In Memory of Craig Forster

Proposal for the
University of Utah Sustainability Research Center
Community-Based Interdisciplinary Education and Research

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I. REQUEST
We request the establishment of the University of Utah Sustainability Research Center. The Sustainability Research Center will be an incubator for creating a cadre of researchers, citizens, educators, business leaders and community leaders who can play key collaborative roles in transforming how we use the Earth’s resources and share them with both current and future generations. By working together across disciplinary boundaries we will ensure that the next generation of decision-makers will have the skills and capacities needed to effect significant changes in the way natural systems and resources are used and affected. Tackling the challenges of the 21st century requires a systemic understanding of the problems and a capacity to disseminate real-world solutions to decision-makers living in similar circumstances around the world.

Mission Statement
“Fostering a more sustainable future through interdisciplinary research, education and outreach.”

The Center will provide a new foundation of support and training, based on philanthropic and corporate funding, for interdisciplinary teams of U of Utah researchers who are currently working independently or who are affiliated with existing Centers and Institutes. Discussions with prospective sponsors, and review of major gifts made to other universities for sustainability-related research centers, reveal the sponsors’ strong desire to foster interdisciplinary teaming that transcends the usual disciplinary boundaries and leads researchers into uncharted territory that can spawn new integrative solutions to pressing societal problems. Thus, we are convinced that philanthropists and corporations who currently provide only limited support for narrowly-defined research projects are ready to make major contributions to a Center that can incubate new interdisciplinary research themes in the sustainability arenas that directly address their economic, social and environmental concerns. Furthermore, our conversations with prospective sponsors indicate that they want to support a pan-campus, facilitative entity that transcends the traditional boundaries found between campus Colleges and fosters broadly interdisciplinary research teams with members drawn from all sectors of the campus community.

We infer from our investigations that the absence of a pan-campus Sustainability Research Center at the U of Utah limits access to the interdisciplinary, sustainability-related funding being
harvested by other universities that have created similar Centers. Thus, the Center will create a unique U of Utah environment for facilitating and supporting the collaboration of researchers drawn from Colleges, Departments, Centers and Institutes who would not otherwise meet nor be able to access the new sources of funding hovering on the horizon. The collaborations fostered by the Center are expected, in turn, to generate innovative thought and research ideas that would not otherwise occur without the broadly interdisciplinary teams to be incubated by the Center.

Much work is needed to prepare faculty and students drawn from differing cultures of research and scholarship to work together and to actively collaborate with philanthropists and corporations. Thus, a principal role for the Center staff is to attract and administer the funding needed to foster the interdisciplinary collaborations that are not otherwise supported at the U of Utah. We anticipate that Center staff will assist U of Utah researchers to become increasingly competitive in applying for the sustainability-related, interdisciplinary funding that might flow along the usual pathways from more traditional research sponsors (e.g., federal agencies such as NSF, NIH, EPA, DOE, etc.) to Colleges, Departments, Centers and Institutes, without passing through the Center.

Although the Center will provide human and financial support for developing proofs of concept and preparing proposal submissions to traditional research sponsors that provide indirect costs, the Center will not receive any of the returned overhead to be generated from funded grants and contracts. Rather, the Center is expected to derive its long-term support primarily from philanthropic and corporate gifts that do not generate returned overhead. Funding generated by Center staff will primarily be used to: 1) seed the exploratory efforts of new interdisciplinary research teams, 2) provide the professional development and training needed for faculty and graduate students to develop interdisciplinary teaming skills and relationships, 3) foster direct collaboration between U researchers, Center sponsors and local community partners, and 4) facilitate formal and informal opportunities for identifying new, broadly interdisciplinary research targets in the sustainability arena. Funds contributed to the Center are expected to augment and enhance existing funding sources, rather than divert or reduce funding already accruing to Colleges, Departments, Centers and Institutes.

A principal goal of the Center staff will be to identify and foster research and learning programs of mutual interest to Center sponsors and U of Utah researchers. That goal will be met by collaboratively expanding upon existing research capacities and moving in new, imaginative directions. Current research initiatives that might form the foundation for new research themes include, but are not limited to, the following:

1) *Green Technology Development*
Existing U of Utah research in renewable energy, alternative fuels, carbon sequestration, environmentally benign products, and green building design, provides a wealth of opportunity for new technology development. U of Utah researchers are actively working on sustainability technologies with substantial commercialization potential including: hydrogen production and storage for fuel cells, converting lignin to liquid hydrocarbon biofuels, smart thermosiphons for seasonal underground thermal energy storage, efficient solar cells, new battery technology and waste heat acoustic conversion. The Center will provide the financial and teambuilding support needed to further develop these concepts and
expand the array of technologies of potential value to Center sponsors and others.

