

# MEGAN P. DARRELL

1935 Eastchester Rd, Bronx, NY | [LinkedIn](#) | [Google Scholar](#)  
[darrellmegan00@gmail.com](mailto:darrellmegan00@gmail.com) | (860) 995 – 0100 | ORCID ID: 0000-0001-6498-9442



## EDUCATION

- Albert Einstein College of Medicine (Bronx, NY)** *June 2022 – Expected 2030*  
*Medical Scientist Training Program, MD-PhD*
- Wheaton College (Norton, MA)** *August 2017 – May 2020*  
*Bachelor of Arts, Magna Cum Laude*  
Bioinformatics Major, Chemistry Minor

## CLINICAL EXPERIENCE

- MSTP Continuity Clinic (Bronx, NY)** *April 2025 – Present*  
*Clinical Trainee*
- Coordinate patient care at weekly student-run outpatient clinic to continue developing clinical acumen during research years
  - Focus on history-taking, physical exams, patient presentations, laboratory testing, and treatment management.
- ECHO Clinic (Bronx, NY)** *September 2022 – October 2023*  
*Patient Advocate and Community Outreach*
- Communicated directly with patients to facilitate interactions with medical professionals
  - Directed educational sessions to provide community outreach and tutoring for children at Bronx Public Schools
- The National Institutes of Health (Bethesda, MD)** *August 2020 – June 2022*  
*Patient Rounds*
- Shadowed several physicians in NIAMS to observe patient rounds
  - Observed leading medical scientists at the George Washington Myositis Clinic, which includes physician consults for disease diagnostics and clinical trial testing
- Sturdy Memorial Hospital (Attleboro, MA)** *August 2019 – March 2020*  
*Emergency Room Patient Care Liaison*
- Assisted patients and families in the ER and waiting area to provide care and comfort during a time of medical distress
  - Served as a liaison between patients and medical staff
- Connecticut Children's Medical Center (Hartford, CT)** *2019 – 2020*  
*Physician Shadowing*
- Pediatric Hematology and Oncology (Michael Isakoff, MD) *March 2019, January 2020*
  - Behavioral Health Unit of the Emergency Room (Robert Sahl, MD) *January 2020*
  - Behavioral Health Transitions Clinic (Kashmeer Zablan, MD) *January 2020*

## RESEARCH EXPERIENCE

- Cognitive Neurophysiology Lab (Bronx, NY)** *March 2024 – Present*  
*Thesis Research*
- Processing and analyzing EEG data to elucidate neural mechanisms underlying autism spectrum disorder
  - Utilizing machine learning to identify autism subgroups and novel EEG biomarkers across multiple behavioral paradigms
- Mill Etienne Diversity and Inclusion Lab (New York Medical College)** *October 2022 – Present*  
*Statistical Analyst*
- Collaborated with clinicians and students to perform statistical analyses (R) that assess health disparities in clinical trials
  - Projects include: A) meta-analyses that evaluate race and gender representation in clinical trials compared to population disease prevalence of: *amyotrophic lateral sclerosis, Alzheimer's disease, epilepsy, heart transplant, lung transplant, stroke, Parkinson's disease, fracture*; B) evaluation of race and gender disparities in medical training by specialty and sub-specialty
- Tim Duong MRI Lab (Bronx, NY)** *June 2022 – January 2024*  
*Research Rotation*
- Performed biostatistical analyses to evaluate a longitudinal COVID-19 patient population compared to healthy controls (R), leading to the identification of novel findings regarding neurological and pulmonary dysfunction in COVID-19
- The National Institutes of Health (Bethesda, MD)** *August 2020 – June 2022*  
*Postbaccalaureate Researcher, Dr. Hanna Kim's Juvenile Dermatomyositis (JDM) Laboratory*
- Performed bioinformatics and statistical analyses, including machine learning classification (Python)
  - Performed bulk and single cell RNA-sequencing analysis (Seurat, R) to better understand JDM pathogenesis and establish novel treatment based on varying levels of disease activity and myosin-specific autoantibody (MSA) classification
  - Wet-lab techniques: PBMC isolation, RNA isolation, flow cytometry, bulk and single-cell RNA sequencing

- Refined a neural network (Python) that can produce 2-dimensional pose estimation used for mouse tracking and gait analysis
- Applied the neural network to video data from Collaborative Cross F1 generations to analyze gait and social interaction patterns, establishing heritability across a panel of diverse mice
- Trained in mouse handling, high performance computing, and RStudio

## PUBLICATIONS

[Google Scholar](#)

- Choi J, **Darrell M** et. al. (2025). Laser hair removal in patients with polycystic ovarian syndrome and darker skin: A case-control study. *Under review in Journal of the American Academy of Dermatology*. 2025, April. April 2025
- Wang B, Bashier M, Fagan M, **Darrell M**, Horan D, Mehraban Alvandi L, Horn W, Kahn M. (2025). The Implications of Language Barriers on Postoperative Outcomes Among Older Adults with Hip Fracture. *Under review in Journal of Orthopaedic Trauma*. 2025, March. March 2025
- Jain A, Vazquez M, **Darrell M**, Ogarro M, Salik I, Pisapia J. Gender Disparities in Neurosurgical Training: Evaluation of the Impact of Gender from Residency to Academic Leadership. (2024). *Under review in Journal of Neurosurgery*; 2024, December. December 2024
- Darrell M**, Williams DKA, Smith C, Faasumalie P, Jerome W, Murray K, Etienne M. (2024). Gender Disparities in Graduate Medical Education from 2012 to 2022: Creating a Pipeline Through the Glass Ceiling in Medicine. *Under review in Academic Medicine*, October 2024. October 2024
- Axler E, Lu A, **Darrell M**, Vielemeyer O, Lipner S. (2024). Surgical Site Infections Are Uncommon Following Nail Biopsies in a Single Center Case-Control Study of 502 Patients. *Journal of the American Academy of Dermatology*. <https://doi.org/10.1016/j.jaad.2024.05.017> May 2024
- Eligulashvili A\*, **Darrell M\***, Gordon M, Jerome W, Fiori K, Congdon S, Duong T. (2024). Patients with unmet social needs are at higher risks of developing severe long COVID-19 symptoms and neuropsychiatric sequela. *Science Reports*, 14. <https://doi.org/10.1038/s41598-024-58430-y> April 2024
- \* equal contribution, co-first author
- Eligulashvili A\*, **Darrell M\***, Miller C, Lee J, Congdon S, Lee J, Hsu K, Yee J, Hou W, Islam M, Duong T. (2022). COVID-19 Patients in the COVID-19 Recovery and Engagement (CORE) Clinics in the Bronx. *MDPI*, 13 (1). <https://doi.org/10.3390/diagnostics13010119> December 2022
- \* equal contribution, co-first author
- Sheppard K, Gardin J, Sabnis G, Peer A, **Darrell M**, Deats S, Geuther B, Lutz C, Kumar V. (2022). Stride-level analysis of mouse open field behavior using deep-learning-based pose estimation. *Cell Reports*, 38 (2). <https://doi.org/10.1016/j.celrep.2021.110231>. January 2022

