

FIRST ANNUAL CALL FOR PROPOSALS
SUSTAINABILITY RESEARCH AND TRAINING PROGRAM (SRTP)
RESEARCH PROPOSALS 2014

1. Synopsis:

This program is a result of the agreement between the **University of California, Davis (UC Davis)** and **Diamond Developers (DD) of Dubai, UAE** to conduct research and training relating to technologies, systems, social conditions and experiences entailed in building, living in, and maintaining communities that are designed for sustainable living. The vision of the program is interdisciplinary, collaborative and engaged. Research that brings together faculty from the social sciences, physical sciences and engineering are especially encouraged. Special focus will be research on water, soil, solid waste management, organic food production, renewable energy, and the social conditions and experiences entailed in building, living in, and maintaining communities which are designed for sustainable living. The Sustainable City (TSC) in Dubai will serve as a living laboratory for projects. Research activities may take place in Dubai, at UC Davis, or elsewhere, depending on the requirements of the proposed research project. All projects are strongly encouraged to include at least one partner from among the BCBCB consortium of universities (American University of Beirut, American University in Cairo, Lebanese American University, and/or Birzeit University).

2. Total Program Funding:

For this solicitation, a total of \$750,000 is available. Individual research projects are limited to a maximum of \$150,000 including all subcontracts to consortium partners and others, and inclusive of UC Davis applicable indirect costs. No match funding is required. Awards will be made for 1 or 2 years duration. The estimated number of proposals to be funded is 5 to 10. The award size and duration of each project will be determined based on the nature of the proposed activities.

3. Proposal Schedule:

Solicitation released:	15 May 2014
Concept Note due:	15 June 2014
Notification of Invitation to Submit Full Proposal:	30 June 2014
Full Proposals due:	31 July 2014
Notification of Awards:	31 August 2014
Effective project start date:	1 September 2014

4. Program Scope:

One- or two-year grants (up to \$150,000 total project cost including UC Davis' applicable indirect and all subcontract costs) to investigate open fundamental questions and unsolved social and engineering issues linked to energy, materials, water, agriculture and food, mobility, information, behavior, policy, and systems integration for the purposes of designing, implementing, and maintaining sustainable communities.

Proposals must address issues of relevance in the development of sustainable

communities for environments in or similar to the UAE. Multiyear projects are subject to annual review.

As a member of the BCBCB consortium of universities (For more information, see <http://sjoseph.ucdavis.edu/bcbbc>), UC Davis seeks to include consortium partners in research, training, and outreach conducted through the Sustainability Research Program (SRTP). All proposals are strongly encouraged to include under subcontract at least one partner from the BCBCB consortium to collaborate in the research project. Representatives from each of the partner institutions have been appointed to help facilitate the identification of BCBCB collaborators. Information on how to contact these representatives and solicit participation in proposals may be found on the website of the BCBCB Consortium: <http://sjoseph.ucdavis.edu/bcbbc/dubai-sustainable-research-and-training>. For questions or additional information, contact the SRTP coordinator at srtp@ucdavis.edu.

For this solicitation, the program has particular interest in the following research topics:

- Social living in a sustainable community
- Biogas plants, anaerobic digestion plants using organic wastes
- Treatment of wastewater (TSE) for agricultural purposes
- Treatment of green waste for compost
- Commercial cultivation of UAE native plants

Additional details relating to these targeted areas of research for this solicitation are located in **section 11** below.

5. Eligibility Information:

UC Davis must be the lead institution on all proposals. Participation of BCBCB consortium partners is to be provided under subcontract to UC Davis. Subcontracts to other institutions outside the BCBCB consortium are permitted. An investigator may serve as principal investigator (PI) on only one proposal, but may participate as an investigator on more than one proposal. PIs must have PI status at UC Davis at the time of proposal.

