Grand Challenges Action Research Team
Final Report
Spring 2014

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1. Executive Summary

In April of 2013, President Obama called on campanies, research universities, foundations, and philanthropists to join him in identifying and pursuing 21st Century "Grand Challenges". He described these Grand Challenges as "ambitious but achievable goals that harness science, technology, and innovation to solve important national or global problems that have the potential to capture the public's imagination." UCLA identified one such Grand Challenge: providing an urban environment with a sustainable source of natural resources. In November of 2013, UCLA's Chancellor Gene D. Block announced the Thriving in a Hotter Los Angeles (THLA) Grand Challenge, an initiative aimed at supplying the Los Angeles region with 100% local water and renewable energy without damaging biodiversity by 2050.

Our ART team was created in the infancy of the THLA Challenge to figure out how research being done by professors at UCLA can be applied to meet these goals on campus, and how opportunities can be created for students to become involved in this research, and to compile this information in a database that could be available to the public to generate public awareness and facilitate community engagement. As the THLA goals focus on energy and water and require implementation in the municipality of Los Angeles, our team identified approximately 50 UCLA faculty members who have signed on to the THLA Grand Challenge and whose research focuses on energy, water, environmental law, or public policy. We interviewed these professors to identify their personal goals in their involvement with the Grand Challenge, how their research can be applied to improve urban sustainability and achieve the THLA goals both at a regional level and on campus, as well as identify opportunities for students to participate in research. After interviewing 45 of 46 professors on the final

list (meaning a non-response rate of one), we compiled this information into a database, which Nurit Katz, UCLA's Chief Sustainability Officer, has agreed to host on the sustainability website, to encourage public awareness about the THLA research conducted by UCLA professors, and to enable students to get involved in this research to further the goal of creating a sustainable, thriving Los Angeles in the context of climate change.

2. Background and Significance

Climate change is occuring, and along with warmer temperatures come impacts on not only natural ecosystems, but human ecosystems as well. We are already experiencing some of these effects, including rising sea levels threatening coastal development, changes in rainfall patterns reducing water and food security, and increased frequency and intensity of extreme weather events causing damage in our communities (US EPA, 2013). With these challenges facing us, the question remains: how will we deal with these changing conditions in a manner that allows us to maintain a high quality of life while preventing further greenhouse gas emissions?

This year, UCLA's Chancellor announced the beginning of the UCLA Grand Challenges Initiative, aimed at bringing together the university's faculty across disciplines to use a holistic approach in tackling six of the most critical issues which face today's society. The first of these challenges focuses on paving a path for a sustainable future for Los Angeles by enabling the LA region to not only adapt, but thrive in warmer conditions. The goal of this Thriving in a Hotter Los Angeles (THLA) Grand Challenge is to achieve 100% local water and renewable energy in the LA region without harming biodiversity by 2050.

The Grand Challenge ART team was created to interview the UCLA faculty who have signed

on to this challenge with the aim of compiling a database on how professors see their work contributing to achieving the grand challenge goals, and how they plan to involve undergraduates in their work. Currently we are working under Michelle Popowitz (Executive Director of the Grand Challenges and Assistant Vice Chancellor for Research), Dr. Mark Gold (one of the directors of the THLA Grand Challenge and Associate Director of the Institute of the Environment and Sustainability), Nurit Katz (UCLA Chief Sustainability Officer), and Dr. Tama Hasson (Assistant Vice Provost for Undergraduate Research).

Project Goals and Objectives

Our team's goals were to (1) further and identify the potential for the application of professor research on the UCLA campus aimed at achieving the THLA Grand Challenge of 100% local water and renewable energy by 2050, and (2) identify opportunities for students to become involved in the THLA Grand Challenge by engaging in research, and (3) provide information and an avenue to increase public awareness and community engagement in the THLA Grand Challenge.

We aimed to achieve the goals through two primary objectives of (1) interviewing energy, water, environmental law, and public policy professors to determine (i) how they see their research being applied on a regional and campus scale to attain Grand Challenge goals, (ii) how they see undergraduates playing a part in Grand Challenge research, and (iii) their personal goals in working with the Grand Challenge, and (2) to use the information from the interviews to generate a database that (i) publicizes Grand Challenge professor research and (ii) provides information for how students might get involved in Grand Challenge research.

Initially, we aimed to interview living lab directors, or directors of projects which already apply professor research on campus, to determine lab effectiveness. However, we discovered that currently

there are fewer than five living labs in place on campus, and that those that are in place did not have always have specific metrics of measuring effectiveness. Therefore, we eliminated living lab research as part of our objectives.

In spring quarter we added Objective I.iii (eliciting professors' personal goals in working with the Grand Challenge), as we wanted to add a question to interviews to identify how each professor saw his or her specific role in and what he or she wanted to contribute to the Grand Challenge.

Research Methodology

Our methodology began with first researching living labs. We looked into what living labs were, how they might be applied to the Grand Challenge, and existing examples of living labs. We came up with the definition of "a pilot of newly-developed technology", in our case, specifically the pilot of technology newly-developed by UCLA professors, being applied on the UCLA campus. To compile information on existing living labs, we created a Google document so that each team member could contribute information about living labs, focusing on those present at UCLA. Since we had difficulty finding information about these projects online, we acquired a list of living labs from Nurit Katz.

Simultaneously, we focused on acquiring the information of the Grand Challenges professors we would interview. We acquired the list of 120 professors who had signed up for the Grand Challenge from Cully Nordby. This list included the section of the Grand Challenge they planned to work on (water, energy, public policy, transportation, etc.) and basic contact information (department, phone number, email). We acquired another list from Ashley Verhines of all faculty working on sustainability-oriented research around campus, which included more detailed information on the professor's background. We then joined the list of sustainability faculty to the Grand Challenge faculty, researched and filled in missing information, and identified and researched information that we did not

yet have but that we wanted to have about each professor prior to entering the interview.

After professor information was collected, we began narrowing down the list of who we would interview. As we knew it was not feasible to interview all 120 professors, we narrowed down the list to those working on water technology, energy technology, or environmental law and policy. To do this, we created a Google document spreadsheet to organize the data. The first tab was a master list of all Grand Challenge faculty, their contact information, and their department, that was not meant to be edited to preserve the original data. Because not all information of interest was present, the next tab included the same master list as well as the information that was initially missing, such as email addresses, as well as research keywords. The next tab was a filtered version of the master list, only including professors that were involved in energy, water, or environmental law and policy, for a total of approximately 40 professors.

After identifying professors we would interview, Michelle Popowitz sent out an email from the Office of the Vice Chancellor for Research to all Grand Challenge professors, thanking them for signing on and informing them that undergraduates (us) would soon be contacting a number of them and asking that they please respond and sign up for the requested interview. Eleven professors responded within a week to this email, and due to their enthusiasm we decided to add them to our list of interviewees although all but one fell into the energy, water, or environmental law and public policy categories. This gave us a total of 55 prospective interviewees.

The next step in our research was sending out emails to Grand Challenge professors to schedule the interviews. During a team meeting, we drafted out an email for the professors that described our purpose as well as details about when we would be able to interview. In order to effectively speak to each professor in a timely manner, we divided the list into different weeks. Beginning on March 24,

2014 of Week 8, the first dozen professors were selected for an interview. We created a Google form (see Figure 2 in Appendix) which included five days out of the week with several different timeslots that each individual could schedule. By enforcing three potential interview times, this allowed flexibility for our team as well as the professor. The form also included the location for where the professor would prefer to be interviewed, along with a checkbox for whether or not they can be photographed for media purposes. Lastly, we provided a note section for those who had special requests or additional comments. The email containing the form was then proofread by Michelle Popowitz and then sent out to the professors to begin the interview process.

Upon receiving a response from each professor, we sent them a confirmation email verifying the date and location of interview, and including the interview questions to be asked (Figure 1). After being confirmed, the individual was placed on a the Interview Scheduling Google Spreadsheet that included the selected professor, the date of interview, the time and location, and their department and specific field of focus (i.e. energy, water, policy, etc.) Our team frequently communicated throughout the week to discuss the interviewing process, and the availability of our team members, and to ensure that we had sufficient background information on each individual prior to the interview. For the remaining faculty that did not reply by week 9 of Winter quarter, we planned to schedule them in Spring quarter.

After the scheduling form, the individual confirmation emails, and interview questions were sent, the final step was the interview. We devised a procedure for engaging the interview, first introducing ourselves as the ESLP Grand Challenge Team working within the Institute of Environment and Sustainability and our core objectives then asking how their research might be applied to urban sustainability and on the UCLA campus to achieve the Grand Challenge goals of 100% alternative energy and 100% local water by 2050, concluding with a photograph of the individual working in their

office or lab.

After conducting a number of interviews, we adjusted our methodology by adding new questions to ask at professor interviews. These questions asked professors about their mission statement, what exactly undergraduate students would do in their lab, and what skills or experience they prefer for those those working in their labs to have. We had planned to send a follow up email, asking professors if they had anything else they wanted to share and thanking them for their time. In that email, professors that were interviewed before we added more questions would have had the opportunity to answer them. However, we were advised against it, considering that professors have gotten enough emails from us already.

Of course, we faced a number challenges in our project, and the process did not go as smoothly as we initially hoped it might. Many of the professors were hard to get a hold of. Therefore we tried reaching out to them in a variety of ways. If a professor did not respond to the first email, we sent him or her another. If they did not respond to that email, we sent then a third one. In Spring quarter, we realized that emailing was not the best way to contact certain professors and started calling them on their office phones. If we could still not reach a professor we tried to go to their office hours, if they were teaching a course that quarter, we showed up at their classes.

Toward the end of spring quarter, we identified those who had not responded to any of our contact attempts, and noticed that there were a number of professors out of the list of 55 who weren't actually energy, water, environmental law, or public policy (recall that the professors who rapidly responded to Michelle Popowitz's email were added to our list regardless of their research focus) and we therefore eliminated them from the list. We also went on to discover that a number of professors were either retired or retiring (eg. Owen Smith, Robert Fovell) or on sabbatical (eg. Eric Hoek) or on

long-term international travel (eg. Kuo-Nan Liou) and we therefore decided not to disturb them and instead eliminate them from our list. In the end, we had a non-response rate of one out of 46.

