CATSS Newsletter - Center for Applied and Translational Sensory Science
Click here to view this newsletter in your browser.

University of Minnesota: Driven to Discover

CATSS: Center for Applied and Translational Sensory Science

CATSS Newsletter
May, 2019

FROM THE DIRECTOR

Welcome to the Spring 2019 update from CATSS, the Center for Applied and Translational Sensory Science. Finally we think the long winter is done, and the campus is green and beautiful. Several of our graduate trainees have completed their two years in the new National Science Foundation graduate training program, and we are graduating the first few students who have obtained the official graduate minor in Translational Sensory Science. We had another successful course offering, with 16 new students taking our Grand Challenges course: The Human Experience of Sensory Loss.

Summer is already looking busy around Elliott Hall, with a different kind of energy in the laboratories. The three booths are all up and running, and experiments are underway focusing on vision loss, hearing loss, and dual sensory loss. I hope you get a glimpse of the exciting activities as you read this newsletter. Better yet, stop by in person to see what's happening.

From all of us in CATSS,

Peggy Nelson

CATSS RESEARCH PARTICIPATION REGISTRY

As part of its outreach mission, CATSS occasionally receives names and contact information of individuals who are interested in participating in sensory research. We wished to expand our capability for interfacing with the public in this way. After receiving approval from the University of Minnesota IRB, we pursued development of an online tool that could provide a public platform for individuals to sign up to be contacted about research studies they might be eligible for and could be used to enter individual data into a database.

With the help of LATIS, a Qualtrics survey was developed as an online sign-up form for entering basic demographic and contact information, age, and self-reported sensory status. Initial prototype forms were sent to several individuals with low vision and hearing loss, to determine design accessibility and functionality. This process led to some refinements and ultimately to the final form, which can be accessed from the CATSS web site (http://catss.umn.edu/opportunities.htm). The data entered into the form populates a database kept in a secure Box.com folder.

Contact Liz Anderson, CATSS Project Manager *(ande8292@umn.edu)*, for more information.

Information for inclusion in IRB apps for researchers intending to use database for recruiting:
The Center for Applied and Translational Sensory Science (CATSS) maintains a database on a secure server that contains names, contact information, and self-reported sensory status of individuals who have indicated an interest in (and given permission for) being contacted about research studies in which they may be eligible to participate. This research subject registry can be accessed only by UMN investigators who have received IRB approval for their study, and access is facilitated by CATSS professional staff.

ON PURPOSE: PORTRAIT OF CATSS

From: cla.umn.edu/slhs/news-events

To commemorate its 150th anniversary in 2018, the College of Liberal Arts commissioned 60 OnPurpose photographs taken by Xavier Tavera. Departments and programs partnered with Tavera to envision their images and to write the narratives that accompany each photograph. (View On Purpose: Portrait of the Liberal Arts.)

Sensory loss - or loss of vision, hearing, and balance - increases with age and can be related to a decline in quality of life. The Census Bureau predicts that by 2050, the number of people 65 years and older will approach 20 percent of the U.S. population. Sensory loss of all types is prevalent among aging people, accounting for a sharp decline in social engagement and a reduction in socioeconomic potential.

Social support, social networks, and participation in social activities have all been shown to promote healthy aging and mitigate some of the effects of general decline. However, individuals with sensory loss experience decreased social spheres and reduced life experiences. Both Erin O'Neill and Donna Savage experienced changes in their social networks as a result of profound hearing loss, and they're working with us to find solutions for others like them.

These large and important issues that require the multidisciplinary and multisensory approach fuel the OnPurpose mission of the Center for Applied and Translational Sensory Science (CATSS). In CATSS, researchers are studying solutions for sensory loss. Emerging technology is significantly improving the lives of those with sensory loss, and access to technology is changing with the rapid growth of smartphones and wearable devices.

CATSS scientists, clinicians, and engineers combine fundamental and translational science to develop and test the next generation of technology for vision and hearing loss. Together with experts in aging, we conduct translational research using state-of-the art customized technology, rehabilitation, accessibility, and accommodations. Conversations with the community are key, and CATSS researchers actively listen to elderly persons and others with sensory loss to determine the priorities for research and development that arise from within the community of users themselves.

Erin, a student researcher, and Donna, a study participant, both have personal experience with profound hearing loss. Their stories reveal the complex social and emotional outcomes of sensory loss.

NELSON AWARDED DEAN'S MEDAL

From: cla.umn.edu/slhs/news-events

Professor Peggy Nelson, Executive Director of CATSS, has been chosen as the 2019 Dean's PeggyNelson Medalist.

"I'm pretty much a science nerd," admits Professor Peggy Nelson. However, she doesn't confine her interests purely to the science aspect of speech-language-hearing sciences. The fields of audiology and speech-pathology that are the focus of her academic home also have a side that can be heart-breakingly human.

Brain injuries, strokes, cerebral palsy, cleft palates, and autism are among the conditions that audiologists and speech pathologists help their patients cope with and adapt to. Researchers in these fields bring together engineering, science, psychology, and neurology to improve communication between these patients, their families, and their communities.

"They're not super simple problems that we're solving," says Nelson. "They're intriguing problems that have a human face to them."

"The process of learning how hearing affects your experience with the world, your cognitive development, and how that information flow is critical for forming impressions and new ideas," became a fascinating subject to her early in her academic career, says Nelson.

