Strategic Plan of the Cornell University Sustainability Task Force:
Proposing Cornell's Radical Collaboration on
Solutions for Sustainability

Executive Summary

We propose the *Solutions for Sustainability* initiative to propel Cornell to become the preeminent partner for international agencies, national governments, corporations and NGOs in sustainability research. Specific recommendations fall under four categories:

1. ***Focus interdisciplinary research on the UN Sustainable Development Goals (SDGs)***, with an initial focus on the equitable distribution of food, energy, and water for a growing human population as this focus builds on existing Cornell strengths.

2. ***Fill critical intellectual gaps and enhance Cornell's interdisciplinary intellectual community with coordinated hires of eight senior faculty*** with experience in bridging disciplines relevant to the system of systems analysis necessary to achieve the SDGs. New faculty lines would be available across campus; each position would be tenured in a department and have a 50% responsibility to the Atkinson Center for a Sustainable Future for at least 5 years.

3. ***Educate the next generation of sustainability professionals*** by creating a university- wide graduate program in Sustainability Studies administered by the Atkinson Center. Each graduate fellow would pursue interdisciplinary research, and would have fellowship support for two years, after which TA/RA support would be needed. The program would also provide fellowships for undergraduate research; small grants for graduate research; a seminar series and other networking opportunities; and training programs in communications, policy, and collaborations with non-academic organizations. The program would be piloted for five years and, if successful, endowment funds would be sought to maintain it.

4. ***Create organizational structures in the Atkinson Center to support large, long-term interdisciplinary research programs that are co-created*** with non-academic organizations whose mission is to change sustainability products, practices or policies. A professor of the practice or executive in residence position would build and maintain strategic partnerships with non-academic organizations to increase the impact of Cornell research. A program assessor and manager would provide tactical support to research teams. These staff would also support exchanges of personnel with stakeholder organizations; and help organize and staff topical working groups of 1-2 yr duration to produce strategic research reports that synthesize the policy-relevant state-of-the-art and point toward a research agenda.

Each of these recommendations will synergize with the others to build a transformative Solutions for Sustainability initiative.

The United Nations Sustainable Development Goals: A Roadmap

Endorsed by 193 nations, the 2016 [United Nations Sustainable Development Goals (SDGs)](#) for 2030 provide a compelling road map to a more sustainable future. Collectively, the 17 SDGs recognize that protection of the natural environment can only go hand-in-hand with economic development that promotes greater social equity and increases human welfare. Therefore, sustainability solutions cannot be limited to one field, or one axis, of inquiry. As such, each axis is not independent and progress on one SDG may trade-off progress on another.

For example, a common approach to accomplish zero hunger (SDG 2) would entail dramatic increases in land conversion to agriculture and dramatic increases in the use of fertilizer, pesticides, and irrigation that would make it harder to protect terrestrial biodiversity (SDG15), aquatic biodiversity (SDG 14), and provide clean drinking water (SDG 6).

At the same time, increasing food production alone will do little to address hunger, which is linked to poverty (SDG1), inequality (SDG10), economic growth without decent livelihoods (SD8) and gender inequalities (SDG5). Furthermore, on-going climate change requires that all SDGs be approached with climate change mitigation and resilience in mind (SDG 13). Therefore the SDGs must be addressed simultaneously as a system if they are to be achieved at all, and certainly if they are to be achieved efficiently.

Cornell University: Providing Direction

Universities, especially land grant universities, are uniquely positioned to analyze and provide plausible scenarios for system-wide trajectories that maximize the simultaneous accomplishment of all SDGs. Government agencies, NGOs and corporations—even

collectively—lack the breadth and depth of intellectual capital required for such integrated systems analysis. Even for professional schools and land grant universities, however, the traditional organization of many universities tends toward disintegration of problems rather than integration. Research is often for academic audiences rather than for governments, NGOs and corporations that can effect large-scale, long-term impact on sustainability products, practices and policies.