Results and Discussion

Over the course of two quarters, the Grand Challenge Team interviewed 45 of our final goal of 46 faculty members. Unfortunately, we lost one set of interview notes (those from Professor Steve Margulis) therefore his information isn't included in the database, though he was interviewed. Interview information from all 44 other interviews is compiled in our database (see Figure 3 in Appendix). This database is what we consider to be our most important product, as it is a summary of our interview results, including 19 attributes: professor name (first and last), department, mission statement or quote, a description of their grand challenge research, the application to achieving grand challenge targets on a regional scale, the application to achieving grand challenge targets on campus, their research concentration (eg. energy or water), research concentration sub-category, research sub-sub category and keywords, collaborators, post-docs and grad students, whether they have hosted undergraduates in lab and how any per year, what undergraduates might do in the lab, skills recommended for undergraduates to have prior to joining the lab, facts about their personal lives, their website, and any other notes about their affect or opinion on the Grand Challenge. Because we only added some of these questions later in the interview process, not all attributes are filled out for all professors (primarily mission statement, and information on undergraduate work and skills).

In terms of evaluating our interview process, interviews were typically scheduled within three weeks of sending the email, and each interview typically spanned approximately forty minutes. Outliers included a ten minute interview, and a few that lasted over an hour. The majority of the time spent in the

interview involved interviews explaining their research in a manner comprehensible to the average undergraduate, so that we could present it in the database as a form that could be digestible by the public.

The majority of the faculty within the energy, water, law and policy fields who we interviewed were involved in some aspect of energy (see Figures 1 below), specifically energy harvesting, use, efficiency and conversion, and storage (Figure 2).

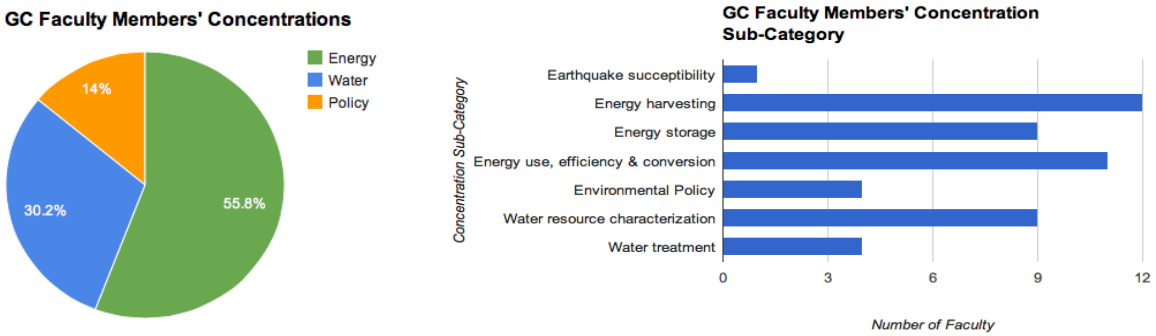


Figure 1. (on left) GC faculty by research concentration: Energy, Water, and Policy.
Figure 2. (on right) GC faculty by department department

The department which held the greatest number of faculty was Mechanical and Aerospace Engineering, followed by Civil and Environmental Engineering, followed by Electrical and Materials Science Engineering (see Figure 3).

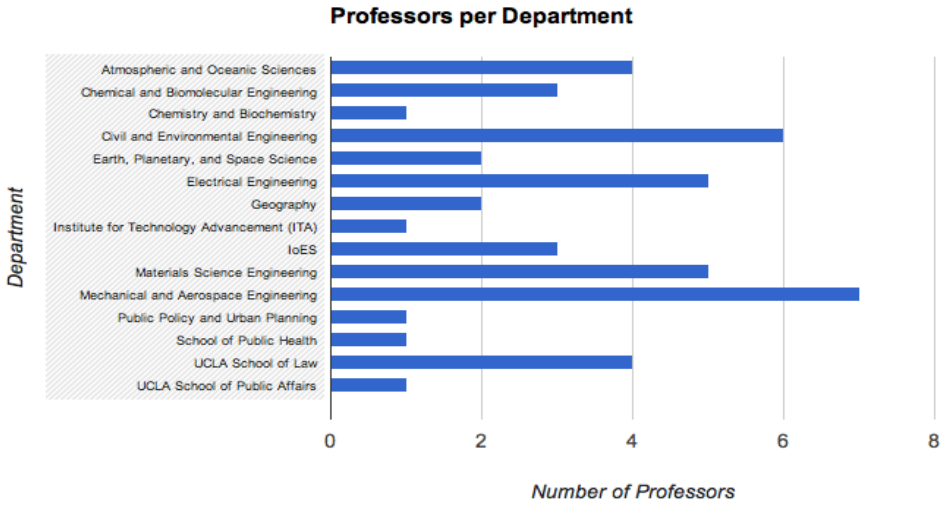


Figure 3. GC Faculty departments (including joint appointments)

Within the energy sector, most energy harvesting researchers focused on solar PV and improving the efficiency, often via organic polymers. One energy harvesting researcher focused on wind (Richard Wirz), one focused on piezoelectrics (Qibing Pei), one focused on generating energy from algae (Laurent Pilon), and a few focused on generating energy from waste sources (James Liao, Vidvuds Ozolins, Laurent Pilon, Gaurav Sant, and Abdon Sepulveda). Researchers focusing on energy storage were primarily concerned with increasing the energy density of storage materials, which could have a large impact on the feasibility of employing intermittent renewables such as wind, solar, and piezoelectrics. Other energy researchers were involved in sensing technologies and designing feedback loops for smart grids and other demand-based systems necessitated by the intermittency and variability inherent in renewables such as solar and wind (Jane Chang, Rajit Gadh, Vwani Roychowdhurry, Mani Srivastava, Paulo Tabuada, Tsu-Chin Tsao).

On the water side, most focused on water resource characterization, generally by using climate models to determine the future of California's precipitation and water availability. Some focused on water treatment technologies, usually via a chemical or filtration system (Yoram Cohen, Richard Kaner,

Shaily Mahendra, Michael Stenstrom).

In terms of assessing the potential applying this research to further the Grand Challenge goals and provide Los Angeles with local water and renewable energy, we found that all professors saw a potential for the application of their research on the regional scale to achieve these goals, and all but the climate modelers (generally focusing on water resource characterization), and law and policy experts saw a potential for the application of their research on campus. However, it is important to note that the maturity time for any given developing technology is approximately three to five years. This means that most technologies must be developed in lab for three to five years before being applied as a pilot on campus. Therefore, though it is certainly feasible to apply professor research on campus as a pilot and then on the regional scale to work toward achieving Grand Challenge goals, it will take a number of years for this to happen.

Regarding undergraduate involvement, we found that 74.4% of faculty have had or currently have undergraduates in their lab, and of these, the mean number of students per lab per year is five and the median four (see Figures 4 and 5). Though faculty typically said that hosting undergraduates is costly and requires funding, most faculty felt it was important and a part of their job to host undergraduates. From our data, it seems that the professors practice what they preach as 74.4% host undergraduates, and the 25.6% who don't includes law professors who don't interact with undergraduates, a member of the ITA which is not on the main campus, and a couple newer professors who are in the process of hiring. Regarding future undergraduate involvement,
95% saw a potential for this, most of which involved students working on topics including GIS and spatial modeling, climate modeling, data processing, computer programming, various engineering, and policy research.

Figure 4. (on left) Undergraduate involvement with GC faculty (either past or present)
Figure 5. (on right) Undergraduate involvement in labs, quantified by number of undergraduates hosted in each lab per year

In terms of faculty reception of our interviews, most conveyed that they were happy that we were working to provide more public awareness about the Grand Challenge and to engage undergraduates in the initiative, and most were very accommodating in explaining their research to us.

Lastly, one of the results that our team is personally most grateful for is the opportunity to speak with all of the Grand Challenge professors and learn about all of the research being done at UCLA. Speaking with a wide spectrum of faculty members from different specialties and backgrounds allowed for a rich understanding of the integrative nature of the Grand Challenge, showcasing the need for people of all fields to engage as a community.

Recommendations

While our team has accomplished significant progress this year, especially as the first Action Research Team of its kind, we have high hopes for the continued progress of next year's team. Since our team only had the time to interview Grand Challenge professors studying energy, water, law, and policy, next year's team could complete interviews of other Grand Challenge professors in other disciplines, such as humanities, in order to get a more broad perspective of how to accomplish the goals of the Grand Challenge. Once all the interviews are done and the organized information is in the online database for the public, next year's team along with Grand Challenge staff and directors could facilitate focus groups for the Grand Challenge professors. The purpose would be to connect Grand Challenge professors with the hope that research projects could be started across disciplines in order to ultimately reach Grand Challenge goals by 2050.

Next year's Grand Challenge team could also identify possible research projects and

collaborations based on the information found in the database. This is because professors often are working on very similar projects without knowing or working together.

Furthermore, a goal of the Grand Challenge is to produce more living labs, therefore a future team could focus on implementing these. Living labs would apply research on campus to see what can help UCLA be 100% sustainable by 2050. To accomplish this, the ART team can work with Nurit Katz to connect facilities with professors to start piloting applied research.

Lastly, a future ART team might further develop the database on an interactive website, and focus on engaging students and perhaps even the Los Angeles community in working toward the Grand Challenge goals.

If future teams do decide to interview professors, we have a number of recommendations to avoid the challenges that we ran into. One problem we had was with professors cancelling their interviews once they were already scheduled. This was often due to circumstances that had arisen suddenly, such as personal emergencies or an arising deadline. There was not much we could do in these situations but to ask if we could reschedule our interview. To help avoid this problem in the future, we could perhaps include a sentence in our interviewing forms that says "I have checked with my calendar to avoid time conflicts" with a mandatory check box. Each professor gives their top three times and it is unfair to give someone else's preferred time to another if they are not going to show up. However, this problem is likely unavoidable due to the busy schedules of professors.