6. Intellectual Property:

6.1 Nondisclosure Agreement:

Reviewers will use any confidential information provided in each proposal only for the purpose of evaluation of the proposal for suitability for funding, and for no other purposes. Except for sharing with the sponsor, during the review period, and for a period of two (2) years thereafter, reviewers will keep the information provided in each proposal as confidential, but only to the extent that such information (a) was not known to the reviewers prior to review in the submitted proposal, or (b) was publically available at the time incorporated in the proposal, or later becomes publicly known without disclosure by the reviewers.

Confidential information, as used here, may include formulations, techniques, methodology, assay systems, formulae, procedures, tests, protocols, data,

reports, know-how, business plans and business developments, information concerning the existence, scope or activities of any research, and development.

6. 2 Authorship

The investigators on each project, including all subcontractors, will be required to establish protocols for authorship, specific to their proposal, prior to starting research. This should include a statement on their principles of cooperation, methods of assigning authorship, a definition of contributions that will qualify for co-authorship, types of activities that would not qualify for authorship but might qualify for acknowledgement or other credit, and how authorship will be credited.

7. Application Procedures:

Submission of a full proposal to the SRTP is by invitation based on prior submission and acceptance of a Concept Note.

7.1. Concept Note

Submit a brief Concept Note (maximum 3 pages) outlining the nature of your proposed research concept. The Concept Note should identify i) the UC Davis PI and other UC Davis investigators, and provide ii) title, iii) scope, iv) objectives, v) potential impacts, vi) timeline, and vii) preliminary budget estimate for the intended research. Each Concept Note will be reviewed by the SRTP Scientific Advisory Committee (see **section 8** below) and serves as the basis for selection (by DD) to submit a full proposal. Concept Notes should therefore provide sufficient information to assess the relevance and importance of the work to the SRTP. BCBCB consortium partners may be (but are not required to be) identified in the Concept Note. Concept Notes must be submitted via the Research Funding system at <https://researchfunding.ucdavis.edu/#announcement/546> by 5 p.m Pacific time on the due date indicated above under **section 3 Proposal Schedule**. Notification of Invitation to Submit a full proposal will be issued by the date indicated above. Assistance in identifying BCBCB consortium partners will follow notification of Invitation to Submit a full proposal.

7.2 Full Proposal

Proposals must be submitted via the Research Funding system at <https://researchfunding.ucdavis.edu/#announcement/546> by 5 p.m. Pacific time on the due date indicated above. Each proposal, including cover sheet, statement of work, budget, and justification, must be submitted as a single PDF file. You will receive an email confirmation within 48 hours of receipt of your proposal.

Full Proposal Format and Instructions:

The proposal application consists of the following components:

1. Cover Sheet (provided below)
2. Project Description: (5 pages maximum) Describe the scope, objectives, detailed research methodology, research team including BCBCB partner(s), and other elements of the project as outlined below. Formatting requirements:

1-inch margins all around; font no smaller than Times New Roman 12 or Arial 11. The project description must include the following sections, with headings that correspond to each section:

- a. Abstract (1 page maximum)
- b. Key personnel: Include all key personnel and their departmental or BCBCB consortium member affiliation and role on the project (PI, Co-Investigator, Post-doctoral researcher, graduate student researcher, consultant, etc.)
- c. Introduction and Program Objectives
- d. Background and Preliminary Studies
- e. Research Design and Methods (include a description of all methodology, processes, and equipment that will be used)
- f. Justification and Anticipated Impact including scientific merit and potential commercial applications
- g. Timeline and Milestones: Indicate the entire proposed period of support, and include specific expected project milestones.

The following items are not included in the 5-page limit and can be appended at the end of the description as appropriate:

- h. Literature Cited
- i. List of potential background intellectual property applied to the proposed project. If none, indicate "None."
3. **Budget:** Provide a budget sheet for each year of the proposal, using only the Excel budget template provided. The sheets will auto-compile individual year amounts to a cumulative budget sheet. Use a separate workbook for each subcontract, if applicable. *Do not use the budget form included in the online application.*
4. **Budget Justification:** Provide a narrative justification of expenses, using the format provided. If an equipment purchase is requested as part of the proposal, a manufacturer's quote should be included.
5. **Curriculum Vitae (CV):** A two page CV should be included for each of the key personnel and partners listed in item **2(b)** above, including a list of relevant awards and publications in the past five years.
6. **Subcontractor Verification:** Append signed institutional letter of support and budget for each proposed subcontractor including the BCBCB partner(s).

