BIOGRAPHICAL SKETCH

NAME: Gilbert-Diamond, Diane

eRA COMMONS USER NAME: DIAMOND_D

POSITION TITLE: Associate Professor of Epidemiology

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
Dartmouth College, Hanover	AB	06/1998	Biology
Harvard T.H. Chan School of Public Health, Boston	ScD	05/2010	Nutritional Epidemiology
Geisel School of Medicine at Dartmouth, Hanover	Post-doc Training	02/2012	Bioinformatics, Genetic and Environmental Epidemiology

A. Personal Statement

I have a long-standing interest in preventing child obesity and have developed a vigorous collaborative research program to study how genetic factors interact with our current obesogenic environment to cause excess weight gain in children. I have a strong history of NIH-funded research and have served as principal investigator on R01 and R21 projects. Through these funded awards, I have developed a collaborative, multi-disciplinary research program that utilizes diverse methods to better understand risk factors for child obesity. For example, in a randomized trial of pre-adolescent children, my lab found that children with a common obesity-risk variant in the *FTO* gene had a greater response to food advertisements in terms of food consumption (Gilbert-Diamond, *Int J Obes.*) and brain response in dopaminergic reward regions of the brain (Rapuano, *PNAS*) compared to children with the low risk variant. In close collaboration with Dr. Emond (multi-PI on this proposal), I have further researched the effect of environmental food cues on preschool children using both observational and experimental research methods. In one study of 60 preschool children, we demonstrated that food advertisement exposure leads to excess consumption (Emond, *Pediatrics*). The fMRI-based physiological markers of food-cue-reactivity that I utilize in my research with older participants are not appropriate for very young children, because they are unable to tolerate the loud noises and small confines of the MRI machine. To address that limitation, our lab has developed a robust eye-tracking methodology for use in young children to measure attentional bias to food cues, a proxy for food-cue-reactivity. Dr. Brand (co-I) Dr. Emond, and I have collaborated extensively on this research. Using these methods, we have observed an association between attentional bias to food cues and current BMI z-score in preschoolers (Brand, *Appetite*). In addition to experimental methods, I also have extensive experience using observational methods with large genome-wide datasets and prospective cohorts to further interrogate obesity risk factors and have published 13 peer-reviewed journal articles in that examine genetic risk for disease outcomes in respected journals such as *American Journal of Human Genetics*, *Human Genetics, Int J. Obesity* and *PNAS*. I have also worked extensively with longitudinal cohorts and have extensive experience with participant recruitment and retention. My research extends to the Dartmouth-Hitchcock weight and wellness center where I have gained experience with clinical translation of obesity prevention and treatment findings. Through that center, I have collaborated extensively with Dr. Meijer, (co-I) who is a PhD researcher and clinical dietician. Dr. Meijer and I meet weekly for 2 hours to discuss ongoing research projects and we have several publications in progress. The research team on this current proposal has complimentary academic training including Cognitive Psychology, Biostatistics, Public Health, Clinical Dietetics, Epidemiology, and Genetics that will support our vigorous interdisciplinary research. Importantly, our team shares a dedication to conducting research that accounts for inter-individual differences to support future child obesity prevention and treatment interventions that are targeted and effective.

Ongoing and recently completed projects that I would like to highlight include:

R01 HD092604   Gilbert-Diamond (PI)   07/01/2018 – 04/30/2023
Title: The Relation of Genetic Factors, Food Cues, and Self-Regulation with Excess Consumption and Adiposity in Children
Goal: The primary objectives of the study are to evaluate the influence of genetics and television food advertisement exposure on children's eating patterns after they have eaten to satiety.
Role: Principal Investigator

1R21HD097475   Gilbert-Diamond (PI)   09/21/2018 - 08/31/2020
Title: Media multi-tasking and cued overeating: assessing the pathway and piloting an intervention using an attentional network framework
Goal: This research aims to elucidate attentional mechanisms that may mediate a previously observed association between electronic media multitasking and eating in the absence of hunger. It further aims to test whether an intervention designed to reduce attention to peripheral cues can reduce cued eating.
Role: Principal Investigator

1UH3OD023275   Karagas (PI)   09/2018 - 08/2023
Title: A prospective study of critical environmental exposures in formative early life that impact lifelong health in rural US children: The New Hampshire Birth Cohort Study
Goal: The primary objective of this research is to contribute environmental exposure and child health data to the ECHO – Environmental Influences on Child Health Outcomes Pediatric Cohorts program.
Role: Co-Investigator

