked through the different roles and responsibilities and answered questions about the process.
[https://www.youtube.com/watch?v=sVkkSbqfuyo]

BSA LEGACY SOCIETY

Thank you to all of our Legacy Society members for supporting BSA by including the Society in your planned giving. We look forward to hosting you at this year's Legacy Society Reception at Botany 2022 in Anchorage, Alaska. If you are interested in joining the Legacy Society, you are welcome to come to the event and sign up in person or by filling out this form at any time: https://crm.botany.org/civicrm/profile/create?gid=46&reset=1.

The intent of the BSA's Legacy Society is to ensure a vibrant society for tomorrow's botanists, and to assist all members in providing wisely planned giving options. All that is asked is that you remember the BSA as a component in your legacy gifts. It's that simple—no minimum amount, just a simple promise to remember the Society. We hope this allows all BSA members to play a meaningful part in the Society's future. To learn more about the BSA Legacy Society, and how to join, please visit: https://botany.org/home/membership/the-bsa-legacy-society.html

BSA SPOTLIGHT SERIES

The BSA Spotlight Series highlights **early career scientists** in the BSA community and shares both scientific goals and achievements, as well as personal interests of the botanical scientists, so you can get to know your BSA community better.

Here are this year's Spotlights so far:





- **Dr. Andrea Berardi,** Postdoctoral Fellow, OEB and Harvard University Herbaria, Harvard University (https://botany.org/home/careers-jobs/careers-in-botany/bsa-spotlight-series/andrea-berardi.html)

- **Dr. Rocio Deanna,** Postdoctoral Fellow, Ecology and Evolutionary Biology, University of Colorado, Boulder (https://botany.org/home/careers-jobs/careers-in-botany/bsa-spotlight-series/rocio-deanna.html)

- **Danielle Gafford,** Undergraduate Student, Biological Sciences, University of Missouri (https://botany.org/home/careers-jobs/careers-in-botany/bsa-spotlight-series/danielle_gafford.html)

- **Luiza Teixeira-Costa,** Postdoctoral Fellow, Functional Ecology of Plants and Ecosystems, Vrije Universiteit, Brussel (https://botany.org/home/careers-jobs/careers-in-botany/bsa-spotlight-series/luiza-teixeira-costa.html)

- **Shawn K. Thomas,** Graduate Student, Biological Sciences, University of Missouri (https://botany.org/home/careers-jobs/careers-in-botany/bsa-spotlight-series/shawn_thomas.html)

Would you like to nominate yourself or another early career scientist to be in the Spotlight Series? Fill out this form: https://forms.gle/vivajCaCaqQrDL648.

DID YOU KNOW?

Do you want to know more about what the BSA has to offer you as a member? Each month a new BSA resource will be highlighted in the BSA *Membership Matters* newsletter in the "Did You Know" section. Below are the three most recent resources. Visit www.botany.org and browse the website to find even more great information.

- **Did you know that BSA has a Careers in Botany Profiles page that highlights diverse careers that BSA members have in the field of botany?** The BSA Student Representatives update this page each year. If you want to be highlighted, contact them at studentrep1@botany.org and imenavaldes2020 @u.northwestern.edu. [https://botany.org/home/careers-jobs/careers-in-botany/careers_in_botany_profiles.html]

- **Did you know that you can volunteer to review books for the *Plant Science Bulletin?*** Books for review are available to BSA members. To find the current list of books, and instructions on how to request to review the books, go to https://botany.org/booksforreview/view/reviewrequests/. Books go quickly, so check out the list today!

- **Did you know that the BSA's website houses Botany Conference websites, abstracts, photos, and more going back to 2000?** Simply click on "BOTANY Conference" in the website menu of www.botany.org and then click any conference year for a sub-menu with that year's meeting website, submitted abstracts, and presentation videos!

Make sure to check out the *Membership Matters* eNewsletter for more great information, events, and news. Not receiving the eNewsletter? Email me at aneely@botany.org.

BSA GIFT MEMBERSHIPS

This is a reminder that BSA Gift Memberships are a great way to introduce students and Developing Nations' Colleagues to the BSA community. You can purchase one-year ($10) or three-year ($30) gift memberships by visiting: https://crm.botany.org and choosing "Give a Gift of Membership."

Don't have anyone specific for whom to purchase a gift membership? Not a problem! You can put your own name and email in the gift membership fields and I will add that donation to a list of memberships that we offer to those who need financial assistance. Questions about gift memberships or other ways to donate? Email me at aneely@botany.org.

FROM THE *PSB* ARCHIVES

60 years ago

"In the course of the last decennia the income from the endowment which Henry Shaw left to the Missouri Botanical Garden could not keep up with the increasing costs of maintaining such a garden, and at first it was tried to keep expenditures within the limits of the endowment income. When it became obvious that this resulted in deterioration of the once so beautiful Garden, the Trustees adopted a new policy, namely, that of temporary deficit budgeting. It was believed that if only the Garden could be brought into a physically attractive condition and would again provide inspiration and beauty to the visitors, then contributions from the visiting public and from the community could be obtained. With the exception of research projects financed by the National Science Foundation, the Missouri Botanical Garden has never received support from tax money, and as long as it remains a private institution it cannot receive any state or city funds for its operation.

". . . Therefore, this deficit budgeting was adopted not just to close financial gaps, but it was rather incentive money used in the amelioration of Garden and public facilities. This resulted in an unprecedented increase in the attendance by the public and this in turn was the basis for an increase in our operational income.

