

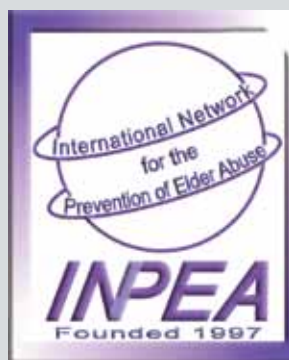


GRC NEWS

THE NEWSLETTER OF THE GERONTOLOGY RESEARCH CENTRE

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12 WHY GLOBAL WARMING SHOULD CONCERN SENIORS AND THEIR ADVOCATES



The GRC is the Secretariat of the International Network for Prevention of Elder Abuse (INPEA) with President Gloria M. Gutman, Ph.D.

FOR INFORMATION ON GERONTOLOGY PROGRAMS

PhD, Masters, Diploma, or Minor contact:

Anne Marie Barrett
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And see our department website
www.sfu.ca/gerontology

GRC News 'special edition' dedicated to falls and falls prevention research



TECHNOLOGY FOR INJURY PREVENTION IN SENIORS (TIPS) RESEARCH PROJECT: A NOVEL PROGRAM OF COLLABORATIVE RESEARCH

by **Fabio Feldman**, (co-leader, TIPS Co-Investigator, Fraser Health)

Falls and fall related injuries have serious and far reaching personal, economic and societal consequences for seniors (aged 65 and older). Injuries due to falls account for 60% of all injury related deaths and 86% of all injury related hospitalizations. Unlike other external causes of death (e.g., traffic accidents), falls disproportionately injure or kill older people.

Continued on p.2

RECENT CENTRE ACTIVITIES

UPCOMING EVENTS

The GRC is proud to present the upcoming 20th Friesen Conference: **Growing Old in a Changing Climate: Exploring the Interface Between Population Aging and Global Warming** – May 25-26, 2011. Please see our website for more details (<http://www.sfu.ca/fc2011/>).

COMINGS & GOINGS



The GRC welcomes our new Post-Doctoral Fellow, **Ryan Woolrych**. Ryan comes to us from the UK where he was a Research Associate with RIHSC (Research Institute for Health and Social Change) in Manchester. Ryan will be working at the GRC as a post-doctoral fellow on the TIPS project. He will be responsible for developing a research protocol on risk factors for falls in long-term care, data collection, analysis and report writing. Ryan will be working closely with all project partners to ensure a collaborative approach. Ryan will be disseminating findings of the research to a wider academic audience and will be involved in various activities of the GRC.



The GRC welcomes **Bobbi Symes** as their newly appointed part-time Development Manager. In this role Bobbi will work closely with the Director, faculty, students and staff to foster an exciting academic community within the Centre through: activities, outreach, grants facilitation, networking and community engagement.



MESSAGE FROM THE DIRECTOR

by **Andrew Sixsmith**, Director, SFU Gerontology Research Centre

This issue of GRC News is devoted to falls and falls prevention research. Falls are a major cause of injury amongst seniors, often having a devastating effect on their mobility and independence. To address this, the CIHR-funded TIPS program comprises an interdisciplinary group of researchers based at SFU and UBC to examine the causes of falls in long-term care and to develop innovative interventions to reduce the incidence and negative effects. As we were going to press, the GRC Director himself slipped and fell on a wet metal grating at the corner of Granville and Hastings in downtown Vancouver! This highlights the fact that falls are a common occurrence at all ages. A big difference is that the effects of falling- wrist and hip fractures- are more frequent amongst seniors. In this case, no damage was done, but in a city that claims to be one of the most liveable and senior friendly in the world, it is imperative that steps are taken by planners and engineers to make our streets less hazardous.

Technology for Injury Prevention continued from page 1

Falls among older adults is a serious economic burden with the direct health care cost of falls among seniors in Canada estimated at \$2.0 billion (B.C. data not available) and the hospitalization cost of treating a hip fracture alone is approximately \$20,000. (SMARTRISK, 2010)

Two trends are of note when examining the rates of falls-related deaths over the last two decades.

First, there is a positive relationship between age and falls-related mortality. In particular, seniors who are 85+ have a significantly higher death rate from falling. In fact, in Canada, falls are the most common cause of unintentional injury for the very old (age 80+). In 2004, 1,393 or 47.3% of deaths caused by unintentional injuries were falls-related among persons aged 80 and over (359 or 7.7% for those aged 65+). (Fact Book on Aging in B.C., 5th Edition, 2009, p.66)

Second, falls-related death seems to have stabilized in the 1990s after a declining trend in the 1980s. In other words, there has been little or no improvements in falls-related mortality for older adults in British Columbia between 1980 and 1999 (no recent data were found). (Fact Book on Aging in B.C., 5th Edition, 2009, p.66)

Furthermore, around 40% of admissions to long term care (LTC) facilities are related to falls. LTC facilities are for adults who can no longer live safely or independently at home because of their complex health care needs. This environment is of particular concern to health care providers as the rate of falls among LTC residents is two to three times the rate found among community dwelling seniors with approximately 30% of falls resulting in injury, and 3% - 5% causing fractures. Despite these disturbing statistics, the LTC setting has received relatively little attention from researchers, due to the implicit challenges found in these settings, where residents are typically frail and cognitively impaired. Thus, to be effective, researchers must develop new fall and injury prevention strategies that account for the complex range of physical and cognitive abilities in this population.

