DASD

Civic Design Challenge on Transportation 2017

INTRODUCTION TO

DESIGN FOR SAN DIEGO

Design for San Diego (D4SD) is an initiative that seeks to explore complex civic problems through design thinking and crowdsourcing, led by the UC San Diego Design Lab—with support from the National Science Foundation, Design Forward Alliance and SCALE SD. D4SD structures a process of discovery, ideation, prototyping and implementing solutions inspired by the principles of human-centered design . Through this novel open civics approach, we hope to create opportunities for government, academia, and industry to collaboratively innovate on solutions for San Diego.

THE PROBLEM

The 2017 challenge focused on urban mobility. People need to move around a city. Whether for work or play—and by car, bike, train, bus, boat, or foot—citizens' mobility significant affects the daily lives of millions.

San Diego is culturally and economically diverse, as well as geographically dispersed, which made transportation a ripe topic for exploration. The mobility topic challenged participants to investigate concerns currently facing San Diegans, as well as look to future transportation systems, like autonomous cars.

TRANSPORTATION ISSUES

- Promoting walkable and bikeable communities
- Improving accessibility
- Enhancing the commuter experience
- Preparing for our city's future with autonomous vehicles

WHO GETS INVOLVED AND HOW?

Civic Leaders

Provide knowledge, constraints, funding for civic challenge

Business Partners

Provide resources, explore business opportunities within the larger civic challenge

Citizens

Participate out of a sense of civic duty and general curiosity

OUR GOALS:

Demonstrate what design can do for big issues facing San Diego

Provide opportunity to support widespread involvement from many stakeholders

Professional Designers

Engage as expert facilitators/ mentors for students and novice citizen designers

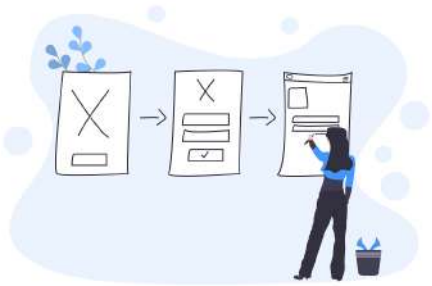
Enable the design researchers to explore novel participatory design methods

Students

Participate in design process as an educational opportunity and to network with designer community

Generate design materials (issues, ideas, prototypes) to showcase at public events about the mobility challenges

Researchers

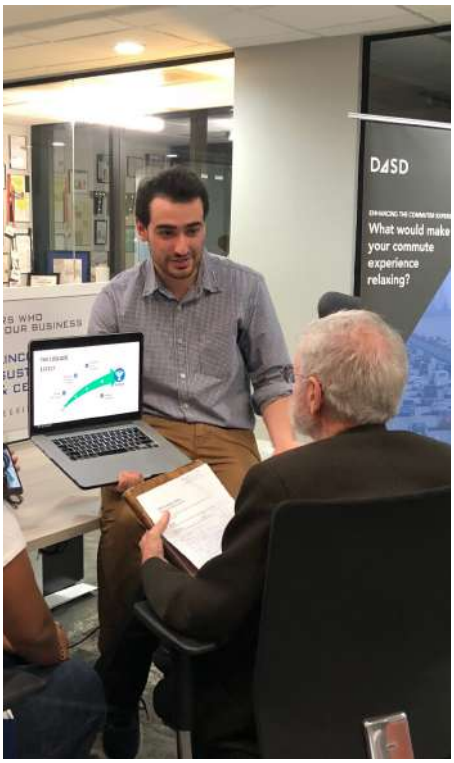


Investigate novel participatory design approaches

Expand awareness and appreciate of human-centered design methods to the local business and civics community

2017 EVENTS TIMELINE

Innovators from across the city kicked off the Design for San Diego (D4SD) challenges with a design sprint and hackathon. Dozens of people worked into the wee hours of the morning and submitted 13 amazing and diverse concepts for the kickoff competition aimed at improving transportation in San Diego. Check out this story by ThisWeek@UCSanDiego and this blog report by SCALE SD about the event.



