Aging Technical Group Newsletter

Spring 2014

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Message from the Chair

This has been an exciting year for the Aging Technical Group. I first want to thank Anne McLaughlin for all of the excellent work that she contributed to our group during the last two years. I greatly appreciate her help with the transition. I'm also excited about this year's International Annual Meeting, which will be held October 27-31 at the Hyatt Regency Chicago in Chicago, Illinois. Anne Adams has been working very diligently to recruit the best sessions and panels. No doubt that we will again sponsor work that contributes to the knowledge of aging and human factors in both the research and applied research worlds. One of the most exciting things is that aging doesn't seem to be just for the old. I am constantly amazed at how aging is in the news every day. Whether it's for "ergonomic" features in cars or for ways to improve one's health, people are realizing that healthy aging starts when you're young(er). As members of the Aging TG, we should be at the forefront of this work. We contribute to product and process design and enable individuals to work and contribute to society. Kudos to all of you aging TG members! Please email me at Schwerha@ohio.edu with any ideas for the group. I hope to see you all in Chicago.

Diana Schwerha

Best regards,

Diana J. Schwerha, PhD

Message from ATG Program Chair for 2013 Conference
Dr. Marita O'Brien

We had a variety of topics covered in our session for the conference this year, so we entitled it Aging Potpourri. To create this session, we had 7 papers submitted with 5 accepted for a 71% acceptance rate. Thanks to all of our reviewers, and especially to Clive D'Souza and Cara Bailey Fausset for chairing the session. We were also able to award Wei-Ting Yen the Arnold Small award for best student paper in our session. His paper, Product Physical Interface Design Characteristics for Older Adults with Hand Use Limitations: Laboratory Study, was based on his dissertation with advisor, Carolyn Sommerich, at Ohio State University. We were also able to award graduate student, Hee-Sun Choi, of NC State University $500 to cover research expenses for her research on Aging and Attentional Failures during Driving. We look forward to the presentation of this work at the Aging TG within the next 2 years.

Wei-Ting Yen

Arnold Small Award Winner

Vercruyssen Returns to Research After 15-year Hiatus

Max Vercruyssen, one of the founding members of the HFES Aging Technical Group, disappeared some 15 years ago to coach his daughters in artistic and trampoline gymnastics at the national and international levels. In 2013 Dr. Vercruyssen retired from coaching and was named Master of Sport by USA-Gymnastics, the national governing body. Since then he has become increasingly active in research and entered a master's degree program at the University of Hawaii in statistical modeling to learn the most current research methods for analyses of data in the Hawaii Longitudinal Study of Fitness (for which he is the principal investigator). The HLSF has 17,000 cases to date and provides cohort information on participants of age 1-99 years on 38 measures of anthropometry, strength, flexibility, speed, skill, and power. His fundamental research interests still involve modeling and explanation of age (and use) changes in human speed of behavior across the lifespan. However, he sees a unique opportunity for ergonomics applications to greatly impact the war on the global epidemic of obesity and physical inactivity. For the first time in human history, children today do not live longer than their parents. He feels that with education, environmental design, and some public health policy changes the poor health conditions for our children (the future senior citizens who are expected to have morbidities far worse than those experienced today) can be changed in only a few years to restore life expectancy, functional abilities, and the quality of later life. The challenge is to influence attitude changes at many levels thereby inspiring people to MOVE MORE and to MAKE BETTER FOOD CHOICES. The easiest way is to change the environment in which we live so that physical activity and good diet is convenient and valued.

He can be reached at director@hawaiiacademy.com

Welcome back Max! Good luck with your return to graduate studies and all your human development and HF/E research endeavors.

Rehabilitation Engineering Research Center on Technologies to Support Successful Aging with Disability

The Georgia Institute of Technology has recently received a $4.6 million, five year grant from the National Institute on Disability and Rehabilitation Research (NIDRR) in the Department of Education, to support an interdisciplinary Rehabilitation Engineering Research Center which will focus on Technologies to Support for Successful Aging with Disability (RERC TechSAge). Project directors include Jon Sanford, M.Arch, from the Center for Assistive Technology and Environmental Access (CATEA), Wendy Rogers, Ph.D., and Tracy Mitzner, Ph.D., both from the School of Psychology. RERC TechSAge will also include project investigators from Georgia Tech's Institute for People and Technology (IPaT), School of Industrial Design, Center for Geographic Information Systems (GIS Center), Alternative Media Access Center (AMAC), Interactive Media Technology Center (IMTC), Human-Centered Computing (HCC), Biomedical Engineering (BME), and Georgia Tech Research Institute (GTRI), as well as the Emory University Center for Health in Aging, and Computer Science and Engineering at the University of South Carolina.
RERC TechSAge will serve as a catalyst for a major shift in the understanding and development of home and community technologies. The mission of RERC TechSAge is to conduct programs of advanced rehabilitation engineering and technical R&D to increase:

