BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors. Follow this format for each person. **DO NOT EXCEED FIVE PAGES.**

NAME: Amy Margolis, Ph.D.

eRA COMMONS USER NAME (credential, e.g., agency login): margola

POSITION TITLE: Assistant Professor of Medical Psychology (in Psychiatry) at CUMC

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
University of California, Berkeley	BA	08/90	Biochemistry and Physical Anthropology
Teachers College, Columbia University	M.Ed.	05/99	Neuroscience and Education
Mount Sinai Medical Center, Department of Rehabilitation Medicine	Clinical Psychology Intern	9/98-9/99	Clinical Neuropsychology
Teachers College, Columbia University	Ph.D.	05/00	Applied Educational Psychology: School Psychology
Teachers College, Columbia University	Clinical Postdoctoral Fellow	05/00-05/01	Clinical Neuropsychology
Columbia University and The New York State Psychiatric Institute, New York, NY	Research Postdoctoral Fellow	07/10-06/13	T32 Research Fellowship in Translational Research in Child Psychiatry

A. Personal Statement

I have a longstanding interest in the assessment and treatment of children with neurodevelopmental disorders and learning problems. As director of a learning disability clinic, I spent 10 years assessing and treating children with neurodevelopmental disorders and training postdoctoral fellows to work with these children. During this time working as a clinician, I published a paper on the complexities of psychological testing in the digital age (Naglieri et al., 2004). This research experience led me to volunteer in a neuroimaging lab, work that culminated in a first-author data paper (Margolis et al., 2006), and in an infant development lab, work that culminated in a number of papers on mother-infant interaction at 4-months (e.g. Margolis et al., 2019). Ultimately, my overarching desire to use neuroimaging to improve the lives of children with neurodevelopmental disorders prompted my entrance into an NIMH-funded T32 fellowship program in translational research in child psychiatry at Columbia University Medical Center (CUMC). At the conclusion of my postdoctoral research training, I received foundation funding and a Gray Matters Award to conduct a neuroimaging study of children with Learning Disorders; this research and funding generated several papers (e.g. Margolis et al., 2017; 2018) helping to bridge my transition to Assistant Professor. At that time, I also began working as the Career Development Investigator for the Columbia Center for Children's Environmental Health, which also bridged this transition period. My passion for using MRI to understand the effects of exposure on brain development was borne out of these experiences.

Over the past six years, I have worked on a number of projects that use neuroimaging to assess the neural correlates of early-life exposure to neurotoxicants and the subsequent manifestation of neurodevelopmental problems in children and specifically learning disorders. I have served as PI or Co-Investigator on two neuroimaging studies nested within longitudinal birth cohorts conducted within the Columbia Center for Children's Environmental Health (CCCEH). First, I am PI for a study of the effects of prenatal exposure to tobacco smoke on fronto-striatal function and the manifestation of learning problems (NIEHS K23ES026239) that is conducted within the Sibling cohort. Second, I am Co-Investigator and serve as the neurodevelopment expert on a study using MRI to examine effects of *in utero* exposure to air pollution on developmental trajectories of brain structure and self-regulatory function in the Mothers and Newborns cohort (P50 ES009600). Last, I am Co-Investigator on a third federally funded grant (R01ES027424) studying the effects of bisphenol exposure on infant development in the Fair Start cohort. For this project I lead the infant cognitive assessments. In addition, I lead the neuroimaging effort on a new supplement to the grant assessing maternal brain function and postpartum depression.

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B. Research And Professional Experience

Employment
8/1990 – 6/1994	Tutor, Full-time, Brooklyn Learning Center. Supervisor: Nancy Curcio, PhD.
9/1996 – 9/1998	Teaching Assistant for Psychological Assessment Course, Part-time, Teachers College Columbia University, N.Y. Department Head: Steven T Peverly, Ph.D.
9/1995 – 6/1996	School Psychology Extern, Part-time, Bank Street School for Children, Supervisor: Bernice Berk, PhD.
9/1996-8/1997	Neuropsychology Extern, Part-time, Rusk Institute for Rehabilitation, Supervisor, Rose Lynn Sherr, PhD.
9/2001 – 6/2008	Adjunct Assistant Professor, Health and Behavior Studies, Teachers College, Columbia University, N.Y. Department Head: Steven T Peverly, Ph.D.
6/2001 – 6/2004	Neuropsychologist, Brooklyn Learning Center
7/2004 – 6/2010	Director of Neuropsychological Services, Brooklyn Learning Center, Brooklyn, N.Y.
8/2005 – 6/2010	Adjunct Assistant Professor, Part-time, Special Education, Bank Street College of Education, N.Y. Department Head: Andrea Spencer, PhD.
7/2013 - present	Assistant Professor of Medical Psychology (in Psychiatry), Full-time, Columbia University Medical Center. Division Chief: Jeremy Veenstra-VanderWeele, M.D.