## SELECTED PRESENTATIONS & ABSTRACTS

[Google Scholar](#)

- Zajmi U, **Darrell M**, Chin A, de Jesus AA, Brooks S, Goldbach-Mansky R, Rider LG, Kim H. Top Peripheral Blood Transcriptomic Gene Modules Reveal Functional Annotation and Correlation with Clinical Traits in Juvenile Dermatomyositis (JDM) and Myositis-Specific Autoantibody (MSA) Groups. Poster Presentation at: American College of Rheumatology; 2024, November 18. Washington, DC. November 2024
- Kaneshiro A, Chin A, **Darrell M**, Biancotto A, Cheung F, Miller F, Rider L, Kim H. Broad Proteomic Analysis Reveals Top Differential Protein Modules and Functional Annotations with Clinical Traits in Juvenile Dermatomyositis (JDM) and Myositis-Specific Autoantibody (MSA) Groups. Poster Presentation at: American College of Rheumatology; 2024, November 18. Washington, DC. November 2024
- Darrell M**, Vanneau T, Cregin D, Lecaj T, Foxe J, Molholm S. 27- & 40-Hz Auditory Entrainment Delay in Children with Autism Spectrum Disorder. Poster Presentation at: Intellectual and Developmental Disabilities Research Center (IDDR) Annual Leadership Meeting; 2024, October 10. Madison, WI. October 2024
- Darrell M**, Vanneau T, Cregin D, Lecaj T, Foxe J, Molholm S. 27- & 40-Hz Auditory Entrainment Delay in Children with Autism Spectrum Disorder. Poster Presentation at: Society for Neuroscience; 2024, October 5-9. Chicago, IL. October 2024
- You M, Dyce C, Vazquez M, **Darrell M**, Etienne M. Analysis of Disparities in Racial and Ethnic Diversity in the Pipeline to Neurology Fellowships from 2012-2022. Poster Presentation at: Annual Meeting of the American Neurological Association; 2024, September 14-17. Orlando, FL. September 2024
- Chao J, Parker-Fong K, Wang B, **Darrell M**, Horan D, Kahn M, Horn W. Comparison of 1-year mortality and in-hospital ambulation rates in English and Spanish speaking geriatric patients after hip fracture surgery. Poster Presentation at: American Orthopedic Association; 2024, June 18-22. St Louis, MO. June 2024

Olivera J, Hashmi M, <b>Darrell M</b> , Faith I, Colon S, Sapin A, Chopra A. Hypercoagulability in Obesity: Factor VIII Levels Improve after Weight Loss induced by Laparoscopic Sleeve Gastrectomy. Poster Presentation at: American Society for Metabolic and Bariatric Surgery.; 2024, June 11. San Diego, CA.	June 2024
Rao D, Brabant P, Chau I, <b>Darrell M</b> , Yao C, Roth M, Pandit M, Gary M, Etienne M. Racial Disparities Among Triple Negative Breast Cancer Clinical Trials Enrollees Between 2010 - 2023. Poster Presentation at: American Society of Clinical Oncology (ASCO); 2024, June 4. Chicago, IL.	June 2024
Olivera J, Ramesh R, Williams D, <b>Darrell M</b> , Pura-Bryant J, Hashmi M, John D, Forest S, Bush E, Kilic A, Etienne M. Disparities in Cardiothoracic Transplantation: A Metanalysis of Participant Demographics in US-Based Heart Transplant Clinical Trials. Poster Presentation at: Annual Meeting of the Society of Thoracic Surgeons; 2024, April 27-30. Toronto, Canada.	April 2024
Steinhart A, Vazquez M, <b>Darrell M</b> , Murray K, Etienne M. An Analysis of the Inverted Gender-Gap from OBGYN resident to OBGYN Department Chair. Poster Presentation at: 2024 Diversity in Medicine Conference; 2024, April 27. Ann Arbor, MI.	April 2024
Katz M, Barone N, Vazquez M, <b>Darrell M</b> , Etienne M. Gender Equity in Cardiac Subspecialty Fellowships, 2012-2022. Poster Presentation at: American College of Cardiology; 2024, April 6-8. Atlanta, GA.	April 2024
<b>Darrell M</b> , Williams D, Faasumalie P, Etienne M. Gender Disparities in Graduate Medical Education from 2012 to 2022: Patching the Holes in the Pipeline to Academic Medicine Leadership. Poster Presentation at: Einstein IMPACT Day; 2024, March 21. Bronx, NY.	March 2024
Peraza C, Ogarro M, <b>Darrell M</b> , Agrawal S, Lartigue S, Etienne M. Dissecting Diversity Trends Amongst General Surgery Residents. Poster Presentation at: BNGAP National Pre-Faculty Career Development Conference; 2023 October 14. New York, New York.	October 2023
Rakolle K, <b>Darrell M</b> , Etienne M. From Resident to Chair: Gender Disparities in Child Neurology Pipeline. Poster Presentation at: American Neurological Association; 2023 September 9-12. Philadelphia, PA.	September 2023
<b>Darrell M</b> , Chin A, Kim H. Peripheral Transcriptomic Analysis to Identify Key Differences in Juvenile Dermatomyositis (JDM) and Myositis-Specific Autoantibody (MSA) Groups. Poster Presentation at: Rheumatism Society of DC Fellows Forum. 2022 May 20. Washington, DC.	May 2022
<b>Darrell M</b> , Sheppard K, Kumar V. Using a deep learning neural network to analyze mouse gait and levels of social interaction. Oral Presentation at: Annual Biomedical Research Conference for Minority Students; 2019 Nov 13-16. Anaheim, CA.	November 2019

## COMMUNITY SERVICE

<b>Mount Eden Children's Academy Afterschool Program (Bronx, NY)</b> <i>Bronx Soccer &amp; Science Program, Founder &amp; Volunteer Coach</i>	August 2023 – Present
<ul style="list-style-type: none"> <li>Founded an afterschool program for children (grades K-5) to participate in structured sports and science experiments</li> <li>Formed collaboration with the Cognitive Neurophysiology Laboratory to involve students in scientific research</li> </ul>	
<b>NICU Development (Bronx, NY)</b> <i>NICU Cuddling Volunteer</i>	March 2023 – Present
<ul style="list-style-type: none"> <li>Worked directly with infants in the NICU to provide human contact essential for sensory development</li> </ul>	
<b>Project Sunshine (Washington, DC)</b> <i>Washington, DC Chapter Leader</i>	August 2021 – May 2022
<ul style="list-style-type: none"> <li>Organized Teleplay sessions for pediatric patients, providing clinical service in a safe, virtual setting</li> <li>Managed a large group of clinical volunteers, which includes volunteer on-boarding and leading practice sessions</li> </ul>	

