Dr. rer. nat. LaShae K. Nicholson, PhD

Curriculum Vitae — May 2026

Kavli Postdoctoral Research Fellow | Stephen Strittmatter Lab
Department of Neuroscience, Yale University
100 College Ave, Suite 225, New Haven, CT 06510
Phone: 203-508-5791 | Email: lashae.nicholson@yale.edu | LinkedIn: linkedin.com/in/LaShaeNicholson
ORCID: 0000-0002-5171-181X | Web of Science: QAY-8870-2026

EDUCATION & TRAINING

Doctoral Thesis, Dr. rer. nat. Biology (Ph.D.) — Conferred 2023
Research: Aug 2014 – Nov 2019
Wolfgang Goethe University, Frankfurt, Germany
Thesis: *"The functional role of cell-type specific VEGF secretion during neuronal development"*
BLMS and Max Planck Institute for Brain Research, Frankfurt | Supervisor: Prof. Dr. Amparo Acker-Palmer

Master's Degree, Biomedical Sciences & Technology — 2013
University of Applied Sciences, Mannheim, Germany
Thesis: *"Whole-cell dynamics of protein exchange in developing neurons"*
Max Planck Institute for Brain Research | Supervisors: Prof. Dr. Erin Schuman, Dr. Cyril Hanus

Bachelor's Degree, Biomedical Sciences — 2006
University of South Alabama, Mobile, AL, USA
Thesis: "*Characterization of the StiC gene locus involvement in the starvation stress response of Salmonella enterica serovar Typhimurium*"
Department of Biomedical Sciences | Supervisors: Dr. Michael Spector

PROFESSIONAL DEVELOPMENT

Cold Spring Harbor: Ion Channels in Synaptic and Neuronal Circuit Function — Accepted, June 2026
Cold Spring Harbor Laboratory, Cold Spring Harbor, NY

Certificate of College Teaching Preparation (CIRTL) — Jan 2026 – Present
Center for the Integration of Research, Teaching, and Learning, Yale University

NIH Grant Writing — June 2024
Columbia University, CareerMODE Fellowship Program

Multi-omics Boot Camp: Analysis of Omics Data for Research Studies — June 2024
Columbia University, SHARP Training Program

Bayesian Modeling for Environmental Health Workshop — August 2024
Columbia University, SHARP Training Program

Data Science and Machine Learning: Making Data-Driven Decisions — June – Sept 2023
MIT Institute for Data, Systems, and Society (IDSS) | 12-week program

FELASA-B, Surgical Certification: Animal injection, surgery, and postoperative care — May 2012
Regierungspräsidium Karlsruhe, Baden-Württemberg, Germany

FELASA-B Certification: Laboratory animal science and methods of animal experimentation — Oct 2010
Interfakultäre Biomedizinische Forschungseinrichtung (IBF)
Ruprecht-Karls-Universität Heidelberg, Germany

RESEARCH FELLOWSHIPS & AWARDS

Leading Edge Fellow — 2026 – Present

BRAINS Fellow, University of Washington 2024 – Present
CareerMODE Fellow, Columbia University 2024 – Present
Kavli Postdoctoral Research Fellow, Yale University 2023 – Present
Graduate Student Fellowship, Max Planck Institute for Brain Research 2013 – 2014

GRANTS & FUNDING

Alzheimer's Association Research Fellowship (AARF-A) LOI Accepted, Feb 2026
Title: "*Impact of metabolic stress-induced Meis2 on amyloidogenic signaling in Alzheimer's*"
Role: Principal Investigator

NIH K99/R00 Pathway to Independence Award (1K99AG092742) Submitted Oct 2025
Title: "*Impact of metabolic stress-induced transcriptional regulation of cortical inhibitory circuits in Alzheimer's disease"*
Role: Principal Investigator | Study Section Review: April 6, 2026

Kavli Postdoctoral Fellowship Research Funds, Yale University 2021 – Present
Title: "*Insulin resistance as a mechanistic driver of pathogenesis in the Alzheimer's brain"*
Salary and $20,000 direct costs for independent research | Role: Principal Investigator