The Technology for Injury Prevention in Seniors (TIPS) research project, based at Simon Fraser University in Vancouver, Canada, is a novel program of collaborative research between universities, government agencies, and end users for the development of innovative technologies to prevent hip fractures and other fall-related injuries in older adults through dissemination and utilization of research results in order to guide clinical and environmental changes for reducing the incidence of fall related injuries in LTC facilities.

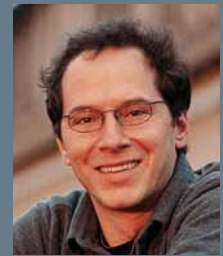


TECHNOLOGY FOR INJURY PREVENTION IN SENIORS (TIPS)

Everyone experiences a fall now and then. While these events are usually benign, occasionally we are reminded of how even a simple fall from standing can cause serious injury, especially for older adults. Indeed, falls represent the most common cause of injuries in those over age 65. They are responsible for over 90% of hip fractures and wrist fractures, and up to 60% of head injuries in this population. Approximately 20% of hip fracture patients die within a year, and 50% will not return to their pre-fracture level of mobility and independence. Clearly, the development of improved strategies to prevent falls, and the injuries caused by falls, is an essential public health priority.

The Technology for Injury Prevention in Seniors (TIPS) program, based at Simon Fraser University in Vancouver, Canada, is a novel program of collaborative research between universities, government agencies, and end users for the development of innovative technologies to prevent hip fractures and other fall-related injuries in older adults. Led by Dr. Stephen Robinovitch, SFU Professor in the Department of Biomedical Physiology and Kinesiology (BPK) and the School of Engineering Science, and Canada Research Chair in Injury Prevention and Mobility Biomechanics, TIPS is funded through team grants from the Canadian Institute for Health Research (CIHR) under two programs: the Emerging Team Grants for Alliances in Mobility in Aging program, and the Strategic Teams in Applied Injury Research (STAIR) program.

An important and relatively novel aspect of TIPS is the development of “real life laboratories” to study falls in two participating long-term care (LTC) facilities in the Vancouver area. The high-risk LTC environment (while traditionally understudied) provides an ideal setting for the development and testing of interventions, many of which should be applicable to the entire population of older adults, as well as to the prevention of fall-related injuries in workplaces or sports.

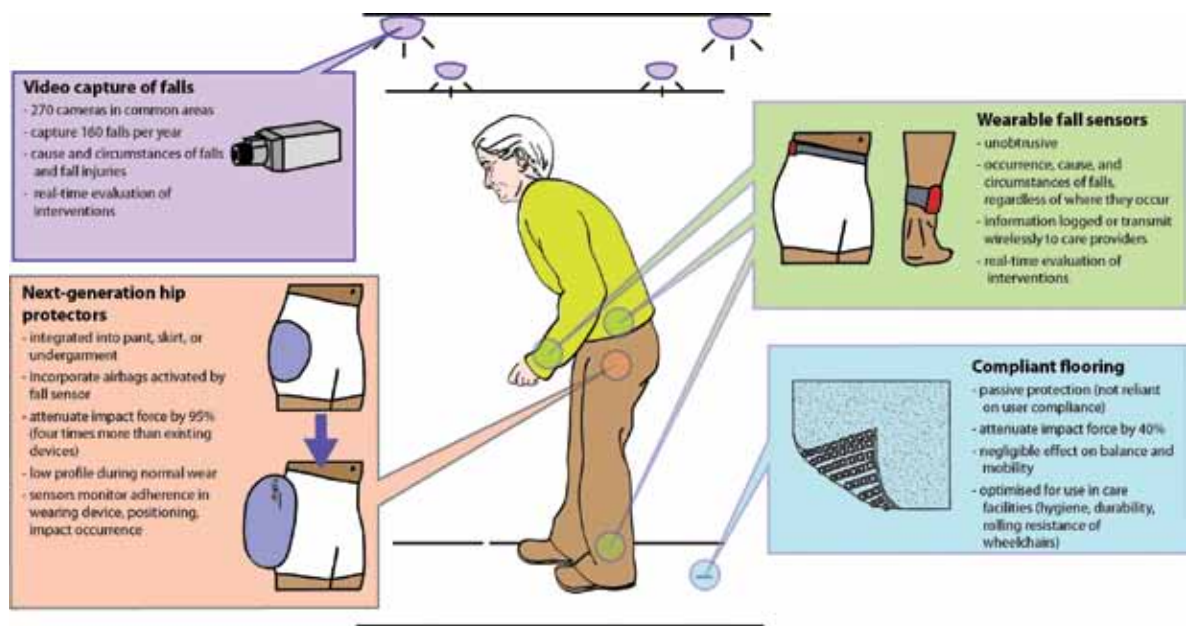


PRINCIPAL INVESTIGATOR:
Dr. Stephen Robinovitch, Simon Fraser University

FUNDING SOURCE: Canadian Institute for Health Research (CIHR): Emerging Team Grants for Alliances in Mobility in Aging (MIA) – \$1,499,643.00 and Strategic Teams in Applied Injury Research (STAIR) – \$896,112.00. Funding for this project runs from 2009 to 2014.

MISSION: to create a novel program of collaborative research between cross-university researchers, government agencies, and end users for the development of innovative technologies to prevent hip fractures and other fall-related injuries in older adults. The list of participants and their institutional affiliations under the various Sub-projects provides the scope of the collaboration involved with this project.

