

Report of the Yale Planetary Solutions Steering Committee

May 2024

INTRODUCTION

The Yale Planetary Solutions (YPS) Steering Committee is composed of members of the university's leadership including provosts, deans, faculty, vice presidents, and directors of key offices:

- [Sunil Amrith](#), *Renu and Anand Dhawan Professor of History; Associate DGS, History*
- [John Barden](#), *Vice President for Information Technology and Campus Services*
- [J. Mike Bellamy](#), *Vice President for Facilities, Campus Development, and Sustainability (Co-Chair)*
- [Deborah Berke](#), *Dean, School of Architecture; J.M. Hoppin Professor*
- [Peter Boston](#), *University Director, Principal Gifts*
- [Jeffrey Brock](#), *Dean, School of Engineering and Applied Sciences; William S. Massey Professor of Mathematics*
- [Indy Burke](#), *Carl W. Knobloch, Jr. Dean, School of the Environment; Professor of Ecosystem Ecology*
- [Liza Comita](#), *Professor of Tropical Forest Ecology; Co-Director, Yale Center for Natural Carbon Capture*
- [Alexandra Daum](#), *Associate Vice President, New Haven and State Affairs*
- [Amber Garrard](#), *Director, Office of Sustainability*
- [Renee Kopkowski](#), *Vice President for Communications*
- [Anthony Kosior](#), *Associate Vice President for Facilities and Campus Stewardship*
- [Doug Kysar](#), *Joseph M. Field '55 Professor of Law*
- [James Levinsohn](#), *Dean, Jackson School of Global Affairs; Charles W. Goodyear Professor in Global Affairs; Professor of Economics and Management*
- [Megan Ranney](#), *Dean, School of Public Health; C.-E.A. Winslow Professor of Public Health (Health Policy); Professor of Emergency Medicine*
- [Eric Sargis](#), *Professor of Anthropology; Director, Yale Institute for Biospheric Studies; Curator of Vertebrate Zoology (Mammalogy) and Vertebrate Paleontology, Yale Peabody Museum*
- [Karen Seto](#), *Frederick C. Hixon Professor of Geography and Urbanization Science; Director, Hixon Center for Urban Sustainability*
- [David Skelly](#), *Frank R. Oastler Professor of Ecology; Director, Yale Peabody Museum; Professor of Ecology and Evolutionary Biology*
- [Sara Smiley Smith](#), *Assistant Provost for Planetary Solutions*
- [Carla Staver](#), *Associate Professor of Ecology and Evolutionary Biology; Associate Director, Yale Institute for Biospheric Studies*
- [Rafi Taherian](#), *Associate Vice President, Yale Hospitality*
- [Gerald Torres](#), *Professor of Environmental Justice; Professor of Law*
- [Julie Zimmerman](#), *Vice Provost for Planetary Solutions; Professor of Green Engineering (Co-Chair)*

BACKGROUND

Yale Planetary Solutions Progression

Planetary Solutions momentum at Yale has been building for nearly five years. The 2018 University Science Strategy Committee report recommended environmental and evolutionary sciences and climate solutions as ideas for priority investment, highlighting the unprecedented challenge of human-accelerated changes to the environment. Through engagement with deans across the university, Planetary Solutions was created to accelerate and focus the scholarship and research happening in this broad intellectual space across the university. In its short existence, the university has taken significant action motivated by Planetary Solutions, establishing new centers including the Yale Center for Natural Carbon Capture and the Yale Center for Geospatial Solutions; stimulated new interdisciplinary research with nearly \$3M in Planetary Solutions Seed Grants to over seventy faculty across seven schools; and made significant progress toward institutional net-zero goals.

As the YPS work has proceeded, the urgency of the environmental crises facing humanity has continued to intensify, and the need for Yale to serve as a model and a source of knowledge has only grown and become more complex. Motivated by this urgency, the university was provoked to ask how Planetary Solutions could be expanded beyond the framework of science priorities and function as a catalyst for all of Yale to create knowledge and drive action towards positive impact. In pursuit of an answer, Provost Scott Strobel appointed Professor Julie Zimmerman as the university's first vice provost for Planetary Solutions in September 2023. This faculty leadership, combined with the intensification of our planetary challenges, positioned Yale to look ahead with a renewed focus.