RESEARCH EXPERIENCE

Yale University, Dept. of Neuroscience 2020 – Present
Supervisor: *Prof. Dr. Stephen Strittmatter, MD, PhD*
Developed and now leading an independent research program investigating how metabolic stress reshapes cortical circuit function in Alzheimer's disease. Discovered that diet-induced insulin resistance selectively upregulates the transcription factor Meis2 in cortical L2 inhibitory neurons and induces a novel pan-glial transcriptional state (MinD) across microglia, astrocytes, and oligodendrocytes (Nicholson et al., *Mol Neurodegeneration* 2026). Generated three novel transgenic mouse lines (Meis2-HA, Meis2-floxed, Meis2-Cre) crossed into AD knock-in backgrounds for conditional genetic manipulation. My research integrates computational transcriptomics, mouse behavioral phenotyping, immunohistochemistry, and synaptic quantification. Initially, built the lab's single-nucleus RNA-seq analysis pipeline, applying it to define the neuron-specific mechanism of an mGluR5 silent allosteric modulator (SAM) and its disruption of the toxic Aβ-Prp^{C}-mGluR5 signaling complex (Spurrier, Nicholson et al., *Sci Transl Med* 2022). Then characterized transcriptional consequences of PrP^{c} deletion in AD models (Stoner, Nicholson et al., *Alzheimer's Res Ther* 2023).

Wolfgang Goethe University, Buchmann Institute for Molecular Life Sciences 2013 – 2019
Supervisor: *Prof. Dr. Amparo Acker-Palmer*
Investigated VEGF-VEGFR2 signaling at the neurovascular interface during postnatal hippocampal development. Discovered, with collaborators, that VEGF-VEGFR2 signaling drives hippocampal circuit development through distinct EphrinB2-dependent (dendritic) and EphrinB2-independent (axonal) trafficking mechanisms in CA3 neurons. Findings published as paired papers in eLife (Harde, Nicholson et al., *eLife* 2019; Luck et al., *eLife* 2019). Generated three conditional VEGF deletion mouse models (neuronal, astrocytic, vascular) to dissect cell-type-specific paracrine and autocrine VEGF contributions to hippocampal circuit integration. Trained in electrophysiological field recordings in acute hippocampal slices.

Wolfgang Goethe University, Neuroscience Center Nov 2013 – Mar 2014
Supervisors: *Prof. Dr. Thomas Deller and Dr. Andreas Vlachos*
Trained in organotypic hippocampal slice cultures, entorhinal cortex lesions, and whole-cell patch-clamp electrophysiology. Cloned a cell-type-specific AAV library for targeting neuronal sub-populations. This rotation established foundational electrophysiology skills applicable to ion channel and circuit-level analyses.

Max Planck Institute for Brain Research, Dept. of Synaptic Plasticity Mar – Sept 2013

Supervisors: *Prof. Dr. Erin Schuman and Dr. Cyril Hanus*

Developed a computational model to quantify and correlate protein mobility with neuronal cell morphology in time-lapse imaging data, revealing filtering effects of the axon initial segment on protein compartmentalization (Nicholson et al., *Front Cell Neurosci* 2020). Established quantitative image analysis and computational modeling expertise.

Ruprecht-Karls-Universität Heidelberg, BioQuant Aug – Oct 2011

Supervisor: *Prof. Dr. Dirk Grimm*

Developed an AAV shuttle vector protocol to increase cell-type specificity of viral infection for neuronal network tracing. Trained in alternative AAV virus production and purification methods, and tissue laser microdissection.

Heidelberg Universitätsklinikum, Klinik für Paraplegiologie 2010 – 2013

Supervisor: *Prof. Dr. Armin Blesch*

Continued and translated the gene therapy and cell transplantation approaches developed at UCSD into a clinical, patient-oriented research environment (*Liu et al., Acta Biomaterialia 2017; Sandner et al., Stem Cell Res 2013*). Refined AAV viral vector design for therapeutic gene delivery in both rodent models and human applications. This interdisciplinary setting, collaborating with clinicians, engineers, and physiotherapists, shaped my approach to research that bridges molecular tools with translational application.