Honors and Awards
6/1990	High Honors for Graduation, U.C. Berkeley
6/2000	Fellowship in Clinical Neuropsychology: Teacher's College
3/2002	APA Special Task Force: Psychological Testing on the Internet
6/2007	Invited Member: Higher Education Disability Support-Universal Design Principles Advisory
1/2008	Awarded $70,000 grant from the FAR Fund for treatment of NonVerbal Learning Disability.
7/2010	T32 Fellow in Translational Research, CUMC, Department of Psychiatry
10/2013	NIEHS Center For Environmental Health In Northern Manhattan, Pilot Project Grant
8/2015	MRI Unit Research Pilot Grant
9/2015	Junior Faculty Trainee for the Columbia Center for Children's Environmental Health
9/2015	Grey Matters Fellow, Columbia University Medical Center, Department of Psychiatry
1/2017	Associate Member, NIEHS Center for Environmental Health in Northern Manhattan
1/2017	Founding Member of the Board of Trustees, The Bridge School.
3/2018	Chairman's Pilot Award: Neural Correlates of Reading Disorder in Children from Low Socioeconomic Status.
3/2019	NIEHS Center For Environmental Health In Northern Manhattan, Pilot Project Grant
5/2019	Invited author of DSM5 Text Revision – Chapter on Learning Disorders
7/2019	Elected Co-Chair of the ECHO Neurodevelopment Working Group

Professional Societies
American Psychological Association
International Neuropsychological Society
National Academy of Neuropsychology

C. Contribution to Science

1. **Environmental Exposure and Neuroimaging.** My research has focused on using neuroimaging (MRI, EEG) to study associations between prenatal exposure to neurotoxicants and altered brain structure and function. Specifically we have thus far acquired MRI data from two cohorts of young children (age 5 and ages 7-9 years old). We have documented associations between prenatal exposure to neurotoxicants (flame retardants and environmental tobacco smoke) and neural circuits that support cognitive control and reading. Identifying this interim process in the developmental pathway for exposure to poor behavioral outcome will allow us to develop more targeted prevention and intervention policies.

   a. Margolis AE, Banker S, Pagliaccio D, De Water E, Curtin P, Bonilla A, Herbstman JB, Whyatt R, Bansal R, Sjödin A, Milham MP, Peterson BS, Factor-Litvak P, Horton MK. Functional Connectivity of the Reading Network is Associated with Prenatal Polybrominated Diphenyl Ether Concentrations in a Community Sample of 5 Year-Old Children: A preliminary study. Environment International. 2019. In press.
   b. De Water E, Curtin P, Zilverstand A, Sjödin A, Bonilla A, Herbstman JB, Ramirez J, Margolis AE, Bansal R, Whyatt RM, Peterson BS, Factor-Litvak P, Horton MK. A preliminary study on prenatal polybrominated diphenyl ether serum concentrations and intrinsic functional network organization and executive functioning in childhood. Journal of Child Psychology and Psychiatry. 2019. doi: 10.1111/jcpp.13040
   c. Margolis AE, Pagliaccio D, Banker S, Tomas L, Ramphal B, Herbstman J, Rauh V, Marsh R. Prenatal exposure to environmental tobacco smoke alters the structure and function of cognitive control circuits in childhood. Poster accepted at the 58th annual meeting of the American College of Neuropsychopharmacology, December 7-13, 2019, Orlando, Florida.

2. **Environmental Exposure and Neurodevelopment.** Environmental exposure to neurotoxicants poses significant risks to children's neurodevelopmental outcomes. In my work at the Columbia Center for Children's Environmental Health, I have been studying the behavioral and cognitive outcomes after exposure to various neurotoxicants including air pollution and neurotoxic metals. These exposures are associated with behavioral and cognitive disturbances in youth that can lead to poor psychosocial outcomes and mental health disturbance. Understanding the associated outcomes of these exposures will allow for enhanced public policy messaging and prevention programs to ensure children's safety from these exposures in the future.