## TEACHING & MENTORSHIP

<b>Polygence (Menlo Park, CA)</b> <i>High School Research Mentor</i>	September 2023 – Present
<ul style="list-style-type: none"> <li>Worked directly with high school students to facilitate and develop independent research projects as pre-college experience</li> </ul>	
<b>Albert Einstein Anatomy &amp; Physiology (Bronx, NY)</b> <i>Chief Peer Assistant</i> <i>Peer Assistant</i>	July 2024 – Present May 2023 – July 2024
<ul style="list-style-type: none"> <li>Collaborated with course directors to develop and lead tutoring sessions for Medical Anatomy &amp; Physiology</li> <li>Directed and facilitated weekly small-group sessions to tutor first-year MSTP and MD students</li> </ul>	
<b>Albert Einstein Anatomy &amp; Physiology (Bronx, NY)</b> <i>Teaching and Laboratory Assistant</i>	November 2022 – Present
<ul style="list-style-type: none"> <li>Collaborated with curriculum directors to teach anatomy to first-year medical students in human cadaver laboratories</li> </ul>	

**Prince George County Biomedical Mentorship Program (Washington, DC)***October 2020 – May 2022**Biomedical Mentor*

- Mentored two high school students pursuing a career in STEM; planned group sessions for college application advising

**Wheaton College Varsity Women's Soccer (Norton, MA)***December 2018 – May 2020**Team Peer Advisor*

- Mentored and academically advised teammates through tutoring sessions and management of class schedules

**YMCA Reach and Rise Program (Attleboro, MA)***November 2019 – April 2020**Youth Mentor*

- Served as a mentor to children within 5<sup>th</sup> – 8<sup>th</sup> grade in a therapeutic afterschool program that supports students suffering from PTSD and trauma related to adverse childhood experiences

**Elizabeth Amen Nursery School (Norton, MA)***January 2018 – March 2020**Teaching Assistant*

- Worked as a personal aide to a child with behavioral challenges, monitoring safety and increasing his interpersonal skills
- Interacted with and taught students, while also monitoring safety and maintaining order in a 4-5 year old classroom

**Wheaton College Chemistry Department (Norton, MA)***August 2018 – January 2020**General Chemistry and Organic Chemistry Laboratory Assistant*

- Collaborated with both general chemistry and organic chemistry professors to teach students laboratory techniques
- Managed set-up and clean-up, in addition to training students in the completion of laboratory tasks and benchwork

**Wheaton Tutor Outreach Program (Norton, MA)***August 2017 – January 2018**Yelle Elementary School Tutor*

- Assisted 4<sup>th</sup> and 5<sup>th</sup> graders in an afterschool program to complete homework assignments

**LEADERSHIP EXPERIENCE****MSTP Social Media & Outreach (Albert Einstein COM)***November 2022 – Present**Director*

- Coordinated official Instagram, Twitter, and TikTok accounts for the MSTP program at Albert Einstein

**Artificial Intelligence in Medicine Club (Albert Einstein COM)***January 2023 – Present**Executive Board – Vice President of Programming*

- Responsible for organizing speaker panels and leading coding workshops for students and faculty

**MSTP Recruitment Chair (Albert Einstein COM)***Senior Recruitment Chair**March 2024 – April 2025**Junior Recruitment Chair**March 2023 – March 2024*

- Organized and led recruitment events for prospective students, including interview panels and welcome events

**Orthopedic Surgery Interest Group (Albert Einstein COM)***May 2023 – May 2024**Executive Board – Research Coordinator*

- Collaborated with Montefiore faculty to identify academic opportunities and research mentorship to current medical students

**Pediatrics Interest Group (Albert Einstein COM)***January 2023 – March 2024**Executive Board – Jacobi Kids Coordinator*

- Led outreach events for pediatric patients at Jacobi Hospital, including founding a weekly socialization and play program

**NCAA Student-Athlete Advisory Committee (Wheaton College)***February 2019 – May 2020**Wheaton Athletic Mentor Executive Board*

- Organized, served at, and fundraised for community events, in addition to serving as marketing and social media coordinator

**Wheaton College Athletics (Wheaton College)***May 2019**Lyons Leadership Academy*

- Represented women's soccer at a week-long leadership academy, which included group collaboration activities to enhance peer leadership and interpersonal skills

**WORK EXPERIENCE****Falk Recreation Center (Bronx, NY)***September 2022 – Present**Intramural Assistant*

- Responsible for greeting and check-in at the front desk, in addition to management of weekly intramural sports

**Winged Foot Golf Club (Mamaroneck, NY)***May 2024 – August 2024**Server*

- Delivered exceptional customer service to high-profile members and guests by efficiently managing high-pressure environments, demonstrating strong multitasking abilities, and ensuring meticulous attention to detail

**Summer House Santa Monica (Bethesda, MD)***September 2021 – April 2022**Server*

- Served at a modern California-inspired restaurant, where I worked directly with guests to ensure a positive dining experience

**Lucky Lou's Bar and Grille (Wethersfield, CT)***May 2020 – August 2020**Server and Bartender*

- Served 40-50 hours per week; developed conflict resolution and interpersonal skills, enforced COVID-19 protocol

**Wheaton College Admissions Ambassador (Norton, MA)***January 2018 – January 2020**Tour Guide and Information Session Panelist*

- Provided informational sessions and tours to prospective students

**AWARDS AND ACCOLADES**

---

Award of Excellence in Medical Education

*Einstein IMPact Day 2024*

Richard and Virginia Thornburgh Leadership Award

*2020*

Wheaton College May Fellows Honor Program

*Fall 2017 – Spring 2020*

Dean's List

*Fall 2017 – Spring 2020*

Candace Whiffen Dyal '76 Endowed Scholarship

*2018, 2019*

NEWMAC Academic All-Conference

*2018, 2019*

Charles A. Dana Scholarship

*2018*

Award for Excellence in Hispanic Studies

*2018***GRANTS AND FELLOWSHIPS**

---

**Wheaton College**

Trustee Merit Scholarship

*2017 – 2020*

Porter Fellowship Fund

*2019*

Wagner Professional Development Funding

*2019***National Institute of Neurological Diseases and Stroke**

Summer Research Experience in Neurobiology (Federal grant #2R25NS078795-06A1)

*2019***RELEVANT SKILLS**

---

- Techniques:** Machine learning, high-performance computing, bulk and single cell RNA sequencing analysis, biostatistics, PBMC isolation, RNA isolation, mouse handling (restraint, sex determination, tail tip, ear notch, and CO<sub>2</sub> euthanasia), social media marketing, graphic design and fundraising
- Applications:** Microsoft, RStudio, Python, C++, Adobe Photoshop, GIMP
- Foreign Languages:** Conversational Spanish proficiency