7.3. Budgetary Information:

Applicants should develop a carefully crafted budget in line with the scope and scale of the project. The role and proposed effort for each investigator (PI, Co-Investigator, BCBCB collaborator, etc.) should also be commensurate with the activities proposed.

The budget should include all taxes, shipping, and installation charges for any equipment purchases.

Indirect costs should be computed using the applicable campus negotiated indirect

cost rate and a modified total direct cost base.

The annual cost limits by proposal category noted above include direct and UC Davis's applicable indirect costs.

8. Proposal Merit Review Criteria:

Full proposals will be selected for funding based on a review of scientific and technical merit. All proposals will be reviewed by an independent Scientific Advisory Committee composed of faculty and staff from UC Davis and a faculty representative from one of the BCBCB consortium partners (on annual rotation). Recommendations for funding will be made to DD which will retain responsibility for final award decisions. Review comments of proposals that are not selected will be available following notification of awards. The Scientific Advisory Committee will also have responsibility for review of the Concept Notes with recommendations to DD for projects to invite for full proposals.

Scientific and Technical Criteria:

Each proposal should address the following selection criteria:

1. **Significance:** Does the study address an important problem? How will scientific knowledge or applications be advanced? What will be the effect on concepts, methods, technologies or systems influencing the development of sustainable communities? Is the research applicable to the on-the-ground situation at the Dubai Sustainable City?
2. **Approach:** Are the conceptual framework, design, methods, and analyses adequately developed, well integrated, well-reasoned, and appropriate to the aims of the project? Does the proposal acknowledge potential problem areas and consider alternative approaches for enhancing the probability of success? Are social aspects integrated into the research? Does the project utilize the living laboratory of The Sustainable City (TSC) in Dubai?
3. **Innovation:** Is the project original and innovative? Does the project develop or employ novel concepts, approaches, methodologies, tools, or technologies?
4. **Investigators:** Are the investigators qualified to carry out the work? Is the work proposed appropriate to the experience and training of the researchers? Does the investigative team bring complementary and integrated expertise to the project? Does the scientific environment in which the work will be done contribute to the probability of success?
5. **Budget:** Is the budget request appropriate to the work proposed and adequately justified?

9. Reporting Requirements:

Researchers funded by the SRTP must submit the results of their research in a final project report within three months of project completion. An annual summary of accomplishments is to be submitted at the end of each year. Researchers are expected to publish their results and make them available to the SRTP for public dissemination. Where intellectual property or human subjects are involved, researchers will follow standard procedures of UC Davis for ensuring all necessary protocols and disclosures

are satisfied.

10. Further Information:

A faculty briefing session relating to this funding opportunity will be held on campus and will be scheduled following the release of the solicitation. This meeting will offer an opportunity for direct Q&A with faculty co-directors and staff of the SRTP initiative. See <http://sjoseph@ucdavis.edu/bcbcb> for information about the briefing session or contact stp@ucdavis.edu.

11. 2014 SRTP Targeted Areas of Research

The following areas of research have been identified by DD as of particular interest for this solicitation:

11.1. Social living in a sustainable community

Problem Statement: One of the main pillars of sustainability rests on the notion of a healthy and prospering society. Having a meaningful connection to one's community and social cohesion are important aspects of social sustainability.

The Sustainable City (TSC) is a new community with the goal of aligning community interests with principles of sustainability. Therefore, implementing relevant activities to encourage sustainability at the social and cultural level will be an essential component of TSC's vision. Aspects such as identity, sense of place and culture, empowerment, participation and access; social mixing and cohesion; well-being, happiness and quality of life are crucial to this vision. The TSC is a place that needs to connect with the larger City of Dubai and with global sustainability interests. Proposals are encouraged to consider the place of TSC in this broader context as well as linking the social living questions with questions stemming from agriculture and engineering.