"For persons who believe that such an increase in public interest can only come by cheapening the type of displays and by catering to the lower instincts of the public, such as the television interest seems to have done with the greatly increased crime and fight programs, it should be stated here that our educational work has been increased and deepened, that more and more educational exhibits accompany the popular flower shows, and that our newest green-house, the Climatron, is used in part for research purposes. I am thoroughly convinced that the public is interested in any type of scientific information which can be given to them, and they enjoy being considered as grown-ups. Yet our new educational exhibits find perhaps even more appreciation in the eyes of children than grown-ups."

Went, Fritz W. 1962. Notes from the Missouri Botanical Garden. *PSB* 8(2): 1-4

50 years ago

"The present emphasis on the environment and its relation to society gives botanists a far greater opportunity than they have had recently to educate college students, including future teachers, concerning plants as a basic resource. While it is apparent to most of them that green plants are the foundation of all biotic communities and food chains, much of society, including some scientists, fail to understand the critical nature of this relationship. This emphasis provides opportunities to seek greater support, not only for general botany, but also for interdisciplinary courses and programs which interpret the various interactions between society, vegetation, and biotic communities. Such courses should involve not only botanists, but also colleagues from other disciplines as diverse as engineering, economics, sociology, zoology, nutrition, psychology, philosophy, architecture."

Sharp, A. J. and A. S. Heilman. 1972. Present Opportunities in Botany. *PSB* 18(2):15

40 years ago

The slide exchange program, sponsored by the BSA Teaching Section, will be expanded this year. The membership is encouraged to submit slides to be added to the collection. Slides in several new categories are being solicited, Economic Plants, Non-vascular Plant Morphology, and "Slides that tell a story" (small sets of slides illustrating a single principle or theme). Additional slides for last year's categories, Vascular Plant Morphology and Plant Geography (S.E. U.S. was particularly weak) would also be appreciated. We would also like to expand Plant Geography to worldwide coverage. Contributions should be sent to Dr. Marshall D. Sundberg . . .They will be duplicated, and the originals returned. The copies will be placed on exhibit at the annual meeting at Penn State and members will be offered the opportunity to purchase duplicates, for the cost of reproduction, to be used in teaching. We hope to make this program even more successful with greater contributions by the membership.

Teaching Section Slide Exchange. 1982. *PSB* 28(2): 10

Spring 2022 PlantingScience Session Recap

If the COVID-19 pandemic taught us anything, it's that we work with some amazing teachers and scientists. Despite the fact that many K-12 schools are still working through a regrouping phase, we had a solid spring session that served nearly 700 students. All together, they completed 190 investigations with nearly every available Investigation Theme represented! Interestingly, the theme that drew the most attention from teachers and students this session was our Agronomy Feeds the World theme, perhaps reflecting the Next Generation Science Standards' emphasis on human reliance on the environment and effects on biodiversity. In the end, 30 projects received nominations for Star Project awards, of which 10 were selected to receive honors. Check out the winning projects in our new Star Project gallery at: https://plantingscience.org/psprojects/starprojectssp22.

Of course, none of this could have happened without the generous support of our wonderful donors, mentors, and Master Plant Science Team (MPST) members. Our thanks go out to those who willingly gave their resources, time, and attention to our student teams, giving them the opportunity to discover firsthand what wonderful people you are! We hear regularly from our teachers how much they and their students love PlantingScience, and how effective the program has been in capturing students' interest in plants. Thank you for being a part of this effort!

By Dr. Catrina Adams, *Education Director*

Jennifer Hartley, *Education Programs Supervisor*

THANK YOU 2021-22 MASTER PLANT SCIENCE TEAM!

As we close out the 2021-22 school year, we'd like to take this opportunity to recognize the following BSA-sponsored PlantingScience MPST members:

Claudia Anca Barcu

Israel Borokini

Yanni Chen

Dani Davis

Kelsey Fisher

Ana Flores

Sara Johnson

Brooke Kern

Josh Kraft

Guadalupe Maldonado Andrade

Jill Marzolino

Chelsea Pretz

Lydia Tressel

Renate Wuersig

Shan Wong

Aleena Xavier

These PlantingScience participants not only mentor student groups directly; they also serve as our teachers' guides by assisting with mentor recruitment, monitoring student project progress, and ensuring that communication is flowing smoothly. Please join us in applauding the contributions of these important PlantingScience members and thanking them for playing a vital role in the program's success.

Recruitment is now underway for the 2022-23 Master Plant Science Team! If you or someone you know could benefit from an opportunity to grow as a mentor and leader, visit https://plantingscience.org/mentorjoin/mpstinfo to learn more about this unique and meaningful experience.

PAST PLANTINGSCIENCE PARTICIPANTS, WE WANT TO HEAR FROM YOU!

As the PlantingScience team looks forward to the coming school year, we're seeking input from our past participants to ensure we're prioritizing features and improvements that make the program the best it can be for all. If you've served as a PlantingScience MPST member or mentor (or both!), we'd love to hear more about what aspects of the program worked well for you and where you encountered challenges. Consider completing our Participant Feedback survey—this survey is completely anonymous, and takes about 5 minutes to complete: https://bit.ly/PS-Survey-2022.

PLANTINGSCIENCE AT BOTANY 2022

Attending Botany2022 in Anchorage (either in person or virtually)? Consider joining us for our PlantingScience discussion session, or come visit our table.

Getting Ready for Botany 2022

Are you excited about our first-ever hybrid Botany conference?! We definitely are and are so looking forward to seeing you in Anchorage! We have some great events planned and we hope you can join us. If you have any questions or need any assistance in navigating Botany, please email us (Imeña: imenavaldes2020@u.northwestern.edu; Ioana: studentrep1@botany.org) or connect with us on Twitter (@imenarv and @ioana_anghel).

