Nicholas Christopher-Hayes

Curriculum Vitae

MEG Research Associate

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EDUCATION

Degree: 2011 – 2015 **Bachelor of Arts, University of Wisconsin-Milwaukee**

Major: **Psychology**

Faculty Advisor: **Dr. Deborah E. Hannula**

Senior Independent Research Project: Oculomotor capture by aversive stimuli.

Relevant Courses: Child Psychology, Psychological Statistics; Research Methods; Neuropsychology; Advanced Physiological Psychology; Cellular & Molecular Neuroscience; Brain Injury; Cognitive Neuroscience; Computer Science (Java 1); Computer Science (Java 2).

PROFESSIONAL RESEARCH EXPERIENCE

University of Nebraska Medical Center, Department of Neurological Sciences

Lab: **Digital Imaging and Cognitive Neuroscience (DICoN) Lab**

Principal Investigator: **Dr. Tony W. Wilson**

Position: 2019 – Present **MEG Research Associate**

Description: Processing and analysis of Magnetic Resonance Imaging (MRI), Magnetoencephalography (MEG), Positron Emission Tomography (PET), Arterial Spin Labelling (ASL), and Electromyography (EMG) data; present and lead discussion in weekly lab meetings; develop research studies and cognitive tasks; prepare material for inclusion in scholarly conference presentations and publications; computer and data management; lab wiki development and maintenance; processing pipeline and toolbox development; lab website response form development and database management.

University of Nebraska Medical Center, Department of Neurological Sciences

Lab: **Warren Neuroscience Lab**

Principal Investigator: **Dr. David E. Warren**

Position: 2016 – 2019 **Clinical Research Associate, Omaha, NE**

Description: Participant scheduling; participant data collection using Magnetic Resonance Imaging (MRI), Magnetoencephalography (MEG), Neurostimulation, and eye-tracking; data analysis; present and lead discussion in weekly lab meetings; develop, plan, and implement research studies; prepare material for inclusion in scholarly conference presentations and publications; participant-related data entry; computer and data management.

University of Wisconsin-Milwaukee, Department of Psychology-Neuroscience

Lab: **MINDfull of Memory Lab**

Principal Investigator: **Dr. Deborah E. Hannula**

Position: 2016 – 2019 **Research Assistant**

Description: Participant scheduling; participant data collection using computerized tasks and eye-tracking Software (Eye-Trac 6 & Eyelink 1000); data analysis; present and lead discussion in weekly lab meetings.

FUNDING

Award: Summer 2015 **Support for Undergraduate Research Fellows (SURF)**

PUBLICATIONS

Wiesman, A. I., Christopher-Hayes, N. J., Eastman, J. A., Heinrichs-Graham, E., Wilson, T. W. (2020). Response certainty during bimanual movements reduces gamma oscillations in primary motor cortex. Neuroimage.

Christopher-Hayes, N. J., Lew, B.J., Wiesman, A. I., Wilson, T. W. (In prep). Cannabis use impacts prestimulus visual oscillatory activity in people with HIV.

Wiesman, A. I., Christopher-Hayes, N. J., Wilson, T. W. (In prep). Stairway to memory: left-hemispheric alpha dynamics as a progressive visual memory store.

Wiesman, A. I., Murman, D.L., May, P.E., Schantell, M.D., Losh, R.A., Johnson, H.J., Willet, M.P., Eastman, J.A., Rezich, M.T., Christopher-Hayes, N.J., Knott, N., Houseman, L.L., Wolfson, S.L., Losh, K.L., Johnson, C.J., Wilson, T.W. (In prep). Spatio-spectral relationships between pathological neural dynamics and cognitive impairment along the Alzheimer's disease spectrum.

Warren, D. E., Rangel, A. J., Christopher-Hayes, N. J., Eastman, J. A., Frenzel, M., Stephen, J. M., Calhoun, V. D., Wang, Y.-P., Wilson, T. W. (Submitted). Resting-state functional connectivity of the human hippocampus in periadolescent children: associations with age and memory performance. Organization for Human Brain Mapping.

Phipps, C.J., Rangel, A., Christopher-Hayes, N. J., Phatak, V., Murman, D., Warren, D.E. (In prep). Measuring brain and cognitive changes in memory systems after targeted multiday repetitive transcranial magnetic stimulation of healthy young, healthy old, and amnestic mild cognitive impairment(aMCI) participants.

