

# **AOS Strategic Plan 2022-2026**

## **MISSION**

The Department of Atmospheric and Oceanic Sciences (AOS) contributes to the Wisconsin Idea through pursuit of scientific insights and technological advances with respect to weather and climate; wide communication about the changing environment; and rich educational opportunities that nurture the next generation of scientific and professional leaders.

## **VISION**

The vision of the Department of Atmospheric and Oceanic Sciences (AOS) is to realize a fully integrative and transformative view of the Earth system that advances observation, understanding, and prediction to provide actionable environmental intelligence to benefit all of humanity and the planet.

### **Strategic Priority I: Support the community**

- Goal 1.1: Improve the onboarding process for new faculty, staff, and students.
- Goal 1.2: Increase diversity in AOS
- Goal 1.3: Support a diverse and welcoming AOS community

### **Strategic Priority II: Build Excellence in the AOS Community**

- Goal 2.1: Diversify and increase funding
- Goal 2.2: Prepare a long-term plan for new faculty and staff hires
- Goal 2.3: Enhance connections on campus to build AOS presence and provide new opportunities
- Goal 2.4: Develop long-term plans for space utilization and facility development

### **Strategic Priority III: Reimagine Educational Offerings**

- Goal 3.1: Update curriculum and process for advancement in the graduate program
- Goal 3.2: Consider offerings in the undergraduate program that expand opportunities for students
- Goal 3.3: Implement continual professional training opportunities and pilot projects to faculty, instructional staff, and students to improve and integrate educational offerings

## **Strategic Priority I: Support the community**

The AOS Department seeks to promote core values of collegiality and respect among the faculty and students. At national and global scales, though, continued violence and injustice against racial minorities, an increasing distrust of science in the general population, and a global pandemic have exposed areas where we can do a better job of ensuring that we uphold and promote those core values. This strategic priority addresses our collective desire to continue to build a just, equitable, diverse, and inclusive AOS community.

### **Strategic Goals:**

#### ***Goal 1.1: Improve the onboarding process for new faculty, staff, and students.***

New faculty, staff, and students can find AOS and the AOSS community to be a bit overwhelming and may require significant investment to learn culture and policies in addition to navigating complex processes across UW. To support a welcoming and inclusive environment, we recommend re-imagining our overall process to “onboard” new members and provide support through their time here. For students, this includes improvements on website handbooks, a more comprehensive orientation, assignment of advising committees in first year, and improved process for annual reporting. For staff, including office staff, academic research staff, and instructional staff, we recommend providing thoughtful and consistent information about AOS practices and policies, inclusion in staff and departmental meetings, and frequent communication. For faculty, while the mentor committee provides career advice to incoming faculty, due to the infrequency of these meetings, they are insufficient for helping incoming faculty gain a general sense for how the department operates and expectations for establishing high-quality scholarship necessary to gain tenure. Practices such as group professional development discussions, and regular meetings with more seasoned faculty who can advise on more nuts-and-bolts type issues, can benefit junior faculty. Mentor and oversight committees will continue to serve an important role in making recommendations and submitting evaluations, but creative approaches to group mentoring and social opportunities should be increased.

#### ***Goal 1.2: Increase diversity in AOS***

We recognize a need to increase diversity and support diverse populations in our field and in our department and realize that actions are needed at a variety of levels to be successful in these endeavors. This will require our expanding outreach to, and recruitment and wraparound support of a diverse set of students into AOS across multiple affinities. We recommend expanding our statewide outreach efforts to high schools and to community and tribal colleges, developing a high school “on-ramp” for welcoming diverse students to our field, and to develop outreach activities to underserved communities in coordination with activities in Space Sciences and Engineering Center (SSEC), Center for Climatic Research (CCR), Sustainability and Global Environment (SAGE). We support development of a “Research Experience for Undergraduates” site to provide critical research opportunities for undergraduates nationally. Further, we support continued development of efforts to recruit and fund diverse students into the graduate program such as through the AGU Bridge Program and Advanced Opportunity Fellowships (AOF).

Targeted alumni fund raising toward diversity initiatives would help provide additional recruitment support.

### ***Goal 1.3: Support a diverse and welcoming AOS community***

We recommend enhancing DEI activities in the department. This includes moving beyond increasing diversity, toward developing a more welcoming and inclusive department. Many suggestions of actions – such as formalizing a code of conduct, regular review of demographic data, starting affinity groups, adding to and clarifying resources on the department website – were introduced during participation in the 2020-2021 Unlearning Racism in Geosciences (URGE) program, and these actions should be formalized and carried out within the department.

In addition to increasing diversity, the AOS department needs to ensure that we create a welcoming community for all community members. While the pandemic has hindered our ability to sustain a highly welcoming community, as it recedes, there is the opportunity to reset and implement new initiatives. We recommend enhancing opportunities for student engagement and mentoring with the AOS community through both informal interactions (e.g. the AOSS Building Poster Session, AOS women’s committee, the AOS mentoring program, student lunches) and exploration of new social opportunities. As our department develops a more diverse community, it is also essential that we continue to provide growth opportunities for all students (e.g. following recommendations developed during URGE) as well as providing safe spaces for students to air grievances. We recommend establishing a neutral “Ombuds” position that provides that safe space.