In January of 2024, Provost Strobel and Senior Vice President Jack Callahan convened the YPS Steering Committee with the objective of establishing goals and ambitions for this next critical part of the university's work. This committee has been asked to integrate the university research agenda, academic priorities, and broad commitments to sustainability for campus operations and external engagements. Co-chaired by Julie Zimmerman and J. Mike Bellamy, vice president for facilities, campus development, and sustainability, the committee was charged with:

- Considering how the broad University Science Strategy Committee (USSC) strategic planning framing and Yale's existing sustainability plans intersect with the multifaceted reality of today's planetary challenge needs and Yale's commitment to developing and implementing integrative solutions to planetary threats we face;
- Formulating a mission for the Planetary Solutions work that integrates academics and operations, as well as a series of three to four key overarching themes to guide the next

phase of bringing all Yale has to bear on the profound environmental issues of our time; and,

- Setting priorities for a series of working groups to develop strategic plans for each of the established goals.

Committee Process

The committee first convened in February 2024 to conduct an initial brainstorm and landscape assessment. Following this meeting, the committee met over late February and early March in small groups focused on two different themes. The first round of small group meetings explored the concept of creating a mission and what committee members felt would be critical elements. The second round of small group meetings turned to the major themes that YPS should focus on, building on the diverse backgrounds of the committee members. With this feedback, the co-chairs drafted a first draft of a mission and themes which was then reviewed in early April by the full committee along with a proposed series of principles that would be critical in enabling successful implementation. After additional revisions, the committee met again in late April to finalize their recommendations and discuss pathways to operationalize the work of Planetary Solutions.

The following report presents the committee's response to its charge.

THE MOTIVATION

Light and truth – *lux et veritas*. Truth seeks to understand the world as it is, as it was, and as it could be in all its infinite complexity. Light serves as a beacon to call people to common cause, warn them in times of danger, and help them steer clear of harm. Light can turn truth into enlightenment that can propel and inspire positive action. And through this positive work, light, in both a literal and figurative sense, provides power to sustain life itself.

YPS is a manifestation of the university's pursuit of *lux et veritas*, Yale's motto. By synergistically utilizing the university's capabilities and capacity to mobilize and focus collective resources, we can accelerate action on advancing solutions to the greatest planetary challenges of our time. The breadth of Yale's endeavors provides innumerable opportunities for individual impact. However, achieving the greatest progress will require all aspects of the university to be meaningfully and collaboratively engaged.

Notably, the challenge we are undertaking is not to “understand planetary problems”; while that may be an essential prerequisite to the work that we do, it is not sufficient on its own. We need to transform understanding into action and impact from every dimension of our university community.

There is significant clarity on *why* we must undertake this course:

Because there are currently unavoidable consequences of climate change that must be managed and unmanageable consequences of climate change that must be avoided.

Because the biogeochemical cycles of the planet are being forced out of balance and the critical ecosystems that make life possible are being degraded while species are disappearing at alarming rates.

Because the degradation of planetary and societal systems causes concomitant degradation of human physical and mental health through disease and despair.

Because the planet's most valuable assets are not adequately reflected in our economic and political systems.

Because these challenges are intertwined and reinforcing, expediting, compounding, and magnifying the adverse impacts.

Because there is an urgent imperative to act, particularly for those who are most disadvantaged and for those yet to be born.

Because Yale is uniquely positioned; with its extraordinary capabilities, global network and influence, and tradition of training leaders, we can catalyze significant positive impact for the planet.

So, it is not the *why* that is the question, but rather the *what* and the *how*.