Cornell is uniquely equipped to help bridge this gap—to provide globally preeminent leadership in the analysis and design of the system of systems that would support the achievement of the SDGs in three primary ways:

- The university's dual identity predisposes it to radical collaboration internally and externally: it is endowed with Ivy League intellectual firepower, and is committed to the land grant mission that extends beyond New York state.
- Its geographical reach will allow it to be a living laboratory of SDGs in ever larger concentric circles including the Ithaca and Geneva campuses, the diverse rural-urban networks linking upstate and downstate New York, Cornell Tech and New York City as one of the most important and innovative urban centers globally, and Cornell's collaborations in Europe, Asia, Africa, and South America.
- The Atkinson Center for a Sustainable Future provides an existing vibrant hub of seed funding for interdisciplinary sustainability research. This research is often already co-created with government agencies, NGOs and corporations--wherein both parties define the research problem and agree on the steps to produce a mutually valued impact. But a transformative step change is needed to have long-term impact on sustainability at large scales.

Solutions for Sustainability Initiative: The Destination

Here we propose to launch Cornell's Radical Collaboration on *Solutions for Sustainability*. If the following recommendations are implemented, Cornell will become one of the most sought after universities in the US for engagement on sustainability by international agencies, national governments, corporations and NGOs. Our recommendations fall under four categories:

1. ***Focus interdisciplinary research on SDGs***, with an initial focus on the equitable distribution of food, energy, and water for a growing human population as this focus builds on existing Cornell strengths;

2. ***Fill critical intellectual gaps and enhance Cornell's interdisciplinary intellectual community with coordinated hires of senior faculty*** with experience in bridging disciplines relevant to the system of systems approach necessary to achieve the SDGs;

3. ***Educate the next generation of sustainability professionals*** by creating a university- wide graduate program in sustainability administered by the Atkinson Center; and,

4. ***Create organizational structures in the Atkinson Center to support large, long-term interdisciplinary research programs that are co-created*** with other universities and especially non-academic organizations whose mission is to change sustainability products, practices or policies.

We detail below our specific recommendations under each category. Each recommendation supports all others to build a transformative Solutions for Sustainability initiative.

1) Focus interdisciplinary research on Sustainable Development Goals (SDGs)

Cornell's Solutions for Sustainability initiative will adopt the SDGs as the broad framework for research, focusing on Cornell's outstanding reputation for research on transitions to sustainable agriculture, food systems, and food security; freshwater infrastructure that provides both quantity and quality; renewable energy creation and grid innovation; and computational and big data analysis in support of food, energy and water sustainability.

We will also build on Cornell's growing reputation in research addressing the equitable distribution of benefits and costs of urbanization, including transportation systems; planetary health; and income inequality. Combined, these synergistic themes emphasize the increasingly common realization that production of ecosystems goods and services cannot be addressed independently of the equitable distribution of those services if social and political sustainability are included in the goal.

The Solutions for Sustainability initiative will periodically identify interdisciplinary research themes consistent with the SDG roadmap. Two initial interconnected research themes linking urban and rural communities will launch the initiative:

- ***Increase resilience of networks for food, energy, and water security.*** As human population approaches 9B by about 2050, with 70% of them living in cities, systems knowledge of rural-urban networks will be required to achieve the SDGs**.**

- ***Reduce inequality/promotion of equity.*** To achieve social and political sustainability, reducing inequality must be an explicit goal in efforts to analyze and improve access to health-promoting food, water and energy and other ecosystem goods and services.

In conducting use-inspired and interdisciplinary research on these related topics, we will organize Cornell human and material resources with nimbleness in mind. As capacity, needs and opportunities arise, we will pivot to other research themes that emphasize different combinations of SDGs. Since natural systems and the systems of human societies must be analyzed jointly at multiple spatial scales, we will conduct research at global to local scales.

2) Fill critical intellectual gaps and enhance Cornell's interdisciplinary intellectual community with coordinated hires of eight senior faculty coordinated by the Atkinson Center.

While the essential intellectual strengths described above exist at Cornell, they are scattered across campus in humanities, social sciences, physical sciences, biological sciences, engineering, business, veterinary science, law and planning departments. Compounding this challenge, several intellectual gaps exist in our ability to conduct integrative studies, particularly in scaling from the local and state scales to national and global scales, and therefore contribute sufficiently to achieving the SDGs.

