catss CENTER FOR APPLIED & TRANSLATIONAL SENSORY SCIENCE

News from the Center for Applied and Translational Sensory Science
at the University of Minnesota

September, 2016

The CATSS mission:
To enhance the capability and well-being of persons living with sensory deficits by translating fundamental scientific research into functional and accessible devices and therapies

CATSS Advisory Board

Christine Morgan
Lionel Locke
Jean Christie
Ken Mills
Michael Sullivan
Brian Stankiewicz
Lloyd and Sheila Van Hofwegen

The newly formed CATSS Advisory Board is composed of representatives from the community and CATSS industry affiliates. Our first meeting is scheduled for September 30, 2016. The Board will be joined by CATSS leaders and scientific committee members Hubert Lim and Linda McLoon.

Announcements

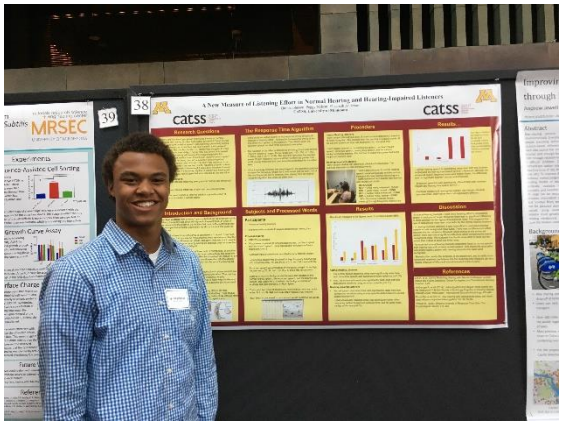
- Call for candidates for Institute of Advanced Studies interdisciplinary doctoral fellowship. Applications due Oct 24, 2016.
- Next CATSS scientific symposium will be Jan 2017 (Stay tuned for details.)
- CATSS Small Grant applications due Nov 15 (http://catss.umn.edu/opportunities.htm)

CATSS Scientific Symposium: *Neural Interfaces for Sensory Loss*

The second annual CATSS Scientific Symposium was held on May 19 at the McNamara Alumni Center, and was attended by close to 100 people. Presenters included **Robert Shannon** (http://www.usc.edu/programs/hcn/profile.php?fid=77), **Geoff Ghose** (http://www.ghoselab.cmrr.umn.edu/index.html), and **Inyong Choi** (https://clas.uiowa.edu/comsci/people/inyong-choi), and about a dozen posters by CATSS members were on display. The program included a lively panel discussion featuring Shannon, Ghose, Choi, and CATSS Board members Hubert Lim and Andrew Oxenham.

STEM Undergraduate Research Internships

This past summer, Carleton College sophomore Quinn Johnson gained research experience as an undergraduate MnDRIVE and North Star STEM Alliance-sponsored research intern in CATSS. Johnson worked primarily on a project that involved using measures of reaction time as indices of listening effort when listening to processed speech stimuli.



The summer internship culminated with creating and presenting a poster at a reception for summer research interns at McNamara Alumni Center on Aug. 11.

Another STEM intern, undergraduate Sandra Osei, worked in the lab of Evelyn Davies-Venn and was featured in an article titled "Students gain STEM experience as interns in MnDRIVE labs".

Summer Grad Student Industry Internships

This past summer, two U of M doctoral students were involved in internships with two CATSS industry partners: Jackson Graves worked on a speech perception and signal processing project with Envoy Medical Corporation, and Jordan Beim completed a summer internship with Starkey Hearing Technologies involving a signal processing project.

Industry internships such as these are integral to the vision of CATSS, and we anticipate seeing opportunities such as these flourish in the next few years.

CATSS Member Profile: Evelyn Davies-Venn, Ph.D.

Understanding the Limitations of Hearing Aids

Evelyn Davies-Venn, Assistant Professor in the Department of Speech-Language and Hearing Sciences and CATSS member, is working to identify the behavioral and physiological factors that limit successful treatment outcomes for individuals with hearing loss.

Davies-Venn's research focuses on determining how an individual's overall profile might influence their treatment outcomes with sensory aids such as hearing aids and cochlear implants. This requires a whole-systems approach, ranging from genomics and profile of hearing damage all the way to cognitive skills and life experiences.

Limitations of amplification

One current project explores the effect of something that is well-established in auditory science: the fact that the human ear responds differently to sounds, depending on whether they are delivered at a high intensity or a lower intensity. Specifically, the basic "tuning" or frequency selectivity of the auditory system, which is exquisitely tuned for low- and mid-level sounds, becomes more poorly tuned for high-level sounds. This poses a problem: the conventional way of compensating for hearing loss is to amplify sound – make things louder – which can have the end result of pushing sound, particularly speech, into a range of poorer fidelity for the human ear… in other words, hearing aids may potentially trade clarity of speech for adequate loudness.

Explaining individual differences

The trade between clarity and loudness is, however, highly variable among individuals with normal hearing and even more so among individuals with hearing loss. Understanding what underlying mechanisms contribute to this variance among individuals may inform why some people do well with amplification while others may still need extra help.

Translational research in action

Davies-Venn's research uses different methods to determine behavioral and physiological factors that can explain why some individuals may do well with sensory aids and others, with similar hearing loss, may not have a favorable outcome. A better understanding about how an individual's profile affects their treatment outcome may allow us to beyond the generic approach, and customize the design of signal processing algorithms for sensory aids, which may in turn optimize treatment outcomes for *each* individual with hearing loss.

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