THE MISSION

The magnitude, complexity, and interconnectedness of the planetary challenges we face are daunting and require urgent action. As such, we are committed to:

*Catalyzing all that Yale **is**, and all that Yale **does**, in pursuit of Planetary Solutions*

With this mission statement we invoke all that Yale is – that is, our students, our faculty, our staff, our resources, our buildings, our collections, our alumni, our partners – and all that Yale does – teaching, learning, researching, building, operating, convening, curating, investing, buying, leading. We will leave nothing behind as we strive to contribute to impacting the greatest planetary challenges of our time.

We will bring all we are and all we do. We will bring all Yale has to bear on solving the greatest challenges of our time. There is a humility in this mission, as we are not saying that Yale has all the answers. Instead, we are committing to our global community that we are going to bring all that Yale can to creating, practicing, implementing, leading, convening, and advancing planetary solutions, with hope and optimism that, along with partners around the globe, our collective efforts will meet the challenge.

The principles that must precede effective Planetary Solutions efforts are succinct, yet critical. The Planetary Solutions mission must be embedded into all decision-making at the institution, providing directionality and consistency. We must actively work to connect efforts across the institution, resisting the norms of our siloed past. We must ensure facile exchange between Yale and the world, seeking to deploy solutions, explore ideas, and problem solve across all scales and contexts.

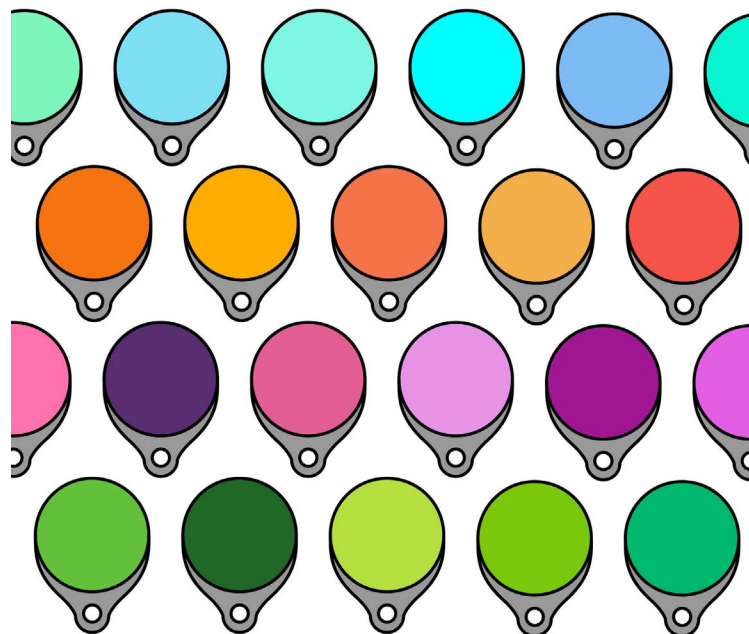
FOCUSING THROUGH LENSES

The planetary crises we face are complex, intertwined, and existential: climate change, caused by greenhouse gas emissions from human activity, is altering the atmosphere, oceans, and land faster than at any point in recorded history. The result of the increasing temperatures and frequency of storms, droughts, and floods is disrupted ecosystem function and exacerbated biodiversity loss, which were already impaired by deforestation, land-use change, unsustainable resource extraction, and pollution. Together, these crises impact well-being, social systems, livelihoods, economies, and future development – as well as threaten the inherent sanctity of the natural world.

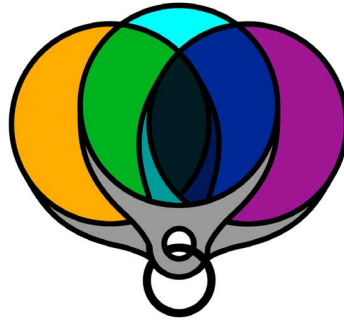
Given the scale and scope of the challenges – and recognizing the interconnectedness of the climate and biodiversity crises and their complicated relationship with humanity as the cause of and the solution to these challenges – Yale Planetary Solutions will focus our interdisciplinary and integrative systems work through three primary lenses: **climate change, biodiversity and ecosystems, and communities and society.**