2) Science-Policy Challenges at the Energy-Water Nexus
Inextricable and reciprocal linkages exist between two essential resources; water and energy. Being able to recognize, analyze and account for these linkages is critical if we are to prepare our global society for resilience in the face of looming concerns regarding scarcity in water and energy. Trends of concern at the water-energy nexus include: 1) a growing proportion of water consumption for energy production, and 2) growing communities in arid regions which compete for water among with other communities, energy developers and agricultural industries. With financial and facilitative support from the Sustainability Center, energy and water researchers at the U of Utah can develop innovative new programs of collaborative research to produce the knowledge needed for a sensible and fair water policy evolution.

3) Metropolitan Sustainability
An existing, multi-disciplinary faculty team (the Synergy-funded Ecosystems + Health + Built Environment initiative) provides a strong research foundation for assessing how interrelated social, health and environmental aspects of rapid population growth in Utah affect, and are affected by: human behavior, urban microclimate, weather, urban/rural policy-making, air quality, human health, medicine, hydrology, carbon cycles, urban growth dynamics, ecosystem health and climate. The soon-to-be-created Metropolitan Research Center will provide important capacity in helping to create the data, research products, and insight needed to support local metropolitan decision- and policy-making.

4) Ecosystems of Utah and the Western United States
The center will engage community partners (corporations, philanthropists, government agencies, non-governmental organizations, citizens) and University of Utah faculty and students in collaborative, interdisciplinary research, education and community outreach within Utah and the Western U.S. Impacts caused by population growth and widespread development of water, energy, minerals and other natural resources are readily manifest in the declining quality and health of air-sheds, water-sheds and ecosystems of the Western U.S. Actively engaging students, members of Utah communities, and informal educational organizations at the University (e.g., Red Butte Gardens, Utah Museum of Natural History) in the Center’s education and outreach activities will foster the ability to anticipate and avoid the negative consequences of resource development and urban growth.

5) Communicating Research Results & Fostering Sustainable Behavior
Communicating results of Center research to sponsors, research partners and the citizens of Utah requires innovative approaches for visualizing policy outcomes and inviting the stakeholder input needed to instigate behavior change. Principles and methods drawn from behavioral psychology, marketing, computer visualization, community-based social science, human health, medicine, public policy, law, urban design, architecture, and other disciplines are ready to be integrated by broadly interdisciplinary research teams.

II. NEED
**Rationale**

The advent of the 21st century is accompanied by enormous challenges for the human community. The global population is predicted to rise from 6.7 billion to more than 9 billion, with the bulk of the increase occurring in developing countries that are rapidly increasing their per capita natural resource use. Communities will become increasingly concentrated in urban centers that rely upon food, water, energy and resources derived from afar. Petroleum may decline in importance as a principal energy source and will likely lose its standing as a key source of plastics and fertilizers. The finite limits of metallic and other minerals will become increasingly evident. National and international programs intended to counter climate change will affect energy strategies and limit carbon emissions. Arid regions of the world, including Utah, will bear the brunt of a warming climate with increased threat of severe drought, shifting agricultural options and increased summer cooling requirements. Increased emissions of solid, liquid and gaseous wastes will place human health at increasing risk. An ethical approach to equity and social justice demands that the human community, principally those living in the developed countries, change direction to better preserve resources and ecosystems for future generations. Adjusting to these challenges requires a whole-system understanding of the social, economic, environmental and political dynamics that interact at the local, national and global scales.

Yet we are only just beginning to prepare citizens, educators and political leaders to learn about, and make, the critical personal choices and policy decisions required to work towards a more sustainable future. Fostering this preparation requires the supportive environment and resources of a pan-campus Sustainability Research Center that can facilitate and incubate interdisciplinary research involving a multi-college mix of faculty, students and off-campus partners.