**REFERENCES**

---

**Sophie Molholm, PhD***Professor & Director of Rose F. Kennedy Intellectual and Developmental Disabilities Research Center*

Department of Neuroscience | Albert Einstein College of Medicine, Bronx, NY

Email: [sophie.molholm@einsteinmed.edu](mailto:sophie.molholm@einsteinmed.edu)**Hanna Kim, MD, MS***Assistant Clinical Investigator*

Juvenile Myositis Therapeutic and Translational Studies Unit | NIAMS, Bethesda, MD

Email: [hanna.kim@nih.gov](mailto:hanna.kim@nih.gov)**Vivek Kumar, PhD***Assistant Professor*

Genomics, Behavior and Addiction Research | The Jackson Laboratory, Bar Harbor, ME

Email: [kumar.vivek@jax.org](mailto:kumar.vivek@jax.org)**Mark LeBlanc, PhD***Professor & Department Chair*

Department of Computer Science | Wheaton College, Norton, MA

Email: [leblanc\\_mark@wheatoncollege.edu](mailto:leblanc_mark@wheatoncollege.edu)**Michael Kahn, PhD***Professor & Department Chair*

Department of Mathematics | Wheaton College, Norton, MA

Email: [kahn\\_michael@wheatoncollege.edu](mailto:kahn_michael@wheatoncollege.edu)

## **A. SIGNIFICANCE**

Autism spectrum disorder (ASD) is a neurodevelopmental condition characterized by social impairments and restricted, repetitive behaviors [1] that arises from altered brain development [2, 3]. Despite sharing a single diagnosis, the heterogeneity of behavior, sensory processing [4], genetics [5, 6], and underlying neural mechanisms [7] in autism contributes to a wide range of poorly understood sub-clinical phenotypes [8, 9]. Advancing our understanding of this heterogeneity requires integration of neurophysiological and behavioral measures to quantify the diverse patterns of brain activity underlying ASD.

A promising avenue for capturing this neural variability lies in the study of neuro-oscillatory activity. Neuro-oscillatory activity—which reflects synchronized neural activity within and between cortical regions [10]—is ubiquitously reported to be atypical in ASD [11-13], offering a potential assay of disrupted information processing and connectivity [14]. However, findings are often difficult to compare across studies due to variability in methods, participant characteristics, and task. To address these challenges, we have collected a comprehensive battery probing diverse cognitive, sensory, and motor domains within a single well-characterized cohort—an approach well-suited to capturing the spectrum of neuro-oscillatory function in ASD.

The standardized collection of quantitative neuro-oscillatory markers spanning multiple cognitive and sensory modalities offers an invaluable opportunity to examine how neural activity relates to clinical phenotype at the individual-level—thus addressing a longstanding challenge in characterizing heterogeneity in autism and linking this to possible biological mechanism. Previous works are typically limited to between-group comparisons, which risk oversimplification of subtle neurophysiological differences that may underly phenotypic variation within autism. Critically, such variability likely reflects differing neurobiological mechanisms that may respond differently to treatment. To address these limitations, we propose application of novel machine learning approaches, which enables a) rigorous evaluation of the strength of neural biomarkers associated with ASD and b) identification of meaningful subgroups within ASD to begin disentangling heterogeneity. While cluster-based identification of ASD subgroups has been attempted, prior efforts have largely relied on functional Magnetic Resonance Imaging (fMRI), which lacks temporal resolution and typically focuses on resting-state activity or a single sensory domain (see [15] for review)—failing to capture the full extent of neural dysfunction likely present in autism.

This project, therefore, is designed to **significantly improve our understanding of the atypical neural measures commonly reported in ASD through electroencephalography (EEG)**—a robust direct measure of neural activity. We assume there is variability in the clinical and behavioral profiles of individuals with autism and that a single deficit model will be inadequate. Therefore, deployment of cluster-based machine learning algorithms will allow us to elucidate **how impaired brain mechanisms in ASD fundamentally relate to continuous clinical measures of autism severity, both at the individual- and subgroup-level**. Moreover, our clinical cohort includes unaffected siblings of individuals with ASD, which allows us to investigate whether observed neural markers reflect heritable mechanisms contributing to ASD risk, or whether they instead represent consequences of overt disease expression [16]—thereby addressing a critical challenge in the search for mechanistic neural biomarkers in autism [17]. Importantly, neurophysiological markers of autism (and subgroups) identified in this work may serve as quantitative indicators of treatment efficacy and support the development of more personalized diagnostic and therapeutic interventions [18, 19].

## **B. APPROACH**

### **B.1 METHODS**

**B.1.1. Project Overview.** We have curated a rich clinical dataset comprising high-density EEG data from 136 individuals and eight paradigms, alongside rigorous clinical assessments. This data provides a rare opportunity to evaluate neuro-oscillatory activity across diverse stimulus and task modalities within a single well-characterized cohort.

**B.1.2. Research Design.** Selected paradigms were chosen to probe neural activity that i) span cognitive, motor and sensory domains (see **Fig. 1**) and ii) are potentially relevant to autism. Each paradigm targets distinct neural processes likely implicated in ASD pathology, which we evaluate here in a standardized manner.

**B.1.2.1 Auditory Steady State Response (ASSR).** ASSR—which elicits a sinusoidal frequency-following response in the primary auditory cortex—provides a non-invasive measure of neural oscillatory function. Here, we evoke ASSR by periodic auditory stimulation in the beta (27-Hz) and gamma-frequency range (40-Hz), which is thought to probe intact synchronization of GABAergic interneurons [20] and offers insight into potential excitatory-inhibitory (E/I) imbalance in ASD [21-26]. Previous ASSR studies demonstrate an ASD-specific reduction in evoked gamma power and inter-trial coherence (ITC) [27-31], although findings are conflicting. Analyses will evaluate gamma-band activity and the broad-band evoked response.

**B.1.2.2 Illusory Contours (IC).** Kanizsa IC stimuli invoke increased gamma-band activity compared to control stimuli, reflecting synchronized activity that underlies automatic binding of visual contours [32]. Kanizsa IC stimuli offer a powerful means of probing local versus global visual processing, which is ubiquitously shown to be atypical in individuals with ASD [33, 34]. Here, we passively present both IC and control stimuli [35] to test the integrity of gamma-band activity in ASD.

**B.1.2.3 Face Processing.** Social impairment—a core diagnostic feature of ASD—is likely linked to atypical face processing [36, 37], which has been reported by multiple behavioral, eye-tracking, and neuroimaging studies (see [38] for review; [39-43]). We present a mix of social (faces) and non-social (objects) stimuli to assay alpha and theta function—neural oscillatory measures associated with altered face processing in autism [44, 45].

**B.1.2.4 Inter-sensory Attention.** Alpha-band activity is increased to suppress the processing of task-irrelevant visual information, a process shown to be atypical in individuals with ASD [13]. We deploy a cued-target S1-S2 cross-sensory attention task in which participants are required to attend to a target in either the visual or auditory modality. This assay is designed to evaluate alpha oscillatory activity as a measure of attentional suppression—particularly relevant given the widespread attentional difficulties observed in autism [46-48].