Conclusions

After two quarters of drafting emails, meeting with stakeholders, scheduling professors, interviewing every week, and compiling a large amount of data for the database; our team essentially achieved our project goals and objectives. We interviewed 45 of 46 water, energy, law and policy

professors and determined that 84% of the professors see potential for research application in living labs at UCLA, 100% see potential for research application in the Los Angeles region, and 74% currently have undergraduates involved in their work, 95% see potential for undergraduate involvement in future work, and compiled all data from our background research and interviews into a database that Nurit Katz has agreed to publish on the UCLA sustainability website.

The database has the potential to inform the public as it is written in language that can inform the average undergraduate about the research being done by each professor, their current and future contributions to the Grand Challenge, and it's application to urban sustainability and UCLA as a living lab campus. The database also has the potential to foster undergraduate involvement as it lists the necessary skills a student must have have in order to effectively work in the professors lab and a list of projects that they might work on. Ultimately, this database will allow undergraduates to seek topics of interest and work with professors to make greater strides towards achieving the Grand Challenge.

Our original scope attempted to target the main faculty members who we believed would be the most involved in innovating technologies and policies to aid in achieving the Grand Challenge goals of 100% carbon-free energy and local water. We hope that our information provided in our database will aid in informing future Grand Challenge staff and ART teams about basic information on ongoing UCLA Grand Challenge research, that the database can be put online and help further public awareness and community engagement, and that our project as a whole might positively impact the future of UCLA's THLA Grand Challenge.

References

U.S. EPA. (2013). Climate Change: Basic Information. Retrieved from http://www.epa.gov/climatechange/basics/

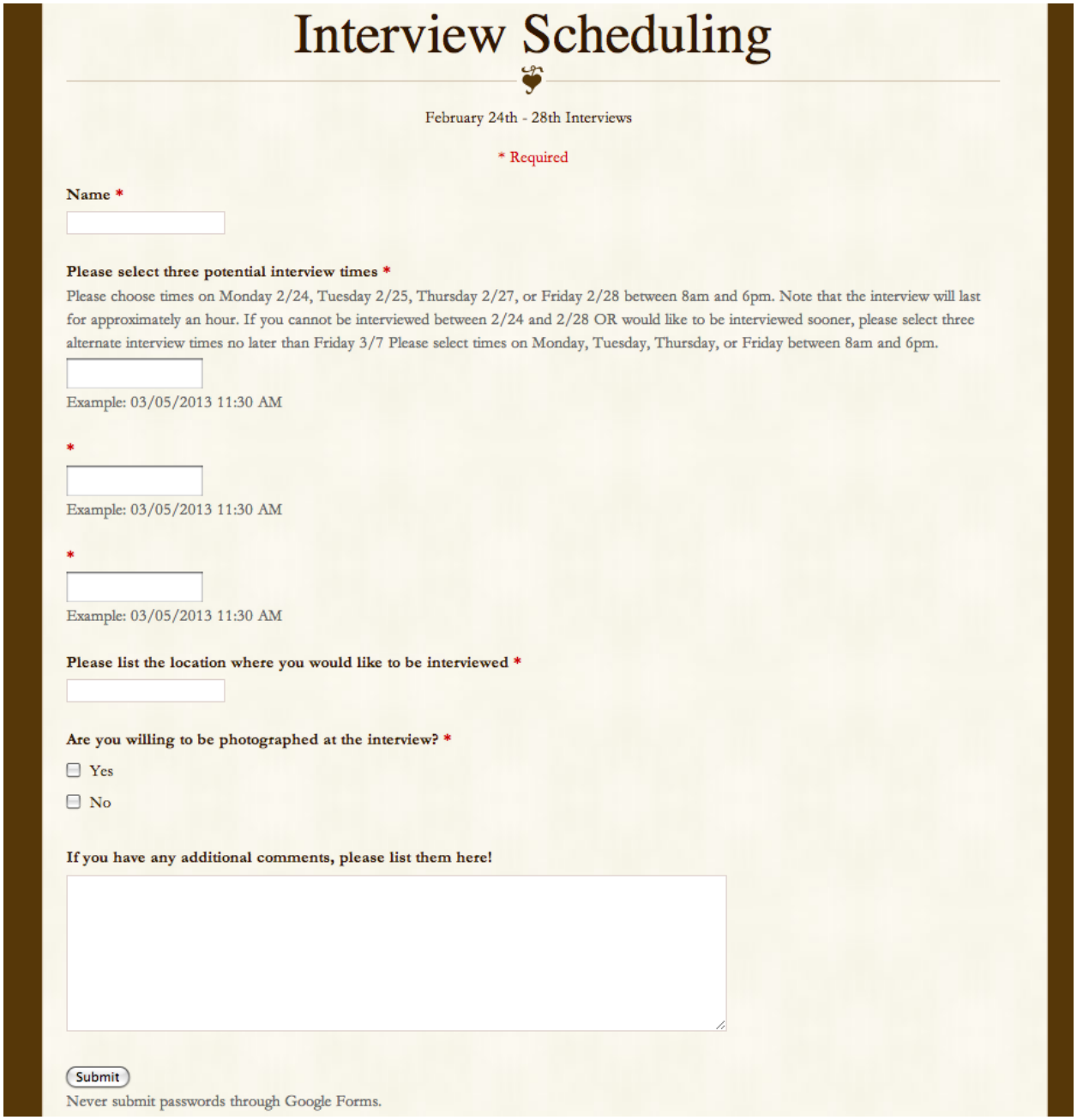
Appendix

Figure 1. Interview Questions

Grand Challenge Professor Interview Topics

- Applied Research
    - What research projects are you currently working on that would be applicable to urban sustainability?
    - What aspects of your research would be applicable to the Grand Challenge (aka carbon free LA future: 100% renewable energy, 100% local water)?
    - How can your research be applied to meet Grand Challenge targets on campus? (aka improve sustainability)
    - Which other professors do you collaborate with on these projects?
    - Who are the post-doc, grad students, & research questions in your lab working on these projects?
- Undergraduate Involvement
    - Do you currently have undergraduates involved in your research lab?
    - What research would undergraduates perform in your lab?
    - What skills do you like undergraduates to have before they enter your lab?

Figure 2. Interview Scheduling Form



Interview Scheduling

February 24th - 28th Interviews

* Required

Name *

Please select three potential interview times *

Please choose times on Monday 2/24, Tuesday 2/25, Thursday 2/27, or Friday 2/28 between 8am and 6pm. Note that the interview will last for approximately an hour. If you cannot be interviewed between 2/24 and 2/28 OR would like to be interviewed sooner, please select three alternate interview times no later than Friday 3/7 Please select times on Monday, Tuesday, Thursday, or Friday between 8am and 6pm.

Example: 03/05/2013 11:30 AM

*

Example: 03/05/2013 11:30 AM

*

Example: 03/05/2013 11:30 AM

Please list the location where you would like to be interviewed *

Are you willing to be photographed at the interview? *

- [ ] Yes
- [ ] No

If you have any additional comments, please list them here!

Submit

Never submit passwords through Google Forms.