**Demand**

Rio Tinto|Kennecott expressed strong interest in supporting a Sustainability Research Center at the U of Utah. Rio Tinto|Kennecott is particularly interested in providing the corporate leadership needed to catalyze funded partnerships with other corporations concerned about the diminishing availability of natural resources, degradation of natural environments and the implications for changing the social fabric of Utah communities. Given current trends observed in attracting sustainability-related research funding to other institutions, we are convinced that additional corporate sponsors will wish to provide the new sources of funding needed to support integrative efforts of the Sustainability Research Center. Additionally, the recent focus on the funding of alternative energy research through the government stimulus package presents an opportunity for the U to foster new research projects and expand existing research programs.

U of Utah faculty members are increasingly interested in developing broadly interdisciplinary research projects within a sustainability-related framework. Engineering faculty wish to link their solutions-oriented research to problems of global importance. Humanities and social science faculty want to better understand the technical issues that lead to controversy and uncertainty in decision- and policy-making. Although agency funding for broadly interdisciplinary research is growing, U of Utah researchers can be more competitive if their interdisciplinary efforts are incubated and sustained during gaps in agency funding. Although members of the Ecosystems + Health + Built Environment initiative joined forces to build the
necessary capacity, it has been difficult to maintain participation in the absence of consistent funding that supports research teams with multiple investigators drawn from diverse colleges. Founding the Sustainability Research Center is expected to attract the new philanthropic and corporate gifts needed to instigate and help maintain interdisciplinary research programs that would not otherwise develop.

Students interested in moving the University, and various communities, towards a more sustainable future worked closely with faculty, staff and members of the local community to generate interest in, and approval for, the newly-formed University of Utah Office of Sustainability. This effort coincides with growth in the number of U professors who are developing and delivering sustainability-related courses and preparing proposals for both undergraduate and graduate Certificates in Sustainability Studies. Increasing interest in alternative fuels, conservation, CO₂ sequestration, and other green technologies is causing a number of U of Utah faculty members to pursue sustainability-related research. A Sustainability Research Center will provide an otherwise absent platform for integrating these related interests, and will provide a catalyst for developing innovative academic, outreach, and research programs at the University of Utah. Deans from the School of Medicine and the Colleges of Engineering, Architecture+Planning, Humanities, Law and Social & Behavioral Sciences have already endorsed the founding of a Sustainability Research Center.

III ORGANIZATIONAL STRUCTURE AND IMPACTS

Management Plan

A small management team can facilitate new programs of interdisciplinary, solutions-oriented research while helping faculty teams from across campus access new sources of philanthropic and corporate funding. In the first phase of operation, Center staff will comprise a full-time Development Officer, a part-time Director, and a full-time Center Manager/grant writer. The initial Center staff will: 1) work with founding sponsors to catalyze major gifts from a growing number of prospective community partners, and 2) oversee the distribution funds from founding sponsors. It is critical that the Development Officer begin working immediately to instigate a national search for the gifts needed to make the Center sustainable. The Director will report directly to the Senior Vice President for Academic Affairs and work closely with two oversight committees; an Executive Steering Committee of Academic Deans and an Advisory Board comprising representatives of the funding partners and researchers from the Colleges actively participating in the Center. Faculty from the Colleges of Architecture+Planning, Business, Engineering, Health, Humanities, Medicine, Mines & Earth Sciences, Law, Science and Social & Behavioral Sciences are likely to be active in the first phase of operation. Dr. Kent Udell, Professor, Department of Mechanical Engineering, will serve as the first Center Director. Udell will be responsible for facilitating the various collaborative partnerships, ensuring a smooth start-up for the Center, overseeing the work of the Development Officer and guiding the transition to a full-staffed office as funding increases. Udell can provide about 0.2 FTE to 0.3 FTE of effort during the initial phase of Center operation.

The second phase of Center operation would begin when funding provided by the sponsors can support meaningful incubation of new collaborative research programs, begin building a sizeable endowment and support a full-time management team (Director, Center Manager,
Development Officer and Administrative Assistant). The Director will report directly to the Senior Vice President for Academic Affairs and work closely with the Executive Steering Committee and the Advisory Board. The Development Officer will be responsible for maintaining a steady stream of philanthropic and corporate funding. The Director will work on refining the vision for the Center, and managing the Center’s facilitative capacity. The Center Manager will perform the day-to-day tasks of building interdisciplinary research teams, facilitating collaborative research partnerships, assist in grant writing and implementing outreach programs. In the long term, the Center team should remain small and focus on facilitating research performed by faculty situated in diverse Colleges, Departments, Centers and Institutes rather than attempting to build a Center-based research team.