PLANTING THE SEEDS OF SCIENCE COMMUNICATION WORKSHOP

Sunday, July 24, 10:00 AM–12:00 PM

Where do we start when we want to share our science with our broader communities? Which social platform is the best medium for the topics we want to amplify to engage the audience we want to reach with our preferred style of communication? Join us for a two-hour workshop to:

By Imeña Valdes and Ioana Anghel
BSA Student Representatives

- Meet a panel of plant science communicators who reach people through varied media and platforms: community outreach, museums and botanical gardens, social media, video, and writing
- Hear their advice on how to effectively talk about plant science to diverse audiences
- Ask questions about how to get started
- Connect with other scicomm enthusiasts

In this workshop, a panel of science communicators will introduce themselves and their work, and share some actionable advice. Then we will chat in small groups where you can learn directly from the panelists who best align with your scicomm interests. You will leave the workshop with ideas for developing an action plan for your science communication strategy.

Panelists: Taran Lichtenberger, Budburst; Molly Edwards, Harvard University; Teressa Alexander, University of the West Indies; Chris Martine, Bucknell University; Tanisha Williams, Bucknell University; Brandon Corder, University of Wisconsin-Madison; Sarah Jacobs, California Academy of Sciences; Loy Xingwen, Southeastern Center for Conservation; and Kathryn Parsley, Donald Danforth Plant Science Center.

CAREERS IN BOTANY LUNCHEON

Monday, July 25, 12:00 PM–1:30 PM

We are still working on organizing this, but we plan to have over 20 professionals from a variety of academic disciplines and job titles that you will be able to interact with! We will have rotating small-group discussions so everyone has a chance to speak with our panelists. Check out the Careers in Botany Profiles (https://botany.org/home/careers-jobs/careers-in-botany/careers_in_botany_profiles.html) from last year's conference and the tweets below to see some of the positive feedback we received!

This event costs $10.00 for students and has limited space, so register today!

STUDENT SOCIAL

Monday, July 25, 9:00 PM–11:59 PM

After the full first day of a lot of cool plant information, please join us to wind down, network, and socialize with other students. This is a great opportunity to make friends that you can explore Botany and Anchorage with! *[Event sponsored by Wiley]*

CV REVIEWING

Monday, July 25, 4:00 PM–5:00 PM
Tuesday, July 26, 4:00 PM–5:00 PM
Wednesday, July 27, 2:00 PM–3:00 PM

We will hold daily CV reviewing sessions for 18 students during the Botany conference. Each student will send their CV to their reviewer prior to the conference and will have 30 minutes to talk through it on their scheduled date and time. Unfortunately, we cannot coordinate for more students, but stay tuned to the Botany360 calendar for future CV reviewing events by the Early Career Professional Development Committee!

BSA OFFICER MIXER

Wednesday, July 27, 6:30 PM–7:00 PM

Join us as well as other BSA Officers to learn more about how to get involved with the Society by making contributions to BSA publications or taking active roles in leadership positions. Come with your questions and we'll have answers!

PAPERS TO READ FOR FUTURE LEADERS

As we continue in our careers, we hope to see the academic culture shift to be more inclusive and equitable. We hope to share papers with student members to help support this goal. This form (https://forms.gle/KPWhaePDi1h6Ufp2A) is available for sharing papers with us. These recommendations will be included in the student section of the *Plant Science Bulletin*. Thank you for your help!

Montgomery, B. L. and J. A. Whittaker. 2022. The Roots of Change: Cultivating Equity and Change across Generations from Healthy Roots. *The Plant Cell* koac121. https://doi.org/10.1093/plcell/koac121.

Woolston, C. 2022. PhD students face cash crisis with wages that don't cover living costs. *Nature* 605: 775–777. https://doi.org/10.1038/d41586-022-01392-w.

Check out this thread by Dr. Beronda Montgomery for a great reading list!

(Available at https://twitter.com/BerondaM/status/1219977765027340288?s=20&t=lW342jyy7VyZlvbMbabBUQ)

GETTING TO KNOW YOUR NEW STUDENT REPRESENTATIVE!

Eli Hartung (Kansas State University)

When did you join BSA and what motivated you to do so? Will you encourage other students to become members and participate in the Society as well?

I joined BSA in 2020. Most of my lab mates and my undergrad advisor were BSA members so it just made sense for me to join too. I will absolutely encourage other students to join BSA. I think it is a great organization for anyone interested in plants.

What motivated you to run for the position of Student Representative to the Board of Directors, and what do you plan to do as the student representative of BSA?

I love plants and sharing my love for plants, and I really wanted to get involved with an organization like BSA that shares my passions for the plant sciences. As the student representative of BSA, my biggest goal is to help students connect with and get involved with more established plant scientists and vice versa. It can be really hard for students to find labs to get involved with. It can also be hard for labs to find interested students. I hope I can bridge this gap.

What have you gained from being a student member of BSA, and why would you encourage other students to become members and participate in the Society?

I think the most important thing I've gained from being a BSA member is the access to current plant research. Whether it's from the annual meetings, the newsletters, or just the social media pages, I always have access to what's going on in the plant world and I get to keep learning about what other plant scientists are doing. I think students should join BSA because it is a great organization and a great opportunity for anyone to expand their knowledge and passion for plants.

What's your research about and how did you discover your research interest?

My current research is focused on how big bluestem (*Andropogon gerardii)* responds to local and foreign soil microbial communities and how these communities influence big bluestem success and productivity. I learned about my research interests from getting involved in different labs at my undergraduate university. By getting involved in a variety of research areas, I was better able to choose a research project that fit my interests.

What sorts of hobbies do you have?

I enjoy hiking and camping, especially in the springtime when things start to flower again. I also enjoy playing the piano in my free time.