Climate change is the inescapable challenge that will impact every aspect of our institution, either directly by impacting the systems, processes, communities, phenomena, or individuals/organisms we study, or indirectly in influencing our ability to carry out the daily work of the institution from teaching and research to operating campus. In selecting biodiversity and ecosystems, the committee recognized the historic, renowned, and deep strength of the university from the tremendous depth and thought leadership of our faculty to our cherished institutional resources, like the Peabody Museum and numerous storied centers and programs. In selecting the third lens, communities and society, the committee recognized that realizing solutions will require engaging with the complexity of human societies, the dire impacts we are experiencing as a result of the climate and biodiversity crises, and our ability to translate and implement solutions in varied and variable contexts across scales. With Yale's profound strengths in the public health, law, management, divinity, social sciences, arts, and humanities, we are uniquely positioned among our peer institutions to use this lens given our breadth and depth across physical, natural, and applied sciences and engineering.

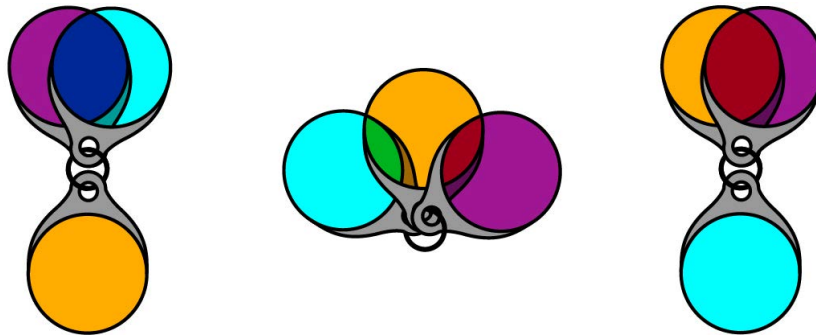
Among all the entry points to the work of planetary solutions, these lenses are intended to serve as priority foci, individually and considering their robust interconnections, for the work of YPS.



From many possible lenses....



A selection of three to guide us...



with many possible configurations.

CLIMATE CHANGE: MITIGATING AND ADAPTING

The urgency to mitigate and adapt to climate change stems from its vast, detrimental impacts on global ecosystems, human health, communities, and economies. As temperatures rise, we experience more extreme weather events, sea-level rise, and biodiversity loss, threatening food security, water availability, livelihoods, and social stability. Mitigating climate change involves drastically reducing greenhouse gas emissions and removing carbon dioxide from the atmosphere through renewable energy adoption, sustainable practices, technological innovations, and market mechanisms. Adaptation requires building resilience against climate impacts through infrastructure improvements, community planning and engagement, and conservation efforts, all of which are underpinned by effective policy, communication strategies, and dedication to follow-through. These steps are essential to safeguard our planet's future, protect vulnerable communities, and ensure a sustainable way of life for generations to come.

Yale can play a pivotal role in addressing climate change by fostering innovation, providing education, and pursuing sustainable practices. We can lead in researching and developing generation, transmissions, and storage; sustainable agriculture methods; water access, quality, and quantity technologies; carbon capture and valorization processes; and strategies to change the underlying material and energy basis of our economy and society to be conducive to life today – and into the future. Pursuing science-based campus climate goals – such as decarbonizing operations, reducing waste, and enhancing green spaces – enables us to use the campus infrastructure to learn about mitigation and adaptation strategies and aligns with our role as an institution of learning and our commitment to be a generous partner to the city of New Haven and the state of Connecticut. Through collaborations we can translate our knowledge and innovations into real-world settings, driving broader societal change towards solutions to the climate crisis.