TIPS “Real life” laboratory for studying the cause and prevention of falls in the long-term care (LTC) environment. Video capture and wearable sensors will be used to determine the characteristics of injurious and non-injurious falls, and examine how these associate with physiological function and environmental features. Next-generation hip protectors will be developed, and compliant flooring will be installed and evaluated for its potential to reduce fall injuries.



The overall goals are (1) to develop new technologies (such as wearable sensors or video-based networks) for reliably detecting falls, and providing objective, real-time data on the cause and circumstances of these events; and (2) to develop and evaluate novel interventions (such as compliant flooring and active wearable hip protectors) to reduce the risk for injury in the event of a fall. To achieve these goals, the team is focusing on six related Sub-Projects:

A. Video-based recording of real-life falls. This project utilizes networks of video cameras to record and interpret the cause and circumstances of real-life falls in the LTC setting.

B. Wearable fall recorders. This project involves the development of wearable fall recorders to accurately detect and log the onset of a fall, and record key characteristics associated with the initiation, descent, and impact stages of falls.

C. Characterizing predictors of falls in the long-term care setting. In this project, researchers will combine video surveillance of falls into a prospective cohort study, to determine how the cause and circumstances of falls and fall injuries in LTC are influenced by physical abilities, cognitive function, cardiovascular status, medication use, assistive devices, and features of the environment.

D. Compliant Flooring. This project will test the effect of force-attenuating compliant flooring (similar to the rubber tile found in some playgrounds) on mobility, falls, and fall-related injuries in the LTC environment.

E. Development of next-generation protective clothing. This project involves

the development and evaluation of “smart” wearable hip protectors, which incorporate (a) integrated sensors to record fall occurrences, and monitor user adherence and proper positioning in wearing the device, and (b) active, inflatable elements for improved protection against fracture.

F. Knowledge exchange. Knowledge exchange is an overarching aim of TIPS. To achieve this, the research team includes stakeholders who participate in all stages of the research process (study design, execution, and evaluation of results). The research team also adapts new knowledge to each context, and assesses barriers and facilitators to the uptake, utilization and dissemination of new products and technologies.

SUMMARIES OF SUB-PROJECTS

SUB-PROJECT A: VIDEO-BASED RECORDING OF REAL-LIFE FALLS

Research team: Greg Mori (co-leader, TIPS Co-Investigator, SFU), Fabio Feldman (co-leader, TIPS Co-Investigator, Fraser Health), Shahram Payandeh, Joanie Sims-Gould, Stephen Robinovitch

The goal of this project is to determine “how” and “why” falls occur in older adults, based on careful review of video footage of real-life falls experienced by residents of two partnering long-term care facilities. Video footage is acquired from a network of over 400 digital video cameras installed in common areas (dining rooms, lounges, and corridors) of two partnering long-term care (LTC) facilities in the Vancouver area (Delta View and New Vista Society care homes). In the event of a fall, an incident report is completed by care providers. We then review these reports to identify

the location of falls, and retrieve the corresponding video footage.

We then carefully analyze the video footage to determine the cause and circumstances of each falls, based on a structured questionnaire completed by an expert team. Characteristics of interest include (a) the cause of the fall (e.g., slip, trip, syncope, or loss-of-balance), (b) the activity at the time of the fall (e.g., walking, turning, reaching, or standing), (c) the direction of the fall, (d) the use of specific balance recovery or “safe landing” responses (e.g., stepping or grasping, or arresting the fall with the outstretched hands), (e) the presence of clutter or apparent role of environmental factors (e.g., tripping hazards, poor lighting), and (f) the type of assistive device being used (if any). In related work, we are developing computer-based methods to automatically identify falls (and distinguish key characteristics of falls) from video data. Our long-term goal here is to develop video surveillance systems suitable for extensive implementation in high-risk environments, which provide automatic detection and alerting to care staff of fall events. These efforts are based on novel algorithms that recognize human actions based on “novelty motion estimates.”

Preliminary results from this Sub-Project challenge some common perceptions concerning the circumstances of fall in older adults. For example, we are finding that most falls are caused by incorrect weight shifting (or transfer of body weight), which is more than twice as common as the next most-frequent causes (trips, hit/ bump, and loss of support with an external object). We have also observed that head impact occurs in over one-third of falls, and that while the arms are commonly used in an attempt to arrest the fall, this



SUB-PROJECT B TIPS trainees Omar Aziz (seated) and Thiago Sarraf conduct experiments in the IPML laboratory to test the ability of wearable sensors to distinguish the cause of falls.

response is insufficient for preventing impact to the head, perhaps due to insufficient upper extremity strength. Ongoing analysis is providing a unique window into the mechanisms of fall initiation, descent, and impact.

SUB-PROJECT B: WEARABLE FALL EVENT SENSORS

Research team: Ed Park (co-leader, TIPS Co-Investigator, SFU), Stephen Robinovitch (co-leader), Joanie Sims-Gould, Greg Mori

In this Sub-project, we are combining miniature sensors (Microstrain G-Link and APDM Emerald sensors) with custom-designed data analysis algorithms to create wearable fall recorders that can accurately detect and log the onset of a fall, and record key characteristics associated with the initiation, descent, and impact stages of falls. The first stage of this work involves laboratory experiments with young adults, who act out a variety of daily activities, as well as falls and near-falls. By using a large array of sensors in these experiments, we can test how features of the sensor array (number of sensors, mounting locations, and type of sensor signal) and the type of data analysis algorithm affect the sensitivity and specificity of the system for detecting key characteristics of falls and near-falls. Simultaneously, we will conduct focus groups and interviews with LTC residents and care providers to identify the factors that influence individuals' willingness of to wear these devices, and care providers' attitudes in supporting their use. This will allow us to select the hardware and data analysis algorithms for the next stage of the research, which involves using the system to measure falls, near-falls and mobility patterns in LTC residents.