UC San Diego, School of Medicine, Dept. of Neurosciences 2006 – 2010

Supervisors: *Dr. Mark Tuszynski and Dr. Armin Blesch*

Developed regulatable viral vector systems for controlling gene expression *in vivo*, which were used to study neuronal degeneration and promote axonal regeneration in spinal cord injury models (*McCall, Nicholson et al., Front Mol Neurosci 2012; Hou, Nicholson et al., J Neurosci 2012*). Designed and cloned a viral vector library and rapid cloning platform for therapeutic gene delivery. Optimized primary cell and iPSC co-transplantation protocols with hydrogel biomaterials to promote axonal outgrowth and circuit formation in SCI rodent models. This work pioneered combinatorial therapeutic strategies integrating gene therapy with biomaterial scaffolds.

Emory University, Dept. of Immunology and Microbiology Summer 2003, 2004

HHMI Summer Fellowship

Supervisors: *Dr. June Scott and Dr. Asiya Gusa*

Trained in DNA-binding assays and radioactive labeling. Identified a consensus sequence of CREB binding in Group A *Streptococcus pyogenes*.

PUBLICATIONS

*H-index: 10 | Total Citations: 515 | *First or co-first author*

A. Under Review / Accepted

1. ***Nicholson L**, Tang S, Karra T, Abouelatta H, Strittmatter SM. *Insulin resistance alters cortical inhibitory neurons and microglia to exacerbate Alzheimer's knock-in mouse phenotypes.* Molecular Neurodegeneration, 2026. [Accepted, in press May 2026]
2. Ramakrishnan K, Wang X, **Nicholson L**, Lin N, Howard E, Basu A, Ingabire I, Sekine Y, Strittmatter SM. *Axon regeneration and functional recovery from spinal cord injury is enhanced by allele-specific ApoE neuronal action through Lrp8.* Science Translational Medicine, October 2025. [Conditionally Accepted]
3. Zhang L, He CH, Coffey S, Yin D, Hsu IU, Su C, Ye Y, Zhang C, Spurrier J, **Nicholson L**, Rothlin CV, Ghosh S, Gopal PP, Hafler DA, Zhao H, Strittmatter SM. *Single-cell transcriptomic atlas of Alzheimer's disease middle temporal gyrus reveals region, cell-type, and sex specificity of gene expression with novel genetic risk for MERTK in females.* [Final revision submitted: Journal of Alzheimer's Disease, May 2026]