Some of the elements of this problem include:

- Who are the residents who come to live in the TSC, and what is the impact of their demographic makeup on the reproducibility of ecological learning from the eco-city?
- With regard to civic engagement and participation: how can the community build an enabling society at TSC that has positive feedback loops? What is a good governance structure? How can developers and community leaders encourage and implement transparency at the community level?
- How do developers and community leaders instill a sense of place and pride in TSC community, fostering a culture of support and caring for all spaces in the city—especially in defining public spaces, activities, and events?
- Residents who come to TSC may not be fully committed to sustainability practices. How do developers and community leaders motivate or inspire residents to live in an environmental and ecologically-responsible way?

How do developers and community leaders facilitate demand side management – reduce consumption, reduce waste, reduce toxins into the system, etc.?

- Technology translation: How does the local population learn about ecological issues, what educational approaches can be used, and how can this learning about sustainability concepts be exported to other countries? What are the larger issues in reproducing the success of eco-cities in older cities and urban environment, where demographics are different than the built environments of eco-cities, which may attract an international and transient group of residents who are not aware of the local environmental issues.
- What is the appropriate analysis of environmental performance of sustainable communities like TSC?

TSC is working to define activities to encourage community cohesion and community connectivity. Some of the ideas currently proposed are:

- A market place, carpooling, childcare/playground, and foodshare.
- Sustainability events – e.g. a “Reuse” exhibition, tree planting and agriculture planting/picking activities, clean-ups.
- A website for residents of the city to facilitate resident-only and public activities, events, and community interaction.
- Skills development programs, e.g. cooking classes (food waste reduction strategies; nutrition; local, organic, and seasonal foods, etc.)
- Tourism events and activities for Dubai City (e.g. at the Science Museum and Center of Excellence).
- Hosting of NGO and other volunteer activities, etc.

Tools and methods are needed to help design and analyze the success of these programs, including:

- How to assess the well-being and happiness of our residents (e.g. measuring residents’ attitudes, quality of life, social cohesion, etc.)
- What are the best methods for promoting and facilitating pro-environmental behavior (e.g. incentives, reward systems, discounts, reminders, etc.)
- What are the economic benefits to various activities?
- What are the appropriate social and environmental indicators for assessing the “success” of a sustainable community.

Desired Deliverables/Project Examples:

- Critical reviews of existing literature
- Comparative studies of TSC and other sustainable communities (West Village, etc.)
- A manual for residents to understand issues of sustainability as well as understand the facilities of TSC and how to optimize usage. The manual could include codes of conduct and rules & regulations for TSC or other approaches for guiding behavior.

- Training staff to answer sustainability questions and encourage sustainable behavior.
- Staff recommendations and job descriptions for sustainability managers and/or troubleshooters.
- Tactics to make service providers aware of the sustainability culture in TSC
- Tactics for effective use of social technology:
 - Website/mobile sites for residents to connect to each other
 - Website/mobile sites for the public to connect to TSC
 - Social media for communication and knowledge transfer – Facebook, LinkedIn, Twitter, Instagram.
- Assessment and decision support tools, e.g. for quality-of-life, sustainability, and overall “success” of eco-cities as sustainable communities.

11.2. Biogas plants, anaerobic digestion plants using organic wastes

Problem Statement: The Sustainable City aims to be zero waste. The community’s organic waste will be collected and taken off-site to *Tadweer*, the Waste Management Division of this project. *Tadweer* also receives organic waste from across Dubai (+500 tons per day). The goal is to utilize this waste stream for a source of energy production, specifically looking at biogas/anaerobic digestion plants.

At present, this technology is not accepted by the local government to be incorporated into residential communities. There are few if any facilities in the UAE and the regulation of what to do with the energy produced is still in the draft phases, but is being examined at the governmental level. Research proposals are encouraged to consider the social and technical aspects related to organic waste technology.