Recently, we conducted falling experiments in the IPML laboratory to determine how the number and location of 3D accelerometers affects the accuracy of a machine learning algorithm to distinguish the cause of falls. 16 participants underwent falls and near-falls due to slips, trips, simulated faints, and loss-of-balance due to weight shifting. We found that data from a single accelerometer (placed at the waist) provided a minimum sensitivity of 76% to distinguish fall type; accelerometers at the waist and sternum

increased this to 93%, and accelerometers at each ankle, and a third at the waist or head increased this to 97%.

SUB-PROJECT C: CHARACTERIZING PREDICTORS OF FALLS IN THE LONG-TERM CARE SETTING

Research team: Andrew Sixsmith (co-leader, TIPS Co-Investigator, SFU), Teresa Liu-Ambrose (co-leader, TIPS Co-Investigator, UBC), Victoria Claydon, Habib Chaudhury, Fabio Feldman, Stephen Robinovitch



SUB-PROJECT C TIPS trainees take measures of postural stability.

In this Sub-project we are exploring the risk factors for falls in LTC. In particular, we are looking at how the falls are influenced by the complex interaction of factors such as the person's physical and cognitive status, medication use, use of assistive devices, and features of the physical and social environment. To assess intrinsic factors we are conducting a battery of physiological and cognitive measures based on recent pilot work at the LTC facilities. These include measures of postural stability, gait speed, coordination, cognitive function and cardiovascular status. To assess extrinsic factors in falls, we are using video data, interviews, case notes and observation to determine the role of LTC design features, movable objects (chairs etc) as well as the role of the social and care context. The project combines quantitative and qualitative methods to obtain a holistic picture of the factors that influence falls and to use these insights to develop and evaluate preventative interventions.

SUB-PROJECT D: COMPLIANT FLOORING TO REDUCE FALL-RELATED FRACTURES

Research Team: Fabio Feldman (co-leader), Andrew Laing (co-leader, TIPS Co-Investigator, University of Waterloo), Karim Khan, TIPS Co-Investigator, UBC, Stephen Robinovitch, Joanie Sims-Gould, Andrew Sixsmith, Habib Chaudhury



SUB-PROJECT D TIPS trainees measure impact upon simulated hip on floor surface.

This project will test the effect of force-attenuating compliant flooring (similar to the rubber tile found in some playgrounds) on mobility, falls, and fall-related injuries in the LTC environment. We will start by extending our previous research to determine the most appropriate type of compliant flooring for installation. Our decision will be based on three criteria: (1) the amount of cushioning (or force reduction) provided by the flooring at impact from a fall; (2) the effect of the floor on the mobility and balance of older adults; and (3) the effect of the floor on the push-pull forces required to move equipment such as wheelchairs, beds, and carts. These results will be presented to various stakeholders, including care providers and administrators in our partnering LTC facilities and in the Fraser Health Authority, who will actively participate in decisions on material selection and installation.

Simultaneous with these efforts, we will begin to collect data to evaluate the clinical utility of compliant flooring in reducing fall-related injuries in the high-risk long-term care environment. We will start by carefully monitoring falls and injuries in our partnering long-term care facilities, for a 12 month period prior to installation of compliant floor. This will allow us to calculate the baseline "injury-per-fall" rate. We will then install the best of our "laboratory-tested" compliant flooring

systems in a high-risk area of a LTC facility, and compare the subsequent injury-per-fall rate with the value determined for the same wing in the previous 12 months (pre-post comparison) as well as in a comparison wing of similar size and resident population (contemporaneous comparison). Our aim is to systematically detail total and fall-related health care resource utilization (and associated costs) for each LTC resident in the wings that have, and do not have, compliant flooring. Through focus groups and interviews, we will also describe the experience of staff, residents' and family members related to the novel compliant flooring.

SUB-PROJECT E: ACTIVE HIP PROTECTORS

Research team: Siamak Arzanpour (co-leader, TIPS Co-Investigator SFU), Stephen Robinovitch (co-leader), Ed Park, Andrew Laing

The aim of this Sub-project is to develop “next-generation” hip protectors that overcome current barriers to the uptake and biomechanical effectiveness of this intervention. The Sub-project addresses 3 objectives: Creation of a Hip Protector Status Monitor, Design of an Inflatable Hip Protector, and Determining factors contributing to Hip Protector Usability.

To address the first objective, we plan to develop sensors that can be integrated into currently available hip protectors to provide information on: (a) user compliance in wearing the device, (b) the occurrence and severity of impact to the protector, and (c) positioning of the device. Our approach in developing these systems will range from



SUB-PROJECT E TIPS hip protector

the basic (e.g., pressure sensitive film or an array of ink-filled plastic bubbles that explode on impact), to advanced systems developed in Dr. Leung's SFU laboratory. The second objective is achieved by advanced developments that include creation of an inflatable hip protector that deploys after fall initiation is detected by the wearable fall event sensors being developed under another Sub-project. Through experiments with our hip impact simulator, we will refine design features of the protector to reduce the force delivered to the bone, therefore reducing the risk for injury. Furthermore, it will involve the evaluation of how variables such as airbag thickness, surface geometry, inflation pressure, supply network geometry, and timing of deployment influence the force attenuation provided by the device. Lastly, the third objective is addressed through studies that will involve determining how design features of hip protectors (such as protective ability, cost, comfort, appearance, ease of donning on or off, and maintenance) influence the compliance (acceptance of, and adherence to) the device.

