BIOGRAPHICAL SKETCH

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NAME: Brozdowski, Chris

eRA COMMONS USER NAME (credential, e.g., agency login): CBrozdowski

POSITION TITLE: Neuroscience Data Engineer

EDUCATION/TRAINING (*Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.*)

INSTITUTION AND LOCATION	DEGREE (*if applicable*)	Completion Date MM/YYYY	FIELD OF STUDY
University of Connecticut, Storrs	B.S	05/2013	Cognitive Science
University of California, San Diego & San Diego State University	Ph.D.	08/2018	Language and Communicative Disorders
RWTH Aachen University, Aachen, Germany	Postdoctoral	10/2019	Mechanolinguistics of Sign
Vanderbilt University, Nashville	Postdoctoral	10/2021	Neuroscience of Literacy

A. Personal Statement

In my career, I've cultivated two domains of expertise. First, my projects across pre- and postdoctoral work have examined the cognitive science topics in Deaf and Hard of Hearing populations through behavioral, motion capture, and neuroimaging studies. My predoctoral work investigated the cognitive impacts of native American Sign Language exposure for Deaf adults, including spatial cognition and predictive processing. In my postdoctoral work, these questions extended to gesture production among German signers and the development of literacy among Deaf and Hard of Hearing children, while also mentoring research assistants. My various positions have also fostered expertise in the research infrastructure used to standardize processes, expedite development, and promote collaborate uses of data. I developed tools to automate gesture transcription, stimulus presentation, standardized testing score retrieval, etc. In each case, I focused on the usability of the tool from the perspective of a new lab member. At DataJoint, I've continued this emphasis on research efficiency through approachable tools via the DataJoint Elements, a collection of open source Python packages to help scientists build transparent and reproducible computational workflows. My research background gives me a strong understanding of how scientists with little technical training can benefit from automation. The technical, communication and mentoring skills I've required over the course of my career allow me to generate such user-friendly tools, successfully contributing to the ongoing research project.

1. Emmorey, K., **Brozdowski, C.**, & McCullough, S. (2021). The neural correlates for spatial language: Perspective-dependent and -independent relationships in American Sign Language and spoken English, *Brain and Language*, 223, 105044.
2. **Brozdowski, C.**, & Booth, J. R. (2021). Reading skill correlates in frontal cortex during semantic and phonological processing.
3. **Brozdowski, C.** & Emmorey, K. (2020) Shadowing in the manual modality. *Acta Psychologica*, 108, 103092.
4. **Brozdowski, C.**, Secora, K., & Emmorey, K. (2019). Assessing the Comprehension of Spatial Perspectives in ASL Classifier Constructions. *The Journal of Deaf Studies and Deaf Education* 24(3), 214-222.

B. Positions, Scientific Appointments, and Honors

Positions and Employment

2010–2013	Research Assistant, Various Labs, University of Connecticut, Storrs, CT
2013–2018	Graduate Researcher, SLHS, San Diego State University, San Diego, CA
2018–2019	Researcher and Lecturer, RWTH Aachen University, Aachen, Germany
2019–2021	Researcher, Dept of Psych. & Human Dev't, Vanderbilt University, Nashville, TN
2021–	Neuroscience Data Engineer, DataJoint, Houston, TX

Honors and Awards

2012	University of Connecticut Summer Undergraduate Research Fund Recipient, Storrs, CT
2013	Honorable Mention, National Science Foundation Graduate Research Fellowship Program
2016	Travel Award, Theoretical Issues in Sign Language Research, Melbourne, ASTL.
2018	Travel Award, University of Michigan NIH Training Course for fMRI, Ann Arbor, MI

C. Contribution to Science

1. Scientists are accustomed to finding idiosyncratic solutions to meet the needs of unique and innovative experiments. Unfortunately, this individuality can sometimes hinder interoperability across labs, impeding collaboration and open science. Bespoke time-consuming solutions sometimes reinvent well-validated industry standards, impeding reproducibility. Open and reproducible science requires not only sharing the data, but transparent practices for rerunning analyses. To address these issues, DataJoint Python and MATLAB APIs make the industry-standard of relational databases accessible to scientists with little training in data engineering (Yatsenko et al., 2015), and(b) DataJoint Elements provide validated and transparent data pipelines for common modalities (Yatsenko et al., 2021). DataJoint Works allows research to upload data to a cloud-based service that automatically populates the Elements for either array electrophysiology or calcium imaging, and sends notifications when the data are ready for analyses specific to the experiment.

    a. Yatsenko D., Reimer J., Ecker A.S., Walker E.Y., Sinz F., Berens P., et al. DataJoint: managing big scientific data using MATLAB or Python. *bioRxiv*. 2015 Jan 1:031658. doi: https://doi.org/10.1101/031658
    b. Yatsenko D., Nguyen T., Shen S., Gunalan K., Turner C.A., Guzman R., et al. DataJoint Elements: Data Workflows for Neurophysiology. *bioRxiv*. 2021 Jan 1. doi: https://doi.org/10.1101/2021.03.30.437358

2. Deafness and sign language exposure, both independently and jointly, reshape how individuals engage with the world. Spatial cognition serves as a clear example. To describe spatial relationships, American Sign Lanugage users use the space in front of themselves in an analog mapping to real world referents. In these Classifier Constructions, it's common to describe the world from one's own perspective. For the interlocutor, accomodating the signer's perspective is slower(Brozdowski, Secora, & Emmorey, 2019) and entails increased neural activation in the superior pareital lobule (Emmorey, Brozdowski, & McCullough, 2021).

    a. Emmorey, K., **Brozdowski, C.**, & McCullough, S. (2021). The neural correlates for spatial language: Perspective-dependent and -independent relationships in American Sign Language and spoken English, *Brain and Language*, 223, 105044.
    b. **Brozdowski, C.**, Secora, K., & Emmorey, K. (2019). Assessing the Comprehension of Spatial Perspectives in ASL Classifier Constructions. *The Journal of Deaf Studies and Deaf Education* 24(3), 214-222.

3. Prevailing theories of language comprehension and literacy development are often uniqely supported with evidence from hearing spoken language users. By extending research to include signers and deaf individuals, researchers can test the boundaries of these theories. For example, evidence suggests that spoken language users rely on motor simulation (i.e., subvocal immitation) for immediate comprehension. Under similar circumstances in the manual modality, nonsigners, but not signers, demonstrated key markers of motor simulation (Brozdowski & Emmorey, 2020). In the domain of literacy, many theories ephasize the

interaction between orthography, phonology, and semantics. This body of work describes the reading acqusition process as a shift from reliance on ortho-phonological to ortho-semantic pathways (Brozdowski & Booth, 2021). Ongoing data collection at my previous position will examine the impacts of varying levels of deafness and sign language exposure in a logitudinal neuroimaging study.

a. **Brozdowski, C.**, & Booth, J. R. (2021). Reading skill correlates in frontal cortex during semantic and phonological processing.
b. **Brozdowski, C.** & Emmorey, K. (2020) Shadowing in the manual modality. *Acta Psychologica*, 108, 103092.

D. Additional Information: Research Support and/or Scholastic Performance