By leveraging existing local and disciplinary expertise with strategic hires and organizational changes, Cornell can more fully provide national and international leadership on issues of global food, water, and energy security and the tradeoffs these needs incur for a range of communities and natural ecosystems.

Therefore, in order to fill intellectual gaps and promote collaborations in sustainability research across fields while maintaining disciplinary depth, eight (8) senior faculty lines will be created. Thus the hires proposed here will target faculty with expertise at national and international scales to leverage our New York scale living laboratory to the planet (see Appendix 4). Each faculty member will have a home department where tenure resides and also have a 50% responsibility to the Atkinson Center for at least the first five years.

The Atkinson Center appointment, in collaboration with the home department, would incentivize interdisciplinary use-inspired research, collaboration with other relevant centers and institutes on campus, work with non-academic organizations to co-create research and increase its impact, and graduate student training in communications, policy, and engagement with non-academic organizations (consistent with the goals of the proposed new graduate program described below).

While each hire will provide significant synergistic impact on campus, the proposed cohort of senior hires will simultaneously create an intellectual community that is more than the sum of its parts because of a common focus on the Atkinson Center mission and a strong disciplinary connection via the home department.

Hires will be available across campus, including the social sciences, humanities, and arts—fields that are seen as increasingly central to sustainability (see Appendix 4). These fields have a crucial role to play not just in helping to produce solutions to environmental problems but in understanding how those problems arose and sometimes in re-conceptualizing them. All environmental issues have personal, psychological, social and cultural dimensions. When negotiators from around the world come together to discuss climate change, their arguments hinge not just on their understanding of renewable energy, sea-level rise, and cost-benefit analyses, but also on the stories they hear and tell themselves about climate; on the way in which they have been affected by the history of colonialism and imperialism; on dominant ethical frameworks; on political will; on their assumptions about human and natural agency; and maybe even on their sense of humor.

To paraphrase one of the lead Paris negotiators in 2015, if climate change is about ecosystems, climate negotiations are about ego-systems. Disciplines like media studies, history, ethics, aesthetics, literature, sociology, political science, psychology, and anthropology can help us understand why so many brilliant technical solutions to environmental problems have foundered in particular social, cultural, and political contexts.

We propose a cluster of eight senior hires, consistent with the research themes described earlier (networks of food, energy, and water; reducing inequality). We anticipate that most would be recruited from other universities but recommend that applications be welcomed from internal candidates who wish to expand their research in ways consistent with the goals described above. The following nine descriptions exemplify the sorts of skills and experience needed (see Appendix 4 for names of specific people that would fit one or more of these descriptions):

a) Facilitating transitions to sustainable lifestyles in local communities;
b) Global questions of environmental justice, climate justice and intergenerational equity;
c) Envisioning sustainability using environmental humanities: past and future interactions between humans and the environment
d) National and international governance of sustainability;
e) Regional to national energy infrastructure and energy transitions;
f) Regional to global scale land-use change modeling and/or remote sensing;
g) National and international food security;
h) Regional to global scale water resources on natural and/or managed lands; and,
i) National and international biodiversity conservation under climate change.

Financial Model and Search Process for Senior Faculty: For the first five years of each appointment, costs will be split between Solutions for Sustainability funding from the provost's office (via the Atkinson Center) and the home department. After five years, arrangements become more flexible, with the costs borne entirely by the department unless another arrangement is mutually agreed between the Atkinson Center and the home department.

All eight hires would be complete in the next four years, conducted by a search committee comprised of representatives from the Sustainability Task Force, Atkinson Center leadership, and the potential home department(s). Some committee members might change depending on the target topic (from the list above) in a given year and/or depending on availability of strong candidates nominated by the Cornell community. Offers would be extended only on the recommendation of the search committee and agreement between the Atkinson Center and the home department.

3) Educate the next generation of sustainability professionals with a new graduate program administered by the Atkinson Center

To help integrate curricular, research and collaboration opportunities, we will establish a new university-wide graduate program in Sustainability Studies in coordination with existing graduate fields, and administered by the Atkinson Center. We will begin a 5-year pilot program that offers 2-year interdisciplinary graduate fellowships for PhD students. The program would seek a steady state number of current fellows of 10, with a goal of matriculating 5 new fellows per academic year.

