

SPRING 2018

# ADULT NEUROPLASTICITY LABORATORY AT PENN STATE

## CONTACT INFORMATION

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## IN THE NEWS

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Check out these Penn State News articles highlighting our lab members and work:

<http://news.psu.edu/story/419337/2016/08/02/research/undergraduate-students-conduct-research-abroad>

<http://news.psu.edu/story/458907/2017/03/29/research/study-shows-aphasia-may-not-solely-be-language-disorder>

## OUR MISSION

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The Adult Neuroplasticity Lab at Penn State conducts research on the improvement of language rehabilitation for individuals with acquired language impairments, specifically aphasia. Aphasia results from a stroke or other brain injury in the language-dominant hemisphere of the brain. We are specifically interested in how the brain changes during successful therapy and how we can heighten these processes. We also look at how healthy aging affects the language networks within the brain in order to effectively compare and interpret the cortical reorganization that occurs during language rehabilitation.

## STUDENT SPOTLIGHT

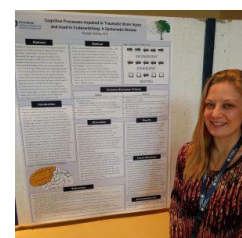
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**Erin Carpenter**, an undergraduate lab member studying Communication Sciences and Disorders (CSD) and Spanish, presented her work at the Second Language Research Forum in October. Erin won a fellowship through the Center for Language Science (CLS) funded by the National Science Foundation (NSF) to conduct research at the University of Granada in Spain. Erin's project applied an abstract word training paradigm used in aphasia to build vocabulary for Spanish speakers learning English. Erin will compare this data to data she collected from English speakers learning Spanish.



**Erika Exton**, an undergraduate lab member studying CSD and Linguistics, presented her work at the Psychonomic Society meeting in November. Erika won a fellowship through the CLS funded by the NSF to conduct research at Radboud University in the Netherlands. Erika's project focused on abstract and concrete word processing in Dutch-English bilinguals. Erika will compare this data to those from monolingual persons with aphasia.

**Kristen Ackley**, a lab member earning her M.S. in Speech-Language Pathology, presented her work at the American Speech-Language-Hearing Association (ASHA) meeting in November. Kristen conducted a systematic literature review to uncover the intersection of traumatic brain injury, bilingualism, and codeswitching. Kristen also won a fellowship to attend the Academy of Neurologic Communication Disorders and Sciences meeting held in tandem with ASHA.



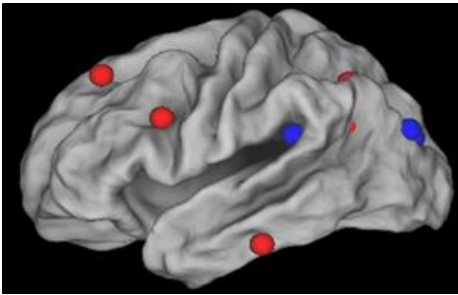
### Online Bilingual Naming Therapy

In coordination with researchers from Boston University and San Francisco State University, we developed a linguistically and culturally appropriate online therapy for bilingual individuals with aphasia. The protocol is freely available to clinicians and clinical researchers who work with individuals with aphasia via a public website (<http://bilingualnamingtherapy.psu.edu>). We are currently beta testing English and Spanish.



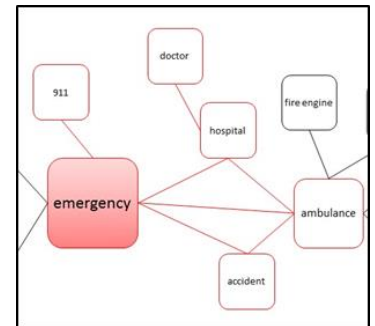
### Brain Changes in Response to Language Therapy

We use fMRI to explore changes in the brain that occur normally over time in people who have not had a stroke compared with changes in the brains of people who have had a stroke and are receiving therapy. This will help us understand which changes support recovery. We have found that people with aphasia who are successful in language therapy show increases in activation of regions that are important for language. We are also finding that whole networks of regions in the brain change in response to therapy.



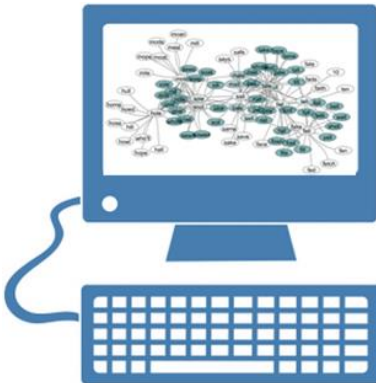
### Abstract Word Training

We found that training abstract word retrieval is an effective way to improve word-finding in aphasia. Our first studies included monolingual English speakers, but we want to extend this training to bilingual aphasia. We created treatment materials in Spanish, Korean, German, and Polish by polling native speakers. We found interesting cultural differences that will be important for making this therapy culturally appropriate. We are also starting a project to see if this training will help people who are learning a second language to increase their vocabulary.



### Computational Models for Language

The emergence of machine learning techniques, especially in their applications to language, provides fertile ground for computational modeling, an avenue of research that has been historically underutilized in the study of communication sciences and disorders. Our lab is investigating methods of simulating abstract and concrete word processing with models trained on neuroimaging or corpus data. The creation of these models will not only enhance our scientific understanding of language processing in the brain, but may also be of clinical relevance, as their performances when disturbed can be compared with and perhaps used to predict patient outcomes after stroke and in therapy.



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## GET INVOLVED!

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*We would like to thank our recent participants for helping further our research. We have made new and interesting discoveries that will help people with aphasia and we couldn't do it without you!*

*If you participated in a fMRI study and would like a copy of your MRI scan, please send an email to [sandberglab@gmail.com](mailto:sandberglab@gmail.com)*

**We are currently recruiting volunteers with and without aphasia to participate in research.**  
Please contact us at [sandberglab@gmail.com](mailto:sandberglab@gmail.com) or **814.867.6118** for more information.