Sept. 21
D4SD Kick-Off Design Sprint and Hackathon - Kick-Off & Info Session

Hosted by SCALE SD
Into by Mayor Faulconer, Chancellor Khosla & Don Norman
@Downtown Works

Sept. 22
D4SD Challenge: Design Sprint & Hackathon - Day 1

Learn about challenges, brainstorm, form teams & build prototypes
@Downtown Works

Sept. 23
D4SD Challenge: Design Sprint & Hackathon - Day 2

Present Prototypes, win prizes & party
@Downtown Works

Oct. 3-19
Human-Centered Design Course at UCSD

Hosted by Professor Dow
@UCSD Main Campus

Oct 3 - Team formation and brainstorming

Oct 5 - Problem framing and ideation

Oct 10 - Rapid prototying

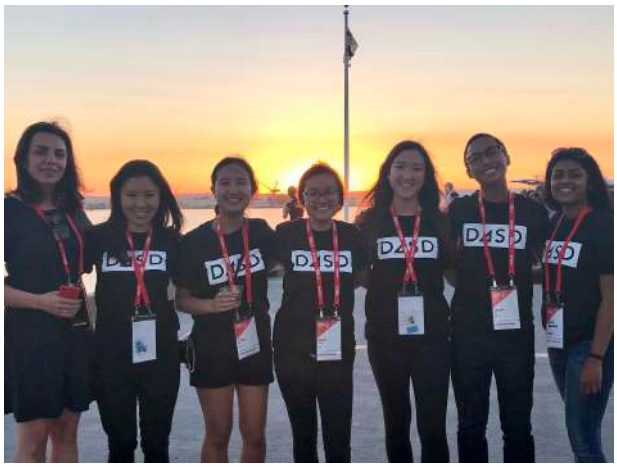
Oct 12 - User research presentations

Oct 17 - Visual design for posters/videos

Oct 19 - Studio time for prototypes, posters, and entries

Oct. 25
D4SD Poster Session, Design Forward Mixer

Teams present posters with the Design Forward community
@Broadway Pier



Oct. 26
D4SD Award Ceremony, Design Forward Summit

Finalists showcase and award ceremony
@Liberty Station

KEY TRANSPORTATION ISSUES FOR SAN DIEGO

How do we create a San Diego where we all move freely?

PROMOTING WALKING AND BIKING

How might we improve safety on the street?

What can be done to improve pedestrian and bicycle safety in San Diego? “There is a latent demand in the public to walk and bike more, but many people, out of a lack of safe routes, choose not to,” said Colin Parent, Circulate San Diego’s Executive Director and City Council member in La Mesa. As the city of San Diego grows in population, more residents are choosing to use walking and biking to avoid traffic congestion and parking. However, since walking and biking are not the norm they can be dangerous in a city built for cars.

In response, city leaders have adopted the Vision Zero program. Its goal is to eliminate all traffic deaths in the city by 2025, through enforcement, education and street engineering. But what does that mean in practice? How might we realistically redesign our city so that it is more safe for bicycles and pedestrians?

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ENHANCING THE COMMUTER EXPERIENCE

What would make your commute relaxing?

San Diego has one of the shortest commutes in the U.S. (at an average of 23 minutes), but an accident or highway repair can add stressful-frustrating hours. There must be some way to reduce the effects of this stress (e.g. higher blood pressure, higher weight, and lower fitness levels). Parking can also be a problem, making the entire commute an ordeal. Often, drivers don’t even know where to park because of the small print and confusing rules on parking signage.

Many avoid driving themselves altogether and instead commute by public transit. However, the public transit system could use several improvements. Feedback and communication with riders is an interesting problem facing the public transit system. Without feedback and communication it can be difficult to improve the commuter experience.

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PREPARING FOR AUTONOMOUS VEHICLES

How do we take our hands off the wheel?

An autonomous vehicle (self-driving car) is a vehicle that can drive itself without human guidance. These vehicles are arriving faster than most people have anticipated. How might we prepare for this major advance in transportation? An important concern about adding Autonomous Vehicles (AVs) is the effect of "driverless" on the industries that hire drivers, as well as the drivers themselves. There are also policy questions about Autonomous Vehicles such as, determining fault in the case of an accident (e.g., passenger, manufacturer, designer). However, a related concern is how other drivers will engage with AVs—there is some concern that other drivers might cut off, chase down, or otherwise aggressively engage with AVs.

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IMPROVING ACCESIBILITY

How do we help everyone reach their destination?

