Nicholas Christopher-Hayes

Department of Psychology and the Center for Mind and Brain
University of California, Davis
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EDUCATION

2021 – PRSNT **PhD, Psychology, University of California Davis**

Relevant Courses: Statistical Analysis in Psychological Research, Fundamentals of Cognitive Neuroimaging, Cognitive and Perceptual Development, Causal Modeling and Correlational Data, Cognitive Neuroscience, Advanced Statistical Inference from Psychological Experiments

Research Projects: *Longitudinal Changes of Hippocampal Subfields Predict Memory Improvements at the Transition into Adolescence*

2011 – 2015 **BA, Psychology, University of Wisconsin-Milwaukee**

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)

Senior Research Project: *Oculomotor capture by aversive stimuli*

PROFESSIONAL RESEARCH EXPERIENCE

MAD Lab: 2021 – PRSNT **Doctoral Student, (Y2)**

PI: Dr. Simona Ghetti

University of California Davis, Psychology

DICoN Lab: 2019 – 2021 **MEG Research Associate**

PI: Dr. Tony W. Wilson

Boys Town National Research Hospital, Institute for Human Neuroscience

University of Nebraska Medical Center, Department of Neurological Sciences

WN Lab: 2016 – 2019 **Clinical Research Associate**

PI: Dr. David E. Warren

University of Nebraska Medical Center, Department of Neurological Sciences

MINDfull of Memory Lab: 2013 – 2016 **Research Assistant**

PI: Dr. Deborah E. Hannula

University of Wisconsin-Milwaukee, Department of Psychology

FUNDED AWARDS

Graduate Funding: 2022 – 2023 **Investigating Hippocampal Contribution to Memory Development in Healthy Children and Children with Chronic Asthma**, Learning-Memory-Plasticity (LaMP) Program, NIH T32 MH112507 **($54,000)**, Role: Doctoral Student Trainee

2022 **Linking Chronic Asthma to Memory Impairments in Children**, UC Davis Memory and Plasticity (MAP) Program **($25,000)**, PI: Simona Ghetti, Role: Doctoral Student Researcher

Undergraduate Funding: 2015 **Support for Undergraduate Research Fellows (SURF) ($1,500)**, University of Wisconsin, Milwaukee

TEACHING EXPERIENCE

Teaching Assistant:

2021 PSY 135, **Cognitive Neuroscience** (Instructor, Evan Antzoulatos, Ph.D.)

2022 PSY 103, **Statistical Analysis of Psychological Data** (Instructor, Shelley Blozis, Ph.D.)

2022 PSY 146, **The Development of Memory** (Instructor, Simona Ghetti, Ph.D.)

PUBLICATIONS

Published:

Picci, G., **Christopher-Hayes, N.J.**, Petro, N.M., Taylor, B.K., Eastman, J.A., Frenzel, M.R., Wang, Y.-P., Stephen, J.M., Calhoun, V.D., Wilson, T.W. (2022). Amygdala and hippocampal subregions mediate outcomes following trauma during typical development: Evidence from high-resolution structural MRI. Neurobiology of Stress.

Springer, S.D., Wiesman, A. I., May, P. E., Schantell, M., Johnson, H. J., Willet, M. P., Castelblanco, C.A., Eastman, J.A., **Christopher-Hayes, N. J.**, Wolfson, S. L., Johnson, C. M., Murman, D. L., Wilson, T. W. (2022). Altered visual entrainment in patients with Alzheimer's disease: magnetoencephalography evidence. Brain Communications.

Christopher-Hayes, N. J., Lew, B. J., Wiesman, A. I., Schantell, M., O'Neill, J., May, P. E., Swindells, S., Wilson, T. W. (2021). Cannabis use impacts pre-stimulus neural activity in the visual cortices of people with HIV. Human Brain Mapping.

Wiesman, A. I., **Christopher-Hayes, N. J.**, Wilson, T. W. (2021b). Stairway to memory: Left-hemispheric alpha dynamics index the progressive loading of items into a short-term store. NeuroImage 235, 118024.

Wiesman, A. I., Murman, D. L., Losh, R. A., Schantell, M., **Christopher-Hayes, N. J.**, Johnson, H. J., Willet, M. P., Wolfson, S. L., Losh, K. L., Johnson, C. M., May, P. E., Wilson, T. W. (2021). Spatially resolved neural slowing predicts impairment and amyloid burden in Alzheimer's disease. BRAIN.

Warren, D. E., Rangel, A. J., **Christopher-Hayes, N. J.**, Eastman, J. A., Frenzel, M. R., Stephen, J. M., Calhoun, V. D., Wang, Y., Wilson, T. W. (2021). Resting-state functional connectivity of the human hippocampus in periadolescent children: Associations with age and memory performance. Human Brain Mapping.

Wiesman, A. I., Murman, D. L., May, P. E., Schantell, M., Losh, R. A., Johnson, H. J., Willet, M. P., Eastman, J. A., **Christopher-Hayes, N. J.**, Knott, N. L., Houseman, L. L., Wolfson, S. L., Losh, K. L., Johnson, C. M., Wilson, T. W. (2021c). Spatio-spectral relationships between pathological neural dynamics and cognitive impairment along the Alzheimer's disease spectrum. Alzheimer's & Dementia: Diagnosis, Assessment & Disease Monitoring 13.

Wiesman, A. I., **Christopher-Hayes, N. J.**, Eastman, J. A., Heinrichs-Graham, E., Wilson, T. W. (2021). Response certainty during bimanual movements reduces gamma oscillations in primary motor cortex. NeuroImage 224, 117448.