The Sustainability Research Center management team will: 1) help faculty and students initiate and tackle an increasingly broad range of interdisciplinary research topics and community outreach, 2) foster and support innovative academic programs, 3) facilitate interdisciplinary career development for faculty, and 4) actively engage growing numbers of students in community-based research and service learning. Center emphases and priorities will be revised as each significant increment of funding is obtained and as new partners ask new questions. The Center team will work closely with the Lowell Bennion Community Service Center to engage students in service-learning projects with corporate and government sponsors. Partners in informal education efforts will include Red Butte Arboretum, Utah Museum of Natural History, Wallace Stegner Environmental Center, and the Utah Science Center.

Individual faculty members drawn from the following academic units have already expressed interest in accessing the opportunities that might be afforded by a Sustainability Research Center.

Architecture
Biology
City & Metropolitan Planning
Civil & Environmental Engineering
Chemical Engineering
Communication
Economics

Family & Consumer Studies
Family & Preventive Medicine
Medicine Geography
Geology & Geophysics
History
Law
Marketing

Mechanical Engineering
Metallurgical Engineering
Atmospheric Sciences
Pediatrics
Pharmacology & Toxicology
Philosophy
Political Science
Psychology

The Center will coordinate, facilitate and enhance collaborations between researchers affiliated with existing (and proposed) Centers, Institutes and Initiatives that may include, but are not restricted to:

Ecosystems + Health + Built Environment (EHBE) Initiative
Utah Traffic Lab
DIGIT-Lab
Metropolitan Research Initiative
Energy & Geoscience Institute
EcoChildren’s Environmental Health Initiative
Ecosystems and Global Climate Center
Institute for Clean and Secure Energy
Scientific Computing Institute
Environmental Studies
Location
During the first phase of operation, the Development Officer, manager and Director will be housed in the College of Engineering. It is anticipated that a new physical location, closer to the center of the U of U campus, will be identified as the Center activities grow.

Consultation with Relevant or Similar Units across the Utah System of Higher Education
The U of Utah Office of Sustainability is facilitating multi-campus discussions regarding campus sustainability and sustainability-related research across the Utah System of Higher Education. To our best knowledge, research Centers or Institutes similar to the proposed Sustainability Research Center neither exist, nor are they being planned, elsewhere in Utah.

Impact on Existing Degrees, Courses or Curriculum
The primary impact of the proposed Center on existing academic functions will be to provide undergraduate and graduate students with opportunities to participate in research programs or learn about the research results in classroom settings. A key outcome of a Center with pan-campus perspective will be to infuse sustainability principles and interdisciplinary thinking into all undergraduate and graduate academic programs. Achieving this result is one stipulation that must be fulfilled to meet the American College and University Presidents Climate Commitment signed by President Michael K. Young on Earth Day 2008.

Practices Elsewhere
Although many sustainability-focused academic centers and institutes are emerging, few institutions have elected to integrate the full spectrum of sustainability, metropolitan planning, urban engineering, marketing, geospatial analysis, human health, behavior change, energy resources management, ecology, natural science, law, and public policy in the way that we envision for the University of Utah Sustainability Research Center. Names used by broadly interdisciplinary centers/institutes addressing related sustainability goals include the following:

- “Global Institute of Sustainability”, Arizona State University
- “Graham Environmental Sustainability Institute”, University of Michigan
- “Climate and Sustainability Institute”, UC San Diego
- “Environment and Sustainability Initiative”, UC San Diego
- “Center for Environmental Research and Education”, University of Maryland
- “Center for Sustainable Urban Development”, Columbia University
- “Center for Interactive Research on Sustainability”, University of British Columbia
- “The Mascaro Sustainability Initiative”, University of Pittsburg
- “Golisano Institute for Sustainability”, Rochester Institute of Technology
- “Center for Sustainable and Integrated Built Environment Research”, Stanford
• “Woods Institute for the Environment”, Stanford
• “Center for Sustainability”, Penn State
• “Center for Sustainability and the Global Environment”, University of Wisconsin-Madison
• “Center for Sustainability”, Kansas State University
• “Sustainable Resource Center”, UC Los Angeles
• “Center for Sustainability”, Aquinas College
• “Center for Sustainable Environments”, Northern Arizona University
• “Applied Sustainability Center”, University of Arkansas
• “Center for Sustainable Communities”, Temple University

IV. FINANCES

Facilities and Equipment
No research equipment is required to support the proposed Center except that which already is, or will be, situated in the participating Colleges, Departments, Centers and Institutes. During the start-up phase the College of Engineering will provide office space, furniture, IT support, payroll/purchasing support and access to standard office equipment.

