ACOTUP Researcher Profile

Name of researcher: Lili Liu, University of Alberta

Degrees and professional qualifications (including fellowships):
PhD (Rehabilitation Science), McGill University, 1988-1993; Fellowship: Fonds pour la Formation de Chercheur et l'Aide a la Recherche (FCAR), 1989-1991; **MSc** (Rehabilitation Science), McGill University, 1986-1988; Fellowship: Alzheimer Society of Montreal, 1987-1988; **BSc** (Occupational Therapy), McGill University, 1981-1984; **DEC** (Health Sciences), Marianopolis CEGEP, 1979-1981

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Area of research:
My research examines the applications of technologies for rehabilitation assessment and intervention, particularly for older adults living the community. I am a co-lead (with Dr. Eleni Stroulia) of the Smart Condo™, a one-bedroom apartment situated at the University of Alberta. This "living lab" provides space for students, researchers and industry to apply principles of Universal Design, and examine usability of technologies including sensors and mobile apps. I am a research affiliate with the Glenrose Rehabilitation Hospital, where I conduct collaborative research with practitioners, clients and stakeholders. I am a member of the AGE-WELL NCE and collaborating with other researchers to examine the use of apps for detecting symptoms of depression, and serious games for assessing delirium.

Research related awards and honors:
- Canadian Occupational Therapy Foundation Scholar Award, June 2013.
- Aventis Award for research and innovation in the use of e-technologies in health education, oral presentation awarded to: Aucoin, R., Varnhagen, S., Cook, A., Liu, L., 5th Annual Meeting of the Canadian Society of Telehealth, October 2002, Vancouver.

Grants/funding history:
- Liu, L., Chignell, M., Stroulia, E., April 1 2015 to March 31 2016 (Year 1 of 5-year funding). Technologies for mental health assessment. AGE-WELL NCE ($172,500).
- Ferguson-Pell, M. (PI), Liu, L. (Co-I), Stroulia, E (Co-I), June 2013-June 2014. Technologies for Living Independently: A Technology Case Study on Remote Patient Monitoring. Mitacs-Accelerate Internship Program, $403,334. The award consists of a $178,000.00 contribution from the industrial partner, Telus Health, and $225,334.00 from Mitacs.
- Liu, L. (PI), 2013-2014. Locator Device Project. AIAE & AHS ($72,607.54)
- Liu, L. (PI), Esmail, S., Taylor, L., Stroulia, E., King, S., 2013-2015. The use of mobile technology to enhance learning through online communities of practice among occupational therapy students in Edmonton and Calgary. Teaching and Learning Enhancement Fund (TLEF), University of Alberta, ($111,010).
- Liu, L., (PI), Stroulia, E., King, S., Nikolaidis, I., 2011-2012. How can technology reduce the workload and increase the productivity of HCAs in home care settings and increase the efficiency of the home care team overall? Alberta Health and Wellness, ($800,000).

Research collaboration:
My research involves collaboration with several disciplines. These include computing science, industrial design, engineering, architecture, psychology, and all health sciences such as pharmacy, nursing, and social work. I also collaborate with colleagues, inclusing occupational therapists, across the country, e.g., Universite de Montreal, and University of British Columbia. My post-doctoral fellows are from Universidad del Rosario in Colombia. Therefore, I also have international collaborations.

What is the most important thing in mentoring graduate students?
Experience has taught me that the most important thing in mentoring graduate students is respect for each other. A successful mentorship relationship begins with the potential student and mentor interviewing *each other*. When there is respect, a graduate student and his or her mentor commit to open and timely communication, and each carry a responsibility to ensure that career goals of the student are achieved.

Most significant publications:

- Liu, L., Stroulia, E., Nikolaidis, I., Miguel Cruz, A., & Rios Rincon, A. (accepted). Smart homes and home health monitoring technologies for adults: A systematic review. International Journal of Medical Informatics. In this review, we identified and analyzed 48 of 1863 relevant papers and found that: (1) technology-readiness level for smart homes and home health monitoring technologies is low; (2) smart homes and home health monitoring technologies are used to monitor activities of daily living, cognitive decline and mental health, and heart conditions in older adults, (3) there is no evidence smart homes and home health monitoring technologies help address disability prediction and health related quality of life, or fall prevention.
- Liu, L. & Juzwishin, D. (2015). Usability of locator technology among home care clients at risk for wandering. Final evaluation report, September 20, 2015, submitted to Alberta Health Services. The Locator Device Project is a recently completed study on the usability of the use of global position system (GPS) devices to help caregivers keep dementia clients safe in their communities. This study was funded by Alberta Innovation and Advanced Education and Alberta Health Services in 2013-2015. As the Principal Investigator, I led the evaluation team (D. Juzwishin, T. Ruptash, S. Barnard, A. Miguel Cruz) which provided one of three GPS devices to 40 client-caregiver dyads in Calgary and Grande Prairie. This was the first study to use the Unified Theory of Acceptance and Use of Technology (UTAUT) to examine the intention to use and actual use of the devices. This was the first study undertaken by a health provider to examine a consumer product for managing the care of adults with dementia living in the community. Due to my work on this study, I am collaborating the Alzheimer Society of Ontario in its "Finding Your Way Home" initiative to develop online guidelines for caregivers purchasing and manufacturers creating GPS devices. We are seeking AGE-WELL NCE funding to further this knowledge translation activity.The results have also been presented at the Canadian Association on Gerontology conference in October 2015. The study has also been accepted to be presented at the 4th Annual World Congress of Geriatrics and Gerontology in Taiwan, November 2016, and a paper has been prepared for publication in a peer reviewed journal.
- Liu, L., Miguel Cruz, A., Rios Rincon, A., Buttar, V., Ranson, Q., & Goertzen, D. (2014). What factors determine therapists' acceptance of new technologies for rehabilitation – a study using the Unified Theory of Acceptance and Use of Technology (UTAUT). Disability and Rehabilitation. http://informahealthcare.com/dre ISSN 0963-8288 print/ISSN 1464-5165 online. The aim of this study was to examine what factors affect the acceptance behavior and use of new technologies for rehabilitation by therapists at a large rehabilitation hospital in Canada. A self-administrated paper-based survey was created by adapting scales with high levels of internal consistency in prior research using the Unified Theory of Acceptance and Use of Technology (UTAUT). The target population was all occupational therapists (OT) and physical therapists (PT) involved with the provision of therapeutic interventions at the hospital. The results indicated that, in a large rehabilitation hospital where use of new technologies in rehabilitation is not mandatory,

performance expectancy, or how the technology can help in therapists' work, was the most important factor in determining therapists' acceptance and use of technologies. However, effort expectancy and social influence constructs were not important, i.e. therapists were not influenced by the degree of difficulty or social pressures to use technologies. Behavioral intention and facilitating condition, or institutional support, are related to current use of new technologies in rehabilitation.

Tips would you give for new investigators:

- Be clear about what you want out of your graduate training. Focus on completing your degree within time frame, negotiate with your mentor for funding to support your graduate work.
- Seek multiple mentors who represent what you would like to achieve and learn their stories and strategies for how they achieved their goals.
- Post-doc training is expected for those seeking academic positions. Use this training to establish your own research program if you plan to seek an academic position.

Resources/supports/training programs for new investigators:

If you are a graduate student and are fortunate to be a HQP in a national network of researchers, take advantage of the funding opportunities for travel, conferences and workshops. The contacts you make in the network will open doors for you as your career progresses.