SUB-PROJECT F: MOVING RESEARCH OUTCOMES INTO ACTION: BEGINNING WITH THE END-USER IN MIND

Research Team: Heather McKay (co-leader, TIPS Co-Investigator UBC), Vicky Scott (co-leader, TIPS Co-Investigator BC Injury Prevention Unit, Ministry of Health), Joanie Sims-Gould, Fabio Feldman, Stephen Robinovitch



SUB-PROJECT F: Knowledge exchange is an overarching aim of TIPS.

The aim of this Sub-project is to engage stakeholders in the design, implementation and dissemination of our research.

To do this we are using a multi-method research model that builds upon existing knowledge and relationships, and contributes new approaches to understanding the nature of fall risk and prevention in real-life settings. Of particular note is our focus on multiple levels of influence including residents, family members, LTC staff members, management, health professionals, government (regional and provincial) and fall prevention researchers. We are also evaluating how end users understand fall monitoring technologies (e.g. video capture and wearable sensors) and how these tools can be designed to maximize user uptake and impact. We are currently completing a scoping review of the literature on implementation of technology in residential care, we have presented to a number of stakeholder audiences and we have conducted our initial focus groups with staff and residents at two facilities. In the coming year we will be applying for a grant to look at novel ways of using the falls video capture recordings for education and health promotion initiatives.

Dr. Steve Robinovitch (seated centre) with TIPS team; please see bios on team and staff members elsewhere in this issue.



TIPS TRAINEE BIOGRAPHIES



Name: Ehsan Arjmand
Program: Engineering and Science – Mechatronics (Masters Program)

University: Simon Fraser University

Research Project: Analysis of Mechanical Behavior of Inflatable Hip Protectors

Research Interests: Dynamics; Modelling; Control



Name: Omar Aziz
Program: PhD student, School of Engineering Science

University: Simon Fraser University

Research projects: Development of a wearable sensor system to determine the causes of a fall; Pre and post impact fall detection using inertial sensors; Detection of events of imbalance/near falls from activities of daily living.

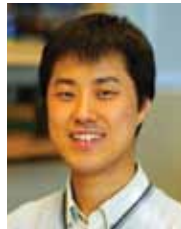
Research Interests: Sensor development; Injury Prevention in older adults; Biomechanics; Robotics and Control.



Name: Niousha Bolandzadeh
Program: Rehabilitation Science, Faculty of Medicine,

University: University of British Columbia
Research Project: Analysis of Functional and Structural MRI Data Obtained from Elderlies Diagnosed with Mild Cognitive Impairment (MCI)

Research Interests: Neuro-Rehabilitation; Neuro-Imaging; Machine-Learning; Computational Neuroscience



Name: Joseph Choi
Program: PhD in Biomedical Physiology and Kinesiology
University: Simon Fraser University

Research projects: Mechanics of falls to be analyzed using real-life fall videos in older adults; Determinants of femoral neck force during simulated falls on the hip; Age-related changes in shock-absorbing properties of soft tissue over the hip region.

Research Interest: Fall-related injury prevention.



Name: Jennifer Davis
Program: CIHR Postdoctoral Fellow, School of Population and Public Health,
University: University of British Columbia

Research Project: Jennifer's post-doctoral fellowship (PDF) explores the potential benefit of using patient-centered and outcome-based performance metrics in health

care to evaluate performance of actors within the health care system.

Research Interests: Include: Applying novel economic analysis techniques to assess performance within the health system in chronic and acute conditions; Specializes in economic evaluations alongside clinical trials in conditions devoid of economic enquiry (e.g. falls, cognition).



Name: Priyanka Deshmukh
Program: Master of Applied Sciences, Biomedical Engineering

University: Simon Fraser University

Research Project: Clinical effectiveness of hip protectors (specifically on its ability to reduce impact force during a fall) and the compliance of individuals in wearing the device.

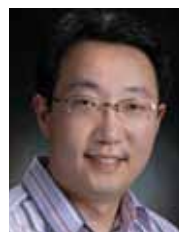
Research Interests: Biomedical Engineering; Mobility and Aging; Falls

Name: Chun Liang Hsu
Program: Rehabilitation Sciences

University: University of British Columbia

Research Project: Seniors falls and cognition

Research Interests: Mobility and Aging; Cognitive function



Name: Jung Keun Lee

Program: Postdoctoral Fellow
University: University of British Columbia

Research Project: Ambulatory human motion tracking using wearable sensors such as inertial and magnetic sensors. Particularly, this research is applied for the development of an innovative fall management system for older people.

Research Interests: Mechanical engineering; Mechatronic systems engineering; Biomechanics; Biomedical engineering; Dynamics and control.



Name: Alexandra Korall
Program: Masters Student, Biomedical Physiology and Kinesiology

University: Simon Fraser University

Research Project: Use a Participative Action Research (PAR) approach to understand the educational requirements of LTC front-line workers surrounding fall prevention in order to develop an educational video and possibly a health promotion video/series of podcasts for the wider community.

Research Interests: I am interested in understanding how the psychosocial environment influences organizational commitment to change, and how this relationship can be used to improve the implementation success of various change initiatives in the workplace.

