Michael J. Kleiman, PhD

2025-07-22

http://michael.kleiman.me
michael@kleiman.me
561-252-2638

SKILLS AND QUALIFICATIONS

Languages: Python, R, C++

Data Science: Machine learning (*scikit-learn, xgboost, lightgbm, imbalanced-learn*), deep learning (*pytorch, tensorflow, keras*), feature engineering (*featuretools, Boruta*), hyperparameter optimization (*optuna, hyperopt, scikit-optimize*) model interpretability (*SHAP, LIME, eli5*), statistics (*statsmodels, pingouin, SPSS, R, Rstudio*), data wrangling (*pandas, numpy, SQL, dplyr*), natural language processing (NLP) (*NLTK, speechbrain, spaCy, Whisper, BERT*), audio processing (*pyaudio, pydub, openSMILE*), neuroimaging analysis (*freesurfer, pydicom, 3DSlicer*), gaze behavior analysis (*Tobii, GazePoint, OpenSesame, pygaze*), visualization (*plotly, matplotlib, ggplot, Tableau*), LLM prompt engineering, Excel

Architecture: SQL (postgres, mysql), AWS, Azure Cloud Platform, Azure Synapse, Docker

Development: Git, UI design (*Qt, PySide, PyGame, PsychoPy*), Unity, software development, PyCharm, Visual Studio Code, Jupyter Lab, WSL

Research: Experiment design, research and literature review, scientific writing (*LaTeX, Word*), public speaking, teaching and presenting, virtual/online lecture production (*PowerPoint*), electronic health record systems (*EPIC, REDCap*), Microsoft Office

Audiovisual: Graphics design (*Adobe Photoshop*), video production (*Adobe Premiere*), audio recording and mastering (*REAPER, Ableton Live, ProTools, Audacity*)

Technical: Linux OS (*Ubuntu, Debian, Mint*) and Microsoft Windows tech support and troubleshooting, computer diagnostics and repair, CLI, bash

EDUCATION

2019 **Florida Atlantic University**, Boca Raton, FL
Ph.D in Experimental Psychology
M.A. in Psychology

2012 **Florida State University**, Tallahassee, FL
B.S. in Biological Science & Psychology

ACADEMIC RESEARCH EXPERIENCE

2023 - **Assistant Director of Data Science and Technology**
Comprehensive Center for Brain Health, Department of Neurology,
University of Miami Miller School of Medicine

- **Data Core Lead**: Head of CCBH Data Science and Management Core (DSMC), directly in charge of the Data Manager, all Data Scientists, Database Analysts, Data Entry Clerks, and

one postdoctoral research fellow, and indirectly in charge of all Research Assistants and Associates in their data-related duties.

- **Deployed Azure Database**: Led a team of in-house and consultant database engineers, data scientists, and data analysts to build an Azure Synapse data lake to house structured and unstructured research data from health and medical records, surveys, forms, biomarker records, MRI scans and other machine data, with ML transformation pipelines.
- **Developed Data Collection Applications**: Created the web-based Brain Health Survey which collects data sufficient to calculate the Brain Health Index, a measure of modifiable and non-modifiable risk factors for cognitive impairment and dementia. The Survey is hosted as an Azure logic app and virtual machine with integrations into the rest of our Azure cloud database.
- **Automated 90% of Manual Tasks**: Transitioned the Center from majority manual data entry and calculation to electronic data capture with automated calculations and pipelines for data preprocessing. Established internal webforms for new participant and study registration, external logic apps for data requests and dissemination of study data including React-based data dictionaries and dashboards. Led development of decision tree-based clinicopathological diagnosis using clinical and biomarker data.

Research Assistant Professor
Comprehensive Center for Brain Health, Department of Neurology,
University of Miami Miller School of Medicine

- **Neurobehavioral Markers of Neurodegeneration**: Primary research focus is in behavioral markers of neurodegeneration, including speech behavioral data (linguistics, audiometrics) and gaze behavioral data.
- **Brain Health Index** and components: Developed the *Vulnerability Index*, contributed to the the development of the *Resilience Index*, and created the *Brain Health Platform* and its associated *Brain Health Index*, a linear scale of weighted brain health components that paints a picture of overall health and likelihood of future impairment.

