Metabolic, movement researchers launch company, shoot for consumer market

‘Fit Companion’ Coming to a Shoe Near You

By Todd Neff

Ray Browning, PhD, was a University of Colorado School of Medicine postdoctoral researcher in 2007 when it struck him that, despite the obvious benefits of walking, it was nearly impossible to quantify how it helps a given patient.

Browning had earned his PhD at the University of Colorado at Boulder studying the biomechanics of obesity – in particular, how obesity affects walking, the most commonly prescribed antidote to obesity. “Walk,” patients were told.

But there was no good way to quantify the amount and caloric benefits of that walking. What was missing, Browning realized, was a tool to help patient and caregiver understand how physical activity affected how much energy they expend. The device would make for healthier patients and more informed health care decision-making. But how to do it?

Four years, two grant proposals, many sessions in the UCH whole-room calorimeter and a Fort Collins-based startup later, a tool to help people track the energy they use now exists. The Fit Companion, as it’s called, lives in shoes, but wirelessly transmits data to a cell phone via Bluetooth, thereby enabling the user to check calories burned, physical activity, and body weight, among other variables, in real-time.

Users can sync the data to their computers to share and analyze. A combination of pressure sensors, accelerometers and software can even tell if you’re sitting, laying down, walking, climbing stairs, jogging, or cycling. The device can alert wearers when they’ve been too sedentary, or when they’ve hit a predetermined threshold for exercise.

The Fit Companion remains in prototype, and Physical Activity Innovations, LLC – the Fort Collins-based startup – still has a ways to go. But the company has come far in a few short years, and recently announced that it had licensed the technology from the University of Colorado and is commercializing it.

Kate Dannecker, a graduate research assistant at Colorado State University, speaks to a research subject in the room calorimeter on the 12th floor of the Anschutz Inpatient Pavilion, in July 2010. This study, by CSU professor Ray Browning, PhD, involved testing the accuracy of a Fit Companion prototype in determining caloric output during different activities.

Serendipitous visit. Browning, who now directs Colorado State University’s Physical Activity Energetics/Mechanics Laboratory, did his postdoctoral work with James Hill, PhD, director of the CU School of Medicine’s Center for Human Nutrition and, more recently, executive director of the Anschutz Health and Wellness Center. The breakthrough came when Edward Sazonov, PhD, an electrical and computer engineering professor specializing in wearable systems at Clarkson University, dropped in for a visit.

Continued
Sazonov, now at the University of Alabama, had developed monitoring devices to prevent falls and comply with rehabilitation therapies, and was conferring with Hill and Ed Melanson, PhD, a School of Medicine exercise and nutrition specialist.

Melanson, in addition to his own research, directs the special whole-room calorimeter on the 12th Floor of the Anschutz Inpatient Pavilion, part of the Colorado Clinical & Translational Sciences Institute. Researchers prize the room’s ability to precisely convey how much energy a subject is using simply by tracking the amount of oxygen and carbon dioxide present in the carefully ventilated space. With such information, plus knowledge of a patient’s weight and diet, scientists can derive how much fat, carbohydrate and protein someone is burning.

He and Browning got to talking, and realized that, “with a little bit of tweaking, we could get this to work as a weight-management tool,” as Browning recalled. “That’s the beauty of collaboration — we put those things together and asked, ‘How can we get this to work?’”

Win lose one, win one. The National Institutes of Health (NIH) reviewers gave the grant proposal high marks, but then promptly rejected it. The issue: Browning, Hill and Sazonov had written that they hoped to develop their new monitoring device into a commercial product.

Their NIH contact suggested trying for a Small Business Innovation Research (SBIR) grant instead. But initial SBIR grants are for six months and $100,000. The trio needed two years and a lot more money. They applied anyway, and ended up with an 18-month, $360,000 grant. SBIR grant officials, they learned, have leeway if the idea is promising enough.

The awards also require a company exist to commercialize the research product. Thus Physical Activity Innovations, with former HP executives Harry Baeverstad and Tom Pritchett, was born. Baeverstad, Pritchett, Browning, Hill, and Sazonov are partners in the new venture.

The grant paid for graduate students, software engineers at the University of Alabama, and 20 days in the UCH room calorimeter, which Browning described as “critical.”

“Through the room calorimeter glass, a research subject’s feet as he steps on and off a step in July 2010. The devices on his heels are prototypes of the Fit Companion.”

Fit Companion prototypes involve five underfoot sensors, a three dimensional accelerometer and an electronics package attached to the wearer’s heel. It measures energy expenditure accurate to within 5 percent and weight and posture within 1 percent. Browning says the company is now working on incorporating the entire device into a removable insole or partial insole.

They’re in talks and considering two paths to market, he says. One involves manufacturing Fit Companions themselves; the other licenses the technology to established footwear, location-services or other companies. The device’s retail price should land in the $100-$250 range, Browning estimates.

Not all medical research may bubble with market opportunity. But commercialization, Hill says, “is something we ought to be thinking about campus-wide, to help get ideas out there in ways that really do help people.”

“We think there’s a great opportunity for these simple devices that can help us live a more healthy lifestyle and help people be more physically active,” he said.