- knowledge about,
- availability of, and
- access to effective, universally-designed technologies that enable people to:
    - sustain independence,
    - maintain health,
    - safely engage in basic activities of daily living at home and the community, and
    - participate in society as they age with disability.

For more information, please visit **www.techsage.gatech.edu** or contact the RERC TechSAge Project Coordinator, Sara Bowman, Ph.D., at Sara.Bowman@coa.gatech.edu.

Ear Lobe and Cartilage Expansion vs. Age- More Work in Progress

John A. Roebuck, Jr. MS, a member of the Aging Technical Group, is compiling data on ear dimensions as a function of age for a wide variety of national and ethnic populations. Such data can support development of several types of ergonomic design requirements, such as size of ear buds, earphones, hearing aids, ear muffs and ear protectors and possibly earrings and other ear-related jewelry (Roebuck and Casali, 2011). Most of such data were found in articles by plastic surgeons, medical doctors, forensics experts, and researchers on growth and nutrition. Measurements sponsored by manufacturers of ear related devices are mostly unpublished, proprietary secrets. To date, useful information on older adults has been found in such diverse populations as Bulgarians (Madzharov, 1986, 1989a), East Indians (Purkait and Singh, 2007), Italian Caucasians, (Schonauer et al., 2012), (Sforza et al., 2009), U.K. Caucasians and resident East Indians (Alexander et al., 2011), and U.S. subjects of unstated ancestry (Brucker et al., 2003). Additional research may uncover more data of a similar nature. As previously reported by Roebuck (2012) and several other authors, ear lobe length increases much more than the cartilage length and width. In fact, the article by Brucker et al. (2003) claims there is insignificant increase of cartilage with age. However, the subjects measured in that study did not include persons over age 65. Further, the oldest persons were included within a group with a large age range (45 -65 years) that probably "washed out" the small differences that might have been shown in the older subjects. The combination of data of males with females further obscured differences by gender. For the reports on samples that include person in the 70s and 80s, graphs of size vs. age cohort show clearly that ear cartilage length and width both increase throughout life, though by only a few percent. The rate of change is usually quite small or negligible in the middle years from 40 to 60 years of age (where many studies of ear dimensions end), but accelerates after that. In general, these changes are more pronounced in males than in females.

Some of the data gathered to date shows obvious errors in the tabulated numbers, so it is not certain that all the results are valid. One of the sources (Schonauer et al., 2012) is only a brief letter, and does not contain any illustrations or details about the measurement landmarks or methods, except that they named the length landmarks and width landmarks the same as Martin (1914) or Martin and Saller (1957). Unfortunately, others have done the same thing, but it is clear from their documents that they deviated from the original meaning of the dimension titles. These types of terminology problems have stemmed from the original descriptions of methodology by Martin (1914) that had serious errors in the illustrations and questionable terminology in the text description in the German language. Work is underway by Roebuck to seek improvements and corrections as needed from the more recent authors and to develop modified titles and descriptions with common basis for all the articles (Roebuck, 2013). However, there seem to be enough data of reasonable reliability such that the above general conclusions about growth rates are correct.

Another issue that has arisen during the study to date is that many different width dimensions (perhaps nine) and some different length dimensions are used by various researchers. Therefore data in the tables do not facilitate comparisons of absolute dimensions and proportions across several different populations. However, the trends within the samples seem to follow similar patterns as a function of age.

John Roebuck welcomes any help that he can get from serious researchers who may be interested in this subject matter, whether it involves additional data analyses, translation from Bulgarian, German, Italian or other foreign languages or assistance in making contact with authors of the original data to seek clarification and to contribute to technical documents that summarize the findings.

Please network with him at :Email: johnroebuck@earthlink.net Phone: 310-394-0807, mail at 450 12th Street, Santa Monica, CA 90402.

References can be found on Page 5.