Figure 3. Grand Challenge Faculty Database

Professor Name (First)	Professor Name (Last)	Department	Mission statement or Quote	GC Research Description	Application to achieving Grand Challenge targets on a regional scale	Application on campus (potential for living labs)	Research Concentratio	Research Concentration Sub-category	Research sub-sub category and keywords	Collaborators	Post-Docs and Grad Students (working on GC projects)	Undergrads (past or current)	# UG per year	What undergrads would be doing	Skills recommended prior to lab work	Fun Facts	Professor Website	Other Notes (eg. affect, opinion on GC, etc.)
Andy	Abele	Institute for Technology Advancement (ITA)	"I've been in clean tech for a long time, longer than you've been alive. I love it, it's exciting, but it's not easy"	The ITA focuses on applying UCLA professor research and transitioning it from academia into the market	Bringing technologies to market	Bringing technologies to market	Applied research	Bringing engineers' technology to market	applied research, technology	All engineers	N/A	N	0	Potentially interning to learn about bringing technologies to market	--	--	--	--
Ann	Carlson	Environmental Law	Carlson sees herself as a senior advisor who studies regulatory mechanisms on how to induce change and determine the appropriate level of governance, staying on the cutting edge of policy issues, mitigating them, and translating them to the public and policy makers.	Professor Carlson studies the roles of social norms and how it affects environmentally cooperative behavior. Her focuses lie with air pollution, climate change, greenhouse gas emissions, mitigation, and energy systems.	Her studies involve pertinent issues that can be used to influence policy decisions on a regional level, such as the power of PUCs to set rates and influence behaviors, and how to structure their authority; how rate design influences people's energy choices; how to transition to an electric transportation fleet.	Carlson was just appointed to the UC-wide global climate initiative, whose task is to create carbon neutrality plan for the UC system by 2025.	Environment Law and Policy	Domestic global warming legislation/litig federalism.	law, climate, policy, behavior, microclimates, mitigation	Suzanne Paulson		N	0	Working as a research assistant, helping research PUCs (public utilities commission) around multiple countries, literature review on science (eg. of micropollutants)	She does not take undergraduates, but for students outside of the Law School, grad students with a science/engineering background, good work ethic and GPA are ideal. They also must be self-directed, and persistent.	Big Dodger fan, likes hiking and traveling	http://law.ucla.edu/faculty/f	--
Jane	Chang	Chemical and Biomolecular Engineering	"To educate a generation of the future engineers who are conscientious of our global community. Not all engineers have to stay in developing future technologies, but we want them to have the global perspective"	Professor Chang works on developing multifunctional materials with a low energy requirement, such as chips which can perform all three functions of computation, memory and data storage, and energy storage.	(1) Energy efficient devices, specifically multifunctional chips; (2) Energy use and electricity transfer: sensors for providing users with information about energy use and for feedback loops in smart grid	(1) Energy use: monitor energy consumption and provide users with information to reduce consumption; (2) Electricity transfer: Smart Grid: use of sensors and commuication equipment in smart grid	Energy	Energy efficiency, harvesting and storage	multifunctional materials, energy efficiency, energy efficient materials, energy sensing technology, nanoscale patterning, nanomaterials, data, efficiency, smart phones	Wang, Tserkovnyak, Zie, Regan, Carmen, Tolbert, Kebler, Lynch, Wang, Dunn	http://www.seas.ucla.edu/Chang/people.html	Y	3	Working with graduate students to synthesize materials and do testing	Motivation and drive, chemical engineering core courses, math, physics	Spend time with kids	http://www.seas.ucla.edu/Chang/	Strongly believes in educating engineers to have a global perspective
Yoram	Cohen	Chemical/Biom Engineering	--	Professor Cohen's work involves developing new water resources from impaired water, including seawater, municipal waste, graywater in treatment and desalinisation--Smaller projects working for the bigger picture.	Developing water independence for Southern California can have a large impact on one of the goals of achieving sustainable, local water sources. His research with characterizing water resources, developing technology for water quality monitoring, treatment, and making them self-adaptable ("Smart") works towards this goal.	Developed a water filtration system for the UCLA co-gen plant to increase water recycling.	Water Technology	Water treatment	desalination, water treatment, membranes, sewage treatment, water reclamation, water recycling, greywater, distributed water systems, water reuse, smart water, waste-to-energy, opportunities	DeShazo, Stenstrom, Panagiotes, Glickfeld, Hicks	Post-Docs: Dr. Andi Rahardianto, Rong Liu, PhD candidate: Zita Yu	Y	3	Undergraduates wouldn't be handling an individual project, but they would collaborate with others towards one solution by working on large components. Ex: Harvesting salts from water, developing and testing new membranes.	--	--	http://www.chemeng.ucla.edu/people/	Wants funding to involve undergraduates because feels it is costly
Magali	Delmas	IoES	"To figure out how information about energy use impacts behavior"	Dr. Delmas researches how to provide information about energy use, how people respond to information about energy use and pollution, and what kind of behavioral alteration and mitigation strategies they engage in. One of her studies conducting in UCLA dorms found that providing users with information about their energy use resulted in a 20% reduction in use. Her website engage.environment.ucla.edu provides real time information for users who have sensors installed in their homes.	Provide energy users with their energy consumption information in a way that reduces their energy footprint	Provide energy users on campus with their energy consumption information in a way that reduces their energy footprint	Energy	Energy use	energy, sensing technology, behavior, actionable information, sustainability	Professor William Kaiser, EE. Robert Gilbert, interdisciplinary team (engineering, facilities, psychology, anderson, IoES)	--	Y	4	Attend meetings, help install equiment	Excited, optimistic, and motivated; desire to contribute; electrical engineering skills	Spend time with kids, paddle boarding, private pilot, scuba diving, water	http://engage.environment/	Very interested in impact of information on energy use
J.R.	DeShazo	Public Policy and Urban Planning	Everything fits under, therefore it is difficult to know how they will be involved because everything fits under it	Professor DeShazo partners with communication leaders to inform pressing environmental challenges locally, conducts policy research for collaboration, and connects the academia with the community. He also focuses on developing local sources of energy and water to create more sustainability within the community.	Works on the policy side of techonlogy (i.e. EV, renewable energy, cleaner transportation, and clean streets) and designing cost efficient programs. Implementing AB32 to reduce GHG emissions and to do so in way that maximizesco-benefits.	Assessment for Nurit Katz about how UCLA could take advantage of program to get paid for solar on campus, GHG reduction fund Revenues from cap & trade program	Environment Law and Policy	Environmental Policy	sustainability, UCLA, community, applied research, environmental challenges, policy, renewable energy, interdisciplinary collaboration, luskin center, electric vehicles, alternative fuels, complete streets, climate change, environmental justice, sustainble energy, smart water, nanotechnology, digital technology	Michael Stenstrom (water reuse), Ryan Matulka and Colleen Callahan (sustainable energy project manager), Magali Delmas (energy), Yoram Cohen (water treatment technologies)	Zita LT Yu (Water reuse)	Y	12	Communication events, social media info, visit sites and collect info on variables impacting air pollution exposure, and code variables	Technical skills, analyzing ad inputting data, spatial analysis, GIS	Spend time with family and kids	http://innovation.	Almost all Luskin Center for Innovation projects revolve around sustainability. Luskin center usually reaches out to experts in a given topic, and serve as policy experts
Bruce	Dunn	Materials Science and Engineering	--	Professor Dunn works on developing energy storage materials such as batteries and capacitors. His lab is currently working on improving the energy density of the battery by developing and testing different materials.	(1) Energy storage via batteries and capacitors in (a) electric vehicle batteries or (b) between renewable energy harvesting source and grid	(1) Battery & capacitor energy storage in (a) electric vehicle batteries or (b) between renewable energy harvesting source and grid	Energy	Energy storage	energy storage, materials engineering, energy density, batteries, capacitors, electric grid, solar power, intermittency	Yang Yang, Dunn, Tolbert, Pilon, Ozolins	PhDs: Leland Smith, Jimmy Kim, Jessie Ko, Danielle Cassius Matt Lai; Post-Docs: Janet Hur, Guillomere Lemmer, Xavier Patrissians	Y	Unknown	Undergraduates would be working under a grad student, weighing or grinding materials. They have the opportunity to eventually take on their own individual research project.	Students should have a good GPA, high enthusiasm, and attention to detail. The lab skillset is something to be learned.	Loves going to the opera	http://www.mse.ucla.edu/people/	--
Rajit	Gadh	Mechanical and Aerospace Engineering	"I think that for someone like me, and engineer, we need to make a difference. I want to make a difference."	The UCLA Smart Grid Energy Research Center or SMERC performs research, creates innovations, and, demonstrates advanced wireless/communications, Internet and sense-and-control technologies to enable the development of the next generation of the electric utility grid - The Smart Grid. The Smart Grid of the future would allow integration of renewable energy sources, reduce losses, improve efficiencies, increase grid flexibility, reduce power outages, allow for competitive electricity pricing, allow for integration of electric vehicles and overall become more responsive to market, consumer and societal needs.	(1) Electricity transfer via smart grid, (2) Energy generation via solar PV, (3) Energy storage via smart grid and electric vehicles	(1) Electricity transfer via smart grid, (2) Energy generation via solar PV, (3) Energy storage via smart grid and electric vehicles	Energy	Energy harvesting, Energy storage, Electricity Transfer, Smart Grid, Electric vehicles	intermittency, energy storage, maximizing capture and storage, smart grid, electric vehicles, feedback loops, convergence, microgrids, batteries, wireless, charging station, technology, engagement, smart phones	Mario Gerla, JPL, Caltech, USC, UCSB's Gupta	--	Y	6	--	--	--	http://smartgrid.ucla.edu/index.htm	Very excited about the Grand Challenge and invested in communicating research to the public
Alex	Hall	Atmospheric and Oceanic Sciences	"We hope to foster interdisciplinary research and connect all researchers on campus who have to do with climate change"	Dr. Hall regionalizes global climate models (GCMs) by downscaling them from cells that are 100 km wide to a width of a few kilometers. He specifically focuses on (1) Southern California, looking at temperature, precipitation, snow, Santa Ana winds, and water resource variables, and on (2) the Sierra Nevada mountains looking at water resource variables. His models predict how climate change will impact Los Angeles' climate and its water resources.	Water resource characterization, specifically water resources provided to LA by Sierra Nevada snowpack	N/A (regional scale)	Water	Water resource characterizatic	community, interdisciplinary collaboration, sustainability, climate modelig, climate change, Los Angeles, urban heat island effect, adaptation, precipitation, snow cover, water resources, local water, hydrology, Sierra Nevada, simulations	UCI Jim Randerson	Sierra Nevada Project: Neil Berg, Maria Schwartz, Fengpeng Sun, Daniel Walton; LA climate change predictions: Neil Berg, Jerry Huang, Alexandre Jousse, Maria Schwartz, Fengpeng Sun, Xin Qu, Daniel Walton	Y	1	Coding, managing simulations, running models, data management, statitical modeling	Coding (esp. python, R, MatLab), GIS (for visualization)	Competitive swimmer, classical piano player, foodie	http://c-change.la	Very interested in communicating with public. Plan to create a website to (1) foster interdisciplinary research collaboration with all professors who work on climate change (note focus is climate change, not urban sustainability) and (2) communicate info & facilitate conversation w/ community stakeholders (eg. NGOs, policymakers) to understand information needs > use feedback to inform research from beginning to be most useful including what they need to know and in what forms (visualized in a certain way, look at certain variables vs. others)
Sean	Hecht	UCLA School of Law Emmet Center on Climate Change and the Environment	Hecht and Horowitz see their role in the Grand Challenge as being regulatory policy consultants, helping to generate policy that facilitates the implementation of green technology developed at UCLA	The two professors work on a variety of regulation, including policy dealing with plastic debris, fracking, and alternative energy	To serve as regulatory policy consultants to aid in the creation of policy which aides in improving the region's sustainability and implementing professor research.	N/A (municipal scale)	Environment Law and Policy	Environmental Law	climate change adaptation, policy, stormwater, groundwater, technology, urban heat island, cool roofs, environmental justice, distributed harvesting, alternative energy	Zaslof, Malloy, Carlson, Parson	N/A	N	0	Doesn't see undergraduates being involved in their research	--	--	https://law.ucla.edu/centers	Sean & Cara seem quite enthused about the Grand Challenge
Cara	Horowitz	(See Sean Hecht)										N	0					
Diana	Huffaker	Electrical Engineering	"We want to draw on existing skills to bring near term technologies to public consumption. The campus researchers are already engaged, and we're hoping Grand Challenge will give campus research a common focus and a common goal."	Dr. Huffaker focuses on developing high efficiency photovoltaic cells by improving organic PV technology. Specifically, she focuses on combining semiconductors with organic polymers to increase the absorption efficiency and mobility of the cells. In terms of efficiency, she aims to create cells which provide more power for the monetary input in a reusable sustainable format (meaning the semiconductor substrate can be reused). Regarding mobility, she aims to create cells that can emit more current than existing technology.	(1) Energy generation: PV cells	(1) Energy generation: PV cells	Energy	Energy harvesting	technology, energy efficiency, semiconductors, organic photovoltaics, solar power, polymers, sustainable, light, Clean Green Solar	Yang-Yang, Sarah Tolbert, Bruce Dunn, Garauv Sant, Laurant Pilon	2 masters, 12 PhD, 1 post-doc, 3 senior researchers	Y	8	--	--	--	http://www.seas.ucla.edu/~huffak	Very enthused about Grand Challenge (one of the original founders/designers) and very interested in being actively engaged
Jenny	Jay	Civil and Environmental Engineering	--	Professor Jay focuses on coastal water quality, and how urbanization causes coastal degradation, illness, loss of tourism and ecosystem. She experiments with indicator bacteria to determine impaired water and develops techniques to identify sources of pollution. She is currently conducting a field study at the Topanga Creek Watershed which provides as an ecosystem service of decreasing impairment through water quality.	How natural rivers can help keep waters clean as they travel through cities, and build cities to retain the ability to provide ecosystem services.	(1) Study the health of Stone Creek stream or any other stream on campus, (2) Investigate potential daylighting of streams (bringing them back to the surface)	Water	Water contaminants	ecosystem services, water quality, indicator bacteria, pollution, stream health	Mark Gold, Rich Ambrose, Shaily Mahendra	http://www.cee.ucla.edu/faculty/jay/students	Y	17	Performing field work (eg. water samples at creeks), professing indicator bacteria, working with DNA and performing DNA extractions on water and sand samples of bacerial or fecal pollution, culture-based microbiology, testing growth under different materials and antibiotic resistance	Professor Jay looks for not skills, but a certain kind of attitude in her students. She looks for students who are willing to learn, be open, pay attention and notice errors, ask questions and engage.	Ride bike every day to work, yoga, lay with kids who are twins, science with kids	http://www.cee.ucla.edu/faculty/j	Very friendly
Richard	Kaner	Chemistry and Biochemistry, Materials Science	--	Dr. Kaner works with graphene, a carbon-based material, which has a high energy density. It has the potential to store large amounts of charge, intending on competing with the average lithium-ion battery. The advantages of graphene is that it's biodegradable, non-toxic and abundant.	Primary application: renewable energy > energy storage (esp important for wind and solar). Improve batteries, devices that don't have to be thrown away	Graphene supercapacitors could be used on campus for energy storage (currently used as backup energy storage), but they are applicable anywhere where energy is being used.	Energy	Energy Storage	energy storage, supercapacitors, regenerative breaking, hybrid systems, energy density, conductivity, water purification, membranes, polymers, graphene, waste-to-energy, opportunities	Bruce Dunn, George Gruner, Sarah Tolbert	Dr. Reza Mohammadi, Andrew Lech, Danny King, Sergey Dubin, Thomas Farrell, Dr. Reza Mohammadi, Andrew Lech, Danny King, Sergey Dubin, Thomas Farrell, Jonathan Wassei, Miao Xie, James Ma, Jessica (Yue) Wang, Maher El-Kady, Kan Wang, Michael Yeung, Jaime Torres, Brian McVerry, Chris Turner, Lisa Wang, Kris Marsh, Michael Yeung, Jaime Torres, Brian McVerry, Chris Turner, Lisa Wang, Kris Marsh	Y	6	--	--	--	http://www.chem.ucla.edu/dept/Fa	Very invested in undergraduate involvement in lab (always had & encouraged undergrads), Very enthused about Grand Challenge and very interested in being actively engaged
Jasper	Kok	Atmospheric and Oceanic Sciences	--	Professor Kok studies the impacts of dust on climate, and aims to quantify the impact of future dust storms on public health, precipitation and water resources, and light availability for solar panels.	Assessing the impact of dust on future water resources	N/A (regional scale)	Water	Water resource characterizatic	climate modeling, dust, water resources, precipitation	Alex Hall, Greg Okin	None yet (new professor)	N - Currently hiring (new professor)	0	--	--	--	http://www.atmos.ucla.edu/people/	--