### ***Goal 1.4: Coordinate outreach and communications to the broader community***

While departmental outreach is active, it is not centralized or coordinated, and considerable time and effort is required to establish relationships and materials for outreach activities. We recommend the department develop a more strategic outreach and communications portfolio that would be managed and executed by a dedicated and trained communications professional (the “outreach coordinator”). The outreach coordinator would be responsible for continued development and tracking of community relationships for outreach, broadening and tracking resources for outreach efforts, and expanded public messaging of “what is” AOS, in coordination with SSEC, the Cooperative Institute for Meteorological Satellite Studies (CIMSS), CCR, SAGE, and other centers. We also recommend exploring new outreach opportunities via using existing resources in creative new ways, such as using the AOS YouTube channel as a platform to connect with AOS relevant communities through interviews of researchers within the AOSS buildings on topics of broad interest,, and through exploring new opportunities such as developing an Atmospheric, Oceanic, and Space Sciences (AOSS) Museum.

## **Strategic Priority II: Build Excellence in the AOS Community**

The AOS Department has undergone growth in numbers and diversification of disciplinary interests among faculty, majors, and graduate students over the last few years. Looking forward, AOS needs to identify ways to ensure continued strength in our traditional research areas; to advance research and educational opportunities for a diverse set of students and student interests; and identify unique opportunities due to our co-location of SSEC, CIMSS, and CCR to distinguish ourselves from other AOS departments.

### **Strategic Goals:**

#### ***Goal 2.1: Diversify and increase funding***

Our principal investigators have had a strong track record of successful funding from federal agencies and internal sources to advance scholarship of labs in AOS and support our graduate students, who are primarily funded by research assistantships. However, given increasing competitive pressures of agency funding and to meet our vision of advancing integrative Earth systems science, coordinated steps should be taken to enhance procurement of research funding collaboratively and from a variety of sources, including non-governmental organizations, private industry, state and local agencies, community stakeholders and philanthropic foundations, graduate student and postdoctoral fellowship programs, and alumni and donor fundraising. We suggest identifying ways to prioritize grant writing that increases graduate student and early career scientist support. Continued opportunities to collaborate on proposals within AOS, and across research centers (SSEC, CIMSS, CCR, SAGE, Energy Institute, etc...) should be identified. We recommend seeking campus-level resources and providing department-level incentives to coordinate joint efforts to compete for large and interdisciplinary grants. Consider securing discretionary funding for “seed grant” opportunities to catalyze new research ideas, especially for graduate student support.

#### ***Goal 2.2: Prepare a long-term plan for new faculty and staff hires***

While we have grown substantially in faculty numbers in the last few years, we recognize that the horizon holds potential retirements that may affect our potential research strengths. Further, over the last few years new administrative roles have emerged that have affected our course offerings in satellite and remote sensing. It is now critical for the department to prioritize strategies to maintain and build teaching and research strength satellite and remote sensing, including with closer integration with SSEC and CIMSS. Future retirements will most strongly affect our offerings in weather systems and numerical modeling, which should be prioritized for tenure-track faculty hiring to maintain our historical excellence in weather systems science. Finally, we encourage creative thinking about hires for instructional positions, “Teaching Professor”, or “Research Professor” to address specific topical areas that align with our strategic priorities, and to continue to integrate academic staff researchers in AOSS into instructional roles where allowed by campus policy.

### ***Goal 2.3: Enhance connections on campus to build AOS presence and provide new opportunities***

AOS enjoys strong connections with a variety of partner centers, including SSEC, CIMSS, CCR and SAGE. We also have ties to other departments on campus (e.g. Civil and Environmental Engineering, Nelson Institute, Center for Limnology, Forest and Wildlife Ecology, Energy Institute, Geoscience) and close collaborations with other national and international research efforts (e.g., University Corporation for Atmospheric Research (UCAR), Climate and Ocean: Variability, Predictability and Change (CLIVAR)). We should strengthen those connections in both formal and informal (e.g. social interactions) ways, and develop new connections to the UW-Madison Data Science Institute and other new centers on campus. We also suggest increasing visibility of interdisciplinary education and research opportunities at UW-Madison through policies that increase incentives to develop, cross-list, and incorporate courses, and integrate affiliate faculty into the curriculum and elective choices, which would address a request from our graduate students for more exposure to interdisciplinary work. We recommend providing greater integration of guest speakers from across campus to allow for more discussions of collaboration. Finally, we recommend advancing the view that AOS is a “go to” resource for climate research on campus, including close connections to the state climate services (State Climatology Office (SCO), Extension).

Beyond campus, our Professional Masters program and our connections to national research laboratories provide opportunities to connect with industry, regional university partners (e.g., UW-Milwaukee), and national and international research. We encourage expanding those connections, especially for projects that develop new grants or student opportunities such as site visits or summer internships. Beyond research collaborations, we recommend advancing opportunities to establish research leadership roles, such as interactions with US CLIVAR, Global Energy and Water Exchanges (GEWEX), National Center for Atmospheric Research (NCAR), American Meteorological Society (AMS), American Geophysical Union (AGU), National Weather Association (NWA), or other organizations.