Project Examples:

- Developing appropriate technology for maximizing efficiencies in energy production/zero waste management goals. A test facility can be located at *Tadweer* (an industrial site).
- Developing appropriate technology to introduce this as a form of local energy production at residential community scale and setting. Produce guidelines to allow for this technology to be adopted in residential communities and at a larger energy provider level.

11.3. Treatment of wastewater (TSE) for agricultural purposes

Problem Statement: The Sustainable City generates two streams of waste water; greywater which is treated locally on site with a membrane bioreactor (MBR) plant

(350 cubic meters/day) and 400 cubic meters/day of blackwater which is sent off-site to a Municipal Waste Water Treatment Facility. This Treated Sewage Effluent (TSE) is brought back through municipal supply lines to the Sustainable city to be used for irrigation.

The quality of TSE varies drastically from day to day and cannot be relied on to meet health and quality standards for irrigating public areas and landscapes that contain edible plants, fruiting trees etc.

The TSE water brought back has been mixed with many other communities and the Municipal Treatment Facility (the facility is assumed to be employing activated sludge technology) and is often overloaded, showing high levels of heavy metals, high salts, trace pharmaceuticals, etc.

TSE is being explored for irrigating ornamental landscape areas, some areas under local food production (edible fruits and herbs), and the composting facility using outdoor windrow methods. The contaminants collect in the compost and landscape and do not meet standards for organic farming and could reach to unhealthy levels for the TSC Research proposals are encouraged to consider the social and technical aspects related to treatment of waste water.

Project Examples:

- How to stop contaminants from getting into the wastewater.
- Is there cultural acceptance of using Treated Sewage Effluent (TSE) for agriculture (e.g. fruits, herbs, and vegetables meant for human consumption) in Dubai/ Middle East no matter what the level of final quality?
- Appropriate technology and standards for tertiary treatment of the TSE to ensure high quality water of acceptable quality for use in organic agriculture (edible crops and compost) and a community wide irrigation network for public and private landscapes.
- Examining uptake of toxins in various crops given different levels of TSE irrigation quality and then establishing standards.

11.4. Treatment of green waste for compost

Problem Statement: The Sustainable City aims to be zero waste, composting is a big part of this goal. Local food production is an important part of this development and the existing soils are very salty, very sandy, free draining, and have almost no organic content. Compost becomes a very important component for building up the site soil and making the local food production goals a reality.

Tadweer is the Waste Management Division of this project. *Tadweer* receives green waste from across the entire city of Dubai. At present, all this green waste is

sorted, shredded, and placed in windrows. These windrows are kept moist by sprinklers using a municipal source of Treated Sewage Effluent (TSE) and are being mechanically turned. Summertime air temperatures reach up to 50 degrees Celsius.

Issues include contaminants in the sources of green waste, very poor TSE water quality adding more contaminants into the process (see brief on TSE quality above), and high summer temperatures.

The end goal is to have a very high quality compost to be used in The Sustainable City organic Farm and also to be commercially marketed throughout the country.

Research proposals are encouraged to consider the social and technical aspects related to organic waste technology.

Project Examples:

- Appropriate technology for composting green waste to ensure high quality for use in organic agriculture (edible crops) and a commercial compost product.
- Examining quality of compost in various scenarios and creating specialized soil mixes to support organic agriculture and local landscaping industry.

11.5. Commercial Cultivation of UAE Native Plants

Problem Statement: The Sustainable City aims to use landscaping not just to add beauty but also to produce food, create habitat, fix nitrogen into the soil, create a cooler microclimate, etc. As water is a very precious resource in the Dubai desert, the landscape should also be very drought tolerant. The use of native plants will be an important part of achieving these goals.

At present, there is very little commercial availability of native plants. The success rates for propagating these plants are low, requiring large numbers of plants to accommodate losses (The Sustainable City site area is approximately 46 hectares with about half of this in landscape). A trial nursery has been established and approximately 70 species have been identified that are candidates for landscaping. Local academic cooperators are in the process of starting these trials and will serve as contacts for collaboration.

