

# KAUST INVESTIGATOR

## *A conversation with Bruce Logan*



Bruce Logan, Kappe professor of environmental engineering, received a highly selective KAUST Investigator award last year from the King Abdullah University of Science and Technology (KAUST). Logan will receive up to \$10 million over the next five years to investigate microbial fuel cell technologies that convert waste into electricity or hydrogen and in the process, clean water.

KAUST is being built in Saudi Arabia as an international, graduate-level research university dedicated to inspiring a new age of scientific achievement. The University is scheduled to open in September 2009.

KAUST established the Global Research Partnership (GRP) to enable world-class scientists and researchers from leading institutions to collaborate in solving challenging and technological problems facing Saudi Arabia, the region and the world.

The Investigator grant provides 5-year grants to accomplished and promising scientists or engineers at leading university-based laboratories. Logan is 1 of 12 scientists selected from a pool of nominees that featured more than 60 submissions from some of the world's leading research universities.

**Q:** *What is the nature of the research that will be conducted with this grant?*

**A:** My proposal was on the energy sustainability of the water infrastructure. The purpose of this grant is to look at ways to ensure both the sustainability of the potable water

delivery to people around the world as well as wastewater treatment. There are approximately 2.5 billion people that lack adequate sanitation around the world and a billion people that do not have access to potable drinking water. Drinking water can be produced and wastewater can be treated, but the energy that it takes to do that is not sustainable for most of the globe. What we are trying to do is look to close that loop to produce enough energy from wastewater that it could both treat the wastewater and provide potable drinking water.

**Q:** *Can you explain a little about the award process. How did you learn that you were nominated and how did you learn that you were selected?*

**A:** The nomination process began with KAUST inviting thirty universities from around the world to submit two names of people that would be potential KAUST investigators. Out of those sixty nominations from thirty universities, twelve people were selected. I didn't find out about the award actually

until about six days before I received it. I was on travel in Chicago and I was listening to my email messages on my phone when I heard a cryptic message of the kind you often see in your e-mails about you have won \$10,000,000 or something like that. Actually the e-mail said "regarding your proposal to KAUST please see attached," but since I was in a cab I couldn't open the attachment. As soon as I checked in to my hotel, I went directly into the business office, went online, and opened the attachment. It said "pending the approval of the budget, you will be a KAUST investigator by Wednesday of next week and I said "wow." So it was really rather a surprise, a pleasant one of course, but six days from the time of hearing about it to the time of the award has to be a record for any grant process.

**Q:** *The award is a five year award. Could you give us details on the amount of the award and how the monies will be distributed during the five year period?*

**A:** The KAUST award for a GRP researcher is for \$10,000,000 over five years. So that is \$2,000,000 per year for five years.

**Q:** *What will the award be used to fund? For example, are you going to use it to fund graduate students, post docs, existing projects, or new projects?*

**A:** Well, first of all each GRP investigator puts together a team. In my case, my team consists of associate professor, John Regan; assistant professor, Mike Janik; and a research scientist, Shaoan Cheng. So part of that money goes to each of those Principal Investigators. We will have a post doctoral researcher as well as eleven students funded through the grant. There is also money for renovation of a laboratory to house the KAUST researchers as well as money for a demonstration project related to bioenergy production that will start to occur sometime next year.

**Q:** *Each investigator is expected to spend between three weeks and three months per year at the KAUST campus. What are your plans for visiting KAUST?*

**A:** The general plan is for each of the GRP researchers to spend a few weeks in Saudia Arabia on the campus probably around the December/January time frame. So we expect that probably two or three weeks in that time frame will be spent there – especially to meet with not only faculty, researchers, and students, but also other GRP investigators. Other time will probably be spent on an “as needed” basis. But this first year of the grant, I won’t be going to Saudia Arabia very much because the campus is not yet open. Once the campus opens in September 2009 this process of spending several weeks a year there will begin.

**Q:** *Will you be serving as an advisor for KAUST University students?*

**A:** Well, that is a good question. I think we are going to have to see how some things develop. The students

will be at that campus being advised by somebody there. But I am sure, like many collaborations, we can serve as co-advisors. We will probably host several of these students in our laboratory from time to time as well as send researchers from this laboratory over to KAUST to help them with different procedures or processes related to the research we are engaged in.

**Q:** *Do you think any Penn State undergraduate students will apply to graduate school at KAUST?*

**A:** I believe that several students have already applied for this program to go there as graduate students. I am not really knowledgeable about the details of that aspect of it.

**Q:** *Collaboration is an integral objective of the grant – how do you envision the collaborative process will work?*

**A:** I think we will start by going over and meeting with the faculty and looking at the research they are doing how we might be engaged in that research, as well as what expertise would be complimentary for the people at KAUST versus my own areas. Once we have identified those areas I think we can then begin to look at establishing projects that we each might have particular expertise in and that would move the project forward.

**Q:** *Are there any other specific requirements to the grant?*

**A:** There are no specific requirements other than those that are in a more general sense laid out in the proposal, which is to investigate microbial fuel cells that generate electricity from waste organic matter and to investigate microbial electrolysis cells, which is a process to generate hydrogen gas using a very similar type of process.

**Q:** *How will the intellectual property rights of the research funded through KAUST be handled?*

**A:** What KAUST did not want to do was to limit the universities to do research that they would own. That would be a difficulty for many

universities. So what the agreement is, is that anything that is discovered remains a part of the university; that is, the university owns it. However, the Kingdom retains the right to intellectual property within their boundaries. So, essentially if you discover anything you just don’t license it within Saudia Arabia and therefore they are free to use whatever information is discovered.

**Q:** *Given the state of the world economy, do you think it will have any impact on the award?*

**A:** I think that the University is already there. As far as I know, at least I hope, that this won’t be affected at all by the current financial situation. The university is in a very aggressive timetable in terms of construction start-up, funding and so forth. I don’t think anything that is occurring is going to affect that.

**Q:** *Receiving the award is quite an honor. In your opinion what do you feel is the best aspect of receiving this award?*

**A:** All of us, as investigators, know that it is very, very difficult to get grants. It is even more difficult to get a grant that runs over multiple years. So typically our grants go for one, two, three years. This is a five year grant. It is a very nice way to be assured of having funding for a long term project. We are, of course, very excited about having long-term funding for this project on bioenergy production, but the best part of receiving this grant is that it brings attention to the large amount of energy used for the water infrastructure. We hope that with this funding, we will be able initially to create zero-energy wastewater treatment systems, and then later to make excess energy that can be used to sustain our water infrastructure. ■

*Logan is the Kappe professor of environmental engineering, director of the Engineering Environmental Institute, and director of the Hydrogen Energy Center. He can be reached by email at [blogan@psu.edu](mailto:blogan@psu.edu).*

*For more information see: KAUST Engineering Environmental Institute Hydrogen Energy (H2E) Center*