Name: Pet Ming Leung
Program: Masters of Kinesiology, (Co-ordinator,

Seniors Falls and Injury Prevention Fraser Health Authority Geriatric Service)
Project Name/Thesis: The association between physical, cognitive, psychosocial function and activity levels in older adults living in Assisted Living Residencies.
Research Interests: Fall Prevention in seniors in different clinical settings (Adult Day Care, Assisted Living, Residential care)



Name: Lisa Lucarino
Program: Undergraduate Co-op Student, Biomedical Physiology
University: Simon Fraser University
Research Project: As a co-op student, I interact with staff and residents at two long term care facilities to gather consent and facilitate cognitive and physical testing. I also capture video based recordings of real life falls, which I then bring back to our lab for analysis.
Research Interests: The ergonomics of assistive devices commonly used in LTC facilities and how they are associated with increased fall rates.

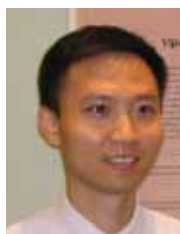


Name: Thiago A. Sarraf
Program: M.Sc. student, Department of Biomedical Physiology and Kinesiology
University: Simon Fraser University

Research Project: Biomechanical and neuro-muscular basis of balance recovery by handrail grasping while standing on public transportation. Also involved in the TIPS project (Technology for Injury Prevention in Seniors)
Research Interests: Prevention of falls and fall-related injuries in older adults, by exploring the involvement of the hand support in the dynamics and control of human movement and postural stability.



Name: Rebecca Schonnop
Program: Undergraduate Student, Biomedical Physiology and Kinesiology, Faculty of Science
University: Simon Fraser University
Research Project: Research assistant for numerous sub-projects within TIPS, including the video-based analysis of real-life falls and characterizing the environmental predictors of falls in long term care settings.
Research Interests: Health and clinical care with respect to falls in older adults through the association of physiological, biomechanical and social approaches.



Name: Yijian Yang, M.D.
Program: PhD Student, Injury Prevention and Mobility Laboratory, Department of Biomedical Physiology and Kinesiology

University: Simon Fraser University
Research Project: Determining the cause and circumstances of falls in older adults residing in Long Term Care facilities through real-life falls captured on videos
Research Interests: Gait and balance impairment, risk factors for falls in older adults. Improve our understanding of the cause of falls and the underlying fall mechanisms associated with physiological factors.

TIPS STAFF BIOGRAPHIES



Name: Bobbi Symes
Position: Research Manager
 With over 15 years Research Management experience Bobbi works closely with Dr. Robinovitch and the Co-Investigators overseeing the day to day operations of the TIPS Team.



Name: Colin Russell
Position: Research Engineer
 Colin is interested in many aspects of biomedical engineering, and has experience in biomechanics, mathematical modeling, and image processing. As a Research Engineer in Dr. Robinovitch's lab, Colin supports student projects and helps set up and maintain the wide range of lab equipment.



Name: Joanie Sims-Gould
Position: Knowledge Translation and Exchange
 Joanie is a Research Associate in the Faculty of Medicine at UBC at the Centre for Hip Health and Mobility (CHHM). She is involved in knowledge translation and exchange across a number of projects at CHHM primarily with older adults, their families and the health professionals who work with them.



Name: Ryan Woolrych
Position: Post-doctoral Fellow
 Ryan will be working at the GRC as a post-doctoral fellow on the TIPS project responsible for developing a research protocol on risk factors for falls in long-term care, data collection, analysis and report writing. Ryan will be working closely with all project partners to ensure a collaborative approach and will be disseminating findings of the research to a wider academic audience and will be involved in various activities of the GRC.





GERONTOLOGY RESEARCH CENTRE

NEEDS YOUR SUPPORT

The SFU Gerontology Research Centre and the SFU Department of Gerontology are seeking your tax-deductible donations to support our research, teaching, and public awareness efforts in the area of seniors' issues. Please visit the GRC website homepage and select the DONOR LINK to download a PDF-version of our DONOR SUPPORT FORM. Thank you!

<http://www.sfu.ca/grc/>



THE GERONTOLOGY RESEARCH CENTRE

(GRC) is committed to high quality research and knowledge transfer in the field of aging.

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This newsletter aims to provide accurate information. Although the information presented and the opinions expressed are gathered from sources thought to be reliable, their accuracy and correct interpretation cannot be guaranteed.



GERONTOLOGY GRADUATE CAUCUS UPDATE

by Ashleigh Wilson (M.A. Candidate & 2011 GGC Chair)

On Sunday, January 30, 2011 eight graduate students from the Gerontology program walked a 5km route through Stanley Park in the beautiful sunshine as participants in the 2011 Alzheimer's Society of BC 2011 Walk for Memories. Thanks to the sponsorship of 54 generous friends and family of our team members we were able to raise \$1,738.00. Funds collected go directly to the Alzheimer's Society and are used for research, community outreach and information programs for caregivers. Great work everyone!