2020 - 2023 **Postdoctoral Fellow, Data Scientist**
University of Miami, Miller School of Medicine

- **Software Engineering:** Built novel software tools for measuring cognition and cognitive impairment on desktop systems using Python and Qt5
- **Data Analysis:** Analyzed medical data, investigated methods for clinical practice, and developed assessment tools using statistical and machine learning techniques
- **Development:** Developed and maintained web-based dashboards on VM architecture for clinical and research applications
- **EHR:** Assisted in the integration of machine learning pipelines into university-wide electronic health record systems (EPIC) for clinical decision support
- **Audiovisual:** Directed, recorded, and edited live and pre-recorded seminars, lectures, and advertisement media for local and international conferences, webinars, and recruitment events
- **Graphics Design:** Designed print and digital graphics and media for advertisements of the Center and recruitment of target participants and patients
- Instructed coworkers in using Python, R, and RStudio to streamline intra-office collaboration

- **Collaboration:** Worked with other universities and research groups to develop and implement machine learning models for clinical and academic use
- Regularly communicated technical topics to expert, non-technical, and lay audiences
- Recipient of state and private grants

2013 - 2019 **Graduate Researcher**
Florida Atlantic University, Department of Psychology

Machine Perception and Cognitive Robotics Lab
Advisors: Dr. Elan Barenholtz, Dr. William Hahn

- Developed paradigms for human interfacing with machines
- Utilized machine learning and neural networks to categorize clinical populations based on eye movements for multiple tasks
- Lead Researcher for *Behavioral Analytics Team*, managing up to 7 undergraduate students' projects

Visual Mind Lab
Advisor: Elan Barenholtz, PhD

- Compared eye fixation measures when modifying subjects' perceptions of real-time versus pre-recorded interactions
- Developed mechanisms for cognitive research using virtual reality systems, including multiple object tracking, attention restoration, and object saliency
- Interviewed prospective students for independent study roles

2011 - 2012 **Undergraduate Researcher**
Florida State University**,** Department of Biological Science
Advisor: Lisa Lyons, PhD

- Examined behavioral effects of ethanol with respect to circadian rhythms of *drosophila melanogaster*
- Independently managed fly stocks for experimental procedures
- Performed surgical removal of intestines to examine gut perfusion due to chronic ethanol administration

NON-ACADEMIC RESEARCH EXPERIENCE

2025 - **Sensory Science Inc**
Chief Scientific Officer

- Develop and maintain innovative conversational AI application that captures sociocognitive functioning, episodic memory, and other metrics known to be associated with risk of cognitive impairment
- Facilitate multi-site observational clinical data collection of speech analysis collection application for cognitive impairment screening
- Develop end-to-end speech and audiometric analysis including a novel voice signature detection algorithm and multimodal-multimodel ensemble hierarchical machine learning prediction algorithm
- Manage tech stack including AWS cloud service and integrations with Twilio, Voiceflow, Google Workspace, and Slack

2023 - 2025 **WellSaid.AI**
Consultant
- Developed pre-processing and analysis pipelines for speech responses to daily assessments built into a digital speech detection platform
- Explored cognitive predictive value of linguistic and audiometric data from responses

2023 - 2025 **Cognivue**
Consultant
- Created the Cognivue Amyloid Risk Scale (CARM), a categorical measure of amyloid positivity and risk of future impairment based on cognitive measures derived from the Cognivue Clarity cognitive assessment
- Wrote and contributed to publications detailing the effectiveness of the CARM in the BioHermes study

2016 - 2018 **VoxelRx**
Data Science Intern
- Developed deep learning models to classify Alzheimer's disease from MRI scans
- Cleaned and restructured behavioral and neuroimaging data from ADNI
- Prepared visualizations using Tableau and Python

TEACHING & ADVISING

2019 - 2020 **Adjunct Professor**
Florida Atlantic University, Department of Psychology