Getting around can be a challenge for anyone, but particularly for people with disabilities and the elderly population. What does this mean for mobility in San Diego? First of all, approximately 17% of San Diegans have some form of physical, sensory, mental, or cognitive impairment that affects their mobility. Aging also affects one's ability to move freely around the city; and individuals over the age of 60 represent the fastest growing segment of the population. In fact, the number of San Diego's senior residents is expected to double by 2030! How can we improve accessibility in San Diego with the specific needs of people with impairments and elderly people in mind?

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HIGHLIGHTED SOLUTIONS

WALKING AND BIKING

How might we improve safety on the street?

How Might We Make Intersections Safer?

The Fatal 15 is the name given to 15 intersections in the San Diego area that have the highest number of pedestrian deaths and injuries since 2001. What are the common features that make these intersections dangerous and how might we protect people from being hit by cars?

SafeD

Bradley Day, Christopher Wong, Eric Liu, Grace Chen, Steven Chen

To address pedestrian visibility and raise traffic awareness, we introduce a three part system called SafeD for ridesharing services designed to improve citizen safety in popular nightlife areas of San Diego.

d4sd.org/mobility/SafeD

How Might We Improve the Visibility of Bicyclists?

Everyday we see car-bike collisions result in injury, if not the death of a cyclist. Bike lanes are one solution for safe roadways, but cannot always be put in place. Outside of making major infrastructural changes, what else might we do to make streets more “bike-friendly”?

Cycle Detection

D.J. Nelson, Savera Soin, James Maron, Stephen Cerruti

How can we make bicycles more visible to cars in the future? Dedicated Short Range Communications (DSRC), the technology behind Vehicle to Vehicle communication, may be the answer. We propose a lightweight bike sensor that would alert drivers of bikes nearby.

d4sd.org/mobility/CycleDetection

How Might We Create More Walkable Communities?

Pedestrian traffic changes throughout a day just like car traffic. Large crowds of pedestrians can create problems for communities at certain times, for example, when the bars close and people spill out into the streets. How can we improve pedestrian safety at critical moments?

Pylon Pioneers

Andrew Seo, Shiva Malhotra, Cole Rudnick, Liam Tan, Jack Stevenson

POLE (Prevention of Life Extermination) installs electronically operated bollards into intersections that are prone to pedestrian casualties. The dynamic bollards could be deployed at times of high pedestrian traffic or in emergencies to protect walkers.

d4sd.org/mobility/PylonPioneers

How Might We Alert Drivers about Pedestrians on the Road?

When drivers get stressed out or overwhelmed, it can create risk for others. If drivers are not fully aware of their surroundings, pedestrians can be seriously harmed. How can we help make drivers more aware of nearby people and bikes?

Essence: Driver's Seat Vibration Pad

Erich McMillan, Lindy Wong, Dean Ravida, Siyuan Gao, Joel Yun

Essence delivers a new way to alert drivers of pedestrians crossing the street at an intersection through specially designed vibrations, addressing blindspots in a car's limited field of vision.

d4sd.org/mobility/Essence

HIGHLIGHTED SOLUTIONS

COMMUTER EXPERIENCE

What would make your commute relaxing?

How Might We Create More Dynamic Parking?

In a large city like San Diego, parking is a widespread problem. As the population increases each year, more cars join the road and better systems are needed to manage and plan for new parking infrastructure. How might we help drivers and planners navigate the challenge of parking in San Diego?

Spot: The Smart Parking App

Shelly Bae, Daniel Won, Kyle Rico, Tayte Duong, Kellie Higa

Spot is an application that aims to make parking in congested areas easier and more efficient by allowing people to give their parking and its location directly to someone else.

d4sd.org/mobility/SPOTParkingApp

How Might We Improve Dialogue between Transit Services and Commuters?

Improvements in public transportation can motivate people to continue using transit systems, which ultimately benefits San Diego residents and businesses financially, and it helps San Diego to be more environmentally-friendly. What are the best ways to connect with this population of riders, and actively get their input about specific spots that need improvement?