Generating and Managing Center Funds
Rio Tinto|Kennecott’s (RT|K’s) interest in supporting a Sustainability Research Center at the U of Utah instigated this proposal. Although originally intending to provide a major founding gift, RT|K’s priorities have temporarily shifted to focus on supporting other initiatives. In the interim, however, we continue to work closely with RT|K to catalyze the interest of other corporate sponsors and philanthropists. Once the Center is approved, RT|K has agreed to work with us in convening a summit of local business leaders to kick-off a focused discussion of the issues and problems that are their greatest concern. Over the past year these leaders have seen a roller-coaster-like rise and fall in petroleum prices, a devastating decline in economic health, rising unemployment, continued concern about the lack of access to health care for all and a global-scale reverberation of events occurring both within and outside the U.S. At the same time, there is a growing realization that business leaders will be required to operate in a carbon constrained future brought about as new policies are implemented to aggressively reduce the greenhouse gas emissions causing climate change. Working with this group, we expect them to identify specific questions of collective interest that will provide rallying points for U researchers drawn from diverse Colleges, Departments, Centers and Institutes. As the business leaders’ concerns are highlighted, we will show how their financial support for the Center will catalyze the integrative problem solving research needed to deal with the complexity of these interdependent challenges. In short, we aim to use the summit as a key tool for instigating one or more founding gifts for the Center.

In anticipation of an initial founding gift, Senior Vice President Pershing has agreed to provide a start-up contribution to support a full-time Development Officer and Center Manager/Grant Writer. Small operational expenses and the travel funds needed to support development efforts will be drawn from the founding gift on an as-needed basis. Once approval to create the pan-campus interdisciplinary Center for sustainability-related research is obtained, we can unequivocally explain the University’s commitment to creating the research teams that
will tackle problems to be identified by Center sponsors.

Once a founding gift is obtained, the Center Development Officer will work with the Director and Center Manager to map out and implement an aggressive strategy for generating major gifts from prospective philanthropic and corporate sponsors. While preparing this proposal, several prospective sponsors indicated their interest in supporting the goals of a Sustainability Research Center that would have a truly pan-campus presence and could facilitate the emergence of the new research teams needed to address issues of concern to the sponsors.

As the funding base for the Center grows, Center staff and the Advisory Board, with input from the Executive Steering Committee of Deans, will work with the sponsors to identify how Center funds can be best used to tackle questions of common interest and greatest concern. We envision that sponsor funding will support nascent research teams created and nurtured by the Center, rather than supporting individual researchers or pre-existing teams working on research programs that fail to address issues of primary interest to the sponsors. As prospective research targets are clarified with the sponsors, Center staff will circulate calls for researchers to contribute their expertise to the teams needed to tackle the specified problems. Center staff will facilitate the process of team formation and provide the support needed to create viable research plans that will address priorities expressed by the sponsors. The Center will also entertain proposals to support new interdisciplinary research teams that can show how their collective capacity can be used to successfully tackle questions posed by the sponsors. The disbursement of Center funds will be jointly determined by Center staff, the Advisory Board and Center sponsors. The Executive Steering Committee of Deans will provide the oversight needed to ensure that the sponsors’ priorities are being honored while hewing to the academic mission of the University and maintaining communication with the Departments, Centers and Institutes of each College participating in the Center. Principal criteria to be used in awarding Center funds will include the following:

- Prospective awardees will have participated in Center hosted workshops designed to; 1) build the capacity for operating effectively in broadly interdisciplinary teams, and 2) explain issues of primary concern to Center sponsors,
- Proposals for funding must clearly show how the efforts of an interdisciplinary research team will respond directly to the interests of the sponsors and produce meaningful results over a specified time period,
- Recipients of Center funds must commit, during the period of Center-funded research, to participating in team-specific workshops aimed at maximizing the interdisciplinary effectiveness of each team while helping them to achieve the jointly agreed upon research goals.