**B.1.2.5 Audio-visual Speeded Reaction Time (AVSRT).** In this simple reaction time task participants respond as quickly as possible to the presentation of visual, auditory, and audio-visual stimuli. This allows for evaluation of multisensory integration at the behavioral level and its association with cortical oscillatory activity [49]. This approach is motivated by consistent evidence that individuals with autism exhibit alterations in early sensory processing [50], as well as impaired multisensory performance and electrophysiological responses [51].

**B.1.2.6 Motor Processing (Treadmill Walking).** Atypical gait and other motor abnormalities are commonly reported in ASD [52, 53]. Here, we use treadmill walking to assess oscillatory activity during motor behavior, particularly focusing on alpha and beta synchronization, which has been shown to increase in the motor and posterior parietal cortices with rising gait demands [54].

**B.1.2.7 Go-NoGo Cognitive Control (Single & Dual-Task).** We employ a classic Go-NoGo task, which requires cognitive control to inhibit a prepotent response. This enables interrogation of theta function—a neural marker of cognitive control shown to be reduced in ASD [55, 56]—across single-task, motor dual-task (walking), and cognitive dual-task (visual optic flow distractor) conditions.

**B.1.2.8 Rest.** Resting state (RS) data—which is collected in the absence of a task—offers a powerful assay of neural oscillatory function across all frequency bands [57] that is both i) clinically relevant and ii) easily translatable to animal work. Spectral analysis of alpha- and gamma-activity during RS has revealed significant correlation with measures of autistic traits and language function in ASD, respectively [58, 59]. Moreover, RS alpha- and theta-activity offer measures of cognitive control, as measured in TD adults [60].

**B.1.3. Participants.** This large, heterogeneous sample includes autistic children (n=66), and age-, sex- and IQ-matched typically developing peers (n=41) and unaffected siblings of individuals with ASD (n=29), drawn from the Bronx—a highly diverse and historically underrepresented population in biomedical research. Participants are age-restricted (8-12 years) to minimize developmental confounds.

**Diagnostic categorization:** To be included in the ASD group, diagnosis was confirmed on the basis of: (1) *Autism Diagnostic Observation Schedule, 2<sup>nd</sup> edition (ADOS-2; [61, 62])*; (2) Diagnostic Criteria for Autistic Disorder from the DSM-5; (3) Clinical impression of experienced licensed psychologist.

**Autism severity/autistic traits:** Scores from the ADOS-2 can be used to determine calibrated severity scores (CSS) [63, 64]. The *Social-Responsiveness Scale, 2<sup>nd</sup> Edition (SRS-2; [65])*—which was collected for all participants, irrespective of group—will be used as continuous measures of autistic traits.

**Cognitive function:** Cognitive function was assessed by *WASI-II Intelligence Quotient (IQ; [66])*.

**Attention function:** Continuous measures of attention were obtained from *Conners' Continuous Performance Test, 3<sup>rd</sup> edition (CPT-3; [67])*, which is a computerized test to evaluate attention in individuals >8 years old.

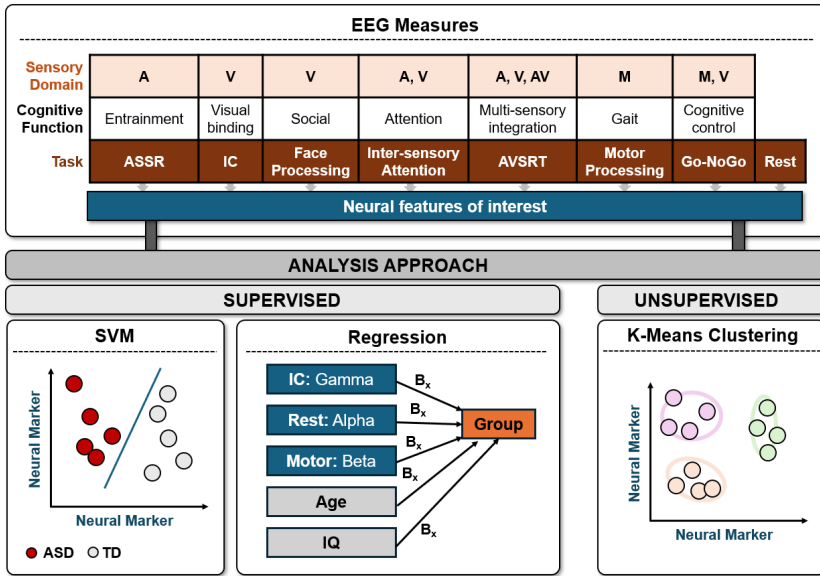
**Exclusion criteria:** Uncorrected vision; genetic syndromes. TD participants may not have a first degree relative with ASD or language impairment, or a history of special education services.

**B.1.4 EEG Acquisition.** EEG recordings were made using a Biosemi 70-channel electrode system. Artifact rejection is performed by visual inspection of EEG waveforms, automated rejection of trials with EEG amplitude exceeding a preset threshold, and ICA capture of artifactual activity including eye movements. We have collected sufficient data to yield a minimum of 100 accepted trials per condition, for a high signal-to-noise ratio.

**B.1.5. Analysis and Potential Outcomes.** Preliminary analyses to identify group-level neural differences in each paradigm will be done using traditional statistical methods. Linear mixed-effects modeling (LMM) will be deployed to investigate the effects of our independent measures [68, 69]. Standard approaches to selection of



electrode sites, latencies and amplitude values, based on literature and confirmatory inspection of data, are applied.



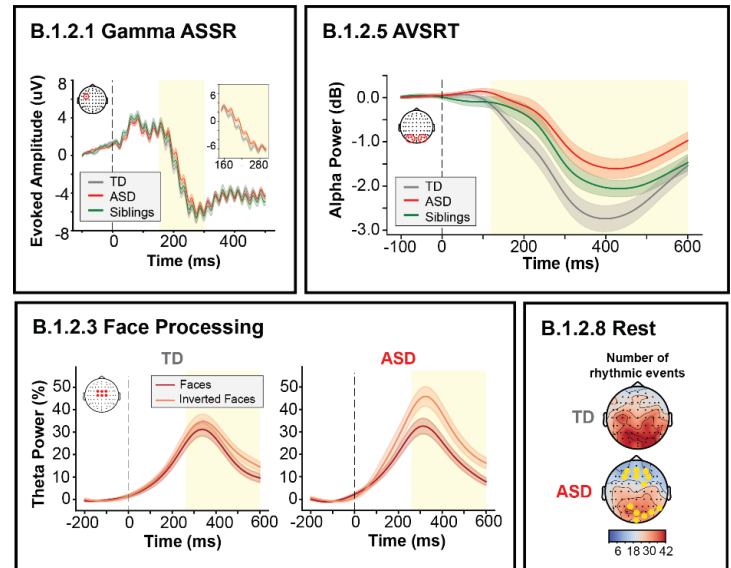
**Fig. 1. Schematic of approach.** A: auditory; V: visual; AV: audiovisual; M: motor; ASD: autism spectrum disorder; TD: typically-developing

SRS-2), with covariates of age, sex, and IQ.