Audio Movement

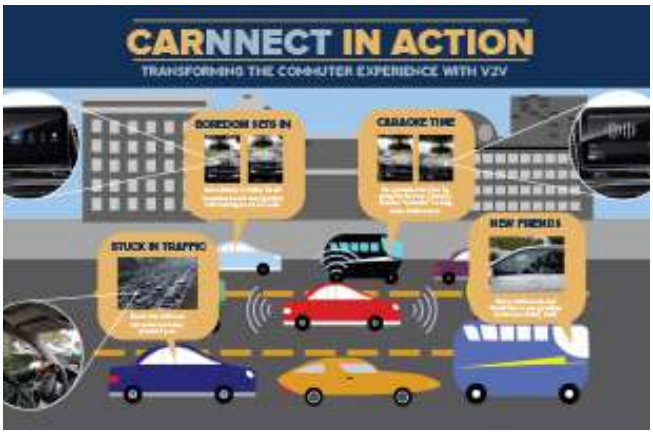
James Rich, Tin Wei Ling, Danfei Sun, Diana Nguyen

To improve the overall commuter experience for transit riders, Wifi can be installed on UC San Diego transit vehicles to provide student access to online education and entertainment resources, and to get feedback on rider experiences.

d4sd.org/mobility/AudioMovement

How Might We Make Long Commutes Enjoyable?

Our dependence on cars is not only bad for traffic and congestion, but also our health and the environment. Start and stop traffic can be maddening. The frustration of being stuck in traffic can easily morph into stress. Rather than only focus on reducing traffic, how can we improve the driver experience in these situations?



Carnnect

Se One Park, Justine Shih, Derrick Lieu

Carnnect will transform the commuter experience in traffic by providing opportunities for entertainment through social interaction between multiple cars.

d4sd.org/mobility/Carnnect

How Might We Envision Mobility Services in the Future?

The San Diego Association of Governments has been envisioning the idea of mobility hubs as a unified network of mobility services, drawing upon technological and urban design enhancements to seamlessly connect transportation options. What kinds of systems and services can enhance SANDAG's vision for mobility hubs?

sAVe

Debbie Leung and Matthew Cox

sAVe is an application that offers multi-modal ridesharing services in a community-supported, accessible, Mobility-as-a-Service platform that connects riders to public transit mobility hubs.

d4sd.org/mobility/sAVe

HIGHLIGHTED SOLUTIONS

AUTONOMOUS VEHICLES

How do we take our hands off the wheel?

How Might Self-Driving Cars Change the Experience of Driving?

The experience of riding in an autonomous vehicle (AV) may be very different than driving. Many cars are already WiFi-enabled and wired for conference calls. Without needing to focus on the road, a rider could focus on preparing that important report or holding a meeting while on the go?

How Might We Create Jobs with the Increase in AVs?

As autonomous vehicles begin to rise in popularity and use, professions and labor markets that depend on cars will transform. What kinds of changes need to be made to accommodate the job training or potential spike in unemployment if industries rapidly adopt AVs?

JoyRide

Yuka Okina, Alexander Chen, Amber Tang

JoyRide seeks to re-prioritize the passenger experience over technology by redesigning the visual, physical, and emotional aspects of AV rides.

d4sd.org/mobility/JoyRide

AV onDEMAND

Josh Duhay, Marissa Hing, Alex Tunchez, Claire Pham

AV onDEMAND eliminates rider takeover responsibilities and improves accessibility in autonomous vehicles in order to foster trust and reliability between the society and these new technologies.

d4sd.org/mobility/AVonDemand

How Might We Enable Communication between AVs and Pedestrians?

For passengers, these safety precautions add to a relaxing experience of being chauffeured, but for walkers, bikers and others' on the road, negotiating traffic with an AV may be a stressful experience. How might an AV signal to a walker or biker that they have been "seen" and accounted for in the navigation routing system, and that it's actually safe to walk?

AVICS (AV Intent Communication System)

Lauren Liu, Sanika Moharana, Isaac Fehr, Nick Phalen

AVICS delivers an exterior display on autonomous vehicles that uses intuitive iconography to communicate a vehicle's intent to persons outside of the car, particularly pedestrians

d4sd.org/mobility/AVICS

How Might We Prepare Society for the Changes to Come?

San Diego is one of the 10 cities that has been selected by the Department of Transportation to test introducing autonomous vehicles (AVs) on city streets. How might we help people embrace autonomous vehicles through education, training, and empowerment?