As an undergraduate studying math and psychology, Nelson took a practicum at the state school in Faribault, Minnesota that served students who were blind and sometimes deaf-blind. She became intrigued by the relationship between hearing and language.

After graduation, she studied American Sign Language, worked on setting up interpreter services and teletype phone service in Greensboro, North Carolina, and eventually earned her AuD from the University of Kansas. Her degree emphasis was speech perception and hearing loss. She joined the University of Minnesota Department of Speech-Language-Hearing Sciences (SLHS) in 2000.

One word that comes to mind when reviewing Nelson's breadth of work is collaboration. She works across disciplines and connects with organizations and companies in the community.

"Peggy's work has immense breadth," says department chair Ben Munson, "It ranges from basic-science studies of auditory perception across species, to in-the-field studies of new hearing aid technologies. This quality makes it attractive to a very diverse group of collaborators, including students. Rarely does one see a faculty member who works equally well with budding basic-science auditory perception students, practicing otolaryngologists, and biomedical engineers."

One example of the diversity and collaborative spirit that Nelson brings has been her role in founding the Center for Applied and Translational Sensory Science (CATSS). Launched in 2016 with funding from a grant from the Office of the Vice Provost for Research and additional funds from SLHS and the Department of Psychology, this multi-sensory lab was developed, where researchers can re-create challenging listening situations to test sensory aids, hearing aids, and cochlear implants. Groups from disciplines across the University book the lab regularly to test prototypes with the goal of informing the development of devices and technologies to solve problems for people with sensory limitations like hearing and vision loss. Dozens of studies have taken place in the years since CATSS began. Outcomes from the research that's performed in the lab have the potential to improve the quality of life of the many people who live with sensory deficits.

Before launching CATSS, Nelson served as chair of the Department of Speech-Language-Hearing Sciences from 2008-15 and led the department through difficult financial times with a "combination of realism, optimism, and, above all, grace," says Munson. "She made certain that she found strategic ways to grow our department by looking for allies and partners in unexpected places."

Nelson is a prolific author and has received a number of subcontract awards from small business grants, which, according to the CATSS website, "have led to fruitful collaborations between her students and local industries." She has also mentored a number of PhD and AuD students and post-doctoral fellows. She is considered generous with advice to her colleagues and students and brings "infectious positivity and enthusiasm" to roles she has taken on in the College and the University.

Her dedication to using science to solve problems of some of the most vulnerable members of our communities, her contributions to her research field, and her service to her colleagues and students make Nelson an exemplary and multifaceted scholar.

Nelson's work reminds Munson of the treatise of David Hull (*Science as a Process*, University of Chicago Press [1990]) "that science is an evolutionary process, in which individuals work together to shape ever-changing solutions to the problems we face as humans. Peggy cannot be pinned down in one sub-area, or to one method precisely because her focus is on working with others to help all of us-and especially people with hearing impairment-function better in the world."

EVALUATING NEW HEARING AID TECHNOLOGIES IN LABORATORY SIMULATIONS OF LISTENING SCENARIOS

It can be important for clinical researchers to be able to evaluate the performance of sensory aids using both objective and subjective methods. To this end, a new method is being developed and refined in CATSS for assessing new technologies (such as self-fit hearing aids) in a laboratory setting using calibrated listening scenarios that reflect daily listening situations.

Dr. Peggy Nelson and colleagues have developed simulations of challenging conversational scenarios to allow users of sensory aids to make judgments of sensory aid performance in realistic, but controlled conditions in CATSS's multisensory lab. Listeners with hearing loss can make ratings of intelligibility, sound quality, and preference in scenarios such as small-group conversations and entertainment listening. At the same time, objective measures of hearing-aid gain and speech intelligibility can also be obtained. These subjective and objective measures can then be compared to additional subjective surveys such as the Speech, Spatial and Qualities of Hearing Scale (SSQ, Gatehouse & Noble, 2004) and Social Participation restrictions questionnaire (SPaRQ, Heffernan et al., 2018) to determine relationships among intelligibility, preference, benefit, and hearing aid gain. The aim of this work is to help refine methods for evaluating the performance of emerging technologies for hearing loss.

PHOTOGRAPHY EXHIBIT BY GRADUATE STUDENT WALTER WU

WalterWu Walter Wu, a vision science doctoral student and a member of the NRT training grant cohort, recently had an exhibit of his photographs displayed at Vision Loss Resources (VLR), 1936 Lyndale Ave. S., Minneapolis, MN.

Walter has low vision himself; he was born with retinitis pigmentosa (RP) and is legally blind. Walter began his doctoral training in the fall of 2016 and works with Gordon Legge, PhD. His current research focuses on how reduced acuity and impaired contrast sensitivity affect people's reading performance.

Walter started taking photographs as a hobby about ten years ago. He states that the quality of his photos WalterWu has improved over the years. He notes that just like the many musicians with hearing loss, there are other visually impaired or legally blind photographers, and some their works are quite professional. "Everyone should be able to pursue what they love without the limitations of any kinds of disabilities."

Walter's exhibit at VLR has been extended a few additional months. Call VLR at 612-871-2222 for more information.

EMAIL: catss@umn.edu
PHONE: 612-624-7846

catss.umn.edu

S39 Elliott Hall
75 East River Parkway
Minneapolis, MN