Graduate students often bring faculty together across disciplines, but there is currently no reliable mechanism at Cornell to fund such students, or to foster their regular cross-departmental engagement. For example, the task force learned in interviews with non-Cornell experts that the creation of an endowed graduate program in sustainability at Stanford University provided an important catalytic effect on interdisciplinary research (see Appendix 3). We would achieve the same result at Cornell with a new graduate program in Sustainability Studies, which would be developed in parallel with the undergraduate major in Environmental and Sustainability Sciences. A graduate program in Sustainability Studies will provide interdisciplinary opportunities for both student and faculty engagement at multiple levels of research and training, and contribute to a transformative educational opportunity for majors in the various sustainability-related majors across campus.

The program will be large enough to achieve a critical mass of interdisciplinary PhD students actively working on SDG-related research, but small enough that the fellowship support is highly competitive and attracts top students. Other aspects of the graduate program would add substantial value to each Sustainability Graduate Fellow and, indirectly, to their faculty mentors. Past experience with cross-department NSF-funded graduate student training programs indicates that a successful interdisciplinary graduate program is energized through modest investment in support activities that help create a broader intellectual community among students and faculty. Such programs thrive when they have a critical mass of student activity and a platform for students to learn each other's languages and exchange and pursue ideas. Proven enhancements that we will implement with the Sustainability Studies program include:

- *A seminar series and informal structured discussions* to bring together students and faculty to share research and build interdisciplinary understanding on sustainability topics. This can be accomplished by modifying existing Atkinson Center Outside Voices, or similar, speaker series and Topical Lunches to give graduate students ownership of a subset of activities.

- *Funding for undergraduate research* to support undergraduate collaboration in the research done by each graduate fellow, with the graduate student providing undergraduate mentorship. Undergraduate majors in the new Environmental and

Sustainability Sciences major would be given preference.

- ***Sustainability Small Grant program for graduate students to***: (a) spur collaborative projects; (b) create buy-in from a larger pool of students & advisors than can ever be supported by fellowships; (c) provide students with training on writing and reviewing proposals; and (d) build a cohort of students versed in each other's disciplinary questions through proposal-writing and peer review practices.

- ***Short courses/training programs/retreats on communication with non- specialists, policymakers, and non-academic organizations*** to provide grad students with the skills for sustainability research. These programs could be leveraged with existing programs at Cornell and elsewhere (e.g., online communities like [research 4 impact](#) and [Wetsus](#)) and/or with other fellowship programs with similar missions (e.g., TNC's NatureNet program, the Smith Fellowship program).

- ***Half-time administrative support*** to coordinate the graduate fellowship application process, speaker series, undergraduate research funds, small grant programs, and other training programs.

Graduate Program Implementation Plan: A fellowship committee would be chaired by a new Graduate Program Director and consist of 6 additional members necessarily spanning CALS, Engineering and A&S and at least three other PhD granting colleges. Graduate students would enter Cornell through admission to a home Field, and apply for a Sustainability Graduate Fellowship via a supplementary application. Faculty in the program would be invited to nominate applicants for a sustainability fellowship during the admissions processes with the goal of making initial decisions on fellowship recipients annually by February 1.

Students would be required to have a minor advisor who is also in the sustainability program and in a different discipline than the primary advisory. Students must transition to other support (GRA, TA, etc) in year 3. The program will recruit underrepresented minority (URM) students, working with the various URM recruitment efforts within Cornell colleges and the graduate school and pipeline programs external to Cornell (e.g., SEEDS program of the Ecological Society of America).

If this pilot program is successful in recruiting top applicants, we would work with the Cornell development office, starting in year three, to permanently endow the fellowship program, and discuss with faculty and related disciplines whether the program should become a Field (full or Minor).

4) Initiate a "sustainability knowledge to practice "co-creation environment in the Atkinson Center

We will transform Atkinson Center infrastructure to make Cornell a global hub of research-driven innovation in sustainability products, practices and policies to achieve the SDGs. To

create and maintain the necessary long-term strategic partnerships with select corporations, NGOs, think-tanks, and governments, we will create new non-traditional faculty/staff positions in the Atkinson Center. These positions will fundamentally alter the way in which the university can engage in external partnerships and dramatically increase Cornell's ability to conduct large, long-term interdisciplinary projects world-wide. Such a permanent high-talent human and organizational infrastructure would be designed with the flexibility to shift topics and geographies as needs and opportunities change over time.