   a. Margolis A, Herbstman JB, Thompson VK, Perera FP, Tang D, Peterson BS, Rauh, VA. Longitudinal Effects of Prenatal Exposure to Air Pollutants (Polycyclic Aromatic Hydrocarbons) on Self-Regulatory Capacities and Social Competence. Journal of Child Psychology and Psychiatry. 2016 Jul;57(7): 851-60. PubMed PMID: 26989990; PubMed Central PMCID: PMC5333974.
   b. Cowell WJ, Margolis A, Rauh VA, Sjödin A, Jones R, Wang Y, Garcia W, Perera F, Wang S, Herbstman JB. Associations between prenatal and childhood PBDE exposure and early adolescent visual, verbal and working memory. Environment International. 2018 Sep;118: 9-16. PubMed PMID: 29787900.
   c. Horton MK, Hsu, L, Claus Henn B, Margolis A, Austin C, Svensson K, Schnaas L, Gennings C, Hu H, Wright R, Téllez Rojo M, Arora M. Dentine biomarkers of prenatal and early childhood exposure to manganese, zinc and lead and childhood behavior. Environment International. 2018. 121 (1) 148-158.
   d. Pagliaccio D, Herbstman J, Perera F, Tang D, Goldsmith J, Peterson B, Rauh V, Margolis AE. Prenatal Exposure to Polycyclic Aromatic Hydrocarbons Modifies the Effects of Early Life Stress on Attention & Thought Problems in Late Childhood. JCPP. 07 January 2020 https://doi.org/10.1111/jcpp.13189

3. **Mother-Infant Face-To-Face Communication and Infant Social and Cognitive Development.** Mother-infant face-to-face communication is a discrete developmental line in human development and predicts various risk outcomes. I have collaborated with Dr. Beatrice Beebe since 2006. Our work uses measures of mother and infant interactive- and self-contingency in face-to-face communication to identify behavioral markers of developmental risk.

a. <u>Margolis AE</u>, Lee SH, Peterson BS, Beebe B. Profiles of Infants Communicative Behavior. Developmental Psychology. 2019. doi: 10.1037/dev0000745

b. Beebe, B., Messinger, D., Bahrick, L. E., <u>Margolis, A</u>., Buck, K. A., & Chen, H. (2016). A systems view of mother–infant face-to-face communication. Developmental Psychology, 52(4), 556–571.

c. Beebe B, Myers MM, Lee SH, Lange A, Ewing J, Rubinchik N, Andrews H, Austin J, Hane A, <u>Margolis AE</u>, Hofer M, Ludwig RJ, & Welch MG. (2018). Family Nurture Intervention For Preterm Infants Facilitates Positive Mother-Infant Face-to-Face Engagement at Four Months. 2018. Developmental Psychology. Nov;54(11):2016-2031. doi: 10.1037/dev0000557

d. Beebe B, Steele M, Jaffe J, Buck K, Chen H, Cohen P, Kaitz M, Markese S, Andrews H, <u>Margolis A</u>, Feldstein S. Maternal Anxiety Symptoms and Mother-Infant Self- and Interactive Contingency. 2011. Journal of Infant Mental Health, 32 (2), 174–206.

4. **Neuroimaging of Specific Learning Disability (SLD).** SLD is a common childhood disorder affecting up to 10 percent of children. Neuroimaging studies have focused on elucidating disruptions in neural circuits underlying academic achievement. My work has focused on mapping the neural correlates of psychological problems often associated with specific learning disorders, such as anxiety, social problems, and executive function problems, which have been largely understudied in educational research and which require targeted treatment. By identifying alterations in circuits other than the 'reading' or 'math' circuits that contribute to poor achievement, this work may point to novel targets for intervention. Further this work underscores the need for development of empirically validated, evidence-based treatments for the psychological problems that are inherent in learning disorders.

   a. <u>Margolis AE</u>, Pagliaccio D, Davis KS, Thomas L, Banker SM, Cyr M, Marsh R. Neural Correlates of Cognitive Control Deficits in Children with Reading Disorder. Brain Imaging and Behavior. 2019. Mar 28. doi: 10.1007.

   b. <u>Margolis AE</u>, Pagliaccio D, Thomas L, Banker S, Marsh R. Salience network connectivity and Social Processing in Children with Nonverbal Learning Disability or Autism Spectrum Disorder. Neuropsychology. 2019 Jan; 33(1): 135–143. PMCID: PMC6322976

   c. Davis K, <u>Margolis AE</u>*, Thomas, L, Huo, Z. Marsh R. Amygdala sub-regional functional connectivity predicts anxiety in children with reading disorder. Developmental Science. 2018. Sep; 21(5):e12631. PMCID: PMC6042207.

   d. Alexander L,…<u>Margolis AE</u>,…Milham M. An open resource for transdiagnostic research in pediatric mental health and learning disorders. Scientific Data, Nature Research. 2017 Dec 19;4:170-181. PMCID: PMC5735921.

