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Marilynn Larkin, MA

HomeLab:

A real-life testing ground for older-adult products and services



‘There’s a limit to the research that can be done in a laboratory setting,’ says HomeLab Director Brad Fain, PhD. Learn about this initiative’s in-home studies with older adults—and why your organization might want to get involved

by Marilyn Larkin, MA

From home health care to government agencies to senior living, organizations are looking for effective ways to promote health, wellness, quality of life and safety for older adults where they live—

whether in family homes in the community or in cottages and apartments on a senior living campus. Products, services and, increasingly, technologies are part of the answer. But to ensure that offerings meet the needs and goals of older adults and organizations today, plus shape future possibilities, the active-aging industry needs to assist those who design, manufacture and supply them.

In fact, many *Journal on Active Aging*® readers express a desire to have their organizations participate in research, and so I’m focusing this “TechTalk” column

Continued on page 56

Among other things, Georgia Tech's HomeLab tests product accessibility, usability, safety and perceptions



HomeLab: A real-life testing ground for older-adult products and services

Continued from page 54



Originally created for hospital or clinic use, more complex kinds of health equipment are now being designed for the home, according to HomeLab's Dr. Brad Fain

on the Georgia Institute of Technology's HomeLab. An initiative of Georgia Tech Research Institute (GTRI), HomeLab brings together an interdisciplinary team of scientists and engineers to do research with older adults. The program is exciting, and expanding, so there's an opportunity to get involved! (For information, refer to the sidebar, "HomeLab quick facts," on page 57.)

HomeLab researchers conduct in-home studies with individuals ages 50 and up (oldest 96!) in more than 600 homes in metropolitan Atlanta, in areas representing the diversity of the state's population. A key focus is on how older adults use health and wellness products, according to Brad Fain, PhD, a principal scientist at Georgia Tech. (See the box on page 58 to learn more about Fain.)

"The market is waking up to the fact that demographics are changing, and so more products and services are being developed in this area," Fain tells me by phone.

"Also, many products that were previously designed to be used in a hospital or clinic are now being designed for the

home," says the HomeLab director. "For example, we're putting more complex kinds of monitoring, diagnostic and treatment equipment in homes now. How people interact with that equipment is critical," he continues. "So, that's the topic of ongoing investigations."

According to Fain, there's a limit to what researchers can do in a laboratory setting—"that limit being, at most, you can have someone come in for an hour or two before they get really tired. And although you can dress the space up to look like a bedroom or a kitchen or whatever, it's still a lab." He adds, "There's so much more data that can be collected in the context of a real home."

The feedback that flows from HomeLab research allows organizations to learn valuable information about what works in real-life settings.

How it works

All HomeLab research is governed by the university's institutional review board, which approves every study and protects the rights of participants. When preparing to launch studies, the research team alerts homeowners' associations

and other community organizations about the types of projects they're recruiting for, so people can contact HomeLab if they're interested in participating.

"Then we go through an induction process," Fain states. "We visit people in their homes and spend about two hours collecting information about them, their lifestyles, their medical histories and the technologies they have access to."

Details are entered into a database. When a new study is ready to launch, the researchers query the database to come up with a list of potential participants who meet the study's requirements. People then have the option to participate or not. Those who choose to take part sign on for the duration of the study, and provide the required feedback.

A unique aspect of HomeLab "is that we don't just send somebody to interview people and then write up a report," Fain notes. "We send in designers who can learn from their interactions with participants and immediately take those lessons learned and translate them into a prototype that an organization might find useful. I don't know of any other group that's doing that right now."

So, where do the initiative's efforts currently concentrate?

Resources

Georgia Tech Design and Technologies for Healthy Aging initiative

<http://www.datha.gatech.edu>

Georgia Tech HomeLab

<http://homelab.gtri.gatech.edu>

Georgia Tech Research Institute

<https://gtri.gatech.edu>

Understanding health conditions, evaluating products

HomeLab research centers on technologies that assist functioning; health conditions that are relatively common in older adults; and the accessibility, usability, safety and perceptions of specific products provided by companies.

For example, one recent study focused on how aging affects the daily in-home activities of people with mobility impairments that began before age 50. Researchers conducted interviews to learn how participants adapted to necessary changes in the home, such as the use of assistive devices, and how age-related changes (e.g., osteoarthritis, vision and hearing changes) affect their activities of daily living.

Another recent study focused on nocturia, or frequent nighttime urination, which might be a problem in itself but could also signal an underlying health condition. A kit of minimally-intrusive sensor technologies was deployed in homes to measure participants' general activity levels, bathroom visits, sleep patterns, and heart and respiratory rates while in bed.

Many companies ask HomeLab to test the usability and safety of their products, whether it's a new type of coffee lid or an all-purpose gripper. One previous project involved the assessment of a medication dispenser designed to sit on a countertop. "Individuals would load all their medications for a month into their devices, which would determine when it was time to take the medication and dispense it," Fain shares. "The product was envisioned as a way of managing a complex medication schedule with an electronic piece of hardware. Our team had to make sure the dispenser did what it was supposed to do and was also easy to use and maintain."