Arif, Y., Wiesman, A. I., **Christopher-Hayes, N. J.**, Wilson, T. W. (2021). Aberrant inhibitory processing in the somatosensory cortices of cannabis-users. Journal of Psychopharmacology.

Under Review:

Christopher-Hayes, N. J., Embury, C. M., Wiesman, A. I., May, P. E., Schantell, M., Johnson, C. M., Wolfson, S. L., Murman, D. L., Wilson, T. W. Piecing it together: hippocampal subfield profiles relate to cognitive impairment along the Alzheimer's disease spectrum. (Neurobiology of Aging, 2022).

Rempe, M., Lew, B. J., Embury, C. M., **Christopher-Hayes, N. J.**, Schantell, M., Wilson, T. W. Spontaneous sensorimotor beta power and cortical thickness uniquely predict. (NeuroImage, 2022).

Picci, G., Casagrande, C.C., Ott, L.R., Petro, N.M., **Christopher-Hayes, N.J.**, Johnson, H.J., Willett, M.P., Okelberry, H.J., Wang, Y.-P., Stephen, J.M., Calhoun, V.D., Wilson, T.W. DHEA mediates associations between subclinical anxiety and anterior pituitary volume in children and adolescents. (Molecular Psychiatry, 2022).

In prep:

Christopher-Hayes, N.J., Johnson, E.G., Mooney, L.N., Kazemi, A., Lee, J.K., Fandakova, Y., Bunge, S.A., Ghetti, S. Longitudinal Changes of Hippocampal Subfields Predict Memory Improvements at the Transition into Adolescence.

INTER/NATIONAL CONFERENCES

Casagrande, C.C., Picci, G., Petro, N.M., Ott, L.R., **Christopher-Hayes, N.J.**, Eastman, J.A., Frenzel, M.R., Wang, Y.-P., Stephen, J.M., Calhoun, V.D., Wilson, T.W. (2022). Salivary DHEA mediates associations between trauma-related anxiety symptoms and anterior pituitary volume in adolescents. Biological Psychiatry.

Picci, G., **Christopher-Hayes, N.J.**, Petro, N.M., Taylor, B.K., Eastman, J.A., Frenzel, M.R., Wang, Y.-P., Stephen, J.M., Calhoun, V.D., Wilson, T.W. (2022). High-Resolution Structural MRI Suggests Protective Effects of Amygdala and Hippocampal Subregional Volume Following Traumatic Experiences. Biological Psychiatry.

Christopher-Hayes, N. J., Embury, C. M., Wiesman, A. I., May, P. E., Schantell, M., Johnson, C. M., Wolfson, S. L., Murman, D. L., Wilson, T. W. (2021). Piecing it together: relationships between hippocampal subfields and cognitive impairment along the Alzheimer's disease spectrum. Alzheimer's Association International Conference.

Christopher-Hayes, N. J., Embury, C. M., Wiesman, A. I., May, P. E., Schantell, M., Johnson, C. M., Wolfson, S. L., Murman, D. L., Wilson, T. W. (2021). Hippocampal subfield profiles relate to cognitive impairment along the Alzheimer's disease spectrum. Organization for Human Brain Mapping.

Jing, R., **Christopher-Hayes, N. J.**, Rangel, A. J., Murman, D. L., Warren, D. E. (2020). Effect of Targeted Transcranial Magnetic Stimulation on Memory Performance in Older Adults with Amnestic Mild Cognitive Impairment. Journal of the American Geriatrics Society.

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. L., 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.

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.

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

INVITED TALKS

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

SYSTEMS AND COMPUTING

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

3) **Snapshot** – A Python-based package for basic financial management and monthly reporting

Software: **FreeSurfer**, **Brainstorm**, **FSL**, **ASHS**, **AFNI**, **SPM**, **Fieldtrip**, **3D Slicer**

Hardware: **Siemens Prisma/Skyra/Trio** 3T MRI System, **Elekta MEGIN** MEG System, **Eye-Trac** 6, **Eyelink** 1000, **Nexstim** NBS 5.1

Languages: **Python, R, Git, Bash/Shell, Matlab, Java, HTML**

SCIENTIFIC COMMUNITY OUTREACH

2018 – 2019 Science Education Outreach and Engagement Program, UNMC Science Education Partnership Award (SEPA): Health and science education in Native American communities and The National Cancer Institute's Youth Enjoy Science Research Program (YES)

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

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

2012 – 2014 New Horizons Un-Limited Inc. - Independent Disabilities Advocacy and Rehabilitation Center for Computer Training, Refurbishing, and Workforce Preparation

CERTIFICATIONS

2014 – PRSNT TMS (NBS System 5.1), MRI Safety, CITI

RESEARCH REFERENCES

Dr. Simona Ghetti Professor and Vice-Chair for Undergraduate Education Department of Psychology and Center for Mind and Brain University of California, Davis One Shields Avenue Davis, CA 95616 sghetti@ucdavis.edu

Dr. Tony W. Wilson Patrick E. Brookhouser Endowed Chair in Cognitive Neuroscience Director, Institute for Human Neuroscience Boys Town National Research Hospital 14090 Mother Teresa Lane Boys Town, NE 68010 531-355-8909 tony.wilson@boystown.org

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

Dr. Alex I. Wiesman National Institutes of Health Postdoctoral Fellow Montreal Neurological Institute McGill University 3801 Rue University | Montréal, QC H3A 2B4 438-506-3709 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 402-559-6591 dlmurman@unmc.edu