

An elderly woman is glued to the TV when a transparent overlay appears on the screen. It contains the portrait of Dr. Smith, her endocrinologist.

A remote click later she's greeted by the smiling young doctor. He instructs her to take her blood pressure with the device that's sitting on the living room table and watches carefully to ensure she wraps the correct portion of her arm. He asks if she was watching anything interesting, and she begins to chat away. The pump releases its air, and a beep signals that numbers are available, but Dr. Smith already sees them on his computer. She too can see them as they appear in large font on her television screen: 160/99. He doesn't ask her to weigh herself because it's obvious from the line graph in front of him that she did so this morning, and every other morning, for the last four weeks. In addition, the not-so-daily glucose chart tells him that she's not measuring it as often as she should.

"Lois, as you can see on your screen the line representing your daily weight has slowly gone up this month. We've discussed how diet and exercise are essential parts of your health, but what is concerning me more right now is that you're not checking your blood sugar regularly."

She looks down at her slippers. "The TV reminds me, but I don't like doing it."

Upon hearing this, the doctor sits up, and draws himself closer to the webcam on his monitor. "There are many diabetic people out there who are new to this too. You probably have a lot in common with them. Some of my other patients have already offered to help. I'll add them to your buddy list. You can call and help each other be accountable. Who knows, maybe you'll make a new friend."

Dr. Smith smiles and signs off, and Lois quickly rewinds to see the portion of the sitcom that she's missed. It's now dusk, but another click of the remote illuminates her home. When she rises in the morning the TV will greet her with an aerobics workout that the good doctor has recommended for her.

My name is Hector Parra. I design technology to help people. Through applied research in human-computer interaction I believe we can change the way people manage their health and education. The system described above is called Telios, and I've spent the last year and a half architecting and prototyping the platform. It allows patients to help themselves and their doctors prevent disease by communicating data from home-based medical devices to the patient's television, the doctor's computer, and the hospital's medical record. These devices include video cameras, weight scales, blood pressure monitors, and various other wearable and environmental sensors.

I was a student-worker at UCI, redesigning the relational models and user interface for a research institute's contacts database, when Dr. Mark Bachman shared his vision for a magical appliance connected to a television. In 2006 I presented a similar idea using a mobile phone to our school's business plan competition, so I

was all ears. I augmented his vision with mine and began working the weekend after I graduated. I started part-time on an academic salary and stayed because I believe in this dream. I believe in using technology to help people.

I became further convinced of this earlier that quarter. Before I graduated I took a pilot project course on ubiquitous computing, taught by Assistant Professor of Informatics Gillian Hayes. I paired myself with a master's degree student and an undergraduate researcher working on Visual Schedules for Children with Autism, a digital version of a paper and tape tool to assist parents and teachers to communicate the order of daily activities through the use of pictographs.

We had two fruitful brainstorming sessions where we drew mock-ups of the user interface. Unfortunately, the design of the interface is where we stopped agreeing. My vision was to create a social network around a web application, where parents and teachers could share pictures and routines, support one another through their struggles and celebrate each other's victories. This method of implementation relieved its users from installing, updating, and licensing software, and was able to use existing infrastructure. Since I could not convince my colleagues that web standards had matured enough to make our rich user interface feasible, I took a back seat, and agreed to build the business logic and information models.

A couple of weeks before the deadline, I learned that the undergraduate researcher had not started building the user interface and that he "never realized (I) had a deadline". After discussing this with the graduate student and Professor Hayes, I rolled up my sleeves.

Within 72 hours, using Ruby on Rails and Prototype, I built the proposed design: pictures that could be dragged and dropped from a collapsible menu into an ordered list that could be saved and retrieved. The items in these lists could be ordered, and the child could drag a picture into a trashcan when he or she was done with that action. Having read "Activity Schedules for Children with Autism" by McClannahan & Krantz, I included the ability to associate sounds and labels with pictures as a means to teach language, and the data models were designed to facilitate the authors' recommended analysis to determine if a child had learned the proper sequence of an activity.

The most important thing I took from the Visual Schedules project is the belief that technology can help people help people. All that is needed are simple interfaces that never require the helper to seek assistance. Like a hammer, these tools should be picked up and used, not studied or feared. I have continued to design Telios with this in mind. Interfaces should remind people of tangible things and offer clear interactive instructions on how to utilize them. Herein lie some of my research interests. What is intuitive? What is accessible? What symbols, gestures, and groupings can be reused? What virtual representations of real world objects are needed? What is the relationship between screen size, resolution, and distance? When does interface drive changes in form factor?

These specific questions are designed to reach more applied goals. For example, what type of interface would an elderly woman find intuitive? How can we best illustrate a concept to a child using multimedia? What is an ideal touch screen interface for the blind? The needs of these users are different, but systems that accommodate them may have much in common. Experiments are necessary to determine the requirements for such systems and whether or not they provide a benefit to their users. I'm eager to learn and experience these methods through a graduate school education.

As the former owner of a contract programming company I know just how quickly the corporate world spins. Technologies in assistance, healthcare, and education require time and careful observation. There are many potential users to interview and important publications to digest. Interaction with faculty and my peers will bring new ideas and the knowledge necessary to make them a reality will be reinforced and grown by my graduate-level study.

This past year I've been fortunate enough to have two undergraduate researchers working with me. Introducing them to dynamic languages, and reinforcing design patterns in an agile development environment has itself been rewarding work. With the Telios web-based libraries to communicate with serial devices, videoconference, and create flexible interfaces, they have created prototypes of applications that could solve real problems.

Recently, I became UC Irvine Medical Center's Technical Coordinator for the Specialty Care Safety Net Initiative (SCSNI). This statewide project by the California Center for Connected Health (CCCH) will allow University of California specialists from every medical campus to serve 45 clinics in remote and under-served areas using telemedicine. I will be training doctors to use existing equipment and offer technical assistance while I observe and inquire about their experiences. I plan on learning what doctors desire in telemedicine systems and which aspects present difficulties. It is only by immersing myself in living laboratories that successful systems can emerge.

Telios will begin its first trial at a community clinic in January. The SCSNI project will begin seeing patients in February. I am eager to study all that is necessary to produce real technology that can change lives.

You can learn more about Telios at <http://telios.calit2.uci.edu/>

Hector G. Parra  
[hector@hectorparra.com](mailto:hector@hectorparra.com)  
<http://hectorparra.com/>