Biological Bases of Behavior
- Taught undergraduate psychology and biology majors about basic principles of psychobiology, neural physiology, and neuroanatomy

Psychology of Human Development
- Taught undergraduate psychology majors about high-level biological and psychological processes involved in development throughout the lifespan

Cognition Lab
- Instructed undergraduate psychology majors on various topics in cognitive psychology and in scientific research of these topics
- Assigned and graded student presentations of proposed replication studies of classic cognition experiments

2017 - 2019 **Lead Researcher**
Machine Perception and Cognitive Robotics Lab, Behavioral Analytics Team

Mentored Projects
- Depression detection study, using a combined neural network model with capsule networks and LSTMs. 89% detection rate for self-report depressive thoughts

- Chess expert detection based on gaze patterns of chess puzzles
- Personality test prediction based on eye movement behavior towards emotionally stimulating imagery
- Drug relapse prediction based on behavioral data and demographics information

2015 - 2019 **Graduate Teaching Assistant**
Florida Atlantic University, Department of Psychology

Intermediate Statistics Laboratory – Instructor, 4 semesters
- Prepared lectures and class activities focusing on the use of SPSS statistical software to provide students with a hands-on approach to learning statistical analyses
- Created and graded course assessments, and provided continuous feedback to ensure students understood material and stayed on track

Cognition – Teaching Assistant under Dr. Elan Barenholtz, 3 semesters
- Guest lectured
- Graded homework, assignments, and quizzes, and proctored exams
- Managed class grades

Research Methods – Teaching Assistant under Dr. David Wolgin
- Instructed students on how to perform research using online methods and write an APA style research paper
- Graded and provided continuous feedback on APA style research papers

Social Behavior Laboratory – Teaching Assistant under Dr. Derrick Schlangen
- Guest lectured
- Led students in a simulated society activity
- Graded student presentations and provided feedback
- Managed class grades and attendance and proctored exams

"Michael was always willing to help me with any questions or concerns and showed a genuine interest for students to learn the material. He is a great professor."
"Michael was a great instructor. Funny, intelligent and taught well."

PUBLICATIONS

PubMed | Google Scholar

Peer-reviewed articles:

Baig, M.M., Besser, L.M., Tolea, M.I., **Kleiman, M.J.**, Chang, L.C., O'Shea, D.M., Chrisphonte, S., Wiese, L.K., & Galvin, J.E. (2025). Correlates of post-COVID-19 pandemic worry and preventive practices in older adults in Florida. *Frontiers in Public Health*, *13*. https://doi.org/10.3389/fpubh.2025.1608352

Galvin, J.E., Almonte, K.C., Buehler, A., Caicedo, Y.M., Galvin, C.B., Jimenez, W., Joshi, M.S., Mendez, N., Riccio, M.L.A., Walker, M.I., **& Kleiman, M.J.** (2025). The Healthy Brain 9 (HB9): A new instrument to characterize subjective cognitive decline, and detect anosognosia in mild cognitive impairment. *PLOS ONE*, *20*(6), e0322351. https://doi.org/10.1371/journal.pone.0322351

Galvin, J.E., **Kleiman, M.J.**, Harris, H.M., & Estes, P.W. (2025). The Cognivue Amyloid Risk Measure (CARM): A Novel Method to Predict the Presence of Amyloid with Cognivue Clarity. *Neurology and Therapy*, *14*(3), 865–880. https://doi.org/10.1007/s40120-025-00741-x

O'Shea, D.M., Chang, L.C., Gibbs, G., Galvin, C.B., **Kleiman, M.J.**, & Galvin, J.E. (2025). Development and Validation of the DA3 Scale for Assessing Depression, Anxiety, and Apathy in Older Adults. *The American Journal of Geriatric Psychiatry*, *33*(8), 838–849. https://doi.org/10.1016/j.jagp.2025.03.002

Kleiman, M.J., and Galvin, J.E. (2024) High Frequency Post-Pause Word Choices and Task-Dependent Speech Behavior Characterize Connected Speech in Individuals with Mild Cognitive Impairment. *Journal of Alzheimer's Disease.* 10.1177/13872772412912309