Professor Name (First)	Professor Name (Last)	Department	Mission statement or Quote	GC Research Description	Application to achieving Grand Challenge targets on a regional scale	Application on campus (potential for living labs)	Research Concentratio	Research Concentration Sub-category	Research sub-sub category and keywords	Collaborators	Post-Docs and Grad Students (working on GC projects)	Undergrads (past or current)	# UG per year	What undergrads would be doing	Skills recommended prior to lab work	Fun Facts	Professor Website	Other Notes (eg. affect, opinion on GC, etc.)
Adrienne	Lavine	Mechanical and Aerospace Engineering	Dr. Lavine's research addresses various aspects of heat transfer, including thermal energy harvesting, temperature control for nanomanufacturing, thermal aspects of manufacturing processes (e.g. grinding, cutting, and plasma spray), and thermomechanical behavior of shape memory alloys.	Dr. Lavine's Sunshot Program focuses on making solar energy more affordable by developing cheaper methods and materials for storage. Ammonia Recombination: Working with an ammonia-based thermochemical reaction to fuel synthesis.	Energy storage	Small-scale idea (but not direct application of research) is solar thermal dishes which concentrate energy on focal point with engine to generate building electricity (1 dish ~25 kW)	Energy	Energy storage	thermochemical storage, exothermic ammonia recombination, solar power, solar thermal, energy	Y Richard Wirz, Miguel Garcia Garibay, Kavahpour	Ioan Hong (Dennis) Chao, Louis Tse, Gabriela Bran-Anleu, Ben Furst, Audrey Pool O'Neal	Y	1	They typically would be pursuing their own work and interests.	--	--	http://www.mae.ucla.edu/people/	Our first interviewee!
James	Liao	Chemical and Biomolecular Engineering	--	Professor Liao is currently working on developing biological approaches to produce drop-in liquid fuels, particularly from renewable resources. These include cellulosic materials, waste proteins, and carbon dioxide. These processes will cut down net CO2 production. He also works on converting abundant natural gas to liquid fuel reduce carbon dioxide emission.	One of Professor Liao's goals is to produce liquid fuel from CO2 and waste materials with the help of sunlight. This will produce a carbon neutral society depending largely on renewable energy. So far his team has demonstrated the feasibility of converting CO2 to liquid fuel using solar cell-derived electricity.	Each campus generates lots of waste materials. The technology we developed can be used to convert such materials to liquid fuel usable in transportation.	Energy	Energy harvesting	sunlight, CO2, carbon neutral, fuel, solar power, waste-to-energy, opportunities	David Eisenberg, Todd Yeates, Jim Bowie, Rob Clubb, and Matteo Pellegrini.	Graduates: Alec Jaeger, Chang-Ting Chen, David Wernick, Derik Chuang, Fabienne Duchoud, Igor Bogorad, Jeni Takasumi, Jimmy G Lafontaine Rivera, Lemuel Soh, Matthew Theisen, Paul Lin, Sammy Pontrelli, Shanshan LUO, Sio Si Wong, Xiaoqian Li Post-docs: Avinash Srivastava, Ethan Lan Tony Wu, Yu hong, Yun Lee	N	8	Undergraduate students typically will assist graduate students or postdocs to perform experiments. After gaining some experience, they may take on independent tasks to investigate a specific question.	General knowledge of molecular biology and microbiology essential for laboratory work, but can be trained along the way. Computer skills and math background are useful for modeling projects.	Swims as a hobby to exercise, and read novels when traveling.		
Anastasia	Loukaitou-Sideris	UCLA School of Public Affairs	--	Professor Loukaitou-Sideris' research focuses on the public environment of the city, its physical representation, aesthetics, social meaning and impact on the urban resident. Her work seeks to integrate social and physical issues in urban planning and architecture. An underlying theme of her work is its "user focus"; that is, she seeks to analyze and understand the built environment from the perspective of those who live and work there.	More about built environment, less about specific water and energy use	More about built environment, less about specific water and energy use	Urban Design		urban design, public space, build environment, biking, public transportation, light rail, parklets, walking, water, parks, public health, architecture	Dana Koff		Y		pedestrian counts	the ability to speak other languages Ex Korean and Spanish.		http://luskin.ucla.edu/anastas	
Shaily	Mahendra	Civil and Environmental Engineering	I'm going to quote Dumbledore again: "It's not just our abilities but our choices that define who we are" "It's our choices that show who we are, far more than our abilities"	Dr. Mahendra's laboratory pursues research projects employing microbiological, molecular biological, and isotopic tools. Thus, a comprehensive study of the implications and applications of the biotechnology and nanotechnology revolutions will enable us to use their benefits without environmental and public health liabilities.	She works with microbes that are already in the ground and helping clean the toxic water as it is being pumped out, but also underground, called "in situ" remediation. identify the problem, how much is out there and what kind of ecological/human health problems there are, how spread is the problem, and figure out how long the earth can restore itself (natural attenuation)....	She collaborates with those working in mech/chem/civil engineering. May pilot work on campus: ex: producing eiectricity and clean water from sewage (might start with dorm cafeteria), set up a 50 L reactor. Largest contribution is training students about these issues....many grad students stay in the area	Water	Water treatment	UCLA, diversity, communication, fungi, bioremediation, bacteria, sustainability, isotopes, biostimulation, nanomaterials, water quality, clean water, clean energy, energy-water nexus, desalination, sewage treatment	Eric Hoek, Yoram Cohen, Richard Kaner, Laurent Pilon, Michael Stenstrom, Jenny Jay	Post doc Phillip Gedellanga, Linda Tsung, phd: Peerapong Pornwongthong (ice), Vince Reyes, Nancy Tseng: Shu Zhang, Meng Wang Masters: Michelle Meyers	Y	10	Work under a PhD/grad student, looking at water samples, take notes from observing the PhD/grad, and will take an independent approach after initial training. They could also grow fungi, collect spores, blend them up and test them.	Fundamentals, but don't need to be cultured in the discipline yet; focus, fresh ideas.		http://www.cee.ucla.edu/faculty/s	
Jonathan	Mitchell	Earth, Planetary, and Space Science	"We're teachers and I see getting students interested in these problems as a prime role in teaching"	Studies climate from models, focusing on the last glacial maximum (LGM), studying variation between climate models and regional impacts. Characterizes precipitation by telling the history of SoCal and the rest of the Midwest's hydrology.	(1) Water resource characterization: future of California's precipitation and impact on water availability	N/A (regional scale)	Water	Water resource characterizatic	climate modeling, climate change, dynamic systems, precipitation, water source, jet stream, local climate, Earth	Aradhna Tripati, David Neelin	1 post-doc and 3 grad students	Y	1	--	--	--	http://www2.ess.ucla.edu/~mitch/	Welcomes undergraduate involvement
David	Neelin	Atmospheric and Oceanic Sciences	"You need to know the future you are trying to be sustainable in the face of."	Studies climate models and links between precipitation patterns between latitudinally varying locations (eg. ocean deep convection impact on precipitation patterns between rainfall in tropics and LA rainfall)	(1) Water resource characterization: future of California's climate and rainfall and impact on water availability	N/A (regional scale)	Water	Water resource characterizatic	climate modeling, precipitation	Alex Hall	4 grad students, 4 post-docs	N	0	--	coding, math, statistics	--	http://web.atmos.ucla.edu/~neelin/	--
Greg	Okin	Geography	"To ensure that sustainable energy development is done sustainably"	Professor Okin currently focuses on wind and solar, but not considering desserts due to potential impacts (eg. placed along I10 where already many car accidents & solar installations are placed on large rocks on top of a lyer of fine wind-blown sand dust, therefore rocks are removed first, leaving thick, erodable layer of sand dust. In short term, sand dust can be taken care of by calcium chloride, but long term no plan to rehab sites. In regards to desserts; if you disturb past a certain point, it leads to a complete change, such as a high degree of wind-blown sand which kills people and leads to fatalities and car accidents)	Application of wind and solar technology as a renewable energy	Field and lab work could be done on campus, but research cannot be applied on campus (measurements of erosion, grain size & particle size)	Energy	Energy harvesting	deserts, water, solar power, sustainable energy harvesting, consciousness	Jasper Kok, Yonkang Xue, Alex Hall	Post-doc: Nick Webb Graduate: Kebonye Dintwe	Y	2	5-6 undergrads would go to Botswana, sample prep sieving soils and measure sample qualities.	Independence, for students who go into field they need ability to handle hard situations, flexibility, determination, have lab experience (eg. backpackers)	Garden, take care of child, dive, vacation	http://www.sscnet.ucla.edu/geog/fa	Sees a lot of opportunity for undergrads in fieldwork
Vidvuds	Ozolins	Materials Science and Engineering	Using inexpensive custom-designed molecular building blocks, MEEM aims to create revolutionary new materials with self-assembled multi-scale architectures that will enable high performing energy generation and storage applications.	Dr. Ozolins optimizes energy harvesting and storage technologies, specifically in solar PV cells and supercapacitors, and works on technology that uses thermoelectrics to capture waste heat and convert it into electricity.	(1) Energy generation: PV cells; (2) Energy storage: batteries and supercapacitors	Unsure of potential for thermoelectrics. we don't do much burning. Solar panels, generating electricity	Energy	Energy harvesting, storage & conversion	kinetic processes, high-performing materials, energy harvesting, energy storage, energy conversion, hydrogen storage, thermoelectrics, supercapacitors, nuclear fuels, allows, nanoscale self-assembly, solar photovoltaics, electricity, waste-to-energy, opportunities	Bruce Dunn, Yang Yang, Sarah Tolbert, Ben Schwartz	http://meem.ucla.edu/members/	N	0	Computations, data visualizations	Programming, computing, data visualization, physics & math background	Read, music (classical), walks	http://meem.ucla.edu	--
Edward	Parson	Law School	Has not yet made one (new professor to UCLA)	Professor Parson conducts research on evaluating environmental law and policy, such as pollution policy and energy incentive policy.	Professor Parson's research could be applied on a city level to enable policies, laws, institutions, incentives, bargaining, and technology to facilitate climate change mitigation and adaptation.	N/A (regional, national, and international scale)	Environment Law and Policy	International policy	environmental law, incentives, policy, pollution, adaptation, sustainability	Tim Brewer & Sustainability Task Force		N (but has worked w/ undergrads in past at other schools)	0	Environmental policy, law & institutions research projects; (topic example: how policy and regulation did/didn't drive innovation in technology); research on governance and regulation challenges posed by climate change engineering	Knowledge and background in conomics, politics and policy, basic physical science			
Qibing	Pei	Materials Science and Engineering		Professor Pei is currently researching energy harvesting and generation via piezoelectrics, or electro active polymers. When these materials are placed beneath a substrate and physically deformed by work done on them, (such as polymers put under the sole of one's shoe) they store mechanical energy, (such as the energy from the compression of the rubber in a shoe sole), which can then be converted to electricity. This can be applied on a larger scale, such as on highways and other areas with high volumes of mechanical impact.	(1) Energy generation: Using piezoelectrics on highways and streets to capture mechanical energy from traffic above, then use it to generate electricity	(1) Energy generation: Using piezoelectrics on streets to capture mechanical energy from traffic above, then use it to generate electricity	Energy	Energy harvesting	piezoelectrics, polymers, energy source, mechanical energy, energy density, wave energy	Kang Wang, Christopher Lai	Dr. Liang (post Doc), Dustin Chen (Grad),	Y	5	--	--	--	http://www.seas.ucla.edu/ms/facu	--
Laurent	Pilon	Mechanical and Aerospace Engineering	--	Dr. Pilon is currently working on a number of projects related to energy, including energy harvesting and storage. Regarding energy harvesting, he is working to Produce biofuels using photosynthetic microalgae, which would also have the capacity to capture CO2 emitted from industrial plants. Also regarding energy harvesting, he works on converting waste heat into electricity. Regarding energy storage, he is developing materials to improve the performance of supercapacitors.	Dr. Pilon's research could be taken and incorporated into new buildings, and further iproving energy storage as we move towards various forms of renewable, but intermittent, energy technology. Reducing energy consumption by examining building materials, developing waste heat harvesting technology to convert it to electricity.	(1) Energy storage, (2) Energy harvesting: capturing waste heat	Energy	Energy harvesting and storage	energy storage, energy harvesting, supercapacitors, microalgae, biofuels, photosynthesis, electricity, waste-to-energy, opportunities	Gaurav Sant, Bruce Dunn, Vidvuds Ozolins, Sarah Tolbert	Anna D'entremont	Y	4	They start by helping graduate students and later begin to take up their own projects depending on their own interests and time.	--	--	http://www.mae.ucla.edu/people/	He likes to encourage undergraduates to contact professors and find a research lab and be proactive, encourage them to not be intimidated. He sees it as a way to connect, recruit, continue teaching, continue research, and provides valuable lessons for students.
Stephanie	Pincetl	loES	The mission of the CCSC is to create actionable science that improves the sustainability of urban systems. It is to provide the intellectual and conceptual framework for new synthesis and thinking in sustainability research	Dr Pincetl has ongoing research funded by the California Energy Commission PIER program developing an urban metabolism framework for state energy analysis. She has received funding from the National Science Foundation to conduct collaborative research with biophysical scientists on urban ecology and water management in Los Angeles. Her interests include: land use, land use change, with a focus on urban environments and the transformation of their natural environments, the ways that rules and rulemaking impact the participants in decisionmaking and the content of decisions, how institutional rules construct how natural resources and energy are used to support human activities, and how rules form the boundaries of what is perceived of as possible.	Electricity and water with LADWP, Burbank, Glendale. Mapping electricity use in the LA county by census block group & class (industrial, residential, etc.)	Larger spatial scale, therefore will not work on UCLA	Energy and Water	Energy and Water use	urban metabolism, electricity use, energy, policy, natural gas, GIS	Matthew Kahn	4 post-docs, 1 senior staff researcher, 1 project manager, and an admin-master	Y	3	Researching policy initiatives in natural gas, electricity, etc. (legislation, etc.), writing policy briefs, GIS mapping, Statistics (data interpretation), literature reviews, and research projects	GIS, Statistical analyses (eg. experience w/ R), basic writing skills, synthesis	Gardening	http://sustainable	
Vwani	Roychowdhury	Electrical Engineering	"Sustainability efforts will hinge around mass adoption and consciousness of lifestyle, therefore my goal is to generate actionable and decision making information. "	Dr. Roychowdhurry focuses on generating actionable information, meaning information that an energy or water consumer can use and do something about. He focuses on developing sensors which provide real-time feedback to the user, providing people with information and choices about how they can alter their energy use.	"People's decisions are dependent upon their options and priorities, and providing actionable information with which people can interact and see that their making a difference is likely to play a large role in altering behavior."	(1) Awareness: a. in dorms set a goal and provide feedback and information about how to change one's footprint, b. Seminars and classes for education, (2) Developing technologies: competitions to come up with devices and sensors that one can build for energy savings (eg. what kind of informational feedback will make people change or optimize their actions, how do you incentivize a household to decrease its footprint), (3) Application of Story Understanding: sell a combination of fear of climate change impacts and a path toward sucess, and use information that motivates people to rise up and do something on campus	Energy	Energy use	energy sensing technology, actionable information, effecting action, social media, sustainability, lifestyle, awareness, informational needs, waste-to-energy, opportunities	Tangherlini, Bastani	Bandari (Post-Doc), Lichao Chen (PhD), Misigh Falahi (PhD), Mikhail Simkin (Post Doc), Ansuya (Masters)	Y	2	Parsing data, using natural language processing to interpret social media, cloud computing, setting up infrastructure	Software, coding, computer science, text processing, natural language processing, ability to pick up a software package and use it	Hiking, reading, play with son	http://www.ee.ucla.edu/people/	Very interested in big picture of sustainability & society. Interested in social scientists developing a new economic model which isn't based on "the growth of corporate America killing nature" and "unbridaled, unchecked trinket consumption", figuring out how do you have innovation and a good standard of living and happiness without the frenzy of consumption
Sassan	Saatchi	loES	"Quantifying the role of trees in climate change and the global climate cycle"	Dr. Saatchi studies the potential of tree cover in urban areas in mitigating the impacts of climate change at a local level by mitigating heat thereby reducing the amount of energy used for air conditioning. He does this by using satellite remotely sensed data and rainfall data to quantify tree cover, the absorption of heat, creation of shade, and reduction of the urban heat island effect.	Advise which trees might be planted to reduce energy demand regionally.	Advise which trees might be planted to reduce energy demand on campus	Energy	Energy use	tree cover, urban heat island, air conditioning, energy efficiency, energy demand, remote sensing, mitigation, GIS	Tom Gillespie, Alex Hall, Stephanie Pincetl, Sork, NASA	--	Y	1	Learn how to use spatial data (either ground or satellite in GIS & ENVI) and perform statistical analysis	Student should expect the responsibilities of data analysis and project delivery, and have basic knowledge of remote sensing, GIS, and statistics	NA	http://www.environment	Supports student involvement, wants students to be prepared, to participate, and to provide them with educational and skill backgrounds