Accessibility and Safety for an Aging Population

A consortium of north Florida universities has been awarded a Tier I University Transportation Center grant by the US Department of Transportation, which will fund the Center for Accessibility and Safety for an Aging Population (ASAP). Led by Florida State University, the coalition includes researchers from Florida A&M University and the University of North Florida. The center was funded through a $1.4 million grant from USDOT's Research in Transportation Administration, and addresses two of USDOT's identified strategic goals: improving highway safety and strengthening transportation planning and environmental decision making. With motivation from Florida's aging population and their special needs for transportation, the theme of the ASAP Center is providing safe and accessible transportation to an aging population.

Built upon the strengths of the three member universities and a proven focus on interdisciplinary collaboration, ASAP is uniquely positioned to address the challenges of providing safe and accessible transportation to an aging population. FSU has established a University-wide focus on successful longevity through the newly established Institute for Successful Longevity as well as the internationally recognized Claude Pepper Center on Aging and Public Policy. Participating units include the Department of Psychology, the Department of Geography, and the Department of Urban and Regional Planning at FSU, the School of Allied Health Sciences and the Division of Engineering Technology at FAMU, and the School of Engineering at UNF. ASAP will be housed at the FAMU-FSU College of Engineering. John Sobanjo, Ph.D., P.E. will serve as director, and Jeffrey Brown and Neil Charness will serve as associate directors.

Safety and mobility of the aging population have been a matter of increasing concern for transportation officials. Older drivers are disproportionately involved in crashes and suffer more severe injuries compared to other age groups, due to growing frailty, the need to navigate increasingly complex driving environments, and frequently, reduced fitness to drive due to health concerns. In the State of Florida, where the research efforts of the ASAP Center will concentrate, it is projected that 22% of the state's population will be 65 or older as early as year 2020, the highest percentage in the nation. Providing seniors with safe and convenient access to the goods and services they need to sustain their daily lives will be a key issue explored by ASAP personnel. The center is also well located to focus on transportation issues of rural and minority segments within the elderly population. While the state of Florida provides a unique location for conducting this work, ASAP's activities and capabilities are equally applicable to addressing the aging safety issue on a nationwide basis.

Center activities will build on the strengths of the research team to foster high impact scholarship in the transportation field. The ASAP Center will provide the consortium members the chance to conduct multidisciplinary research on a scale not seen before, while focusing collectively on a common theme. To further the center's overall goal of safe and accessible transportation for an aging population, four interdisciplinary thrust areas have been identified as follows:

Thrust 1: Accessibility and community connectivity among older adults

Thrust 2: Human factors affecting the older population, especially regarding acceptance of emerging technologies

Thrust 3: Geometric design research, especially regarding elder crash mitigation

Thrust 4: Health, wellness, and safety of seniors, as it relates to multimodal transportation and emergency colloquia.

ASAP will also support educational and outreach activities including an annual K-12 Transportation Day, student research seed grants and dissertation fellowships, brown bag lunches and annual student research colloquia.

Older Pedestrians in Winter
-Robert Dewar

Winter in many parts of Canada presents a number of problems for older pedestrians. Ice patches, piles of snow and slush on sidewalks and roads make walking particularly dangerous for seniors. Physical challenges to older pedestrians include:

- walking more slowly because of unsure footing and increased chance of falling

- poor balance and reduced ability to catch themselves if they slip and start to fall - physical difficulty walking due to arthritis and other physical limitations

- reduced agility for those who use canes

- the encumbering effects of heavy footwear and clothing.

A major concern among the elderly is failing vision. The old eye has lower acuity, is more susceptible to glare, and has more difficulty detecting some objects in the roadway environment. The presence of snow also makes curbs, uneven surfaces and debris difficult to detect, increasing the probability of a trip or fall. Because of the need to step carefully, older pedestrians crossing the road are more likely to be looking down at the road surface at the expense of noticing approaching or turning vehicles.

Reduced vision increases the difficulty of seeing at night. Darkness presents problems not only of seeing vehicles and the road environment, but also of being seen by drivers. Pedestrians are much less conspicuous to drivers, as many wear dark clothing and there are more hours of darkness in winter. In addition, pedestrians typically think they can be seen at night from double the distance they can actually be detected by drivers.

Problems contributing to accidents among older pedestrians include: misjudging the distances of and intervals between vehicles, stepping off the sidewalk when distracted, watching the traffic lights instead of the traffic, misinterpreting the movement of vehicles, assuming that drivers will yield to them, and impatiently crossing after waiting. All of these problems can be worse under winter conditions.