5R21HD076097   Gilbert-Diamond (PI)   4/01/2014 – 3/31/2016
Title: Children's genetic predisposition to eat without hunger after food advertisements
Goal: The primary objectives of the study are to evaluate the influence of genetics and television food advertisement exposure on children's eating patterns after they have eaten to satiety.
Role: Principal Investigator

Citations:
a) Brand J, Masterson TD, Emond JA, Lansigan RK, **Gilbert-Diamond D**. (2020) Measuring attentional bias to food cues in young children using a visual search task: an eye-tracking study. *Appetite.* 148: 104610. PMID: 31958480
b) Brand J, Diamond SG, Thomas N, **Gilbert-Diamond D**. (2020) Evaluating the data quality of the Gazepoint GP3 low-cost eye tracker when used independently by study participants. *Behavior Research Methods. In Press*
c) **Gilbert-Diamond D**, Emond JA, Lansigan RK, Kelley W, Heatherton TF, Sargent JD. (2016) Television food advertisement exposure and *FTO* rs9939609 genotype in relation to excess consumption in children. *Int J Obesity.* 41(1): 23-29. PMCID: PMC5209258.
d) Rapuano KM, Zieselman AL, Kelley WM, **Sargent JD**, Heatherton TF, Gilbert-Diamond D. (2017) Genetic risk for obesity predicts nucleus accumbens size and responsivity to real-world food cues. *Proc Natl Acad Sci USA.* 114(1): 160-165. PMCID: PMC5224347

B.   Positions, Scientific Appointments and Honors

Positions and Employment
2020-present Director, Quantitative Biomedical Sciences Graduate Program
2018-present Associate Professor, Department of Epidemiology; Community & Family Medicine, Geisel School of Medicine at Dartmouth, Hanover, NH
2018-present Adjunct Associate Professor, Department of Biology; Dartmouth College, Hanover, NH
2018-present Member, The Obesity Society
2012-present Member, Cancer Epidemiology Research Program, Norris Cotton Cancer Center, Lebanon, NH
2018-present NIDDK Fellowship Review Panel
2012-2018 Assistant Professor, Department of Epidemiology; Community & Family Medicine, Geisel School of Medicine at Dartmouth, Hanover, NH
2012-2018 Adjunct Assistant Professor, Department of Biology; Dartmouth College, Hanover, NH

2011-present   Member, American Society of Human Genetics
2010-2011   Post-Doctoral Research Fellow in Bioinformatics, Genetic Analysis and Environmental Epidemiology, Geisel School of Medicine at Dartmouth, Hanover, NH
2008-present   Member, American Society of Nutrition
1999-2005   Biology and Genetics Teacher, Milton Academy, Milton, MA
2001, 2002   Research Assistant (summer), West Lab, Martinos Center for Biomedical Imaging, Boston, MA
1998-1999   Research Assistant, Whitehead/MIT Center for Genome Research, Cambridge, MA

Other Experience and Professional Memberships
2008-present   Member, American Society of Nutrition
2011-present   Member, American Society of Human Genetics

Honors
2011   Loan Repayment Program Award, National Institutes of Health
2010   Travel Award, International Society for Environmental Epidemiology Meeting, Seoul, Korea
2008   Harvard T.H. Chan School of Public Health Simonian Prize for Academic Excellence

C. Contribution to Science
1. A major focus of my research is to understand the effects of food cues on children's eating behavior and excess weight gain. Given the pervasiveness of food cues, such as food advertisements, in our current environment, my research has asked whether those cues affect consumption and whether some children are genetically predisposed to eat more in response to those cues. I have successfully run a randomized trial of 200 9-10-year-old children where we found that exposure to food advertisements leads to increased consumption in children (Gilbert-Diamond, *Int J Obes.*). In that study, we found compelling evidence that children with a common variant in the *FTO* gene had a greater response to food advertisements. To further investigate the biological mechanism behind that response, we did a study in which we neuro-imaged a subset of children using fMRI. In that sub-study we found that children with the obesity related *FTO* gene variant had increased response to food advertisements in dopaminergic reward regions of the brain compared to children with the low-risk variant (Rapuano, *PNAS*). In addition, I have completed a study of 60 children ages 2-5 years old where we have also found an effect of food advertisement exposure on excess consumption (Emond, *Pediatrics*). This preliminary work led to my current NIH-funded R01 project that uses fMRI to study the dopaminergic reward response in pre-adolescence using fMRI.