We will also implement a complementary unsupervised approach (k-means clustering with elbow method; [71]) to identify data-driven sub-groups based on neural features. Clusters will be compared on continuous measures of behavior and ASD symptom severity to assess how neural profiles relate to variations in clinical presentation. Importantly, inclusion of multiple tasks spanning diverse sensory and cognitive domains allows us to examine how neural signatures map onto distinct clinical features (i.e. neural markers of heightened sensory processing may be associated with greater sensory arousal symptoms). We also plan to include exploratory, non-task-specific measures (e.g. broadband EEG signals) to assess whether machine learning algorithms can uncover subtle neurophysiological patterns that may be overlooked by these analytical approaches.

## B.2 PRELIMINARY DATA

**Fig. 2** highlights preliminary group-level differences ( $p < 0.05$ ) in neural markers between ASD and TD individuals across selected paradigms, using traditional between-group analyses. Key findings include significantly reduced ERP amplitude in ASD during evoked response to click trains (**B.1.2.1**), increased theta power to inverted faces (**B.1.2.3**), reduced parieto-occipital alpha desynchronization during multisensory integration (**B.1.2.5**), and fewer rhythmic alpha events during resting state (**B.1.2.8**)—each suggesting atypical sensory and cognitive processing in ASD. These case examples represent just a subset of the neural measures that will be included in machine learning models—alongside those detailed in the methodology above—to test association with the clinical phenotype at the individual- and subgroup-level.



**Fig. 2.** Preliminary case examples of neural markers that significantly differ between ASD and TD ( $p < 0.05$ ) at the group-level (highlighted in yellow). **B.1.2.1. ASSR.** Fronto-central evoked response to 40-Hz auditory click trains (gamma ASSR), highlighting a significantly reduced amplitude in ASD (vs. TD) at 180-250 ms. **B.1.2.3 Face Processing.** Fronto-central theta power (%-compared to fixation baseline) in response to faces (red) and inverted faces (orange) during face processing task, highlighting a significant ASD-only increase in theta power to inverted faces. **B.1.2.5 AVSRT.** Parieto-occipital alpha desynchronization (dB) in response to multi-sensory audiovisual stimuli. Significantly reduced alpha desynchronization in ASD (vs. TD) at ~150 ms post-stimulus onset highlighted in yellow. **B.1.2.8 Rest.** Topographical maps of the number of rhythmic alpha (7-13 Hz) events during eyes-closed resting-state, as calculated by eBOSC. Electrode clusters demonstrating significant reduction in the number of rhythmic events in the ASD group (vs. TD) are highlighted in yellow.



1. Association, A.P., *Diagnostic and statistical manual of mental disorders*. 5 ed. 2013.
2. Courchesne, E., *Brain development in autism: early overgrowth followed by premature arrest of growth*. Ment Retard Dev Disabil Res Rev, 2004. **10**(2): p. 106-11.
3. Lord, C., et al., *Autism spectrum disorder*. Lancet, 2018. **392**(10146): p. 508-520.
4. Lane, A.E., et al., *Sensory processing subtypes in autism: association with adaptive behavior*. J Autism Dev Disord, 2010. **40**(1): p. 112-22.
5. Jeste, S.S. and D.H. Geschwind, *Disentangling the heterogeneity of autism spectrum disorder through genetic findings*. Nat Rev Neurol, 2014. **10**(2): p. 74-81.
6. Willsey, A.J. and M.W. State, *Autism spectrum disorders: from genes to neurobiology*. Curr Opin Neurobiol, 2015. **30**: p. 92-9.
7. Salmond, C.H., et al., *Heterogeneity in the patterns of neural abnormality in autistic spectrum disorders: evidence from ERP and MRI*. Cortex, 2007. **43**(6): p. 686-99.
8. Masi, A., et al., *An Overview of Autism Spectrum Disorder, Heterogeneity and Treatment Options*. Neurosci Bull, 2017. **33**(2): p. 183-193.
9. Mottron, L. and D. Bzdok, *Autism spectrum heterogeneity: fact or artifact?* Mol Psychiatry, 2020. **25**(12): p. 3178-3185.
10. Lakatos, P., et al., *An oscillatory hierarchy controlling neuronal excitability and stimulus processing in the auditory cortex*. J Neurophysiol, 2005. **94**(3): p. 1904-11.
11. Beker, S., J.J. Foxe, and S. Molholm, *Oscillatory entrainment mechanisms and anticipatory predictive processes in children with autism spectrum disorder*. J Neurophysiol, 2021. **126**(5): p. 1783-1798.
12. Dickinson, A., et al., *Peak alpha frequency is a neural marker of cognitive function across the autism spectrum*. Eur J Neurosci, 2018. **47**(6): p. 643-651.
13. Murphy, J.W., et al., *Susceptibility to distraction in autism spectrum disorder: probing the integrity of oscillatory alpha-band suppression mechanisms*. Autism Res, 2014. **7**(4): p. 442-58.
14. Uhlhaas, P.J. and W. Singer, *Neuronal dynamics and neuropsychiatric disorders: toward a translational paradigm for dysfunctional large-scale networks*. Neuron, 2012. **75**(6): p. 963-80.
15. Liu, M., B. Li, and D. Hu, *Autism Spectrum Disorder Studies Using fMRI Data and Machine Learning: A Review*. Front Neurosci, 2021. **15**: p. 697870.
16. Pohl, A., et al., *Behavioral predictors of autism recurrence are genetically independent and influence social reciprocity: evidence that polygenic ASD risk is mediated by separable elements of developmental liability*. Transl Psychiatry, 2019. **9**(1): p. 202.
17. Frye, R.E., et al., *Emerging biomarkers in autism spectrum disorder: a systematic review*. Ann Transl Med, 2019. **7**(23): p. 792.
18. Kim, S.H., et al., *Examining the phenotypic heterogeneity of early autism spectrum disorder: subtypes and short-term outcomes*. J Child Psychol Psychiatry, 2016. **57**(1): p. 93-102.
19. Ousley, O. and T. Cermak, *Autism Spectrum Disorder: Defining Dimensions and Subgroups*. Curr Dev Disord Rep, 2014. **1**(1): p. 20-28.
20. Li, J., et al., *The Thalamocortical Mechanism Underlying the Generation and Regulation of the Auditory Steady-State Responses in Awake Mice*. J Neurosci, 2024. **44**(1).
21. Uzunova, G., S. Pallanti, and E. Hollander, *Excitatory/inhibitory imbalance in autism spectrum disorders: Implications for interventions and therapeutics*. World J Biol Psychiatry, 2016. **17**(3): p. 174-86.
22. Cellot, G. and E. Cherubini, *GABAergic signaling as therapeutic target for autism spectrum disorders*. Front Pediatr, 2014. **2**: p. 70.
23. Juarez, P. and V. Martinez Cerdeno, *Parvalbumin and parvalbumin chandelier interneurons in autism and other psychiatric disorders*. Front Psychiatry, 2022. **13**: p. 913550.
24. Yizhar, O., et al., *Neocortical excitation/inhibition balance in information processing and social dysfunction*. Nature, 2011. **477**(7363): p. 171-8.
25. Rojas, D.C., et al., *Decreased left perisylvian GABA concentration in children with autism and unaffected siblings*. Neuroimage, 2014. **86**: p. 28-34.
26. Saleh, M.G., et al., *GABA and glutamate measurements in temporal cortex of autistic children*. Autism Res, 2024. **17**(12): p. 2558-2571.
27. Arutiunian, V., et al., *Neuromagnetic 40 Hz Auditory Steady-State Response in the left auditory cortex is related to language comprehension in children with Autism Spectrum Disorder*. Prog Neuropsychopharmacol Biol Psychiatry, 2023. **122**: p. 110690.