Professor Name (First)	Professor Name (Last)	Department	Mission statement or Quote	GC Research Description	Application to achieving Grand Challenge targets on a regional scale	Application on campus (potential for living labs)	Research Concentratio	Research Concentration Sub-category	Research sub-sub category and keywords	Collaborators	Post-Docs and Grad Students (working on GC projects)	Undergrads (past or current)	# UG per year	What undergrads would be doing	Skills recommended prior to lab work	Fun Facts	Professor Website	Other Notes (eg. affect, opinion on GC, etc.)
Gaurav	Sant	Engineering	Professor Sant aims to rationalize use of natural resources in construction, promote environmental protection, and advance ecological responsibility in concrete construction industry	Dr. Sant focuses on designing cement's chemical composition so that manufacturing produces 50% less carbon emissions and significantly less energy. He is developing cement composed of waste ash from coal combustion. He is also developing thermally adaptive building insulation using dynamic and responsive materials to reduce building electricity consumption by 25%	This research would provide lower energy consumption for building in LA.	Energy Efficiency: This research would provide lower energy consumption for building at UCLA.	Energy	Energy efficiency	CO2, energy requirement, efficient buildings, dynamic materials, waste-to-energy, opportunities, adaptive insulation	Dino Dicarlo (cements), Laurent Pilon (energy efficient buildings)	http://www.cee.ucla.edu/faculty/sant/students	Y	10	Buildt technical talent, sometimes result in publication	Engineering background	--	www.lcc-ucla.com	Very energetic and enthusiastic about his work, very friendly
Abdon	Sepulveda	Mechanical and Aerospace Engineering	--	Sepulveda works to increase energy storage through ammmonia storage, with a focus on engines. His plan is to build a prototype in Los Angeles to measure ammonia efficiency and emissions with the ultimate goal of scaling down the concept of ammonia tranformation of energy for household use. He is also working with nanomotors and nanomemory to optimize energy efficiency and minimize size. Lastly, Sepulveda works with capturing wasted heat energy using ferromagnetic materials.	Dr. Sepulveda works on improving thermochemical energy storage from hours to months via ammonia storage-- no carbon electricity generation.	Testing ammonia fuel was originally planned for campus work, but they received donated land with better-equipped facilities.	Energy	Energy storage	waste-to-energy, opportunities, energy efficiency, energy storage, thermochemical reactions, nanomaterials, energy harvesting, regenerative breaking	Adrienne Lavine, Tsu Chin Tsao, Davenport, Sisnchmeir, industrial partners (Turman)	About to hire post doc & grad student	Y	10	Students would be thinking out of the box and learning about the big picture. Currently, his undergrads are harvesting nanomaterial energy.	--	--	http://www.mae.ucla.edu/people/	Always tries to have undergrads in his lab
Mani	Srivastava	Electrical Engineering	"My goal is to have fun! I pick topics which I personally enjoy, and energy happens to be one of those. But I also aim to make buildings smarter and create cheap energy use monitoring technology."	Dr. Srivastava develops sensing technology to sense energy use, instantaneously control building systems, and influence energy user behavior.	(1) Detect sprinkler use policy violations (eg. provide LADWP w/ sesnors to detect when policies are being violated), (2) Develop sensors to determine energy demand by appliance and user, both for new buildings and older buildings	Already occured: instrumented 25 labs in Boelter labs w/ sensors that measure energy use and desegregation (apportionment to individual users), and used algorithms to split energy use by appliance/energy user, and provided users with the information to figure out how this information affected their behavior	Energy	Energy use	energy sensing technology, behavior, instrumentation, efficient buildings, energy efficiency	Bill Kaiser	Kevin Ting (Masters)	Y	3	Software development, data collection and experiment running, dependent upon seniority level	Any skill! Try to find a project for student instead of student find project for themselves. Software skills, how to present information, user interfaces, math, physics	In my research, I pick topics which I personally enjoy, and that is fun for me!	http://nesl.ee.ucla.edu	Very enthused about his work
Michael	Stenstrom	Civil and Environmental Engineering		Dr. Stenstrom works on technology to generate local water with a low energy footprint by treating wastewater to potable standards and reclaiming it. This is also known as distributed water treatment, meaning the water is reclaimed at a local level, reducing the urban energy footprint by eliminating the need for long distance water pumping and reducing the urban waste output by treating wastewater and making it usable. Another one of Dr. Stenstrom's projects involves developing a tool to help energy plants locate their projects in places that maximize energy conservation.	This research could apply to Grand Challenge targets by supplying LA with local water by applying water reclamation and distributed treatment technology.	This research could supply the campus with local water by applying water reclamation and distributed treatment technology	Water and Energy	Water treatment and Energy use	water treatment, water reclamation, energy efficiency, local water, water recycling, waste-to-energy, opportunities, greywater	Rosso (from UCI)	Naik, Ben Li	Y	1	Paper studies, data management, data mining, surveys for collecting data	Prefer life science students who have better lab skills needed than engineering	Photography, spending time with his 8 year old daughter	http://www.seas.ucla.edu/stenstro	
Jonathan	Stewart	Civil and Environmental Engineering	"I'm an earthquake guy. I work to characterize earthquake risk and develop strategies to harden infrastructure."	Dr. Stewart focuses on the risk of earthquakes affecting the LA water supply. He characterizes earthquake risk to develop strategies to make the infrastructure more resistant.	This could help make the infrastructure in LA more resistant to natural disasters affecting the water supply.	This could help make the infrastructure at UCLA more resistant to natural disasters affecting the water supply.	Water	Water supply vulnerability to natural disasters	earthquakes, water supply, aqueducts	Profs/Agencies: Scott Brandenberg, Ann Lemnitzer (UCI), Dept of Water Resources, MWD, Japan. Grad Students: Dong Youp Kwak (about to graduate), Ali Shafiee, Sam Ynesita, Ricardo (from UCI)	http://www.cee.ucla.edu/faculty/stewart/students	Y	0	Data crunching from Japan earthquake & water system data, soil processing, literature review & sorting through earthquake studies on aqueduct systems	Familiarity with library system & online access to journal articles, databases, etc.; if working on earthquake test data, must have engineering background	Spend time with his 4 kids, coach softball, go hiking, mountain sports (kayaking, backpacking, skiing)	http://www.cee.ucla.edu/faculty/	
Irwin	Suffet	School of Public Health	"To create safe, healthy, drinkable and smell-able water and air"	Dr. Suffet studies the fate of toxic and odorous chemicals in air and water, including carcinogens such as nitrosoamines, pesticides such as pyrytheroids, and odorous chemicals such as MTBE.	Ensure safe and drinkable water supply	Ensure safe and drinkable water supply; (1) Study creek in Botanical Gardens & Stone Canyon Creek; (2) Study drinking water quality probnlns on campus (eg. fountains, lead piping, odors, flavors), (3) Study contaminants in reclaimed water if that becomes a source	Water	Water treatment	water contaminants, water quality, clean water, safe water, water treatment		6 PhDs (from EHS, IoES & public Health); 5 Masters (from Public Health)	Y	3	--	Background in chemistry, physics, biology, and organic chemistry, compuster skills, and statistical analysis abilities	Sports fan (eg. bike riding and paddle tennis nowadays, but used to play basketball and softball), organic gardening	http://ph.ucla.edu/faculty/i	Very friendly and interested in involving undergrads
Pablo	Tabuada	Electrical Engineering	--	Dr. Tabuado focuses on renewable energy on a small scale, model algorithms, and model systems to create feedback loops to correct speed of machines and maintain good power quality	This research would be applied regionally by creating feedback loops to correct the speed of machines and maintain good power quality.	On campus, the research would be applied with the same algorithm but on a smaller scale. For example, with micro-grid level application, big suppliers could request that campus behave in a certain way on the order of minutes or hours, so the campus will be required to reduce/alter power consumption, and then return energy at cheaper price.	Energy	Energy use and efficiency	feedback loops, computer science, algorithms, energy harvesting, power,	Doerfler, Rajit Gadh	1 post-doc, 6 PhD	Y	3	Come up with simple and effective ways of conveying information	--	--	http://www.seas.ucla.edu/~tabuac	--