B. Published

1. *Stoner A, *Fu L, ***Nicholson L**, Zheng C, Toyonaga T, Spurrier J, Laird W, Cai Z, Strittmatter SM. *Neuronal transcriptome, tau and synapse loss in Alzheimer's knock-in mice require prion protein.* Alzheimer's Research & Therapy 2023, 15: 201.
2. Zheng C, Toyonaga T, Chen B, **Nicholson L**, Mennie W, Liu M, Spurrier J, Deluca K, Strittmatter SM, Carson RE, Huang Y, Cai Z. *Decreased synaptic vesicle glycoprotein 2A binding in a rodent model of familial Alzheimer's disease detected by [18F]SDM-16.* Front Neurol. 2023, 14: 1045644.
3. *Spurrier J, ***Nicholson L**, Fang XT, Stoner AJ, Toyonaga T, Holden D, Siegert TR, Laird W, Allnutt MA, Chiasseu M, Brody AH, Takahashi H, Nies SH, Pérez-Cañamás A, Sadasivam P, Lee S, Li S, Zhang L, Huang YH, Carson RE, Cai Z, Strittmatter SM. *Reversal of synapse loss in Alzheimer mouse models by targeting mGluR5 to prevent synaptic tagging by C1Q.* Science Translational Medicine 2022, 14: eabi8593.
4. ***Nicholson L**, Gervasi N, Falières T, Leroy A, Miremont D, Zala D, Hanus C. *Whole-Cell Photobleaching Reveals Time-Dependent Compartmentalization of Soluble Proteins by the Axon Initial Segment.* Frontiers In Cellular Neuroscience 2020, 14: 180.
5. Harde E, **Nicholson L**, Cuadrado B, Bissen D, Wigge S, Urban S, Segarra M, de Almodóvar C, Acker-Palmer A. *EphrinB2 regulates VEGFR2 during dendritogenesis and hippocampal circuitry development.* ELife 2019, 8: e49819.
6. Luck R, Urban S, Karakatsani A, Harde E, Sambandan S, **Nicholson L**, Haverkamp S, Mann R, Martin-Villalba A, Schuman EM, Acker-Palmer A, de Almodóvar C. *VEGF/VEGFR2 signaling regulates hippocampal axon branching during development.* ELife 2019, 8: e49818.
7. Liu S, Sandner B, Schackel T, **Nicholson L**, Chtarto A, Tenenbaum L, Puttagunta R, Müller R, Weidner N, Blesch A. *Regulated viral BDNF delivery in combination with Schwann cells promotes axonal regeneration through capillary alginate hydrogels after spinal cord injury.* Acta Biomaterialia 2017, 60: 167-180.
8. Sandner B, Rivera FJ, Caioni M, **Nicholson L**, Eckstein V, Bogdahn U, Aigner L, Blesch A, Weidner N. *Bone morphogenetic proteins prevent bone marrow stromal cell-mediated oligodendroglial differentiation of transplanted adult neural progenitor cells in the injured spinal cord*. Stem Cell Research 2013, 11 (2): 758-771
9. McCall J, **Nicholson L**, Weidner N, Blesch A. *Optimization of adult sensory neuron electroporation to study mechanisms of neurite growth.* Frontiers In Molecular Neuroscience 2012, 5: 11.
10. Hou S, **Nicholson L**, van Niekerk E, Motsch M, Blesch A. *Dependence of Regenerated Sensory Axons on Continuous Neurotrophin-3 Delivery.* Journal Of Neuroscience 2012, 32: 13206-13220.
11. Kenyon WJ, **Nicholson KL**, Rezuchova B, Homerova D, Garcia-Del Portillo F, Finlay BB, Pallen MJ, Kormanec J, Spector MP. *Sigma(s)-Dependent carbon-starvation induction of pbpG (PBP 7) is required for the starvation-stress response in Salmonella enterica serovar Typhimurium.* Microbiology 2007, 153: 2148-2158.

TALKS & PRESENTATIONS

Black in Neuro Speaker Series, WTI Institute, Yale University, USA Apr 2026
Talk: Metabolic Stress-Induced Cell States in AD

Adaptive Brain Symposium, DANDRITE Institute, Aarhus, Denmark Aug 2025
Talk: Transcriptional remodeling of cortical inhibitory neurons & microglia in Alzheimer's disease is driven by insulin resistance.

Pharmacology & Toxicology ROP105 Seminar Series, University of Toronto, Canada Aug 2025
Talk: Insulin resistance alters cortical inhibitory neurons and microglia to exacerbate Alzheimer's knock-in mouse phenotypes.

Kavli Awardee Symposium, Yale University, USA Mar 2025
Talk: MinD Your Brain: The Impact of Metabolic Stress on AD Phenotypes.

Merck, Neuroimmune Group, Boston, Massachusetts, USA Mar 2025
Talk: Transcriptomic analysis of the druggable Alzheimer's disease mGluR5 signaling pathway.

Allen Brain Institute, Seattle, Washington, USA Feb 2025

Talk: From Synaptic Loss to Metabolic Dysregulation: A Transcriptomic Profile of Alzheimer's Disease Mechanisms.

Society for Neuroscience, Chicago, Illinois, USA Oct 2024

Poster: Insulin resistance induced by high-fat diet exacerbates Alzheimer's phenotypes in knock-in mice with specific alterations in cortical inhibitory neurons and microglia.

Donders Center for Cognition, Nijmegen, Netherlands Apr 2019

Talk: Driving connectivity in neuroscience research.

German Neuroscience Society Conference, Göttingen, Germany Mar 2017

Poster: VEGFR2-ephrinB2 cooperative signaling controls dendritic arborization and synapse formation.