The Gerontology Graduate Caucus hosted two successful events on Thursday, March 31, 2011 – our 12th Annual Gerontology Careers Night and 6th Annual Networking Wine & Cheese. This year's Careers Night featured four extraordinary guest speakers with a diverse range of educational backgrounds and career paths. Speakers Anthony Kupferschmidt (Support and Education Coordinator at the Alzheimer's Society of BC Richmond Resource Centre) and Pavlina Jarvis (Research Coordinator for the Centre for Healthy Aging at Providence) are past graduates of the SFU Gerontology MA program, and both gave excellent presentations regarding their current work as well as tips and tricks for recent grads looking for employment. We were also fortunate to hear presentations from Nicole Bergman (Corporate Manager of Wellness and Vitality Programs for Amica Mature Lifestyles Inc.), and Connie Haselden (Director of Operations for Trillium Health Care Services). Connie and Nicole were very forthcoming with their advice for new graduates and spoke to the importance of networking with professionals in our chosen field as much as possible. Directly following Careers Night was our Networking Wine and Cheese event at the Top of Vancouver Revolving Restaurant. Offering a chance for graduate, post baccalaureate, and minor students to meet community professionals as well as faculty and past students, this networking event also provided an excellent forum for students and professionals to discuss current projects, uncover common research interests, and forge working relationships.

My sincere thanks are extended to Jennifer O'Hagan (Treasurer), Kimberly McKercher (Vice Chair & Social Coordinator), Katherine Clark (Secretary) and Maia Hillen (Gerontology representative to the SFU Grad Student Society) for their efforts and participation with the GGC this year. For your information, the GGC will elect a new Executive Committee in September 2011 and positions to be filled include Chair, Vice Chair & Social Coordinator, Treasurer and Secretary. Please feel free to contact me at ashleigh_wilson@sfu.ca for more information about the GGC or to volunteer for one of these positions.



RECENT CENTRE ACTIVITIES

UPCOMING EVENTS

Lillian Zimmerman: will be reading from her chapter “No country for old women?” in the book “I Feel Great About My Hands: and Other Unexpected Joys of Aging” at Vancouver Public Library, Main Branch, Wednesday May 18, 7:00 pm-8:30 pm

PUBLICATION



Each year, thousands of seniors are taken to hospitals because of injuries sustained during a simple fall. The majority of these falls happen in their own homes and are often due to home hazards that are easy to overlook but easy to fix. To help address this issue Dr. Fabio Feldman (TIPS Co-Investigator, Fraser Health) developed a unique publication along with Crystal J. Stranaghan (text) and Izabela Bzymek (artwork) that uses a fun story with lively illustrations that teaches children loads of safety tips to make their grandparents' home safer to prevent falls.

To promote an intergenerational approach to fall prevention, Fraser Health is distributing the “Safety Superheroes: Preventing Grandparents from Falling” book to elementary schools and public libraries in the Fraser Health region. For more information please see the Safety Superheroes website: <http://safetysuperheroes.com/>



THE IMPACT OF TECHNOLOGY ON INFORMAL CAREGIVERS

by **Ben Mortenson** (PhD, Fellowship in the Area of Mobility in Aging from CIHR – Institute of Aging)

My post-doctoral work is a multiple-phase project that seeks better understanding of the impact of assistive technology on user's informal caregivers. This article provides a summary of the findings of the first two phases.

BACKGROUND

Many individuals with mobility limitations, especially those who are older and have more severe impairments, use a combination of assistive devices and personal assistance to meet their needs. Assistive technology, which includes devices such as wheelchairs, walkers, bathroom grab bars, and dressing aids, helps facilitate day-to-day activities and social participation (basic and instrumental activities of daily living). Many of these individuals receive help from others, but scant attention has been paid to the impact of assistive technology on their caregivers.

Informal caregiving may have detrimental consequences for the care provider, as caregivers may experience a great deal of stress that can contribute to their physical or emotional burnout. Research that has combined the results from multiple studies has found that,

compared to non-caregivers, caregivers have higher stress and depression and lower subjective well-being, self-efficacy and physical health (Pinqart and Sørensen 2003). The replacement value of informal caregiver's unpaid contributions has been estimated at \$25 billion annually in Canada (Hollander, Liu, and Chappell 2009). Given that informal caregivers provide their unfunded assistance four times more frequently than formal caregivers, the potential for burnout poses a challenge to our health care system (Agree, Freedman, and Sengupta 2004).

Although it is commonly assumed that assistive technology allows individuals with disabilities to be less dependent on the assistance of others, for most assistive technologies this hypothesis is not supported by high-level empirical evidence. This neglect produces an incomplete portrayal of the effect of AT interventions, which has significant practice and policy implications.

PHASE 1. Systematic review of the impact of assistive technology on informal caregivers

To provide justification for our research in this area we in the final stages of a



systematic, scoping review that explores the impact of assistive technology on informal caregivers.

We identified relevant studies, by contacting experts in this area, and systematically searching various electronic databases. We excluded articles that focused exclusively on care recipients under the age of 18, failed to clearly delineate findings for informal and formal caregivers or for caregivers of AT users and non-users, or used simulated informal caregivers. Articles that met our inclusion criteria were reviewed to assess their quality and level of evidence.

Our review identified 18 empirical studies. This included three qualitative studies, seven cross-sectional surveys, two case studies, one longitudinal study, four pre-post prospective studies without a comparison group and one single subject research design. Seven studies focused solely on individuals with cognitive impairments. Three studies exclusively examined the impact of wheeled mobility on users and their caregivers.

Given the study designs of the studies included in the review, it is not possible to make firm causal conclusions. Furthermore, the impact of AT on caregivers is often inferred from very simple variables, like hours of care, and little quantitative data is available. Aggregate findings suggest that AT use may help decrease hours of informal care with some devices, but limited information about physical and psychological burden is available.