Ertugrul	Taciroglu	Civil and Environmental Engineering	"I hope to make information available to the public so that informed decisions can be made with respect to hazard resilience for infrastructure, whether public or private" "Information is power and we don't have this information. There is a big gap between where we're at and what we can do. The necessary information is attainable"	Dr. Taciroglu is currently building a computer program which takes satellite images on a street scale and analyzes the buildings in the images to provide information about their ability to deal with earthquakes.	Dr. Taciroglu's program will allow for monitoring of the city's structural health, and determine in which areas the city should grow and in which it should recede. In his words, "sustainability isn't just how much energy or water you're consuming. Sustainability is considering how much energy you're using to go to work, to build your house, and every other component of one's lifestyle.	Pilot studies have been conducted on campus buildings, where aerial images were taken of Boelter and used to produce a structural model, while seismic instruments were placed on Boelter to take actual measurements, and the model was compared to the actual data to assess accuracy and improve the model.	Tangent	Earthquake succeptibility	earthquakes, infrastructure, computer programming	Jahanshahi, Dianne Favro, Michael Rocchio,	http://www.cee.ucla.edu/faculty/taciroglu/students	Y	5	Taking photographs, operating helicopters for aerial imagery, working on algoritms to help process data, simulating earthquakes to determine potential damage	Civil engineering background, MatLab, computer programming, image processing	--	http://www.cee.ucla.edu/faculty/t	Article on EQ risk: http://articles.latimes.com/2014/mar/15/local/la-me-0316-lopez-lucy-20140316
Sarah	Tolbert	Chemistry and Biochemistry	"I think it could be phenomenal. I think that energy is a topic that could unite people in all fields. It has a huge potential to bring new funding opportunities and bring people together."	Dr. Tolbert works in energy research, developing low-cost solar PV cells and energy storing pseudocapacitors.	(1) Energy harvesting: low cost solar PV; (2) Energy storage: Pseudocapacitors	(1) Energy harvesting: low cost solar PV; (2) Energy storage: Pseudocapacitors	Energy	energy storage	solar photovoltaics, energy generation, pseudocapacitors, nanoscale materials, polymers, collaboration	Storage: Bruce Dunn, Laurant Pilon. photovoltaics: Ben Schwartz, Ebie Ruben, Dannie Newhauser	http://tolbert.chem.ucla.edu	Y	3	fabrication and testing of nanostructured materials	Chemistry (1-2 years of chemistry classes), basic physics	--	http://tolbert.chem.ucla.edu	One of the original founders of the Grand Challenge, believes that it has huge potential and wants university to back and fund it more fully
Aradhna	Tripati	Earth, Planetary, and Space Science	"There's a lot of uncertainty and we need to minimize that and get people talking across disciplines." "In my students, I aim to foster cognicence of issues and a willingness to communicate to the public"	Dr. Tripati's research involves studying paleoclimates to establish climate baselines and determine how water availability has changed over time. This information will help improve climate models to predict future water budgets.	Dr. Tripati's research will help to produce projections of Los Angeles' future water budget, and help inform decisions on where Los Angeles should get its water.	N/A (regional scale work)	Water	Water resource characterizatic	climate modeling, water resources, isotopes, climate change, science communication, community, storms	Neelin, Mitchell, Eagle	http://atripati.bol.ucla.edu/Site/Group.html	Y	5	Preparing soil samples, using mass spectrometers to measure carbon dioxide mass, community outreach for climate change education	Background in basic science	In her undergrad class, Dr. Tripati holds a film festival where students create videos about climate change awareness	http://atripati.bol.ucla.edu/Site/We	
Tsu-Chin	Tsao	Mechanical and Aerospace Engineering	--	Dr. Tsao Has three projects which are applicable to the Grand Challenge, including (1) the Internal Combusion Clean Energy (ICCE) Project, (2) the Electric Power Control Optimization (EPCO) Project, and (3) the Energy Efficient Buildings (EEB) Proposal . The ICCE project involves using ammonia natural gas as an input to a combustion engine to generate electricity, which has the potential to power electric vehicles and provide electricity. The EPCO project involves converting energy from a harvesting source (eg. solar or wind) to electricity or storing in it a storage device, using demand-response systems to meet demand. The EEB proposal involves the use of a portfolio of advanced efficiency solutions (DON-13-301) to improve building efficiency.	(1) Electricity generation and electric vehicle fueling via natural gas engine; (2) Energy harvesting, generation, and smart grid facilitation using on EPCO demand-response systems (3) Building efficiency via DON-13-301 methods	(1) Electricity generation and electric vehicle fueling via natural gas engine; (2) Energy harvesting, generation, and smart grid facilitation using on EPCO demand-response systems (3) Building efficiency via DON-13-301 methods	Energy	Energy Efficiency	energy conversion, natural gas, ammonia, advanced control, demand-response systems, energy demand, feedback loops, energy efficiency, clean energy	Vandenberg (CIEE Project); Pilon & Sant (EEB); Clean energy and combusion (Peter Sinsheimer)		N	0	Undergrads could be involved in trace studies, comparing different fuels and loking at their relative efficiencies, emissions, and other characteristics	Background in physical science and/or engineering	Tennis	http://www.maclab.seas.ucla.edu/index.shtml	
Kang	Wang	Electrical Engineering	"My work goes toward the sustainable progress of mankind. I believe sustainability is to perform work by using natural energy sources and minimizing energy consumption. Sustainability isn't just saving or not using, but using in a smart and efficient way."	Dr. Wang works on two primary Grand Challenge research projects. The first of these is aimed at cultivating energy using solar photovoltaic cells, and the second focuses on energy efficiency via reducing the energy consumption of electronics while enabling them to maintain the level of functionality and perform the same tasks.	(1) Energy harvesting: Solar PV; (2) Energy efficient devices	(1) Energy harvesting (eg. via solar PV); (2) Energy efficiency, specifically that of buildings	Energy	Energy harvesting; Energy efficiency	solar photovoltaics, energy efficiency, sustainability, community, efficient buildings, electronics, computer programming	Materials Science (Pei, Yu Huang), Benjamin Schartz Chem/Biochem, Greg Carmen, Christ Lynch, Jane Chang, Sarah Tolbert, Mathematicians, Physics (Tserkovnyak)		Y	7	Work would be tailored to undergraduate background. Often work with data storage and memory, new materials (nanomaterials) in photovoltaics cells, theoretical analysis, and processing and testing of devices. Dr. Wang is also interested in having students understand the big picture, not just the specifics of their research focus.	Any physical science background, (eg. chemistry and physics, electrical engineering, & computer science)	Hiking	http://drl.ee.ucla.edu	Asks of grand challenge/university: Support (financial), our mission in line w/ UC mission, and must stay focused on mission instead of getting distracted, often organizations due to management & financial situation can be more businesslike w/ profit oriented goal, and loose mission; Institution of education to produce knowledge and teaching & social service for greater los angeles & community
Richard	Wirz	Mechanical and Aerospace Engineering	"I aim to understand the fundamental to solve real world problems. If we want urban generation, we have to think of it in an artistic way."	Dr. Wirz's research focuses on two aspects of energy: generation and storage. On the generation side, his lab explores wind energy, looking at both (a) conventional large-scale wind turbines, where he focuses on increasing energy output by making blades more robust, and (b) small-scale urban wind, where he focuses on the potential for installing wind turbines on top of cell phone towers to provide baseloads and distributed loads. In energy storage, the lab has two projects, the first of which involves storing heat in fluid, and the second of which involves making efficient, large-scale electrical batteries for thermal energy storage. He hopes to play a part in making Los Angeles self sustaining from an energy and water perspective.	(1) Energy harvesting: (a) conventional large-scale offshore (largest wind energy resource in SoCal) and (b) urban wind (wind energy on home-scale to provide baseload power and distributed loads, eg, cell-phone towers); (2) Energy storage: (a) latent and speccific heat storage in fluid as heat and (b) large-scale electrical battery using thermal energy storage	(1) Energy generation: urban wind; (2) Energy storage: (a) latent/specific heat storage (b) large-scale electrical battery for thermal energy storage	Energy	Energy harvesting; Energy generation	wind, urban wind, thermal energy storage, latent heat storage, electrical battery storage	Adrienne Lavine, Pirouz Davapour, Miguel Garcia-Garibay, Rjit Gadh, Hirsch Pearlman	http://www.wirz.seas.ucla.edu/people	Y	3	Integrate technologies, system-level work to ensure systems integrate well (eg. urban wind on buildings, system analysis and mechanical engeineering), assist in system construction (eg. physically putting together components), taking measurements and evaluating performance	Mechanical skills (eg. ability to soder, operate a screwdriver and other tools), use of CAD (computer aided software)	Rides and repairs motorcycles, acoustic rock singer/songwr (songs have been put on movies and TV!), spending time on beach	http://www.wirz.seas.ucla.edu	Recommendation: campus initiative instead of a small group of professors here and there; highly encourage undergraduate involvement and breed a culture b/c better if we had more students recycling and doing things that are good to the environmental and better educating them on energy and water conservation, and i don't see that in the culture, and it would be nice to get some fostering of that
YongKang	Xue	Geography	"I try to find out the relationship between terrestrial landscape and climate, and how human influence induces climate change in the future."	Dr. Xue works to research the relationship between climate and the terrestrial landscape, and it's implications for water resources.	Climate modeling and water resource characterization	N/A (regional scale)	Water	Water resource characterizatic	climate change, climate modeling, water, drought	--		N	0	Modeling, and statistical and data processing	Statistical and data processing skills, modeling skills	Physical exercise	http://www.environmen	