5. **Neuroimaging and Cognitive Abilities.** Modern intelligence quotient (IQ) tests are based either on a general model of intelligence or on a multidimensional model of intelligence. Neuroimaging studies have focused on identifying the neural correlates of general intelligence ('g') with little attention paid to the neural correlates of dimensional aspects of intelligence. As evidenced by lesion studies, these dimensional aspects of intelligence describe specific cognitive abilities that are distinct from general intelligence. Many individuals with neurodevelopmental disorders demonstrate discrepancies between these specific cognitive abilities. Thus much of my work has focused on investigating the structural and functional brain correlates of discrepancies in cognitive abilities in healthy individuals so that we may better understand the neurobiological underpinnings of developmental psychopathologies that are characterized by these cognitive discrepancies.

   a. <u>Margolis A</u>, Bansal R, Xuejun H, Algermissen M, Erickson C, Khlar KW, Naglieri JA, Peterson BS. Using IQ discrepancy scores to examine the neural correlates of specific cognitive abilities. Journal of Neuroscience. 2013 Aug 28;33(35) 14135–14145. PubMed PMID: 23986248; PubMed PMCID: PMC3756758.

   b. <u>Margolis A</u>, Davis K. Pao L, Lewis, A. Wang, Tau G, Zhao G, Wang Z, Marsh R. Verbal-spatial IQ discrepancies impact brain activation associated with the resolution of cognitive conflict in children and adolescents. Developmental Science. 2018 Mar;21(2). PubMed PMID: 28198067; PubMed Central PMCID: PMC5557695.

   c. <u>Margolis A</u>, Bansal R, Peterson BS. Associations of white matter integrity and discrepancies between verbal and performance IQ. (2015). Poster presented at the 54th annual meeting of the American College of Neuropsychopharmacology, December 6-12, 2015, Hollywood, Florida.

Complete List of Published Work in My Bibliography:
http://www.ncbi.nlm.nih.gov/myncbi/browse/collection/48922203/?sort=date&direction=ascending

D. Research Support

Active Research Support

NIEHS   Margolis (PI)   9/30/2016 - 8/30/2021
K23ES026239
Effects Of Prenatal Exposure To Environmental Tobacco Smoke On Brain Function And Academic Skills
This Career Development Award uses fMRI to investigate the effects of prenatal exposure to environmental tobacco smoke on frontostriatal function and academic skills.
Role: Principal Investigator

NIH   Perera, Herbstman (Multi PIs)   9/21/2016-8/31/2023
1UG3OD023290
Identifying Newborns at Risk of Adverse Neurodevelopmental Outcomes and Obesity from Air Pollution, Environmental Influences on Child Health Outcomes (ECHO) Pediatric Cohorts
This study aims to validate a biomarker that is measurable in an easy-to-obtain, small-volume cord blood sample that reflects prenatal exposure to widespread environmental pollutants, polycyclic aromatic hydrocarbons (PAH), and is predictive of risk of adverse outcomes in the domains of obesity and neurodevelopment.
Role: Co-Investigator

NIEHS   Beebe, Herbstman (Multi PIs)   2/15/2018-1/31/2023
R01 ES027424
Prenatal endocrine-disrupting chemicals and social/cognitive risk in mothers and infants: Potential biologic pathways.
This study investigates whether increased prenatal exposure to bisphenols (BPs) predicts less optimal maternal care/mother-infant interaction and infant/toddler development, and whether BP exposure is associated with epigenetic changes in mother and infant genes shown to be impacted by prenatal BP exposure in rodents: estrogen receptor alpha (*ESR1*, implicated in maternal behavior) and brain-derived neurotrophic factor (*BDNF*, implicated in infant neural plasticity and cognition).
Role: Co-Investigator

NIEHS/EPA
P50 ES009600   (Perera/Peterson)   09/30/2015-06/30/2019
EPA 83615401   (Perera/Peterson)   09/01/2015-08/31/2019
The Columbia Center for Children's Environmental Health.
The overarching hypothesis of the proposed program of research, around which our three research projects are organized, is that prenatal and early childhood exposures to PAH disrupt development of the neural systems that support capacities for self-regulation, and that these PAH-related brain disturbances lead to the emergence or persistence of serious cognitive, emotional, behavioral, and adiposity problems during adolescence.
Role: Co-Investigator

NVLD Project   Margolis (PI)   1/01/2013-7/01/2020
Identifying Neurobiological Causes of Non-Verbal Learning Disorders
The Laura Lemle Family Foundation supports my ongoing investigation of the neurobiological causes of Non-Verbal Learning Disorders (NVLD).
Role: Principal Investigator

Completed Research Support
Northern Manhattan Center for Environmental Health   Margolis (PI)   4/01/2013-3/31/2016
P30ES009089, Pilot Project Award
*Effects Of Prenatal Exposure To Air Pollutants On Neurodevelopment And The Manifestation Of Learning Disorders*This pilot award funded learning and achievement assessments of 80 children from the Columbia Center for Children's Environmental Health cohort.