GATE Center: Immersive AV Learning Center

Selene Hoover, Garret Hoover, Jessica Yeung

GATE center provides an education center where the public can directly engage with autonomous vehicles through gamified activities, access learning resources, and provide feedback for stakeholder insights.

d4sd.org/mobility/GATECenter

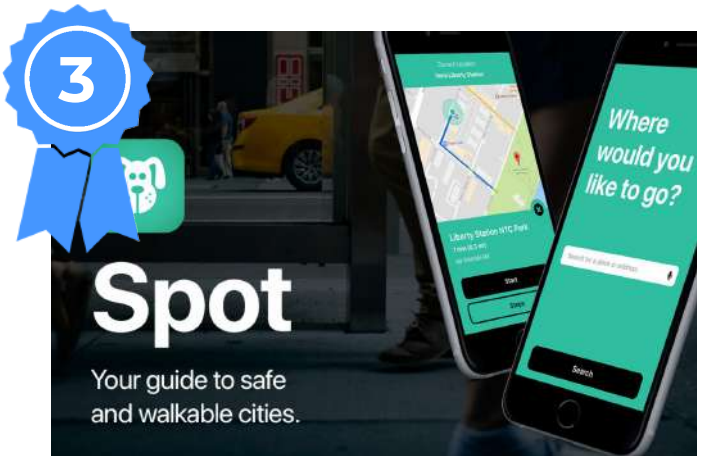
HIGHLIGHTED SOLUTIONS

ACCESSIBILITY

How do we help everyone reach their destination?

How Might We Improve Mobility for People with Visual Impairments?

Most of us take our eyes and ears for granted. For those with sensory disabilities, navigating the city can be a challenge. For people who are blind and others with poor vision, it can be difficult to walk through urban environments and to take public transit. How might we improve safety when auditory clues are not available?



Spot: Your Guide to Safe and Walkable Cities

Sayamon Riddang and Natalie Terenzi

Spot is an application that provides the blind and visually impaired with accessible walking navigation, by using data from General Electric smart street lamps installed around San Diego.

d4sd.org/mobility/SPOTGuide

How Might We Support People with Mobility Impairments?

A person with a mobility impairment (e.g., requiring crutches, a cane, or a wheelchair) often has difficulty with stairways and high curbs, and avoiding these physical barriers may take them in circuitous routes, which might even be more treacherous in rainy and winter conditions. How might we improve access to our city for people with mobility impairments?

Beach Access For All

Andrea Flagiello, Matt Abbondanzio, Tomas Robinson, Daniel Lenzen

To redefine the beach experience for those with limited mobility, implementing an automated, shared-use, mobility aid service designed for the beach environment will increase accessibility for all.

d4sd.org/mobility/BeachAccessForAll

How Might We Help Seniors Move Around in a Low-Tech Way?

Mobile phone based applications have made it easy to reserve a ride, order a meal, and find the hottest events happening right now. But, seniors are often the last demographic to adopt these new technologies. How might we adapt ride-sharing and other applications to make them more approachable and enjoyable for seniors?

GO FAR (Find a Ride)

Ena Liao, Lauren Ring, Azusa Kawakami

GO FAR helps seniors go find a ride in a way that makes existing services more affordable and accessible to those with or without technology. Paper pamphlets will be distributed to senior homes with instructions for how to request car-share services like Uber and Lyft using traditional phones.

d4sd.org/mobility/GoFar

CONGRATULATIONS TO OUR FINALIST WINNERS

The top three teams got the opportunity to pitch directly to the City of San Diego, SCALE SD, and SANDAG to implement their ideas. The winner received a $5000 cash prize.

First Place

Cycle Detection

Stephen Cerruti, D.J. Nelson, Savera Soin, James Maron

Second Place

AV onDemand

Marissa Hing, Alex Tunchez, Jacob Browne, Josh Duhay, Claire Pham

Third Place

Spot: Your Guide to Safe and Walkable Cities

Sayamon Riddang, Natalie Terenzi

JUDGES

A star-studded lineup of experts in human-centered design, civics, and business assessed the D4SD entries based on four key criteria:

- **Human-centered process** (How effectively does the team involve stakeholders, obtain feedback, and leverage data to support design decisions?)
- **Novelty** (How unique is the solution compared to other available solutions?)
- **Feasibility** (How likely can this solution be implemented? Will it work in the real world?)
- **Impact** (How will the solution affect people? Does it have any downsides?)

