

# FAKES

*and the*

Rise *of*

F A B I O

F E L D M A N


*How a young researcher at SFU turned conventional wisdom on its head about how seniors fall – and how to prevent injury*

**BY MICHAEL BERNARD  
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There's something intriguing about Fabio Feldman.

The 38-year-old Brazilian with a PhD in Biomechanics has been interviewed extensively by Global Television, the Discovery Channel, CTV Network and The Province newspaper, to name a few. But don't call him a media darling. There's a lasting substance behind that eight-second sound bite you hear on the evening news.

What sets him apart from the crowd? Feldman is a different breed of health care professional. Working in the area of seniors' falls,

A man with short brown hair, wearing a black long-sleeved shirt, black trousers, and black leather shoes, is sitting on a set of wide concrete steps. He is looking directly at the camera with a neutral expression. His hands are clasped in his lap, and he is wearing a watch on his left wrist. The background is a blurred outdoor setting with a building and other people walking up the steps. The lighting is bright, suggesting a sunny day.

‘You don’t follow someone’s  
trail, you create your own.’

– *Fabio Feldman*

he's quickly become known as an inquisitive mind with a penchant for asking questions no one else dares to ask.

He was part of a team of researchers that challenged and ultimately dislodged much of the conventional knowledge about falls and injury prevention.

And as Manager of Seniors' Falls and Injury Prevention for Fraser Health, Feldman is putting his research into action, improving the quality of life of seniors and saving millions in our health care system.

Some people question how a young, gifted and energetic researcher like Fabio Feldman came to focus his efforts on the problem of seniors' falls. The answer: a little bit of luck and a lot of passion.

Upon his arrival in Canada in 1996, Feldman had spent several years studying computer science at a small university in Brazil, where academics came second to his career as a professional football player.

He wasn't exactly enamoured with his career direction. "My interest just wasn't there. The irony is that I wanted to work with people, but I ended up spending 90 per cent of my time on a computer," he explains.

His wife had received a full scholarship to complete her doctorate in Biochemistry at Simon Fraser University. Their plan was to spend five years here, then return to Brazil. For Feldman, it was the perfect time to return to school. He was immediately drawn to the School of Kinesiology at SFU, a well-established program with a strong track record of innovation. His resolve to pursue this field of study was solidified through informal conversations with professors in between campus football games.

But Feldman didn't have the grades to get into the program. To improve his academic standing and confidence, he attended Coquitlam College and enrolled in the most challenging courses he could find.

"I had a huge issue with math and calculus. I tried three times in Brazil to do calculus and I failed all three. So when I came here I said, 'If I'm going to do this I'm not going to start small and see if I can cut it. I am going to start with the hardest thing. If I pass, I can go all the way.'"

Feldman's focus and determination paid off. He got an A+ in calculus, putting him on the path to a Bachelor's degree in his chosen field. After completing the required coursework in Kinesiology, Feldman enrolled as a co-op student and applied for a position in the injury prevention lab – an area that seemed to match his skills and interests. This led him to work with Dr. Stephen Robinovitch, Canada Research Chair in Injury Prevention and Mobility Biomechanics, who would later become Feldman's PhD supervisor.

As for the subject matter, Feldman had no idea he would be studying seniors' falls. But Robinovitch's passion intrigued Feldman, as did the opportunities for making real change and helping people.

"What really attracted me is that it's such a big problem – it's costly and there are personal issues, pain and suffering, and there's so much being done yet we know so little about the problem," says Feldman.

**B**ig and costly problem is an understatement. Seniors' falls cost the Canadian health care system at least \$1 billion a year, money that could be diverted to other pressing needs.

Falls among seniors, particularly those in long term care facilities are shockingly common, with at least one in two falling once a year and 40 per cent of those falling twice or more. Seven years ago, the field was ready for people like Feldman, who were hungry to ask their own questions and find their own answers.

"And that's the thing for me. You don't follow someone's trail, you create your own. That's what I was trying to do – what's being done is not working. It means there are so many things that we haven't looked at yet that might work," says Feldman.

Trail-blazing sounds a lot easier than it actually is. For Feldman, it has meant constantly questioning the validity of the work of others, putting their conclusions to the test, not accepting what on the surface appears to be true.

It helped to have a scientist like Robinovitch as a mentor. An intense, bespectacled man, he is a sharp contrast to Feldman's easy, friendly, warm manner. During one media interview, Robinovitch begins to lecture the TV reporter about the need to mention the teamwork approach to the work and the university's support before being tersely told by the reporter that she had things in hand.

But Fabio is quick to describe his mentor as "just amazing," reeling off his credentials, which include a Bachelor's of Applied Sciences in Mechanical Engineering from the University of British Columbia and a PhD in Medical Engineering from the Massachusetts Institute of Technology. "Everything I know, it's because of him," Feldman says with an air of certainty.

At the same time, the very mentoring that had fed Feldman's flair for applied research was to lead him to challenge and ultimately contradict

## THE LOWDOWN ON FALLS

- Likelihood of long-term care residents falling: 200 to 400% more frequent than seniors in their own home
- Risk of residential facility residents injuring themselves compared to at-home seniors: 200%
- Risk of women in facilities suffering a hip fracture compared to women in the community: 10.5 times greater
- Percentage of those injured in a fall in a facility that regain their mobility prior to their injury: 15
- Major predictors of falls injuries: dizziness, hypotension, balance, gait disturbances, syncope, confusion and frequent urination, use of assistive devices, dementia or cognitive impairment, increased gait and mobility impairment, staffing and environmental issues.