Galvin, J.E., **Kleiman, M.J.**, Estes, P.W., Harris, H.M., Fung, E. (2024) Cognivue Clarity characterizes mild cognitive impairment and Alzheimer's disease in biomarker confirmed cohorts in the Bio-Hermes Study. *Scientific Reports.* 10.1038/s41598-024-75304-5

Perez, N.D., **Kleiman, M.J.,** Barenholtz, E. (2024) Visual Fixations during Processing of Time-Compressed Audiovisual Presentations. *Attention, Perception, & Psychophysics.* 10.3758/s13414-023-02838-7

Besser, L.M., Chrisphonte, S., **Kleiman, M.J.**, O'Shea, D., Rosenfeld, A., Tolea, M., Galvin, J.E. (2023) The Healthy Brain Initiative (HBI): A Prospective Cohort Study Protocol. *PLOS ONE* 10.1371/journal.pone.0293634

Daniel, E.V., **Kleiman, M.J.**, & Galvin, J.E. (2023). Exploring Reasons for Differential Vulnerability and Alzheimer's Disease Risk in Racial and Ethnic Minorities. *Journal of Alzheimer's Disease*, *91*(1), 495–506. https://doi.org/10.3233/JAD-220959

Kleiman, M.J., Ariko, T., Galvin, J.E. (2023) Hierarchical two-stage cost-sensitive clinical decision support system for screening prodromal Alzheimer's disease and related dementias. *Journal of Alzheimer's Disease.*

Kleiman, M.J., Chang, L., Galvin, J.E. (2022) The Brain Health Platform: Combining Resilience, Vulnerability, and Performance to Assess Brain Health and Risk of Alzheimer's Disease and Related Disorders. *Alzheimer's & Dementia.* 10.3233/JAD-220927

Kleiman, M.J., Plewes, A.D., Owora, A., Grout, R.W., Dexter, P.R., Fowler, N.R., Galvin, J.E., Miled, Z.B., & Boustani, M. (2022). Digital detection of dementia (D3): A study protocol for a pragmatic cluster-randomized trial examining the application of patient-reported outcomes and passive clinical decision support systems. *Trials*, *23*(1), 868. https://doi.org/10.1186/s13063-022-06809-5

Kleiman, M.J., Barenholtz, E., Galvin, J.E. (2021) Screening for early-stage Alzheimer's disease using optimized feature sets and machine learning. *Journal of Alzheimer's Disease.* 10.3233/JAD-201377

Kleiman, M.J., Galvin, J.E. (2021) The Vulnerability Index: A weighted measures of dementia and cognitive impairment risk. *Alzheimer's & Dementia: DADM.* 10.1002/dad2.12249

Galvin, J.E., Chrisphonte, S., Cohen, I., Greenfield, K.K., **Kleiman, M.J.**, Moore, C., Riccio, M.L., Rosenfeld, A., Shkolnik, N., Walker, M., Chang, L.C., & Tolea, M.I. (2021). Characterization of dementia with Lewy bodies (DLB) and mild cognitive impairment using the Lewy body dementia module (LBD-MOD). *Alzheimer's & Dementia*, *17*(10), 1675–1686. https://doi.org/10.1002/alz.12334

Galvin, J.E., **Kleiman, M.J.**, et al. (2021) The Resilience Index: A quantifiable measures of brain health and risk of cognitive impairment and dementia. *Journal of Alzheimer's Disease.* 10.3233/jad-215077

Galvin, J.E., **Kleiman, M.J.**, & Walker, M. (2021). Using Optical Coherence Tomography to Screen for Cognitive Impairment and Dementia. *Journal of Alzheimer's Disease*, *84*(2), 723–736. https://doi.org/10.3233/JAD-210328

Kleiman, M.J., Barenholtz, E. (2020) Perception of being observed by a speaker alters gaze behavior. *Attention, Perception, and Psychophysics.* 10.3758/s13414-020-01981-9