Announcements

IN MEMORIAM

Anne in the field with a favorite plant. [Photo courtesy: Jim McGraw]

ANNE LUBBERS (1954–2022)

Maya Angelou wrote that when great souls die, "Our reality, bound to them, takes leave of us…." It has felt that way for many at Centre College with the unfathomable news that Professor of Biology Anne Lubbers had died. Surrounded by the love of her two sisters, Jane and Julie, and several of her close friends from Centre, she died on March 4, 2022 after a stroke.

A native of Wisconsin, Anne earned a B.S. from the University of Wisconsin-Green Bay, and her Ph.D. from Duke University. She came to Centre in 1993 and was teaching her last course, Plant Biology, before retiring from Centre. Her research on factors affecting seed production in wild ginseng has appeared in *Ecology, American Journal of Botany*, and *The Canadian Journal of Botany*, and numerous other publications.

Anne was a member of the Botanical Society of America, the Kentucky Native Plant Society, the Ecological Society of America, and the Southern Appalachian Botanical Society. She served on the board of the Kentucky Wildlife Refuge and took part in the Audubon Society's annual bird count.

Among Anne's proudest accomplishments was her work on the development of the environmental studies minor, now the ENS major. She was also on the committee that developed Centre's natural science curriculum, and she taught NSC courses for years.

Anne's love for the natural world stems from early walks in the woods near home with her sisters Jane and Julie and her brother John.

In Memoriam Mentions

We have learned of other recent passings of plant scientists; obituaries for these may appear in upcoming issues of the *PSB*.

Jon Giddens

Adriana Hoffmann

David Spooner

Gary Wallace

They'd explore until they'd find frogs and salamanders, examining every characteristic before returning them to their habitat. Early on, Anne could identify individual plants and birds, but she was fascinated by larger patterns and interactions as well. Anne and Jane believed it was significant that Jane became an artist and Anne an ecologist, each approaching the beauty of the world through a different lens; each one examining, interpreting, capturing, and sharing that beauty in unique but interconnected ways. When Anne found snake skins in the crawlspace of her home, she sent them to Jane as a potential medium for her artwork. Anne knew that art and science are sisters, and that made her the ideal biology professor for a liberal arts institution.

To some, it just made her delightfully odd. For office art, she had a framed picture of a hawk eviscerating a squirrel (using the verb literally here)—a picture she took on Centre's campus in utter glee at this thrilling display of "nature, red in tooth and claw" (a reality she evaluated more positively than Tennyson).

Anne loved guiding her students in summer research projects with field work in plant biology and ecology.

"Anne Lubbers' devotion to teaching and to her students was an essential aspect of all she did," said Centre President Milton Moreland. "She especially enjoyed her summer research with students studying wild ginseng populations in Kentucky and showing students how exciting research could be. She will be deeply missed."

In the classroom, her passion for the natural world was contagious. Cristin Palmer Rieskamp '15 wrote: "Josh ['15] and I had BIO 110 with her our first year at Centre. One of our fondest memories is that during one lecture she got really excited about hornworts and she did this cute little dance when she described finding them. It was so pure."

Meghan Langley '04 graduated with a major in BIO and minor in ENS and went on to get a Ph.D. in wetland plant ecology. She credits Anne for being "the first person to introduce me to a love of native plants." Professor of Biology Peggy Richey remembers Anne's delight over an unusual dandelion root. "All scientists are curious," Richey adds, "but Anne was in a league of her own. She was curious about everything—not just 'nature', but people, places, anything. This genuine curiosity made her unafraid to show delight, surprise, confusion, enthusiasm, whatever the emotion when she learned/saw/discovered something new."

Anne was passionate about teaching in a close community of learning. Biologist Mike Barton served on the search committee that brought Anne to campus. "I remember the relief we felt when we realized that we had finally been rewarded with someone who really understood the mission of the college—someone who would go on to become one of our closest colleagues and friends." Biochemistry colleague Stephanie Dew recalls, "One of my fondest teaching memories was when we team-taught biology Senior Seminar. Our teaching interests and areas of expertise could not be further apart, but we finally came up with a topic to suit us both: Carnivorous Plants and Blood-Sucking Animals. Only Anne would have done such a crazy topic with me. Her enthusiasm for all things plants, her love of teaching and her students, and her huge heart are going to be deeply missed."

Anne Lubbers in New Zealand with Associate Professor of Biology Mark Galatowitsch's class discussing invasive species. [Photo courtesy: Mark Galatowitsch]

Another signature course, Plant-Herbivore Interactions, shaped students' ability to look at individual adaptations to larger patterns, an approach rooted in those walks in the Wisconsin woods. Mark Galatowitsch, her colleague in BIO and ENS, remembers, "Anne accompanied me in New Zealand when I taught my first study abroad course about invasive species. As a fellow ecologist she couldn't resist contributing to lectures, student discussions, and helping with our research projects. Having her support made it a much richer experience for the students, but also for me."

Anne's innovative CentreTerm class on The Lawn examined the cultural significance of middle-class American yards, including a whimsical look at yard art in central Kentucky. But it was also a primer on the ecological dangers of monoculture.

Her friends received such instruction outside the classroom. When I bought six Euonymus alatus plants (burning bush) for a small ornamental hedge on one side of my house, she was shocked that her patient instruction on invasive species had been for naught. There were words; I returned the plants. I once got home late for our planned evening at a restaurant and Anne had already arrived. I found her in my backyard, dressed for dinner, but uprooting honeysuckle plants along the fence. Lasting tributes to my dear friend include the many (native) trees I've planted in my yard and the wildflower meadow that replaced a fourth of the back lawn.