In order to achieve this vision, we must accomplish three key goals:

- Create opportunities for new collaborations and new collaborative partners to develop long-term relationships with Cornell (current Atkinson Center staffing is insufficient to accomplish this).
- New staff will maintain relationships with external organizations and therefore nurture projects once they have started.
- Undock implementation-ready research output, and shift research attention to earlier stage topics to restart the knowledge to practice cycle.

To create the broader co-creation ecosystem, we will take the following specific steps:

- Hire two new highly qualified academic and non-academic staff with extensive leadership experience in the kinds of organizations with which Cornell wants to partner. Such positions could be developed in concert and/or shared with central Cornell offices or other Cornell centers with overlapping missions.

    o A professor of the practice or executive in residence--would lead the development of and maintain strategic partnerships with external stakeholders including NGOs, think tanks, corporations and policy makers, and facilitate faculty research with these partners to increase the impact of research.

    o A program manager and assessor—would provide more tactical support to research program teams, provide regular assessment of program progress, and help keep programs on track.

- As partnerships with non-academic organizations mature, we would seek external funding for exchange fellowships for faculty to spend time working in stakeholder organizations and vice-versa; this would be part of the pipeline that would lead to longer term programs with a promising pathway to large-scale, long-term impact. Such a program might be similar to the A.D. White professorship but focus more on practitioners and professors of the practice in sustainability.

- Establish a program to foster short-term (1-2 years) topical working groups of faculty, non-Cornell experts from partner organizations, stakeholders and policymakers to produce strategic research reports that synthesize the state-of-the-

art and point toward a research agenda. Topics would be related to the SDG themes described earlier, but would be chosen for their timeliness and ripeness for impact on products, practices or policies. Such reports would provide the basis for policy briefings and other convenings with partners in state, national and international forums.

Financial Model: Costs for the two positions will be split between the Solutions for Sustainability initiative funding from the provost's office and funding from the Atkinson Center. If after a five year pilot period and evaluation, the positions were deemed successful, the Atkinson Center would seek philanthropic support to take over the provost-funded portion.

Scalable Discovery: Criss-Crossing the Map

The multiple recommendations above are synergistic, and will allow Cornell researchers to more powerfully address the environmental, economic, and societal needs for a sustainable future—problems that are of unprecedented size, scale, richness, and complexity. To fully pursue its mission, the Solutions for Sustainability initiative will foster rigorous integrated assessments of the sustainability of settlement and social systems at multiple scales--local, regional, continental and planetary. It will bring together existing and new Cornell faculty and graduate student researchers who are pioneering new poverty mitigation tools for chronically poor and malnourished populations living in increasingly volatile settings, such as those in the arid and semi-arid lands that comprise two-thirds of Sub-Saharan Africa and vast, poor areas of inland Asia; discovering the impact of climate change on maritime communities such as coral reef, sea starts, and eelgrass; leading research on land use, which is one of the main drivers of soil degradation, climate change, pollution, and biodiversity loss in Africa, Asia, and Americas; and accelerating the discovery of new sustainable renewable energy sources and grid management. In New York state, research teams will assess how the viability of rural-urban networks depend on other critical networks involving food, energy, and water.

Moreover, research teams will provide systems analysis and planning support for Ithaca and other communities attempting to manage transitions to become more environmentally resilient, economically viable, and socially just. A focal point of the initiative will be the engagement in the research of marginalized or underrepresented communities in both rural and urban areas. Across the entire state poor communities face environmental, climate, food, water and social equity challenges on a level that, relatively speaking, are similar to those faced by communities in less developed regions throughout the world.

In this way, we will use Cornell—with its rural and New York City campuses, together with a statewide [cooperative extension network](#)—as a living-laboratory. This state-wide model will help develop sustainability research, partnership and implementation capacity—repertoires of resources (including case studies and analytical frameworks) —at Cornell to address complex systems across multiple scales spanning local to global.