HomeLab also supports research efforts underway on the Georgia Tech campus.

For example, one of the electrical engineers was developing a wearable system that would be installed on the upper torso. "We told people in the HomeLab community about the project, went into the homes of those who wanted to participate and asked them questions," Fain explains. Those questions included the following:

- What would the wearable look like?
- What was the most acceptable placement?
- What would the requirements be?
- When would you want to wear it and when would you not want to wear it?

"Essentially," Fain says, "we were gathering some initial data for the engineers to help them design a product that would work, meet people's needs and be acceptable, should they bring the technology to bear."

HomeLab also supported a GTRI strategic initiative to pilot test a novel remote health-monitoring system, which the team deployed in participants' homes for a month. In addition, the team conducted a survey in support of another project to better understand the factors that influence social media use among older adults. Another project investigated older adults' use of activity trackers and their overall perceptions of technology.

Where will the research initiative soon focus?

Looking ahead

Fain is excited about two directions for upcoming projects. One is health-related disparities, particularly among minorities with major health problems such as heart disease and "diabesity" (a name that fuses *diabetes* and *obesity* to describe the condition characterized by metabolic imbalance). "Understanding how we might assist this population in getting

Continued on page 58

HomeLab quick facts

Georgia Tech's HomeLab undertakes the following activities:

- supports aging in place by collecting data on people and their homes
- conducts ethnographic studies, basic and applied studies, survey research and longitudinal research
- provides independent evaluations on products to assess effectiveness, safety and security, accessibility, usability, perception and adoption
- assists with support activities necessary for research, including obtaining approval from Georgia Institute of Technology's Institutional Review Board (IRB); managing participant recruitment; managing and analyzing research data; and preparing study documentation

For further information about HomeLab, visit <http://homelab.gtri.gatech.edu>.

Opportunity! HomeLab is open to expanding its outreach and relationships with other universities, organizations, communities and companies. To learn more, contact Brad Fain at 678-361-4428 or brad.fain@gtri.gatech.edu.

HomeLab: A real-life testing ground for older-adult products and services

Continued from page 57



Brad Fain, PhD

W. Brad Fain, PhD, a principal research scientist at the Georgia Tech Research Institute (GTRI), has 25 years of experience in human performance research and serves as director of the Georgia Tech HomeLab research initiative.

Currently, Fain's research interests lie in technologies to support aging in place, universal design, application of "Internet of Things" technologies to the home, and commercial product design. He leads human factors programs and human systems integration efforts for both military and industrial customers at GTRI.

In addition, Fain established the Accessibility Evaluation Facility (AEF) at Georgia Tech and has pioneered evaluation techniques designed to measure accessibility and usability of products and services for people with disabilities. The AEF serves both industry and government and is the independent test lab for the Arthritis Foundation's Ease of Use commendation program and similar programs for Arthritis Australia, Arthritis New Zealand, and the Arthritis Society of Canada.

access to better medical care, as well as more opportunities for better nutrition and exercise, is an area of research I'd like us to address more frequently in the future," he stresses.

The other area involves enabling people with major medical conditions, such as chronic obstructive pulmonary disease and congestive heart failure, to avoid hospitalization. "Research sponsors are interested because these conditions use a lot of resources to address people's needs," Fain notes. To help make such research more robust, HomeLab has purposely recruited a larger population with those conditions than might be predicted by statistical norms.


"By working with us to develop relevant technologies," Fain says, "sponsors provide opportunities to enhance people's quality of life by managing their conditions in their residence of choice."

Fain observes that "unfortunately, what often happens is that people don't invest in technology for their surroundings until it becomes absolutely critical for them to do so, and sometimes that's a bridge too far—it's just a little too late. By introducing technology into the home slowly," he observes, "people will adapt to it and it can be there when they need it."

Rethinking practices

Research conducted by Washington, DC-based AARP shows that most older adults want to stay in their homes and communities as long as possible as they age.^{1,2} When they *do* move to senior living communities, many arrive at older ages^{3,4} and with more complex health challenges, particularly in assisted living.⁴ Residents are also reluctant to move from their neighborhoods or communities to higher levels of care,⁴ even when they will live on the same life-plan campus, for example. Rethinking their practices, senior living communities and community-based organizations seek

ways to provide greater care and support to individuals where they are.

Participating in research is one way to support the creation of solutions that meet the challenges and maximize the opportunities for older populations in real-world settings. Active-aging organizations—along with everyone else—will reap the benefits. 

Marilynn Larkin, contributing editor to the Journal on Active Aging[®], has been involved in technology and the web since 1995 and published extensively about her experiences. Her early work encouraged consumers and medical professionals to go online, and she had her own "WebWatch" page in The Lancet. Larkin's current interests include technologies that boost communication and connection, provide support and motivation, and prompt innovation.

Questions or comments? Email: mlarkin@icaa.cc

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Images courtesy of Georgia Institute of Technology/HomeLab