A tireless advocate for native plant landscaping, Anne turned her own property into a natural forest and wildlife refuge. On campus, the native plant garden adjacent to Young Hall presents a small model of her vision. Professor

of Biology Peggy Richey admired "the way she lived her life (no one recycles more than Anne), her home and landscape—all inspiring examples of living her values." Chemistry Professor Joe Workman agrees: "I love that Anne lived her passion for sustainability in the car she drove, the materials she used to renovate her house, her solar panels, and the mug she brought to every on-campus function. She helped me to become a better person."

She loved the campus canopy and used it as a branch of her classroom. Whenever new buildings were announced, Anne spoke for the trees. She spearheaded the "Regeneration" project that resulted in the sculpture near the central staircase of Young (pictured below), created from the majestic beech tree that once stood between Young and Crounse. In its place, three beeches were planted in front of Young. "Anne was not afraid to speak up and act," Richey adds, "whenever she saw an opportunity to advocate for the natural world, for BIO and ENS programs that challenge students to explore all aspects of these disciplines, and for a campus that proactively 'walks the talk' about sustainability, environmental stewardship, and campus ecology. Her combination of passion and intellect was inspirational, and hard to beat as advocacy." Workman adds, "Anne is probably in a Garden Paradise right now making plans to get rid of all of the non-native species." But Workman was inspired by her approach: "Anne could be optimistic no matter how dark the situation. And when she saw a problem, she offered solutions instead of criticisms."

Protector though she was, Anne once hit a tree behind Crounse with her car (and it was not invasive). Galatowitsch recalls that in New Zealand, "We did all our own driving, and the students who rode in her van fondly wrote "Lub Tub" in the dust on the side of the van. And they were still fond of her when she drove on the wrong side of the road." Even in such instances, former Associate Dean Keith Dunn remembers, "Her willingness to laugh at herself, dust herself off, and keep getting better at simply being human—and this wonderful human had an amazingly generous spirit."

That generosity of spirit made a difference for Anne's colleagues—colleagues who became lifelong friends. She cared deeply about the Centre community and was as faithful and caring a friend as one could hope for. "From my first day at Centre, more than 27 years ago," Dew says, "Anne has been my closest friend, professional colleague, and all-around sounding board." Richey adds, "She was always there for people when they needed help, comfort, and a shoulder to cry on. Her compassion was deep and long-lived."

She was a mentor to new colleagues, both formally and informally. Galatowitsch says that "she was an invaluable mentor for teaching, guiding student research, and how to serve our college." Biology colleague Amanda Falk recalls that "Anne was always there, ready to answer a question or offer advice about courses or the campus or the natural world. She was always there to listen…. I thought she would always be there. Centre has lost more than just a professor. We've lost an activist for ecology and conservation, a mentor and supporter of students and new faculty members, and a genuinely kind soul who just cared so much."

Workman admired that Anne "always kept striving to be a better teacher." Colleagues noted that she was usually the first one in and the last one out of the office. Of course, as with all teachers, perhaps more is caught than is taught. Classics Professor Danielle LaLonde reflected, "My own love of the natural world is so much richer for her willingness to show me its beauty." For Professor of Psychology Aaron Godlaski, Anne had been "a participant in the emerging connection to nature in my work, which pleased us both. That was Anne, always excited to share the love and knowledge of nature."

And Anne was just fun. As Richey put it, "It made my heart sing whenever Anne laughed. She had a delightful sense of humor (I say that not just because she laughed at my jokes) and was quick to see the humor in just about any situation. What a gift her humor and laughter were." She enjoyed hiking and exploring new places; loved holidays, movies, and desserts. She loved the Green Bay Packers and NPR. She adored being with family, and she adored her cats (named, of course, after famous ecologists).

Recent graduate Cruz Avendaño-Dreyfus '20 wrote that of all the notes in the book written to the class of 2020 in lieu of their postponed commencement, "Dr. Lubbers wrote the most impactful farewell. I've kept it above my desk and refer to it daily." Anne would have wanted to say goodbye to us. So, I think it's fitting to close this remembrance with Anne's own parting words to the class of 2020, and to all of us:

"No matter what you encounter in the years to come, do not forget to look above at the sky and marvel at the clouds and the stars. Shift your gaze downward and discover the tiny organisms making a living in ways you had never imagined. Look about and note the individuality of every tree—the architecture of its branches, texture of its bark, venation of its leaves. All these things may be oblivious of us, but we do not need to be oblivious of them. This is what we belong to, and what grounds our sense of self."

Anne now belongs to the earth and sky she so loved. And to our grateful memory. Farewell, dear friend.

By Rick Axtell, College Chaplain and Stodghill Professor of Religion

March 7, 2022

[Originally published at https://www.centre.edu/centre-college-mourns-anne-lubbers-professor-of-biology/.]

EAGLE HILL INSTITUTE'S 2022 VASCULAR PLANT SEMINARS

The Eagle Hill Institute is offering in-person week-long seminars in 2022. Eagle Hill is right on the coast of Eastern Maine, between Acadia National Park and Petit Manan National Wildlife Refuge,

July 10–16

Grass Identification: An In-depth Review — Dennis Magee

August 7–13

Field Botany of the Maine Coast: Learning to Network with the iNaturalist Community — Robert Wernerehl

August 21–27

Ferns and Lycophytes: Identification, Biology, and Natural History — Robbin Moran and Carl Taylor

For general information, the registration form, seminar flyers, and a complete calendar, see: https://eaglehill.us/programs/sems-weeklong/calendar-weeklong.shtml.

If a seminar you are interested in is full, and you would like to be put on the waitlist, please fill out the application form.

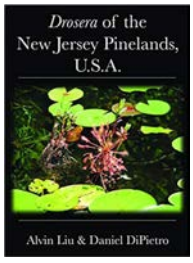
If you have any questions about registering for the seminar, please contact us at office@eaglehill.us.

