

June 13, 2016 | By Tiffany Fox

## SmartCity Hackathon Connects the Data Dots on Behalf of Climate

Some blame the unchecked use of technology for the planet's ills, but the recent SmartCity Hackathon at the University of California, San Diego showed that smart use of technology might be what ends up saving it.

Participants made a strong case for this idea last week during the two-day competition, which was designed to transform climate-related data into solutions the City of San Diego can implement in support of its ambitious

[Climate Action Plan](#). The City's CAP was adopted

earlier this year and calls for reducing greenhouse gases to 20 percent below 1990 levels by 2020, 40 percent by 2030 and 80 percent by 2050.

Two teams affiliated with the UC San Diego Qualcomm Institute (QI) competed against more than 200 software developers and technology designers for \$5,000 in prizes, an hour of quality time with Electric Imp co-founder and CEO Hugo Fiennes (an early advisor of the famed Nest Labs) and the chance to see their ideas implemented in a city threatened by drought, wildfires and other impacts of climate change.

Taking home the prize for the "Best in IoT" (Internet of Things) award was QI2Max, comprised of team members Carmel Fiscko, YiDing Fang, Max Oliver Geislinger, Shu-Meng Lydia Ko, Max Xing and Changeun Mason Park and advised by QI Director Ramesh Rao. The students—who hail from the Departments of Electrical and Computer Engineering, Computer Science and Engineering and Bioengineering—created One Drop, a software and sensor system for monitoring water use that informs residents about how much water they use compared to their neighbors and also reveals consumption habits over time. The system is designed for use by both the general public and city officials, and also features a 3D-printed, Raspberry-Pi-controlled water flow rate sensor designed by the students.



*Team QI2Max*

A second QI team, Team Spectre, featured three computer science students from Keimyung University in South Korea: Changeun Mason Park, Hojun Justin Lee and Junhee Jack Park. All had taken part in QI's joint Internet of Things program (a collaboration with Keimyung University's Leaders in Industry-College Cooperation program earlier this year) and were flown in by the QI leadership once again to participate in the SmartCity Hackathon as Qualcomm Institute Visiting Scholars. Their contribution was a software platform for aggregating city databases for greater ease-of-use by city planners, contractors and others with a use for such data.

The competition's winning team, Routed, developed tools to promote ride-sharing based on traffic patterns. Other entries included Recyclic, a virtual-reality game that trains players how to sort recyclable materials, and Grasshopper, an app designed to reduce event traffic by 25 percent by connecting those attending concerts, sporting events and other activities that tend to draw a crowd.

Other QI affiliates who advised the competition were John Zhu, Seokheon Justin Cho, Corey Baker, Matteo Danieletto and Hans Yu (who also competed at the event).

"California leads the nation in self-imposed environmental restrictions," notes Rao, "and these technologies are only a few of the examples of what can emerge as we all work together to make cities more sustainable. This event also solidified the relationship between QI and Keimyung University and we are looking forward to more exciting joint projects."

QI2Max's Carmel Fisco, an ECE senior, said she was a bit intimidated by the competition at first because she lacks experience coding applications.

"I wasn't able to help with the app and felt like I wasn't contributing very much at first," she recalls. "The first night, however, I had the idea to make a water flow sensor, which turned out to be an awesome addition to our project as it worked fairly accurately and allowed us to be one of the few teams with a hardware component. The week before the hackathon, I took a SolidWorks workshop on campus and was able to apply those skills to CAD and print our sensor. This also tied our project into the more IoT applications and helped make us competitive for the Best in IoT award.

"In addition," adds Fisco, "as the only electrical engineering major on the team, I was able to contribute my knowledge of prototyping and electronics."

Her teammates contributed their own expertise, and Fisco says, also offered her a spot on their couch after her student ID card broke and she wasn't able to access her on-campus apartment the weekend of the Hackathon.

But that only gave them more time to bond and present a united, cohesive front.

"It's really important to think of your team as a mini-business especially for this hackathon," adds Fisco, "as the judges were looking for something directly implementable."

The City of San Diego provided to participants in the competition a total of 500 datasets—some of them never before released—including statistics on energy use, water consumption, traffic, parking, weather patterns, infrastructure and mass transit. Participants in the competition were then charged with tackling some of the city's most pressing climate-related needs: energy- and water-efficient buildings, active transportation, transit and land use; clean and renewable energy; zero waste (gas and waste management) and climate resiliency.

"I have always wanted to participate in something bigger than me," said QI2Max participant Max Xing. "I have always waited for such an opportunity that not only can I show my skills but also be able to represent my department and school.

The winning entries will now be evaluated to determine if they can be implemented by the City, transformed into a bigger research project by UC San Diego researchers or funded and commercialized by one or several of the sponsors (inventor teams retain all IP rights).

The San Diego Smart City Hackathon took place at the UC San Diego Institute of the Americas May 20-22 and was organized by the University's Center for Wireless Communications (or CWC, an affiliate of QI) in collaboration with the City of San Diego and the Silent Intelligence, a consulting firm led by David Obodovski. Sponsoring partners included the FabLab San Diego, Cleantech San Diego, Cybertech, Open San Diego and Smart Cities San Diego. Qualcomm and Teradata Labs were corporate sponsors of the event.

Sujit Dey, a professor of Electrical and Computer Engineering at UC San Diego and director of the CWC, said the competition stemmed from his desire to extend the wireless technologies being developed by CWC researchers into different use-case scenarios—in particular making urban centers into more sustainable "smart cities."

"UC San Diego is very strong in terms of building wireless systems, developing sensors and doing data analytics," remarks Dey, "and these three strengths perfectly align with the SmartCity concept. Although the idea of Smart Cities is not new, we are excited that in San

Diego we can do something impactful and meaningful for the community that provides a different kind of contribution and a different kind of fulfillment that we get from doing research.

“Our next goal is to leverage this alliance in support of the groups that have won the hackathon and new groups that may join us and try to come up with solutions for the CAP challenges,” Dey continues. “We are focusing now on how to convert this first step—the hackathon—into a more sustainable program, with the City of San Diego and CWC as prime partners who will welcome other prime partners. My hope is that we will be able to turn small parts of neighborhoods in San Diego into a living laboratory where we can collect new data, deploy new sensors we’ve developed and connect them to networks. But all this will need a lot of effort, and I hope we’ll be able to have the bandwidth to carry this on.”

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