<u>In Preparation and Under Review:</u>

Kleiman, M.J. (Under review) Evaluating Large Language Model Performance and Reliability in Scoring Picture Description Tasks for Neuropsychological Assessment. *PLOS Digital Health.* 10.31234/osf.io/snb3a

Kleiman, M.J., Gibbs, G.S., Joshi, M., Galvin, J.E. (Submitted) The Brain Health Index: Integrating Vulnerability, Resilience, and Functioning Into a Unified Measure of Cognitive Health and Neurodegenerative Risk. *Alzheimer's & Dementia.*

Kleiman, M.J., Baig, M.M., Salcedo, A., Galvin, J.E. (In prep) "Puppy Escape" - A Novel Narrative Recall Task Leveraging Multimodal Analysis and Weighted Scoring.

Kleiman, M.J., Rader, K., Camacho, S., Galvin, J.E. (In prep) Automated Scoring of Narrative Recall Assessments Using Large Language Models Enables Exploration of Alternate Scoring Criteria.

Besser, L., Baig, M., Henriquez, A., Tolea, M., O'Shea, D., Chrisphonte, S., Joshi, M., **Kleiman, M.J.**, Galvin, J.E. (Submitted). Sociodemographic correlates of cognition and Alzheimer's disease and vascular biomarkers among middle to older age participants in the Healthy Brain Initiative. *Journal of Alzheimer's Disease*.

Baig, M.M., **Kleiman, M.J.**, Joshi, M.S., Galvin, J.E. (In prep) Identifying Alzheimer's Disease Subtypes and Stages Through Machine Learning.

PROFESSIONAL MEMEBERSHIP

2025 -	Member, INCLUDE Network
2022 -	Member, Alzheimer's Association
2021 -	Member, McKnight Brain Institute
2021 -	Member, American Academy of Neurology
2020 -	Member, Psychonomic Society
2015 -	Member, Vision Sciences Society

AWARDS AND HONORS

2025 **K01 Research Grant**
National Institute on Aging, NIH
1K01AG084867 Kleiman (PI)
Title: Neurobehavioral markers of neurodegeneration: quantifying implicit changes in cognitive functioning due to dementia using gaze and speech behavior

LRP Loan Repayment Award
National Institutes of Health
LRP0000065231 Kleiman (PI)
Title: Ensuring diverse representation in models of speech behavior targeting preclinical and prodromal dementia

2022 **Alzheimer's Association Research Fellowship**
Alzheimer's Association
AARF-22-923592 Kleiman (PI) – 05/2022 - 04/2025 – $175,000
Title: Mapping trajectories of speech metrics in preclinical Alzheimer's disease

2022 **McKnight Clinical Translational Research Scholarship**
American Academy of Neurology, McKnight Brain Institute, American Brain Foundation
SA00001776 Kleiman (PI) – 07/2022 - 06/2024 – $150,000
Title: Assessing trajectories of discrete measures of speech behavior in age-related decline

2020 **Postdoctoral Research Fellowship Grant**
Ed and Ethel Moore Alzheimer's Disease Research Program, Florida Department of Health
Title: Development of a gaze- and speech-behavior based cognitive exam to assist in the detection of early-stage Alzheimer's disease and related disorders

PRESENTATIONS

2025 **Alzheimer's Association International Conference**, Toronto, ON Canada
Poster: The Brain Health Index: Integrating Vulnerability, Resilience, and Functioning Into a Unified Measure of Cognitive Health and Neurodegenerative Risk
Poster: Automated Scoring of Narrative Recall Assessments Using Large Language Models Enables Exploration of Alternate Scoring Criteria
Poster: "Puppy Escape" - A Novel Narrative Recall Task Leveraging Multimodal Analysis and Weighted Scoring
Poster: The Healthy Brain 9 (HB9): A New Instrument to Characterize Subjective Cognitive Decline
Poster: Two Stage Screening for Alzheimer's Disease Clinical Trial Recrutiment Enrichment: Cognivue Clarity and Plasma pTau217
International Neuropsychological Society, New Orleans, LA
Poster: The Craft Story 21 can be Reliably Scored by Generative AI Models, Paving the Way for AI-Based Scoring Tools
Florida Atlantic University SMART Health Seminar, Boca Raton, FL
Talk: Using speech as a biomarker for detecting and measuring cognitive impairment