### ***Goal 2.4: Develop long-term plans for space utilization and facility development***

The AOSS Building is the gathering place for our community, but its design inhibits true collaboration and flexible classroom and workspaces. We recommend revisiting our long-term goal of procuring a new building and developing a vision for better use of existing space, consideration of possible expansions, and securing longer-term workspace sites for major field instrumentation. For this to occur, we recommend establishing a joint subcommittee of the alumni and fundraising committee and space committee to identify the process for building development, including cultivating alumni relationships, developing architectural plans, and fundraising.

## **Strategic Priority III: Reimagine Educational Offerings**

As the department continues to grow its Professional Masters program, and as the potential job market expands for undergraduate and graduate degree holders, it is time to reconsider some of our educational offerings. This will require a holistic approach that considers not only our curriculum, but also how our curriculum interacts with progress toward the undergraduate major or graduate degrees as well.

### **Strategic Goals:**

#### ***Goal 3.1: Update curriculum and process for advancement in the graduate program***

The many career successes of our graduates demonstrate the longstanding strength of our graduate program. Advances within and adjacent to the atmospheric and oceanic sciences, however, have been particularly rapid in the past decade (e.g., the challenges of big data; the advent of data science careers; the further incorporation of the atmospheric sciences and oceanography into an interdisciplinary Earth System science; the growing societal need for weather and climate information in an era of global change; etc.). Considering these developments and others, it is time to reconsider both the intent and delivery of our graduate curriculum. Because our graduate curriculum has been loosely tied to the qualification process for advancing toward a Ph.D, a reconsideration of curriculum also requires a review and revision of the qualification or Ph.D. advancement process, milestones, and advising/feedback practices. We recommend a formal evaluation of our graduate curriculum, including identifying the objectives of our graduate curriculum to better support our vision of an integrative and transformative education. Aligned with this goal is a recommendation that we reconsider the intent and execution of our Ph.D. qualifying process and our formal mentoring processes for Masters and PhD students, particularly in their first two years. We also recommend establishing more professional development opportunities for graduate students, such as a Professional Development Seminar and greater infusion of professional development into existing course work. We suggest stronger relationships with our AOS Alumni Organization to help with professional development opportunities. Finally, we encourage professors to continue to discuss, learn about, and apply new teaching methods that could better serve a diverse student population.

#### ***Goal 3.2: Consider offerings in the undergraduate program that expand opportunities for students***

Our undergraduate program provides exceptional training for our students. While undergraduates may declare as soon as they arrive on campus, they do not formally start the program until their junior year. Further, the program as structured, has been strongly aligned to Federal meteorologist job criteria over other factors and career routes. There are opportunities to expand our undergraduate offerings to provide multiple pathways into the major. Recommendations provided here should be considered in a large-scale review and revision of the undergraduate curriculum. We recommend delivering more math- and data science-intensive introductory courses at the 100 or 200 level that would target potential AOS undergraduate majors, and that would provide additional opportunities for interested students to advance toward the AOS

degree. Team taught 200-level courses on physics of climate system, weather analysis and forecasting, observing the Earth system, or computation methods should be considered, or alternatively “advanced” survey topic courses (100 or 200 level) taught by several faculty jointly. To attract more STEM-interested students, we might consider offering an AOS certificate(s) composed of 3 of our 4 core classes. These tracks might open the doors for more students in our advanced, senior level courses. Greater infusion of oceanography into undergraduate courses is also recommended, along with development of an oceanography or climate survey course at the 200 level is also recommended. These might be complemented by new electives in diverse AOS topics at the 400 level to expand opportunities for our majors, possibly focused on emerging and growing career routes. We recommend expanding courses that meet campus “sustainability” attribute or aligning UW-Madison breadth requirements in ways that could attract additional students to the program. Finally, we recommend infusing in our curriculum modules that allows students to develop in our program essential non-technical competencies (e.g., teamwork, leadership, communication, professionalism, and ethics). Doing so will allow our graduates to make a meaningful impact in their chosen work and support their becoming leaders in the paths they choose. This can be accomplished, for example, by establishing a series of 1-credit professional development courses that can be taken freshman through junior year, culminating in the senior year capstone.

***Goal 3.3: Implement continual professional training opportunities and pilot projects to faculty, instructional staff, and students to improve and integrate educational offerings***

Teaching and research co-create scholarship, and integration of these across instructional staff, including teaching assistants, requires continual professional development. AOS is well positioned to lead on new opportunities to improve teaching assistant (TA) training, use program assessment to track and improve student outcomes, revise course evaluations to focus on helping students learn better and instructors improve, increase professional development seminars, align curriculum to allow for co-teaching and cross-department teaching, harmonize and simplify curriculum scheduling and instructor identification to allow for more development of new classes and advanced seminars.