Phipps, C.J., Christopher-Hayes, N. J., Torres-Russotto, D., Warren, D.E. (In prep). Measurement of functional brain network connectivity in people with orthostatic tremor using MRI and transcranial magnetic stimulation.

NATIONAL CONFERENCES

Phipps, C.J., Rangel, A., Christopher-Hayes, N. J., Phatak, V., Murman, D.L., Warren, D.E. (2020). Measuring change in memory networks after targeted repetitive transcranial magnetic stimulation. Organization for Human Brain Mapping.

Phipps, C.J., Rangel, A., Christopher-Hayes, N. J., Phatak, V., Murman, D., Warren, D.E. (2019). Measuring brain and cognitive changes in memory systems after targeted multiday repetitive transcranial magnetic stimulation of healthy young, healthy old, and amnestic mild cognitive impairment(aMCI) participants. Alzheimer's Association International Conference.

Ellis, D.G., White, M.L., Hayasaka, H., Christopher-Hayes, N. J., Warren, D.E., Wilson, T.W., Aizenberg, M.R. (2019). Accurate localization of primary motor cortex in brain tumor patients with DTI and deep learning. Radiological Society of North America.

Ellis, D.G., White, M.L., Hayasaka, H., Christopher-Hayes, N. J., Warren, D.E., Wilson, T.W., Aizenberg, M.R. (2019). Reliability of Functional Neuroimaging for Prediction of Eloquent Brain Function as Determined by Intraoperative Mapping in Brain Tumor Patients. Radiological Society of North America.

Datta, P., Samson, K.K., Warren, D.E., Christopher-Hayes, N. J., Malgireddy K.R. (2019). Assessment of clinical and imaging characteristics in medically refractory epilepsy with poor surgical outcomes. American Epilepsy Society.

Warren, D. E., Christopher-Hayes, N. J., Rangel, A., Stephen, J. M., Calhoun, V. D., Wang, Y.-P., Wilson, T. W.. (2018). Measuring the relationship between memory performance and hippocampal structure/function in periadolescent children: a longitudinal investigation from the Dev-CoG project. Nanosymposium. Society for Neuroscience.

Christopher-Hayes, N. J., Rangel, A., Stephen, J. M., Calhoun, V. D., Wang, Y.-P., Wilson, T. W., & Warren, D. E. (2017). Adolescent changes in hippocampal volume and functional connectivity affect memory performance. Organization for Human Brain Mapping.

Spooner, R. K., Christopher-Hayes, N. J., Stephen, J. M., Calhoun, V. D., Wang, Y.-P., Wilson, T. W., & Warren, D. E. (2017). Intrinsic functional connectivity of the striatum covaries with cognitive performance in adolescents. Organization for Human Brain Mapping.

Spooner, R. K., Christopher-Hayes, N. J., Stephen, J. M., Calhoun, V. D., Wang, Y.-P., Wilson, T. W., & Warren, D. E. (2017). Childhood development of behavioral and brain network changes related to basal ganglia: resting-state functional connectivity of striatal regions varies with performance on cognitive tasks in children. Cognitive Neuroscience Society.

Hopkins, L. S., Christopher-Hayes, N. J., Helmstetter, F. J., Hannula, D. E. (2016). Contingency awareness is not required for fear conditioned capture of attention. Visual Sciences Society.

REGIONAL CONFERENCES

Phipps, C.J., Christopher-Hayes, N. J., Torres-Russotto, D., Warren, D.E. (2019). Measurement of functional brain network connectivity in people with orthostatic tremor using MRI and transcranial magnetic stimulation. University of Nebraska Medical Center Annual Research Day.

Christopher-Hayes, N. J. (2017). Neuroimaging and Neurostimulation in Alzheimer's. Fremont Area Alzheimer's Collaboration.

Pham, D., Christopher-Hayes, N. J., Rangel, A., Stephen, J. M., Calhoun, V. D., Wang, Y.-P., Wilson, T. W., & Warren, D. E. (2017). Brain correlates of memory ability in youth. University of Nebraska Medical Center Summer Undergraduate Research Symposium.

Sajja, K., Christopher-Hayes, N. J., Warren, D. E., Madhavan, D. (2017). Predicting outcomes after corpus callosotomy using FreeSurfer for processing and analyzing pre-surgical MRI images. University of Nebraska Medical Center Annual Research Day.

Christopher-Hayes, N. J., Hopkins, L. S., Helmstetter, F. J., Hannula, D. E. (2016). Oculomotor capture by aversive stimuli. UW-Milwaukee Undergraduate Research Symposium.

