

# Taking up a personal cause, students help Alzheimer’s patients with a GPS-enabled smartwatch

*After her father-in-law was diagnosed with Alzheimer’s, a senior at the University of Arizona launched a passion project with patients and caregivers in mind.*

If the best ideas come from necessity, Teresa Portela’s creative spark is surely one of them. In April 2017, her 61-year-old father-in-law, Jim, was diagnosed with Alzheimer’s disease. “Like many diagnosed with Alzheimer’s, he has a tendency to wander, get confused, and get lost,” she says. “We needed a way to keep him safe without sacrificing his personal autonomy.”

Hoping to find a product to help him, Portela, a student in her senior year at the University of Arizona, realized that there were none. As someone who had always enjoyed problem-solving and building things from scratch, she sprung into action. “Watching someone decline right before your eyes and lose parts of their autonomy, bit by bit, is not easy,” she says. “I wanted to build something to help him keep his dignity while still guaranteeing his safety.”

She enlisted two friends, Michael Lewelling and Peter Siqueiros, with whom she had worked at the 24/7 IT Support Center at the University of Arizona. (She also worked with Siqueiros at the College of Public Health.) The trio developed a concept at Hack Arizona, an annual event that challenges students to create and build something within 36 hours.

“We just started working on this January 2018, for the hackathon,” says Portela, “and that’s when people showed so much interest that we knew we had something that could really help others.” The students ended up winning a prize for the best use of GCP, and [Guardian](#) was born.

## Monitoring and protecting patients on the go

Initially, Siqueiros says that Guardian was conceived as an Android smart watch and companion app to monitor the well-being of Alzheimer’s patients. “Our idea has since evolved into a cloud-based platform that aims to provide caregivers with peace of mind, and patients with safety—no matter where they are,” he says. At this point, he notes, “We have most of the core features working, but there is still refinement in UI and feature depth needed.”

Running as an Android (and eventually iOS) app, Guardian would be used on a caregiver’s phone, to schedule reminders, get live location updates for the patient, monitor vital signs, and more. The team is attempting to address the main issues faced by Alzheimer’s patients who live alone: falling, wandering, two-way communication, and medication management.

Upon starting the project, the team recognized a unique opportunity: “There really isn’t anything on the market right now that provides the same amount of functionality that we envisioned,” says Lewelling. “We did a lot of market research, and found that the options out there weren’t only expensive, but didn’t provide the level of care that some Alzheimer’s patients need.”

Currently, the sole user of Guardian is Portela’s father-in-law, who wears a prototype watch.

## Using GCP to find solutions

The team first learned about Google Cloud Platform at Hack Arizona. They soon discovered that they could focus solely on developing their project because “the GCP services were so easy to use. We were able to set up database connections in minutes, which was fantastic.”

Siqueiros adds that “ease of use, setup, compatibility, and auto-scalability were all amazing benefits of using GCP” and Portela recalls that “GCP made it easy to send push notifications, schedule those notifications from another device, handle authentication, and leverage Cloud Functions to make the reminders possible.”



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Michael Lewelling

“What I love about GCP is how simple it is to use,” she says, “and how much documentation exists on it. The UI is beautiful, intuitive, and actually makes sense! We use GCP now for Cloud Firestore, Cloud Functions, [Firebase Authentication](#) and [Firebase Cloud Messaging](#).”

The Guardian team used Firebase Authentication to easily verify app users, Firebase Cloud Messaging to send push notifications to different platforms, and Cloud Functions for Firebase to execute backend code without having to manage a server. They also used Cloud Firestore, Google Cloud’s document based NoSQL real-time database, to store and sync user data including heart rates, locations, and step counts.



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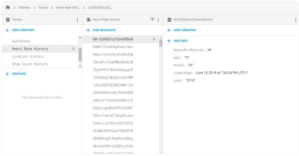
Teresa Portela

## Making a positive impact with technology

Although Portela has been most directly affected by Alzheimer’s (her long-term goal is to “help patients and their loved ones improve health outcomes through technology”), the other team members have been profoundly affected by Guardian as well.

“Before this project, I never felt that my programming and development skills were being used to make a difference in the world,” says Siqueiros. “Our team has talked with caregivers and patients about how Alzheimer’s has affected their lives, and their stories have shown me what a terrible disease Alzheimer’s is, and the importance of being able to stay in their homes for as long as they safely can. Guardian has given me a passion for trying to help people suffering from this disease in any way I can. I hope that our ongoing project will positively impact their lives.”

The project has also influenced Lewelling’s aspirations: “I want to make a difference in the world with technology,” he says. “I’d love to be part of a driving effort to help people in any way that I possibly can. The bigger impact I can make over my career, the better.”



## Planning for the future

Currently, the team is in a business venture program with the Arizona Center for Innovation, working on a plan to bring Guardian to market. “We’re working on aggregating data from many sources to develop a disease progression map,” says Portela. “tying into many IoT devices, such as car OBD connectors, and being able to predict when it is no longer safe for an Alzheimer’s patient to drive.”

For her, this project has been very emotional, as she has watched her father-in-law slowly lose his autonomy—yet it has also made her more determined to succeed.

“By studying him, I’m able to understand Alzheimer’s patients and how this device could help them more, and how it could help people on the other side of the coin, the caregivers,” she says. “I think about how, by the time we have a finished version [of Guardian], Jim may not be around. What keeps me going is the fact that if I can’t help him fully, I’ll be able to improve the lives of other patients with Alzheimer’s and dementia. Time is of the essence—but really, we are just trying to make this degenerative illness slightly more bearable. We are trying to make a difference.”

### ORGANIZATION PROFILE

[University of Arizona](#)

### PRODUCTS USED

[Google Cloud Platform](#)