*Please note that proof of full COVID-19 vaccination (including booster) is required for acceptance into our seminars.

BOOK REVIEWS

Drosera of the New Jersey Pinelands, U.S.A.

Alvin Liu, and Daniel DiPietro
2020. ISBN 13-978-1889878-56-0
US$42.00, 156 pp.
Botanical Research Institute of Texas, Fort Worth, Texas, U.S.A



This is probably one of the more unique field guides I have seen given its laser focus on a few species. This book includes acknowledgements and photo credits, introduction, background and goals, and organization and methodology. The sundews are a relatively small group of carnivorous plants that includes five species within New Jersey. The first species covered is *Drosera filiformis* followed by *D. intermedia*, *D. rotundifolia*, *D. x eloisiana*, and *D. x hybrida* with their own introduction, botanical structure, distribution, and habitat and ecology.

The descriptions are more thorough than any other guide I have seen. *D. intermedia* and *D. rotundifolia* are included in several other guides that I own including bogs and fens and wetland plants of the upper Midwest (Chadde, 2019; Davis, 2016). Those guides include field characters, drawings, and measurements but can't match the level of detail of having entire chapters dedicated to each species. The figure on p. 116 shows a side-by-side comparison of three species but not all five, which would have been a welcome addition. The table on that page also discusses the differences between those three species. With the amount of photos included in this guide, one could argue that comparisons could be made within the guide itself.

The book concludes with winter dormancy, conservation, cultivation and sourcing plants, glossary, bibliography, and about the authors. Some of these species are locally rare and the authors do a good job of suggesting that people reference their state and local laws before trying to bring plants into cultivation or collect them from the wild, since this may be illegal in your area. There are ways to get plants outside of collecting them yourself that have been collected and propagated responsibly. A very detailed and well-planned guide for anyone whom wishes to work with these species but probably not for the casual observer.

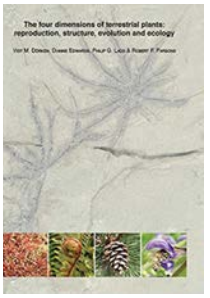
REFERENCES

Chadde, S. W., 2019. Wetland plants of the upper Midwest: A field guide to the aquatic and wetland plants of Michigan, Minnesota, and Wisconsin. Stephen W. Chadde, Middletown, DE. 579 pp.

Davis, R. B. 2016. Bog and Fens. The University of New England Press, Lebanon, NH. 296 pp.

-David W. MacDougall, CWB®, PWS Consulting Biologist

The Four Dimensions of Terrestrial Plants: Reproduction, Structure, Evolution and Ecology



Veit M. Dörken, Dianne Edwards, Philip G. Ladd & Robert F. Parsons
2021.
ISBN: 978-3-945941-80-5
Kessel Publishing House, Remagen-Oberwinter, Germany.

This volume summarizes the morphology of some early land plants, extant bryophytes, and vascular plants (including pteridophytes, gymnosperms, and angiosperms). I very much liked the layout of figures, going from overviews to detailed morphology to anatomical light micrograph sections and on occasion to SEMs. The line diagrams of life cycles are simple and clearly drawn and labelled in an easy-to-use manner. The book provides an up-to-date bibliography that I found particularly useful in tracking down recent contributions.

The book is divided into two main sections; the first half is the morphology of major extant plant groups and the second half and discusses their ecology and is illustrated to show the plants in their habitats. The authors cover details of the vegetative adaptations of plants for their respective habitats, their dispersal mechanisms, and generally how they operate in the world.

The book is an attractive paperback that is well worth the purchase for the wealth of information it contains. There are some particularly nicely laid-out plates, such as one (Fig. 67) showing comparison of gymnosperm seed cones. However, low-magnification photographs of anatomy have poor contrast and some are out of focus (e.g., Fig. 3E, p. 21; Fig. 35F, p. 105). Photographs in the first part of the book are a rather pale green. These issues could be corrected easily in a subsequent addition.

This volume partially fills a niche that hasn't been filled in recent years, in the level of detail it treats each major group. In this manner it is reminiscent of the Ken Sporne books and to some extent Gifford and Foster. It is always good to see a volume that provides details on the members of the land plants that are not angiosperms, that stands back and takes into account all of the major groups of extant bryophytes, pteridophytes and gymnosperms.

Given the good things about this volume there are also some areas that caused me some concern:

1. The lack of inclusion images of fossil plants (except for the Rhynie chert plants). The newly named "eophytes," early land plants, are detailed and there are beautiful photographs of the Rhynie chert plants. However, this is as far as the illustrations of fossils go and the characterization of fossil record is only perfunctory. There is no mention of trimerophytes or zosterophylls, and progymnosperms and fossil lycopsids, horsetails, ferns, pteridosperms and early seed plants are given only a fleeting reference. This is a book about extant plants, but you can't tell the evolutionary stories of plant evolution without reference to the fossil record. This is the fallacy of the PPG I classification scheme that is currently in vogue. A statement mentioning that not all researchers accept this classification scheme would be in order.

2. Disregard for homology and incomplete statements. For example, the horsetails are said to have sporophylls (p. 96). Structures

each bearing a whorl of sporangia on peltate heads are traditionally called sporangiophores to indicate their homology with branching systems, not leaf homologues. Table 1 (p. 11) equates microspores with pollen, whereas pollen includes both the microspore during development and the microgametophyte when mature and functional.

3. Odd statements. On p. 8: "In aquatic nonvascular plants assignment of gender is arbitrary relative to the size of the sex cells, large female cells and smaller mostly motile male cells with flagella." I don't understand why the authors think this, since larger cells even among algal groups are tending to produce more nutrients and are therefore fulfilling the "female" role.