(Source: Canadian Public Health Agency: Residential Care Falls Hospitalization Analysis 2005)

Robinovitch's key findings. One of the prime values of Robinovitch's work is that he was the first to create an 'unexpected fall' in a laboratory setting. Using what was playfully called the 'Slip-a-Tron 2000,' Robinovitch was able to videotape unexpected falls that subjects took when a floor covered by a carpet was yanked from under the subject by a large, spring-loaded machine.

However, the value of Robinovitch's research was ultimately limited by two or three factors, including the fact that his subjects underwent multiple falls, where the unexpected soon became expected. The student subjects took to falling forward and landing on their hands. But Fabio wasn't convinced about the finding that students 'learned' how to fall in a way that avoided hip fractures. While he couldn't test seniors – ethics prevented him from putting them at risk – he could test whether students falling for the first time fell any differently.

What was needed was a larger sample of students than the five subjects Robinovitch had employed in his earlier study. What was also needed was for each of those students to *fall only once* unexpectedly – replicating the real life circumstances of everyone who falls. So Feldman set to work creating a lab experiment to test his mentor's hypothesis, a project he admits "took some courage."

He called for about 70 volunteers from two lab courses to participate in what he humorously called 'Mission Impossible.' He ended up with 44, enough to test the hypothesis that the only reason they avoided hip fractures is because they were young enough – and fast enough – to 'learn' to turn

forward to avoid a hip fracture. What he found was that the students were not turning and falling hands forward on their first 'unexpected fall'; they were in fact falling sideways, impacting their hip.

Feldman talked to Robinovitch about conducting the experiment again, which would effectively put an end to his mentor's explanation of why students are able to avoid hip fractures.

"He was really kind of nervous about this because it was putting all his work on the line," Feldman says.

"But he was bigger than that. He knew that if something [was proved] different, we were the ones who were going to be finding it." The work was to win the team the prestigious New Investigative award from the Canadian Biomechanics Society in 2006, the first of several such awards.

About the same time, Feldman began working with another researcher, Andrew Lang, whose work focused on injury prevention as opposed to falls prevention. Their collaboration has led Feldman into delving into the value of hip protectors as a means of softening the impact of the fall.

In an ongoing experiment at Burnaby Hospital, seniors who come in are fitted with hip protectors, padded briefs that are worn under

clothing, and which have reduced the incidence of hip fractures from 14 in the 2003-04 year to a mere three a year in the 2006-07 period.

Feldman says only two preventive strategies could account for this.

"Almost all of in-hospital hip fractures are due to falls so one factor is falls prevention, which involves educating staff, conducting safety checks and establishing standardized safety procedures. The other is the use of hip protectors."

**T**he cost implications are enormous. "We figure that we saved the system more than \$300,000 in the cost of hip fracture operations and recovery time in hospital," he says. "The outlay for hip protectors for five years? A mere \$5,000."

As if his research work wasn't contribution enough, Feldman also led the establishment of the first seniors' falls prevention clinics in Canada. The clinic, which he has taken to several communities within Fraser Health, is dedicated to helping seniors identify their vulnerability to falling.

The clinics, set up in gymnasiums, community centres and other facilities, feature a talk followed by a physical assessment involving eyesight, blood pressure, medication review, flexibility, among other factors, that can play a role in falls. The clinics proved to be a hit and in fact were recognized by an annual award bestowed by BC's Premier.

Marcia Carr, Clinical Nurse Specialist for Acute Geriatric Services at Burnaby Hospital, says Fabio Feldman's value to Fraser Health and to Canada is indisputable. He and the team at SFU are "action people."

"Fabio is a rare combination of applied researcher and clinician. He is able to take the research evidence and truly transform that evidence into practice in a way that makes an impact on people's lives. Without him we would be nowhere."

Barbara Korbek, Vice-President of Primary Care and Community Health Network for Fraser Health, says she has only been at Fraser Health for a few months but is well aware of Feldman. "He is an invaluable asset to us – kind of a provincial treasure – because of his work and dedication to seniors' falls and injury prevention. We'll keep him, thank you!"

### THE MIRACULOUS BOUNCY FLOOR

Fabio Feldman and the team at SFU have discovered that a new energy-absorbing floor produced by Satech Inc. of Chehalis, Wash. could cushion falls and prevent injuries. This so-called "bouncy" floor was among 14 floor coverings his team tested.

The Satech flooring traditionally has been used to reduce fatigue among workers who stand for long periods of time. Testing revealed that this floor was capable of absorbing about 40 per cent of the energy of a fall, compared to 25 per cent by hip protectors, enough to dramatically reduce injuries due to falls.

Feldman demonstrated the floor's injury-prevention qualities on Global News by repeatedly dropping an egg on the floor without breaking it.

It is projected that, installed in seniors facilities, these floors could reduce hip fractures by more than 80 per cent on top of preventing other fractures such as to arms and ribs as well as concussions by 100 times.

In spite of its miraculous qualities, the costs of manufacturing and installing such flooring run only twice as much as conventional flooring. The flooring is currently being tested at Deltaview, a care facility in Delta.

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