PHASE 2. Randomized Controlled Study

To address the deficiencies noted in our systematic review, we are conducting a randomized controlled study that evaluates the effects of a formalized dyadic AT intervention on individuals with mobility limitations and on their informal caregivers. The Assistive Technology Provision, Updating and Training intervention involves a detailed in-home assessment of participants' current AT; the negotiation and implementation of a personal AT plan with the participants and their caregivers; and the provision of AT devices, non-structural home modifications, and device training.

In this multi-site study, that is currently underway in Montreal and Vancouver, we are randomly assigning participants to either an

immediate or a delayed intervention group. Using standardized tools, we are measuring assistance user's difficulty with performance in a dyad-selected activity and caregiver's sense of burden. Currently we have enrolled 30 dyads in the study and initial results indicate that the intervention causes a significant improvement in user's activity performance and a significant decrease in caregiver's burden.

Findings from this study will have important implications, as they will enable service providers to offer AT interventions that are more attuned to the needs of individuals with mobility limitations and their caregivers. Supportive findings will also enable health-care providers to advocate for better funding of AT and related follow-up services.

CONCLUSION

Our research is offering a better understanding of the outcomes of assistive technology interventions on users and their informal caregivers. If you would like to know more about my work in this area, you can check out my website at http://www.sfu.ca/grc/research/researchstaff/hwang/mortenson_/ or contact me directly at 778-782-7634.

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(EDITOR'S NOTE: *Ben Mortenson, BScOT, MSc, PhD, completed his doctoral studies at the University of British Columbia in 2009. He is currently a Post-Doctoral Fellow with Dr. Sixsmith at the Gerontological Research Centre and Dr. Louise Demers at the Centre de recherche de l'institut universitaire de gériatrie de Montréal. They have recently received a CIHR open operating grant to continue their research in this area.*)

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WHY GLOBAL WARMING SHOULD CONCERN SENIORS AND THEIR ADVOCATES

by **Gloria Gutman**, Operations Chair, FC2011– Population Aging & Climate Change International
Conference Secretariat: Simon Fraser University Gerontology Research Centre

The March 11, 2011 Great Japan Earthquake, the Haiti, Chile and New Zealand earthquakes of this year and last, as well as the floods in Pakistan and mudslides in Brazil are just a few examples of recent disasters that have taken place around the world.

Closer to home, disasters of note include the 1998 Quebec ice storm, the tornado that struck Pine Lake, AB in 2000, the hurricane that made landfall in Nova Scotia in 2003, the Peterborough, ON flood of 2004, and the wild fires that created havoc in BC in 2003 and again last summer.

Are you aware that weather-related disasters have been increasing in number over the last 50 years in Canada?

Are you aware that the most vulnerable group in terms of mortality and morbidity in disasters (weather-related and otherwise) are persons aged 60 and over? Despite the media's attempt to make it look like Hurricane Katrina was a black-white issue, when the facts came in it was clear that about equal numbers of blacks and whites died as a result of the hurricane; men and women were equally likely to die; the most important variable that determined who did and who did not survive was age.

While the increase in weather-related disasters has been linked to global warming one could argue that disasters are relatively rare events and thus not of concern to the average senior. Research shows, however, that even short term and relatively mild falls in temperature tend to be associated with increases in hypertension and haemoconcentration (i.e., decrease in the volume of plasma in relation to the number of red blood cells; increase in the concentration of red blood cells in the circulating blood), which may explain why deaths from arterial disease are more prevalent in winter.¹ While temperature regulation in older people is not as efficient as in younger people it is interesting to note that deaths from hypothermia are

relatively rare (<1%). Rather, during a cold snap, older people tend to die from respiratory disease (COPD; bronchitis) and thrombotic illness (e.g. MI, stroke).²

Pre-disposing factors include age, frailty and co-morbidity; condition of the home; high-risk-behaviour, social isolation, socio-economic status and drugs, especially consumption of psychotropics, anti-depressants and alcohol. The situation is different in the case of heat waves, which for many of us in Canada, until recently, were a relative novelty.

A 2007 study³ conducted in 3 US cities and Toronto during 2005 tells an interesting story. The study shows that despite their age (median was 73 or 74 in each city) 35% believed heat was not dangerous to themselves or only slightly dangerous (25%). Further, while 83% of Toronto respondents and over 90% in the US cities knew about heat warnings (mostly via TV), and a majority in each city knew the key recommended behaviours, only 46% actually engaged in these behaviours on days when heat warnings were in effect. Talk about cutting off your nose to spite your face – a major reason was that they did not self-identify as being seniors and/or as being vulnerable! It should also be noted that while most had air conditioning in their home, over half in Toronto considered energy costs in deciding whether or not to turn on the air conditioning not a wise decision when your health is at stake.

The underrecognized danger of running a fan with windows closed is also highlighted in this important article. Other things to think about are what would happen if there was a power failure during a heat wave or during winter – as happened in Quebec where some homes were without power and thus heat for up to a month after the ice-storm.

[Editor's Note: See also interview with Drs. Heather Stewart and Andrew Sixsmith concerning the upcoming Friesen



COME TO THE MAY 25-26 FRIESEN CONFERENCE

For the latest information on global warming and its impact on climate change and what this means for seniors come to the 2011 John K. Friesen Conference which will take place May 25-26 in downtown Vancouver at SFU's Segal Graduate School of Business on Granville Street. Outstanding speakers from around the globe will address the problems and suggest ways in which governments, communities and individuals can deal with them. We need to move from awareness to action: this conference will provide an evidence-base for doing so. For further information and to register visit www.sfu.ca/fc2011 or call the Gerontology Research Centre at 778-782-5062.

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