BIODIVERSITY AND ECOSYSTEMS: CONSERVING AND RESTORING

Biodiversity loss and ecosystem degradation are occurring at rates unprecedented in human history. Unsustainable human use of resources continues to accelerate, further challenging the healthy functioning of critical systems. Human society relies on biodiversity and healthy ecosystems for well-being and survival. Safeguarding these resources requires a grand reconsideration of the impacts of human behaviors, our consumption and production pathways, and our socio-cultural and political systems. Beyond the utilitarian value of species and ecosystems for humans, the intrinsic value of the natural world and its long evolutionary history must be considered with deference.

Yale can contribute by supporting the development of new and better strategies for avoiding the drivers of ecosystem degradation and species loss, such as land use and climate change. By shifting the paradigm to prevention based on the extent of impact, we can better enable species and ecosystems to thrive, providing numerous co-benefits from safe water supplies to resilient landscapes. We can employ our expertise in designing more effective policies to conserve, restore, and sustainably manage biodiversity and ecosystems by working across scales and through international treaties. Yale can also leverage its influence in New Haven and around the world to demonstrate key strategies for responsible stewardship from managing stormwater, to sustainably harvesting timber, to implementing wildlife corridors. Through the procurement of sustainable materials and management of waste streams, we can reduce the harm to critical habitats and ecosystem function through continually improving standards.

COMMUNITIES AND SOCIETY: THRIVING AND PROSPERING

Society is challenged by climate change and ecosystem degradation, which fundamentally impact human thriving, prosperity, and well-being in systemic and multifaceted ways across scales from the local to the global. Climate change and ecosystem degradation amplify existing stressors, while also introducing novel challenges. Independently, and more notably in combination, they exacerbate inequities and limit access to opportunities and resources, particularly for underprivileged groups. Health crises, such as pandemics and chronic health concerns, are more frequent due to planetary change – and, in turn, strain public health systems and intensify inequalities. Climate change and ecosystem degradation impacts produce political stress on governing institutions across scales. The disastrous ubiquity and diversity of impacts requires synergistic solutions. Addressing these interconnected challenges requires inclusive approaches prioritizing sustainability, equity, and access to health and education.

Yale, as a leading institution, has a crucial role to play in modeling pathways to planetary solutions that enhance physical, economic, social, and spiritual wellbeing. We must deliver transparent, inclusive, and collaborative outcomes within our own campus community and beyond. The university can conduct research, educate, collaborate, and inform policy and economic development to advance human health and well-being through sustainable, resilient, and equitable solutions to climate change and ecosystem degradation. Translating science into action can help realize a green and inclusive economy, which would ensure health-promoting infrastructure and engagement in workforce development. By repositioning its educational resources to reach new audiences, Yale can empower our community, and communities far beyond, to improve their futures and make choices that best fit their challenges and context.

FINDING SYNERGIES

Institutions of higher education, including Yale, tend to organize our work into education, research, operations, and external engagement. And while there is much to be done within these categories to advance the mission of YPS, the impacts of planetary challenges – and their solutions – do not fit neatly into these structures. Further, by organizing this way, we are unable to realize the synergies and the benefits of Yale's full potential to pursue planetary solutions. As such, we must explore not only initiatives within each domain but also ideally interconnected, collaborative efforts that realize novel, significant, and impactful solutions that could not be found within conventional

boundaries. These synergies, places where education and operations intersect or where research is translated through external engagement for implementation and impact, offer additional opportunities to generate innovations that can and must also happen within our conventional frameworks. As such, while we seek to advance YPS through education, research, operations, and external engagement, we strive to catalyze synergistic solutions when the opportunity arises. We present four areas of synergistic activity that will provide a framework for prioritizing university collaborations:

Educating and Empowering While Yale has a 300+ year tradition of excellence in education, previously understood to be the transfer of knowledge from one generation to another, the current global challenges necessitate that everyone is a student, and everyone is a teacher. That is, every individual in the expansive Yale community – student, faculty, staff, alumni, partner, and beyond – possesses the knowledge, capabilities, and awareness to pursue planetary solutions from their vantage point.