28. Rojas, D.C., et al., *Reduced neural synchronization of gamma-band MEG oscillations in first-degree relatives of children with autism*. BMC Psychiatry, 2008. **8**: p. 66.
29. Seymour, R.A., et al., *Reduced auditory steady state responses in autism spectrum disorder*. Mol Autism, 2020. **11**(1): p. 56.
30. Stroganova, T.A., et al., *Left hemispheric deficit in the sustained neuromagnetic response to periodic click trains in children with ASD*. Mol Autism, 2020. **11**(1): p. 100.
31. Wilson, T.W., et al., *Children and adolescents with autism exhibit reduced MEG steady-state gamma responses*. Biol Psychiatry, 2007. **62**(3): p. 192-7.
32. Tallon-Baudry, C., et al., *Stimulus specificity of phase-locked and non-phase-locked 40 Hz visual responses in human*. J Neurosci, 1996. **16**(13): p. 4240-9.
33. Koldewyn, K., et al., *Global/local processing in autism: not a disability, but a disinclination*. J Autism Dev Disord, 2013. **43**(10): p. 2329-40.
34. Stroganova, T.A., et al., *High-frequency oscillatory response to illusory contour in typically developing boys and boys with autism spectrum disorders*. Cortex, 2012. **48**(6): p. 701-17.
35. Altschuler, T.S., et al., *The effort to close the gap: tracking the development of illusory contour processing from childhood to adulthood with high-density electrical mapping*. Neuroimage, 2014. **90**: p. 360-73.
36. Ammons, C.J., et al., *The Mid-Fusiform Sulcus in Autism Spectrum Disorder: Establishing a Novel Anatomical Landmark Related to Face Processing*. Autism Res, 2021. **14**(1): p. 53-64.
37. Kang, E., et al., *Atypicality of the N170 Event-Related Potential in Autism Spectrum Disorder: A Meta-analysis*. Biol Psychiatry Cogn Neurosci Neuroimaging, 2018. **3**(8): p. 657-666.
38. Chita-Tegmark, M., *Social attention in ASD: A review and meta-analysis of eye-tracking studies*. Res Dev Disabil, 2016. **48**: p. 79-93.
39. Schultz, R.T., et al., *The role of the fusiform face area in social cognition: implications for the pathobiology of autism*. Philos Trans R Soc Lond B Biol Sci, 2003. **358**(1430): p. 415-27.
40. van Kooten, I.A., et al., *Neurons in the fusiform gyrus are fewer and smaller in autism*. Brain, 2008. **131**(Pt 4): p. 987-99.
41. Dawson, G., et al., *Neural correlates of face and object recognition in young children with autism spectrum disorder, developmental delay, and typical development*. Child Dev, 2002. **73**(3): p. 700-17.
42. Webb, S.J., et al., *ERP evidence of atypical face processing in young children with autism*. J Autism Dev Disord, 2006. **36**(7): p. 881-90.
43. Webb, S.J., et al., *Developmental change in the ERP responses to familiar faces in toddlers with autism spectrum disorders versus typical development*. Child Dev, 2011. **82**(6): p. 1868-86.
44. Dawson, G., et al., *Early behavioral intervention is associated with normalized brain activity in young children with autism*. J Am Acad Child Adolesc Psychiatry, 2012. **51**(11): p. 1150-9.
45. Hendriks, M.H.A., et al., *Neural processing of facial identity and expression in adults with and without autism: A multi-method approach*. Neuroimage Clin, 2021. **29**: p. 102520.
46. Brookman-Frazee, L., et al., *Characterizing psychiatric comorbidity in children with autism spectrum disorder receiving publicly funded mental health services*. Autism, 2018. **22**(8): p. 938-952.
47. Joshi, G., et al., *Symptom Profile of ADHD in Youth With High-Functioning Autism Spectrum Disorder: A Comparative Study in Psychiatrically Referred Populations*. J Atten Disord, 2017. **21**(10): p. 846-855.
48. Lyall, K., et al., *The Changing Epidemiology of Autism Spectrum Disorders*. Annu Rev Public Health, 2017. **38**: p. 81-102.
49. Benedek, M., et al., *EEG alpha synchronization is related to top-down processing in convergent and divergent thinking*. Neuropsychologia, 2011. **49**(12): p. 3505-11.
50. Marco, E.J., et al., *Sensory processing in autism: a review of neurophysiologic findings*. Pediatr Res, 2011. **69**(5 Pt 2): p. 48R-54R.
51. Brandwein, A.B., et al., *The development of multisensory integration in high-functioning autism: high-density electrical mapping and psychophysical measures reveal impairments in the processing of audiovisual inputs*. Cereb Cortex, 2013. **23**(6): p. 1329-41.
52. Jequier Gyax, M., A.M. Maillard, and J. Favre, *Could Gait Biomechanics Become a Marker of Atypical Neuronal Circuitry in Human Development?-The Example of Autism Spectrum Disorder*. Front Bioeng Biotechnol, 2021. **9**: p. 624522.
53. Kindregan, D., L. Gallagher, and J. Gormley, *Gait deviations in children with autism spectrum disorders: a review*. Autism Res Treat, 2015. **2015**: p. 741480.