4. There need to be qualifiers in some statements. On p. 11: "The diaspore of algae is the diploid zygote which is released." This is true of some algae—i.e., those with a dominant haploid life cycle—but there are many algae with other types of life cycles. I also find it interesting that except for a brief mention of zygnemetales as sister to land plant origin, there is little discussion about which group of green algae are thought to give rise to the land plants, nor anything about important synapomorphies such as the distinctive flagellar apparatus. *Coleochaete* and *Chara* are mentioned briefly, but not much about their potential evolutionary significance.

Also on p. 11, seed plants are said to have the embryo "embedded in a more or less well-developed nutritional tissue (nucellus or endosperm)" and, on p. 17, "... the nucellus surrounds one functional megaspore are containing abundant nutrients." In both cases it's the megagametophyte, not the nucellus nor the megaspore that provides the nutrients for the embryo.

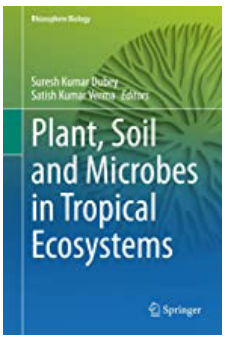
5. Some obscure and unusual terminology. For example, the authors use the macro- prefix in place of the mega- prefix, and the suffix -thallus instead of gametophyte. This leads to the rather unwieldy "macroprothallus" for "megagametophyte."

6. Some omissions. In Chapter 2, references to the Rhynie chert plants are not included. In the fern section, marattialean ferns are mentioned (pp. 76, 77) but not described.

In conclusion, this is a nice volume for introducing the broader plant world to audiences who often are only given the briefest of glimpses to the rich diversity of land plants along with the angiosperms. I only ask for some caution in the details discussed above.

-Kathleen B. Pigg, Arizona State University, Tempe

Plant, Soil and Microbes in Tropical Ecosystems
Suresh Kumar Dubey and Satish Kumar Verma (eds)
2021. ISBN: 978-981-16-3364-5
US$199.99 (hardcover); US$149.00 (e-book);
Springer Singapore



In editing *Plant, Soil and Microbes in Tropical Ecosystems*, Suresh Kumar Dubey and Satish Kumar Verma hoped that their book would "develop a better understanding of how the soil types and abiotic factors influence the plant-soil-microbe interactions in tropics" (p. vii). We think that the text successfully highlights plant-microbe interactions in agroecosystems by providing readers with glimpses of basic and advanced techniques

designed for understanding rhizosphere biology and its importance in agricultural systems. Consisting of 17 independently written chapters, the book delves into a basic concept of plant-microbe interactions in the rhizosphere, extending out into a more advanced and direct understanding of methods and applications. Overall, we feel that this book would be beneficial to students interested in using these techniques and/or interested in going into more applied fields in sustainable agriculture.

We would first like to point out that we found the title of the book to be a bit misleading. Most of the chapters primarily focus on agricultural systems (agroecosystems) with very few examples of rhizospheric microbial impacts on plant host species in nature. Chapters that focused on tropical soils and plant ecology would have been helpful. Secondly, most chapters use case studies, examples, and paper citations primarily from India, and many of the crops discussed in chapters (e.g., wheat, rice, corn) are not exclusively tropical species. Because of these reasons, we believe that the title is a bit misleading and would therefore suggest that, if another edition is to be published, a focus on additional tropical ecosystems or a change in the title to more appropriately reflect the book's content would be helpful.

We believe that many similar overlapping chapter topics contributed to some redundancy in the book. For example, Chapters 3 and 4 both cover rhizospheric cyanobacteria, while Chapters 1, 2, and 12 all discuss plant-rhizobacterial interactions and mechanisms of suppressing stress/disease with varying specificity. In our collective opinion, these can be reduced to a single chapter of their respective topics by the editors. Other examples might be topics on abiotic and biotic stressors in Chapter 1, section 2.3 and Chapter 10; herbicides and fertilizers discussed in Chapters 5, 15, and 17, and section 7.3; or similar concepts covered in Chapters 11 and 14. Chapters on particular crops such as wheat (Chapter 8) and millet (Chapter 12) could be paired. Overall, we would be excited to read another edition of this book in the hopes that the editors restructure concepts and chapters to reduce content redundancy.

As is currently organized, we might suggest a rearrangement of the book into five sections: (1) The impacts of abiotic stressors on plant-microbe interactions (e.g., Chapters 1, 2, 8, 9, and 10); (2) the impacts of pathogens (e.g., Chapters 6, 8, and 12); (3) harnessing microbes to maximize productivity in agroecosystems (e.g., Chapters 7, 11, and 12); and (4) the negative effects of herbicides and the promising impacts of biofertilizers in sustainable agriculture (e.g., Chapters 5, 15, 16, and 17); (5) methods and techniques that can be used to characterize and quantify impacts of microbes (e.g., Chapters 11, 13, and 14). This is merely a suggestion; however, we believe that dividing the book into particular sections would aid in topic organization and furthermore eliminate concepts that were discussed multiple times in the current version.

Overall, we feel that authors from some chapters could have promoted synthesis from the primary literature in a more effective way. For example, rather than synthesize the importance or mechanisms in which plant growth-promoting rhizobacteria (PGPR) function, the authors of Chapter 10 simply listed over 20 genera/species of plant growth promoting rhizobacterial at the end of the chapter abstract. Authors of numerous chapters compiled tables, which were helpful in summarizing current trends and topics in the literature, and we would have liked to see more chapters on the specific mechanisms

and methods of applications for use in agroecosystems (e.g., as described in Figures 15.2 and 16.1). It also would have been effective for at least some chapters to publish raw data from current studies, but there unfortunately were no examples.