Creating and Accelerating When inquiry becomes knowledge. When knowledge becomes action. When theory becomes practice. When insight becomes innovation. When one becomes many. When a network becomes a community. When brilliance becomes impact. By creating and strengthening the pathways to transform Yale’s scholarship into practice, and by accelerating our ability to utilize, test, and build on this foundation, we can deliver on the greatest potential of our institution to solve society’s most pressing planetary challenges.

Leading and Practicing Yale must be an innovative testing ground and exemplar of how to set, pursue, and realize the goal of being net positive for the planet. From the way we operate our campus to the way we build our buildings to the way we invest our resources, Yale must first and foremost be ambitious in using science to define and operationalize our intentions. As we are an institution dedicated to teaching and learning, Yale also has the responsibility to share the lessons – the successes and the challenges – of pursuing these urgent and worthy goals.

Convening and Engaging One of Yale’s greatest strengths is the breadth and complexity of its community, and one of its greatest opportunities is to utilize its community and convening power to ensure that its current and future progress on planetary solutions more effectively translates into the world. This requires a vibrant exchange and testing of knowledge, theories, and insights with the common goal of pushing each other to realize our fullest potential. As broad and impactful as the community is today, the challenges we face necessitate engaging more broadly and deeply with any individuals, organizations, and institutions who are themselves working towards planetary solutions.

THE VISION

If we adhere to this mission, if we stay true to these principles, if we focus through the lenses, and if we pursue solutions within and synergies across education, research, operations, and external engagement, we imagine a Yale in ten years that will have:

- Realized our actual zero goal in advance of 2050 while operating our campus as sustainably as possible in domains beyond carbon emissions.
- Ensured every student graduating has the opportunity to be conversant in climate and sustainability, which can be realized through numerous pathways from formal coursework, to informal education, to campus experiments and demonstrations in the spirit of an innovative test environment for solutions.
- Created opportunities for everyone on campus and in the broad Yale community to contribute to planetary solutions and feel empowered and enabled to act.
- Built a culture where interdisciplinary work is encouraged, rewarded, and common.
- Piloted and implemented new technologies, policies, strategies, and practices that are innovative and may carry higher risks and higher reward potentials.
- Transformed the very way people approach solving planetary challenges so that we do not shift burdens elsewhere, we do not create other legacy problems for future generations, and we do not leave out or disproportionately burden whole communities.
- Demonstrated leadership in terms of scientific, technical, and engineering research to support knowledge and solution generation, intertwined with pioneering research exploring the political, social, economic, and cultural realities that enable or challenge society's ability to adopt new solutions.
- Developed resilient and dedicated pathways to translate our research from discovery to implementation leading to genuine progress in solving planetary challenges.
- Leveraged synergies across education, research, operations, and external engagement, when appropriate and useful, to realize solutions that are significant and impactful in ways that would not be available in individual domains.
- Pushed the boundaries on assessing how we measure and understand our community's impact and excellence in their contributions to planetary challenges.
- Realized a Yale that *is* the place for this work, where Planetary Solutions is a valued recruitment tool. People either want to be at Yale or they want to replicate what we are doing at their own institutions because we are a model for integration, collaboration, accountability, evolution, progress, and impact.

THE PATH FORWARD

To begin this work, the YPS Steering Committee will lead a collaborative effort to convene a series of symposia during the 2024–2025 academic year. These symposia will be open to the entire campus community and focused on each of the three lenses, with sessions considering education, research, operations, and external engagement – and ideally at the nexus of one or more of these to find synergistic benefits. In each session faculty, staff, and students will be led through a facilitated brainstorm of initiatives, activities, projects, and pathways to enhance our existing strengths and to identify opportunities for growth. The results of these symposia will serve as the basis for YPS programming as well as developing proposals to Federal agencies, foundations, philanthropies, and donors to pilot and grow these efforts.

As we do this work, the YPS Steering Committee will continue to consider key questions, which include:

- How do we determine appropriate pathways for accountability?
- How do we measure and report on progress?
- How do we better facilitate translation of research to impact?
- How do we overcome structural or institutional barriers to advancing YPS’s mission?