TRAINING, MENTORSHIP & TEACHING

Graduate & Post-bachelor Student Mentorship

- Zheyun X. (Graduate Student Rotation, 2024, Yale University)
- Christine W. (Graduate Student Rotation, 2023, Yale University)
- Tejaswini K. (Postbach Trainee, 2021–2023, Yale University)

Master's Students

- Madhuri M. (Master's Thesis, 2016, Wolfgang Goethe University)
- Adesanoye B. (Rotation Project, 2015, Wolfgang Goethe University)
- Benjamin M. (Rotation Project, 2014, Wolfgang Goethe University)

Undergraduate Students

- Habiba A. (Summer Research Intern, 2024, Yale University)
- Jacqueline W. (Bachelor's Thesis, 2023–2024, Yale University)
- Sapphire M. (Yale Summer Research Fellow, 2021, Yale University)
- Christina O. (Bachelor's Thesis, 2020–2021, Yale University)

High School Student

Jimin K. (IMPRS Scholar's Program, MPI for Brain Research: Cloning of endothelial cell-targeted AAV GCaMP6 vectors for functional vascular imaging)

Teaching

- Modern topics in neuroscience: Gene & Molecular Networks — MPI for Brain Research, IMPRS, Doctoral Students
- Introduction to basic methods in neuroscience: Histology preparations and microscopy — Wolfgang Goethe University, Master's Course
- Methods in neuroscience: Cloning, PCR, and genotyping techniques — MPI for Brain Research, Teaching Lab, High School Students

COLLABORATIVE LEADERSHIP & PUBLIC ENGAGEMENT

Across these initiatives, I raised over €250,000 over four years to support neuroscience education, career development, and cross-institutional collaboration at local, regional, and international scales.

Neuroscience Education & Outreach

- Deutsche Neurowissenschaften Olympiade e.V. (DNO) 2016 – 2019

  Co-founded a national neuroscience competition for high school students, operating across four German cities (Frankfurt, Berlin, Bonn, Heidelberg) with approximately 200 students participating annually, supported by an organizational team of >60 early-career scientists. Recruited and trained PhD students and postdocs in science communication and public engagement as part of the program. Personally led a 16-member team at the DNO-Frankfurt location and trained my successor. Secured a 5-year educational partnership with the Hertie Foundation.

- International Brain Bee (IBB), 11th FENS Forum, Berlin — Jun 2018

  Served as lead host country organizer for the World Neuroscience Championship on behalf of the IBB Organization and its board members (SfN, APA, FENS, Dana Alliance, IBRO). Coordinated a team of 17 people managing event logistics for international delegations.

Academic Career Development (GRADE Brain)

- Postdoc Teaching Training Program — 2016 – 2019

  Initiated and organized a teaching program for postdocs at non-university neuroscience research institutions (e.g., Max Planck, Ernst Strüngmann Institute), providing an avenue toward habilitation that was previously unavailable. Worked with the GRADE officer at Goethe University to advocate for institutional recognition of postdoc teaching. Required participating postdocs to teach at one of six partner neuroscience institutions where they were not based, promoting cross-institutional exchange of ideas between PhD students and postdocs.

- Scrum-Based Academic Training Workshops — 2017 – 2018

  Organized workshops connecting PhD students with local biotech and technology companies using Scrum methodology, creating a structured line of communication for collaborative idea development between academia and industry.

Science-Industry Partnerships (Science Innovation Union)

Academia vs. Industry Workshop Series, Frankfurt — 2016 – 2019

Organized career development workshops routinely attracting 200–300 attendees, bridging academic researchers with industry professionals. Led an international communications team of 8 people.

PROFESSIONAL MEMBERSHIPS & SERVICE

Society for Neuroscience	Since 2023
Minerva FemmNet	Since 2018
Young Entrepreneurs in Science (Falling Walls Organization)	Since 2016
Hertie Foundation Alumni Association	Since 2016
Deutsche Neurowissenschaften Olympiade e.V.	Since 2016
Max Planck Society	Since 2013