Professor Name (First)	Professor Name (Last)	Department	Mission statement or Quote	GC Research Description	Application to achieving Grand Challenge targets on a regional scale	Application on campus (potential for living labs)	Research Concentratio	Research Concentration Sub-category	Research sub-sub category and keywords	Collaborators	Post-Docs and Grad Students (working on GC projects)	Undergrads (past or current)	# UG per year	What undergrads would be doing	Skills recommended prior to lab work	Fun Facts	Professor Website	Other Notes (eg. affect, opinion on GC, etc.)
Yang	Yang	Materials Science and Engineering	Professor Yang works on solution processable thin film electronic devices, and uses various kinds of materials to pursue highest performance at a low cost.	Professor Yang is conducting research on new solar photovoltaic cells that exhibit an increase in versatility, compared to the crystallized cells.	Professor Yang affirms these new thin film flexible and transparent solar cells can be mounted to a variety of substrates.	Plans to replace windows with transparent solar cells, and application to university utility truck windshields.	Energy	Energy harvesting	solar photovoltaics, nanomaterials, organic solar cells, polymers, high-performance	Bruce Dunn, Sara Tolbert, Richard Kaner	http://yylab.seas.ucla.edu/labmembers.aspx	Y	4	*Unsure of what undergraduates do in his lab	A strong and dedicated mind, basic physics/chemistry, strong curiosity	Reads Japanese history during his free time	http://yylab.seas.ucla.edu/	Questions undergraduate commitment to lab, doesn't actually know what current undergrads in his lab do