David Graham
Deputy Chief Operating Officer City of San Diego

Sean Van Tyne
Customer Experience Architect, Van Tyne Group

Brent Boyd
Manager of Service Quality, Rail Division
Metropolitan Transit System

Lima Saft
Transportation Engineer
California Department of Transportation

John Bandringa
Director Enterprise Strategy & Innovation, Port of San Diego

Katie Rast
Director of Community Impact at The San Diego Foundation, Founder of Fab Lab

Scott Klemmer
Professor of Cognitive Science and Computer Science & Engineering Design Lab, UC San Diego

Chuck Pelly
Chief Creative Officer
Intersection-Inc

Antoinette Meier
Principal Regional Planner SANDAG

Regina Bernal
Entrepreneurship Manager
School of Business, University of San Diego

Daniel Obodovski
CEO/Founder
SCALE SD

Arnaud Vedy
Data Science Program Coordinator Performance & Analytics Department, City of San Diego

D4SD TEAM

D4SD comprises an interdisciplinary group of designers, researchers, and developers led by Prof. Steven Dow from UC San Diego. By combining our team's diverse talents in computer science, cognitive science, and interaction design, we have worked tirelessly to create a website and discussion platform, to provide educational resources on design and technology, and to host a series of exciting events with our community partners.

ACKNOWLEDGEMENTS:

Special thanks Michele Morris and Don Norman in the UC San Diego's Design Lab, and to our partners at Design Forward Alliance (Scott Robinson, James White, and Bobby Buchanan), SCALE SD (Daniel Obodovski, Greg Hoover, Marc Bielas, Morgan Brass and Sarah Hernholm), and Charles Chamberlayne, Inga Kiderra, and Tiffany Fox for their PR expertise.

OUR PARTNERS:

UC San Diego The Design Lab

The City of SAN DIEGO

PORT of SAN DIEGO

SCALE SMART CITIES ACCELERATOR LABS + ENVIRONMENT

SANDAG

DESIGN FORWARD 2017

Spring 2017 Team:

Alejandro Panduro, Ariel Weingarten, Alvin Ho, Anna Le, Catherine Kim, Chris Lim, Cody Pham, David Luu, Diana Nguyen, Donna Yee, Eric Richards, Eric Tseng, Gobind Sethi, Grant Chinn, Joanne Cho, Joseph Le, Karen Ma, Karthik Komatinei, Lauren Gong, Lauren Liu, Mai Eguchi, Nancy Zheng, Narges Mahyar, Qinzhuo Gong, Sanika Moharana, Tara Nejad, Susan Lee

Summer 2017 Team:

Alejandro Panduro, Allison Endo, Andrew Dennis, Brandon Hong, Brian McInnis, Echo Ma, Gabriel Amoako, Joseph Le, Lauren Liu, Michael James, Michelle Ng, Nancy Zhang, Nanna Inie, Narges Mahyar, Reggie Wu, Sanika Moharana, Shawn Kang, Yikun Huang, Yujin Cho, Yutong Zhang

Fall 2017 Team:

Alejandro Panduro, Andrew Dennis, Echo Ma, Justin Tran, Lauren Liu, Nancy Zhang, Narges Mahyar, Sanika Moharana, Regina Chang, Tone Xu, Kelsey Guo, Evan Schmitz, Eric Richards, Tracy Wei, Gustavo Umbelino

CONCLUSION

In 2017 the UCSD Design Lab launched Design for San Diego (D4SD) to motivate innovation around civic issues in San Diego. Hundreds of students and community residents from the area participated and explored solutions related to bike safety, commuter experience, and preparing for autonomous vehicles. The D4SD competition brought together young innovators, vulnerable populations, domain experts, design mentors, and business and civic leaders to follow a human- centered design approach to discuss these interconnected issues, to explore novel solutions, and to test prototypes within target communities.

A team of high school students, including two freshmen, won the overall competition and received a cash prize towards creating a prototype of their idea for a bike sensing system to prevent collisions with cars. Many of the ideas had merit: a system for caravanning vehicles to save energy and reduce traffic, a municipal bus system that leverages mobile devices much like Uber/Lyft drivers, and a system to enable remote control of AVs in difficult scenarios.

We demonstrated that fostering collective innovation can improve how the City of San Diego designs solutions to serve everyone. A key concern moving forward is how to reach out and scale up participation by typically vulnerable or underrepresented populations, especially as we explore other civic challenges like housing, health, and sustainability. As we prepare for D4SD 2020, our plan is to work with our community partners, design educators, and domain experts to define the next challenge topic.

KEY METRICS

Total Projects:

Total Teams:

Total Participants:

Subscribers to the D4SD Newsletter: 483

team@d4sd.org | d4sd.org