RESEARCH COMPUTING

Software: 3D Slicer, Functional Magnetic Resonance Imaging Based (FMRIB) Software Library (FSL), FreeSurfer, Analysis of Function Neuroimaging (AFNI), Brain Electrical Source Analysis (BESA), Brainstorm, Statistical Parametric Mapping (SPM), Fieldtrip, Automated Segmentation of Hippocampal Subfields (ASHS)

Hardware: Eye-Trac 6 & Eyelink 1000, Nexstim NBS 5.1

Languages: **Python, Git, Bash, Matlab, Java, HTML**

Authored Packages: **1) ArtifactScanTool (AST) – A Matlab-based package for automated statistical identification, rejection, and plotting of artifactual MEG channels and epochs. Versions available for BESA and Brainstorm software packages**

2) PyStiMEP – A Python-based package for automated neurostimulation event-related motor evoked potential (MEP) identification, extraction, and plotting

Research Lab Systems: MoinMoin Wiki (Python/Linux)

OTHER COMPUTING

Authored Packages: **1) Snapshot – A Python-based package for basic financial management and monthly reporting**

OTHER PROFESSIONAL EXPERIENCE

La Fleur Law Office, S.C., Milwaukee, WI

Position: 2015 – 2016 **Firm Administrator**

Description: Lead account operator; lead point of contact for all customer account matters; develop long-lasting advisor relationships with clients.

Position: 2012 – 2015 **Law Clerk**

Description: General office management; legal document preparation; legal research; correspond with clients, courts, and attorneys.

Men's Panther Soccer Club, University of Wisconsin-Milwaukee

Position: 2015 – 2016 **President**

Description: Team Management; fundraising; treasury; council leader; marketing.

CERTIFICATIONS

2017 Transcranial Magnetic Stimulation (NBS System 5.1)

2014 – Present MRI Safety

2014 – Present Collaborative Institutional Training Initiative (CITI), IRB Biomedical and Social & Behavioral Combined Researchers Curriculum

SCIENTIFIC COMMUNITY OUTREACH

2019 Science Education Outreach and Engagement Program, The University of Nebraska Medical Center's Science Education Partnership Award (SEPA) - Accelerating access: health science education in Native American communities & The National Cancer Institute's Youth Enjoy Science Research Program (YES) (Native American 5th grade students, Science Summer Camp)

2016 – 2017 Fremont Area Alzheimer's Collaboration, Memory Walk

2014 & 2015 Federal TRIO Program, Upward Bound Math-Science

2012 New Horizons Un-Limited Inc. - Independent Disabilities Advocacy and Rehabilitation Center for Computer Training, Refurbishing, and Workforce Preparation, in Association with the Wisconsin Department of Vocational Rehabilitation

EXTRACURRICULAR ACTIVITIES

Avid English Premiere League Observer, Photographer sometimes, Guitarist almost, Pianist once upon a time, Soccer when I feel young, Snowmobiling please, Boating with the right drink, Hiking seems healthy, Programming inseparable

RESEARCH REFERENCES

Dr. Tony W. Wilson Associate Professor, Department of Neurological Sciences University of Nebraska Medical Center 988440 Nebraska Medical Center Omaha, NE 68198-8440 Phone: 402-559-6444 Email: twwilson@unmc.edu

Dr. Deborah E. Hannula Associate Professor, Associate Chair, Department of Psychology University of Wisconsin-Milwaukee Garland Hall P.O. Box 413 Milwaukee, WI 53201 Phone: (414) 229-4158 Email: hannula@uwm.edu

Dr. Alex I. Wiesman Post-Doctoral Fellow, McConnell Brain Imaging Centre, Montreal Neurological Institute, McGill University 3801 University St Montreal QC H3A2B4 Phone: (402) 203-1397 Email: aiwiesman@gmail.com

Dr. Daniel L. Murman, MD, MS, FAAN Director, Behavioral and Geriatric Neurology Program Professor, Department of Neurological Sciences University of Nebraska Medical Center 988440 Nebraska Medical Center Omaha, NE 68198-8440 Phone: 402-559-6591 Email: dlmurman@unmc.edu

Dr. David E. Warren Assistant Professor, Department of Neurological Sciences University of Nebraska Medical Center 988440 Nebraska Medical Center Omaha, NE 68198-8440 Phone: (402) 559-5805 Email: david.warren@unmc.edu