2024 **American Neurological Association Conference**, Orlando, FL
Poster: Identifying Alzheimer's Disease Subtypes and Stages Through Machine Learning.
Alzheimer's Association International Conference, Philadelphia, PA
Poster: Degradation of gaze-speech synchronization due to mild cognitive impairment in picture description tasks
Poster: Detection of Amyloid Status and Preclinical Alzheimer's Disease Using Cognivue Clarity, An Adaptive Psychophysics Computerized Cognitive Battery in The Bio-Hermes Study
Comprehensive Center for Brain Health: The Brain Health Luncheon, Boca Raton, FL
Talk: Using behavior to separate normal age-related cognitive changes from early-stage dementia
American Academy of Neurology, Denver, CO
Talk: Age-related cognitive decline leads to greater entropic descriptiveness in connected speech tasks
Poster: Cognivue Clarity® in the Detection of Biomarker Confirmed Mild Cognitive Impairment and Alzheimer's Disease
University of Miami's Neurology Update and Stroke Intensive Review
Talk: Neurobehavioral markers of neurodegeneration and brain health
Partnership for Aging
Talk: How we can detect early-stage dementia using behavior

2023 **Southeastern Neurodegenerative Disease Conference,** Atlanta, GA
Talk: Mild cognitive impairment influences post-disfluency speech behavior in narrative recall, picture description, and spontaneous speech tasks
Alzheimer's Association International Conference, Amsterdam, Netherlands
Poster: Unexpected and interesting distractors capture greater attentional gaze behavior in MCI in a naturalistic visual search task

2022 **University of Miami's Department of Neurology**
Talk: Attention directed towards unexpected and interesting distractors can detect mild cognitive impairment
Alzheimer's Association International Conference, San Diego, CA
Poster: Two-stage cost-sensitive clinical decision support system for detecting Alzheimer's disease

2021 **Comprehensive Center for Brain Health: Hot Topics on Healthy Brain Aging**
Talk: Listening to speech to understand the aging brain

University of Miami's Neurology Update and Stroke Intensive Review
Talk: Neurobehavioral Markers of Neurodegeneration
Palm Beach County Library System
Talk: Dementia and Artificial Intelligence
Institute for Learning in Retirement
Talk: Artificial Intelligence and the Detection of Dementia

2020 **Clinical Trials on Alzheimer's Disease**
Poster: Generation of an optimized neuropsychological feature set for the quick screening of mild cognitive impairment in clinical settings

2019 **Introduction to Deep Learning Bootcamp**
Talk: Analyzing Behavior with Ensemble Networks
Course: Decision Trees, Random Forests, and other Ensemble Networks
Cade Prize Innovation Competition
Pitch: The SciKey Scan
Coral Springs Innovate! Downtown
Pitch: A faster and more accurate method for detecting and measuring Alzheimer's Disease

2018 **Florida Blue Healthcare Innovation Competition**
Talk: A New Way to Diagnose Depression
Placed in 2nd Overall
FAU Wave
Poster: Developing a Model for Mood Disorder Classification Using Eye Movements.
Received First Place honors in competition
Vision Sciences Society
Poster: Saliency Map Classification Using Capsule-based CNNs.
Poster: Comprehension of an audio versus an audiovisual lecture at 50% time-compression.
Poster: Attention Restoration Through Virtual Environments.
Osher Lifelong Learning Society
Talk: Diagnosing Alzheimer's Disease Early: Your eye movements are the future of clinical research

2017 **Vision Sciences Society**
Poster: You lookin' at me? Perception of a real-time dyadic interaction influences gaze behavior.
Demo: Virtual reality real-time multiple object tracking psychophysics platform.

2016 **Vision Sciences Society**
Poster: Can you see me? Eye fixations of the face are modulated by perception of a bidirectional social interaction.