We found that many of the citations included a geographic bias and failed to include more global, up-to-date papers. For example, in Chapter 5, the authors cited a nearly 21-year-old paper (Oerke, 2005) to discuss the effects of weeds on crop yield. Later, in section 5.2 on production and consumption of herbicides, the authors cite a paper from 1985 about the global use of herbicides. We would suggest newer citations such as a recent review by Vila et al. (2021) in *Environmental Research Letters* on the effects of weeds on crop yields and a review paper by Sharma et al. (2019) on worldwide pesticide usage in *Springer Nature Applied Sciences*. Additionally, citations were also missing in many places. In Chapter 6, the authors wrote the following sentence without citation: "About 40% of the geographical area of the Indian subcontinent is utilized for agriculture, thus playing a crucial role in comprehensive socioeconomic development" (p. 102). In Chapter 7, only two citations (both >15 years old) were used in an entire review section entitled "Microbial Functions in Soil" (section 7.2). Similar instances occur in other chapters, and we encourage authors to exhibit good scholarship in synthesizing the literature.

We reviewed *Plant, Soil, and Microbes in Tropical Ecosystems* as a graduate-level seminar course. Overall, aside from some organizational and housekeeping issues mentioned, we thought this book was helpful and informative to an audience interested in how rhizobacteria and other microbes could be beneficial in primarily Indian agroecosystems. Authors of the independent chapters did a nice job at bringing many different views from different experiments to explain how agroecosystems benefit from microbe-plant relationships. We particularly enjoyed a synthetic chapter on pathogenic microbes (Chapter 6), as well as chapters that outlined future directions and suggestions on improving agricultural productivity (Chapters 15 and 16). In all, we would like to see the editors update this book in the future.

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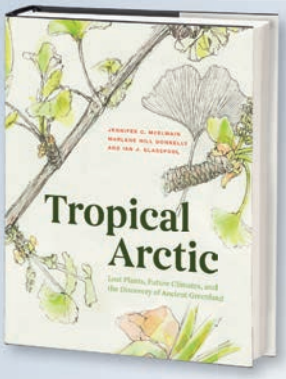

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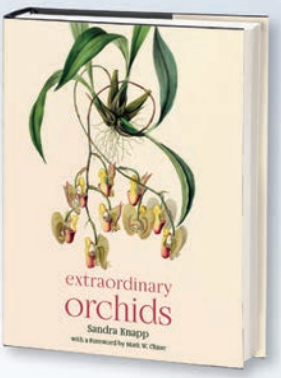

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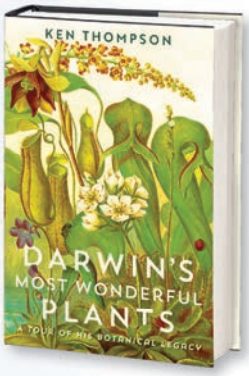

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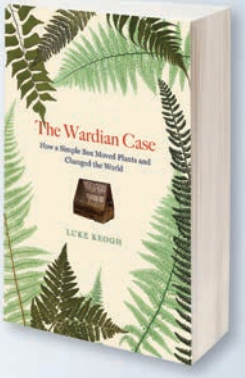

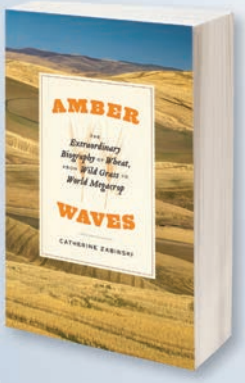

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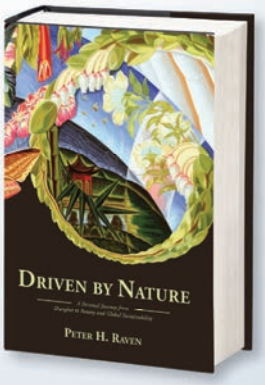

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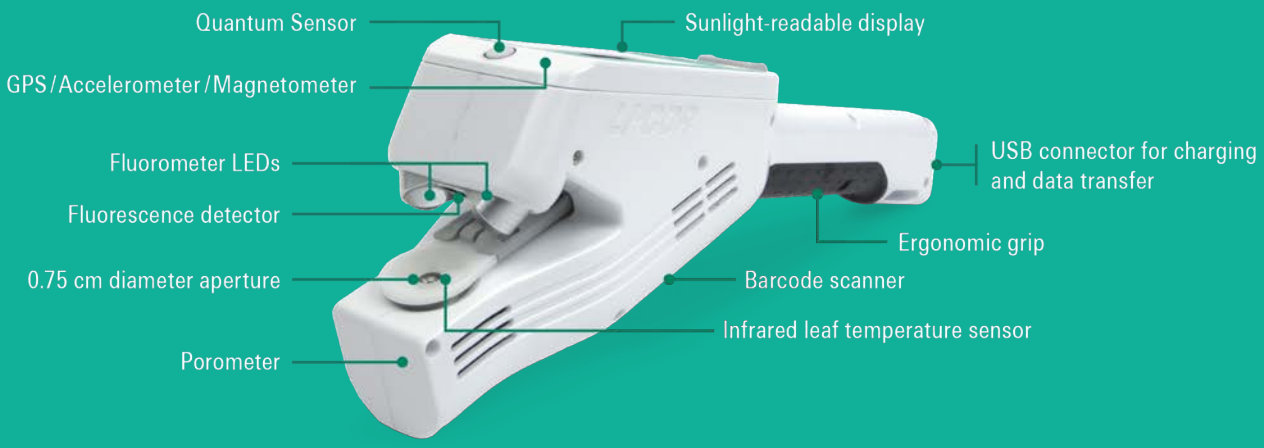

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