   a) Rapuano KM, Zieselman AL, Kelley WM, Sargent JD, Heatherton TF, **Gilbert-Diamond D**. (2017) Genetic risk for obesity predicts nucleus accumbens size and responsivity to real-world food cues. *Proc Natl Acad Sci USA*. 114(1): 160-165. PMCID: PMC5224347
   b) **Gilbert-Diamond D**, Emond JA, Lansigan RK, Kelley W, Heatherton TF, Sargent JD. (2016) Television food advertisement exposure and *FTO* rs9939609 genotype in relation to excess consumption in children. *Int J Obesity. PMID: 27654143.*
   c) Emond JA, Lansigan RK, Ramanujam A, **Gilbert-Diamond D.** (2016) Food advertising exposure and eating in the absence of hunger in pre-school children. *Pediatr.* 138(6). PMID 27940713
   d) Tovar A, Emond J, Hennessy E, **Gilbert-Diamond D** (2016). An *FTO* gene variant moderates the association between parental restriction and child BMI. *PLoS One* 11(5):e0155521. *PMCID: PMC4873182*

2. While GWAS studies have identified many genetic variants related to obesity, the identified variants only explain a small fraction of the heritability of obesity that has been demonstrated through twin studies. To gain the tools to study this missing heritability, I completed my post-doctoral fellowship with Jason Moore in Bioinformatics. One area of my research focuses on the interactions between multiple genetic loci and the interactions between genetic and environmental factors related to obesity and metabolic disease (De, *Hum Gen*, 2017, De *BioData Min*, 2015, Saxena, *Am J Hum Genet*, 2012). This research uses large genomic data sets from genome-wide arrays and involved collaborators from multiple large institutions in the US and abroad; I was senior author on two papers for which the lead author was my graduate student (De, 2017, De 2015). To support such computationally intensive research on highly multidimensional data, I have also developed a machine learning method to study epistasis for quantitative traits (QMDR: quantitative multidimensionality reduction analysis) in collaboration with a statistician; I was senior author on the resulting publication (Gui, *PLoS One*, 2013).

a) De R, Verma SS, Drenos F, Holzinger E, … **Gilbert-Diamond D.** (2017) Identifying gene-gene interactions that are highly associated with four quantitative lipid traits across multiple cohorts. *Human Genetics.* PMID: 27848076

b) De R, Verma SS, Drenos F, Holmes M, Asselbergs F, Moore JH, Keating B, Ritchie M. **Gilbert-Diamond D.** (2015) Identifying gene-gene interactions that are highly associated with Body Mass Index using Quantitative Multifactor Dimensionality Reduction (QMDR). BioData Mining. 8(41). PMCID: PMC4678717.

c) Gui J, Moore JH, Williams SM, Andrews P, Hillege HL, van der Harst P, Navis G, Van Gilst WH, Asselbergs FW, **Gilbert-Diamond D.** (2013) A simple and computationally efficient approach to multifactor dimensionality reduction analysis of gene-gene interactions for quantitative traits. *PLoS One* 8(6):e66545. *PMCID: PMC3689797*

d) Saxena R, Elbers CC, Guo Y, Peter I, Gaunt TR, Mega JL, Lanktree MB, Tare A, Castillo BA, Li YR, Johnson T, Bruinenberg M, **Gilbert-Diamond D**, *et al.* (2012) Large-scale gene-centric meta-analysis across 39 studies identifies type 2 diabetes loci. *American Journal of Human Genetics.* 90(3): 410-425. *PMCID: PMC3309185*

3. My research also focuses on the development of novel methods to assess food approach and avoidance behaviors in children. In collaboration with Drs. Brand and Emond, I have worked extensively to develop eye-tracking methodologies and evaluate eye-tracking hardware and paradigms to better assess attentional bias and attention to peripheral cues in children. I have also collaborated with computer scientists to pilot a device to assess eating rate through collecting and processing audio sounds picked up from the mandible using a head-worn device. The development of that device is ongoing and presents exciting future opportunities for research on eating rates.

a) Brand J, Diamond SG, Thomas N, **Gilbert-Diamond D** (2021) Evaluating the data quality of the Gazepoint GP3 low-cost eye tracker when used independently by study participants. *Behavior Research Methods.* PMID: 31958480

b) Brand J, Lansigan RK, Thomas N, Emond J, Gilbert-Diamond D. (2021) Completing a Sustained Attention Task is Associated with Decreased Distractability and Increased Task Performance Among Adolescents with Low and High Levels of Media Multitasking. *Frontiers in Psychology. In Press*

c) Brand J, Masterson TD, Emond JA, Lansigan RK, **Gilbert-Diamond D**. (2020) Measuring attentional bias to food cues in young children using a visual search task: an eye-tracking study. *Appetite.* 148: 104610. PMID: 31958480

d) Bi S, Yiyang L, Tobias N, Ryan E, Masterson T, Sen S, Halter R, Sorber J, **Gilbert-Diamond D**, Kotz D. (2020) Measuring children's eating behavior with a wearable device. Proceedings of the IEEE International Conference on Healthcare Informatics.