An additional concern for many seniors is hearing loss. Pedestrians rely on sound (e.g., traffic noise, horns) to detect the presence of vehicles as well as to judge their speed and distance.

This is especially important where there are vehicles turning right at red lights, and in parking lots where cars often back out suddenly into the path of a pedestrian. Vehicle sounds may be reduced when there is a layer of snow on the ground.

Many older people are not able to walk fast enough to cross the street at signalized intersections in the time allowed by the WALK signal. The assumed walking speed of 1.2 metres/sec (m/sec) used by traffic engineers to determine timing of pedestrian signals is too fast for many older pedestrians. This problem is worse under many winter conditions, as walking speeds are reduced when the street is covered with snow or ice.

Pedestrians who have certain physical difficulties walk more slowly.

longer walk time intervals are needed at many signalized intersections, especially in winter or when there are large numbers of older pedestrians using the intersection.

In view of the potential difficulties encountered by older pedestrians in winter, it would be advisable for older people to increase and maintain their fitness, especially the ability to keep their balance when walking.

Some of the ways to make walking safer in winter are:

- wear boots or shoes with soles that will grip on snow and ice
- wear sunglasses to reduce glare on sunny days when the ground is snow-covered
- avoid wearing dark clothing at night
- watch the traffic carefully, as drivers often fail to yield to pedestrians who have the right of way
- beware of backing and turning vehicles in parking lots
- practice judging the speed and distance of approaching vehicles to see if there is enough time to cross the street at unsignalized intersections
- be patient and wait for a safe gap in traffic if there is no WALK signal
- use ice grips on canes and crutches when appropriate
- increase and maintain physical fitness, especially the ability to keep your balance when walking.

References for Ear Lobe and Cartilage Expansion vs. Age- More Work in Progress

Alexander, K. S., Stott, D. J., Sivakumar, B. and Kang, N. (2011). A morphometric study of the human ear. *J. Plast. Reconstr. Aesthetic Surg.* Jan. 64 (1) 41-7. 20447883.

Brucker, M. J., Patel, J. and Patrick, S. (2003). A morphometric study of the external ear: Age- and sex-related differences. *Plast. Reconstr. Surg.* 112:647-652.

Madzharov, M. M.; MD-PhD; MD, SC (1986): *Auriculoplasty. anthropological, experimental and clinical research* Thesis. Sofia, Bulgaria.

Madzharov, M. M.; MD-PhD; MD, SC (1989a). Anthropometric research of the lateral surface and the edge of the ears in grown-up Bulgarians," *Acta Chir Plast*. Vol.31m No.2:74-83.

Purkait, Ruma and Singh, Priyanka (2007). Anthropometry of the Normal Human Auricle: A Study of Adult Indian Men. *Aesthetic Plastic Surgery* Jun 2.

Roebuck, J. A. (2012) Anthropometry Of Aging Ears – A Report On Work In Progress. Newsletter of Aging Tech nical Group of Human Factors and Ergonomics Society.

Roebuck, J. A., (2013). Advances in anthropometric accounting for ear digital modeling. In: D'Apuzzo, N., *Proceedings of the 4th International Conference on 3D Body Scanning Technologies, Long Beach CA, USA, 19-20 November*. Switzerland: Hometrica Consulting,

Roebuck, J. A. and Casali, J G. (2011) "Re-Inventing Anthropometry For Design Of Ear-Mounted Or Ear-Coupled Products", Proceedings of the Human Factors and Ergonomics Society Annual Meeting 2011 55: 1649 DOI: 10 1177/1071181311551344.

Schonauer, F., De Luca, S., Razzano, S., and Mole, G. (1957). "Do the ears grow with age*?" Eur Arch Otorhinolaryngol* DOI 10.1007/s00405-012-1957

Sforza, C., Grandi, G., Binelli,M., Tommasi, D. G., Rosati, R. and Ferrario, V. F. (2009). Age- and sex-related changes in the normal human ear. *Forensic Sci Int*. 187 Apr 6; 19356871 Cit:4

Recent Presentations

Caine, K. E. (January, 2014). *Privacy-Enhanced Technologies to Help Older Adults Age in Place.* Invited presentation at the South Carolina Aging Research Day. Columbia, SC.

Pak, R. (March 2014). Technology and Aging. Presented to Senior Leaders Greenville, Osher Lifeline Learning Institute at Furman University. http://www2.furman.edu/sites/OLLI/Senior-Leaders-Greenville/