The effects of using TSE for irrigation, soil requirements etc. also are not yet known in terms of plant growth and management.

Research proposals are encouraged to consider the social and technical aspects related to native plant propagation.

Project Examples:

- The cultural value of using native plants in the landscape, their past importance and relevance to our present day sustainable community.
- Identifying appropriate UAE native plants as high quality biofuel sources.
- Improving UAE native plant species propagation and increasing the number of species under cultivation.
- Monitoring the effects of various irrigation water quality (from saline to TSE to potable) and irrigation rates on plant growth and survival rates. Water usage to be studied for developing standards for sustainable landscape irrigation rates.
- Monitoring the effects of various soil mixes (for example, made partly from the *Tadweer* compost described above) on plant growth and irrigation rates and creating native plant specific soils.

Cover Sheet
UC Davis – Diamond Developers
Sustainability Research and Training Program
Send to: srtp@ucdavis.edu

Program Information	
Applicant Name	The Regents of the University of California, Davis Campus
Program Title	2014 UC Davis – DD Sustainability Research and Training Program
Agreement Name	Master Collaboration Agreement
Sponsor Name	Diamond Developers of Dubai, UAE
Proposal Due Date	31 July 2014 5 p.m. PDT
Principal Investigator(s)	
PI Name	
Title	
Department	
Telephone	
Fax	
e-mail Address	
Project Title	
Project Period	A. Start Date: 9/1/2014 B. End Date:
Amount Requested (Total)	\$
Budget Amount (per year up to two years)	Year 1: \$
	Year 2: \$
Project Abstract	
Administrative Assistant or other person to notify:	
	Department Contact
Name	
Title	
e-mail Address	
Telephone	
Signatures	
PI	Date

**PROPOSAL APPLICATION FORM
UC DAVIS – DD SUSTAINABILITY RESEARCH AND TRAINING PROGRAM
2014**

1. ATTACH COVER SHEET

Project Title:

Principal Investigator (name and affiliation):

BCBCB Partner (name and affiliation, may include more than one):

2. Project Description:

Sections a – i (see call for proposals for description)

3. Budget:

Prepare according to budget template provided

4. Budget Justification:

5. Curriculum Vitae:

6. Other Subcontractor Verification:

Principal Investigator (Last, First, Middle):

SUSTAINABILITY RESEARCH AND TRAINING PROGRAM

Detailed Budget For The Period Of:	FROM:	9/1/2014	THROUGH:	8/31/2015
NAME	ROLE ON PROJECT	TOTAL SALARY REQUESTED	FRINGE BENEFITS	TOTALS
				\$ -
				\$ -
				\$ -
				\$ -
				\$ -
				\$ -
				\$ -
SUBTOTALS		\$ -	\$ -	\$ -
CONSULTANT COSTS			\$ -	\$ -
			\$ -	\$ -
EQUIPMENT <i>(Itemize)</i>			\$ -	\$ -
			\$ -	\$ -
SUPPLIES <i>(Itemize by category)</i>			\$ -	\$ -
			\$ -	\$ -
			\$ -	\$ -
			\$ -	\$ -
			\$ -	\$ -
TRAVEL <i>(Domestic/Foreign)</i>			\$ -	\$ -
			\$ -	\$ -
			\$ -	\$ -
			\$ -	\$ -
			\$ -	\$ -
OTHER EXPENSES <i>(Itemize by category)</i>			\$ -	\$ -
			\$ -	\$ -
			\$ -	\$ -

	\$	-
	\$	-
GSR Tuition and Fees	\$	-
TOTAL DIRECT COSTS	\$	-
<i>Modified Total Direct Costs</i>	\$	-
<i>TOTAL INDIRECT COSTS</i>	\$	-
TOTAL PROJECT COSTS FOR THE BUDGET PERIOD	\$	-