4. My research program has recognized the multi-factorial nature of the development of obesity and has used observational cohort studies to better understand how multiple predictors affect one's risk for developing obesity. In addition to studying how genetic factors and responsivity to food cues affect excess consumption and obesity, my research has also studied other factors including, but not limited to, electronic media in the bedroom (Gilbert-Diamond, *Jama Pediatr, 2014*), media multitasking (Lopez, *Front Psychol*, 2020), and maternal diet (Emond, *J of Nutr, 2018*).

a) Lopez, R, Brand J, **Gilbert-Diamond D**. (2019) Media multitasking is associated with higher body mass index in pre-adolescent children. *Frontiers in Psychology*. PMID: 31798499

b) Emond JA, Karagas MR, Baker E, **Gilbert-Diamond D.** (2018) Better diet quality during pregnancy is associated with a reduced likelihood of an infant born small for gestational age: an analysis of the prospective New Hampshire Birth Cohort Study. *Journal of Nutrition.* PMID: 29378041

c) **Gilbert-Diamond D**, Li Z, Adachi-Mejia AM, McClure AC, Sargent JD. (2014) Television in the bedroom is associated with increased adiposity gain in a nationally representative sample of adolescents. *JAMA Pediatr* 168(5):427-434. *PMCID: PMC4141563*

d) **Gilbert-Diamond, D**, Baylin A, Mora-Plazas, M, Marin, C, Arsenault, JE, Hughes, MD, Willett, WC, Villamor, E. (2010) Vitamin D deficiency and anthropometric indicators of adiposity in school- age children: a prospective study. *Amer J Clin Nutr* 92(6): 1446-51. PMCID: PMC3131841.

5. I have been extensively involved in the New Hampshire Birth Cohort Study, a longitudinal pregnancy cohort based in a rural setting. Through working as an investigator in that cohort, I have researched exposure to environmental contaminants, such as arsenic, and how they influence child growth. A major contribution that I've made in this area is identifying that dietary sources, such as rice, substantially contribute to arsenic exposure in populations with low levels of arsenic in ground water (Gilbert-Diamond, *PNAS, 2011)*. I have also demonstrated that low-dose arsenic exposure affects child growth *in utero* and during the first year of life. I am particularly interested in growth during infancy as it relates to later risk of developing obesity.

a) Tylavsky FA, Ferrara A, Catellier DJ, Oken E, Li X, Law A, Dabelea D, Rundle A, **Gilbert-Diamond D**, Hivert MF, Breton CV, Cassidy-Bushrow AE, Mueller NT, Hunt KJ, Arteaga SS, Lombo T, Mahabir S, Ruden D, Sauder K, Hedderson MM, Zhu Y, Polk S, Mihalopoulos NL, Vos M, Pyles L, Roary M, Aschner J, Karagas MR, Trasande L. (2019) Understanding childhood obesity in the US: the NIH environmental influences on child health outcomes (ECHO) program. *Int J Obes*. PMID: 31649277
b) Muse ME, Li Z, Baker ER, Cottingham KL, Korrick SA, Karagas MR, **Gilbert-Diamond D**. (2019) Relation between *in utero* arsenic exposure and growth during the first year of life in a New Hampshire pregnancy cohort. *Environmental Research.* PMID: 31710845
c) **Gilbert-Diamond D,** Emond J, Korrick S, Baker ER, Karagas MR. (2016) Relation between *in utero* arsenic exposure and birth outcomes in a cohort of mothers and their newborns from New Hampshire. *Environ Health Perspect* 124(8):1299-307. *PMCID: PMC4977046.*
d) **Gilbert-Diamond D**, Cottingham KL, Gruber JF, Punshon T, Sayarath V, Gandolfi AJ, Baker ER, Jackson BP, Folt CL, Karagas MR. (2011) Rice consumption contributes to arsenic exposure in US women. *Proc Natl Acad Sci* 108(51):20656-20660. *PMCID: PMC3251121*

Complete List of Published Work in MyBibliography:
https://www.ncbi.nlm.nih.gov/myncbi/diane.gilbert-diamond.1/bibliography/public/