54. Malcolm, B.R., et al., *Cognitive load reduces the effects of optic flow on gait and electrocortical dynamics during treadmill walking*. J Neurophysiol, 2018. **120**(5): p. 2246-2259.
55. Buzzell, G.A., et al., *Atypical Mediofrontal Theta Oscillations Underlying Cognitive Control in Kindergartners With Autism Spectrum Disorder*. Biol Psychiatry Cogn Neurosci Neuroimaging, 2022. **7**(6): p. 566-575.
56. You, Y., et al., *MEG Theta during Lexico-Semantic and Executive Processing Is Altered in High-Functioning Adolescents with Autism*. Cereb Cortex, 2021. **31**(2): p. 1116-1130.
57. Wilkinson, C.L. and C.A. Nelson, *Increased aperiodic gamma power in young boys with Fragile X Syndrome is associated with better language ability*. Mol Autism, 2021. **12**(1): p. 17.
58. Cohenour, T., et al., *Patterns of spontaneous neural activity associated with social communication abilities among infants and toddlers showing signs of autism*. Eur J Neurosci, 2024. **60**(1): p. 3597-3613.
59. Wilkinson, C.L., et al., *Reduced frontal gamma power at 24 months is associated with better expressive language in toddlers at risk for autism*. Autism Res, 2019. **12**(8): p. 1211-1224.
60. Clements, G.M., et al., *Spontaneous Alpha and Theta Oscillations Are Related to Complementary Aspects of Cognitive Control in Younger and Older Adults*. Front Hum Neurosci, 2021. **15**: p. 621620.
61. Lord, C., et al., *The autism diagnostic observation schedule-generic: a standard measure of social and communication deficits associated with the spectrum of autism*. J Autism Dev Disord, 2000. **30**(3): p. 205-23.
62. Lord, C., et al., *Autism diagnostic observation schedule: a standardized observation of communicative and social behavior*. J Autism Dev Disord, 1989. **19**(2): p. 185-212.
63. Gotham, K., A. Pickles, and C. Lord, *Standardizing ADOS scores for a measure of severity in autism spectrum disorders*. J Autism Dev Disord, 2009. **39**(5): p. 693-705.
64. Shumway, S., et al., *The ADOS calibrated severity score: relationship to phenotypic variables and stability over time*. Autism Res, 2012. **5**(4): p. 267-76.
65. Constantino, J.N., & Gruber, C. P., *Social responsiveness scale: SRS-2*, ed. W.P. Services, Los Angeles, CA, 2012.
66. Wechsler, D., *Wechsler Abbreviated Scale of Intelligence, Second Edition*. Pearson Assessments, 2011.
67. Conners, C.K., *Conners third edition (Conners 3)*. Los Angeles, CA: Western Psychological Services, 2008.
68. Payne, B.R., C.L. Lee, and K.D. Federmeier, *Revisiting the incremental effects of context on word processing: Evidence from single-word event-related brain potentials*. Psychophysiology, 2015. **52**(11): p. 1456-69.
69. Tremblay, A. and A.J. Newman, *Modeling nonlinear relationships in ERP data using mixed-effects regression with R examples*. Psychophysiology, 2015. **52**(1): p. 124-39.
70. Cortes C., V.V., *Support-vector networks*. Mach Learn, 1995. **20**: p. 273-297.
71. Steinley, D., *K-means clustering: a half-century synthesis*. Br J Math Stat Psychol, 2006. **59**(Pt 1): p. 1-34.

**DESCRIBE THE DESIRED IMPACT YOUR RESEARCH WILL MAKE ON THE FIELD AND SOCIETY, AND WHY THIS IS IMPORTANT TO YOU.**

Entering college, I was torn between studying neuroscience—captivated by the brain's unparalleled complexity—and bioinformatics, an innovative field that required logical rigor and creativity. As I delved deeper into research, I quickly realized the two disciplines exist not in competition, but in parallel—and that the most meaningful advances in healthcare would come from integrating them.

In my first research role, I helped develop a convolutional neural network to non-invasively measure naturalistic gait in neurological disease models, and was immediately captured by the ability of AI-driven tools to reveal profound insights into brain function and behavior. Eager to explore the power of bioinformatics to drive medical discovery, I've since applied novel AI methodologies to rigorously analyze data across a wide range of clinical domains—from identifying transcriptomic subtypes in a rare pediatric autoimmune condition at the NIH, to my most recent work, which has uncovered critical healthcare disparities in large clinical trials. These prior experiences have been the driving force behind my current research, as they reveal the immense potential of novel informatics approaches to extract meaningful insights from complex health data—insights that would remain hidden using traditional analyses.

Currently, my work centers on autism spectrum disorder (ASD)—a condition characterized by significant clinical and biological heterogeneity, which poses profound challenges for both diagnosis and treatment. In my proposal, we leverage a large, diverse dataset from children in the Bronx—a population historically excluded from research—that integrates rigorous clinical assessments and EEG from eight behavioral paradigms. Instead of relying on traditional analysis methods—which risk oversimplifying the complex neural and behavioral heterogeneity in ASD—we propose an innovative alternative: cluster-based identification of neural subgroups within ASD.

This methodology—applied to a uniquely rich clinical dataset—offers a rare and powerful opportunity to identify functional neural mechanisms that drive phenotypic variation in ASD, a challenge that has long hindered progress in the field. Above all, I am deeply motivated by the hope that this work moves us closer to personalized, effective care for individuals with autism—while demonstrating how data-driven methods can reveal insights into the brain's complexity.

## **DESCRIBE AN EXAMPLE OF YOUR LEADERSHIP EXPERIENCE.**

Leadership found me before I acquired the words to define it. As the eldest daughter in a home that buzzed with chaos and responsibility, I took on the role of mentor, teacher, mediator, confidante, and caretaker. I learned quickly that true leadership relied not on authority, but on consistency, confidence, and reliability. These early experiences laid the foundation for how I would lead in every chapter of my life.

The role of “big sister” followed me into my professional life, profoundly influencing my passion for teaching and mentorship. What began as early-morning math lessons with my brother at the kitchen table evolved into tutoring underserved youth and, now, educating young scientists and medical students. While the content has changed, the heart of mentorship remains the same, and I draw daily on the instincts and patience I first cultivated with my siblings.

I also came to understand early on that leadership is not a solo act. At home, I wasn’t leading alone; I was part of a family where cooperation and compromise were essential. That same interdependence drew me to team sports—soccer, basketball, softball—spaces that cultivate support, collaboration, and togetherness. Competing at national and collegiate levels taught me the quiet strength of reliability—showing up for teammates in both triumph and adversity. Whether comforting a younger sister through college homesickness or coaching an injured teammate from the sidelines, I learned that leadership often lives in small moments of solidarity. Recently, I founded a soccer-and-science afterschool program in the Bronx to offer children in my community access to those same lessons—discipline, confidence, and the value of teamwork. It’s a full-circle return to where my leadership journey began: not in a title or position, but in being present.

Truthfully, my earliest lessons in leadership were learned at home, which laid the groundwork for the collaborative, dependable leadership style I bring to my professional life today. As a physician-scientist in training, I carry these lessons with me—leading with care, competence, and the belief that small acts of support can transform someone’s life.