BIOGRAPHICAL SKETCH

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NAME: Penny Gordon-Larsen

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

POSITION TITLE: Professor, Department of Nutrition

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
Tulane University, New Orleans, LA	B.A.	1989	Anthropology & Experimental Psychology
University of Pennsylvania, Philadelphia, PA	M.S.	1992	Human Biology
University of Pennsylvania, Philadelphia, PA	Ph.D.	1997	Human Biology
University of North Carolina, Chapel Hill, NC	Post-Doc	1998-2000	Nutritional Epidemiology

A. Personal Statement

Gordon-Larsen has more than 20 years of experience leading a large research program that integrates biology, behavior, and environment to understand, prevent and treat obesity and cardiometabolic disease. As PI or co-Investigator on many NIH-funded grants Gordon-Larsen has experience in working with biomarker, microbiome, metabolome, genetic, weight, diet, and environment data using multilevel modeling and pathway-based analyses, with a focus on race/ethnic disparities. She has worked with data from the Coronary Artery Risk Development in Young Adults (CARDIA) on lifecourse weight gain; the China Health and Nutrition Survey (CHNS) on microbiome and metabolome, and the National Longitudinal Study of Adolescence to Adult Health (Add Health) on genetics of obesity, for close to two decades. For CARDIA, she has held a series of R01's to incorporate external data into the parent CARDIA data using Field-based data collection, so she has a long-standing relationship with CARDIA for data collection, analysis, and dissemination. In 2010, she received the Lilly Scientific Achievement Award from The Obesity Society. She has leadership roles in the field, such as Chair of the Kidney, Nutrition, Obesity & Diabetes NIH study section and as a member of the Nutrition Research Thought Leaders Panel which advises the NIH Nutrition Research Task Force designed to develop the NIH-Wide Strategic Plan on Nutrition Research. She is a Past-President of The Obesity Society and served on leadership council of the Lifestyle and Cardiometabolic Health Council of the American Heart Association. At UNC she is the Vice Chair for Research in the Nutrition Department.

B. Positions and Honors

Positions and Employment:

1996-98 Academic and Administrative Coordinator, W.K. Kellogg Foundation Program to Link Intellectual Resources and Community Needs, University of Pennsylvania
1998-00 Dannon Institute Postdoctoral Fellow, University of North Carolina at Chapel Hill (UNC-CH)
2000-02 Research Assistant Professor, Department of Nutrition, UNC-CH
2002-08 Assistant Professor, Department of Nutrition, UNC-CH
2008-13 Associate Professor, Department of Nutrition, UNC-CH
2013- Professor & Vice Chair for Research, Department of Nutrition, UNC-CH

Other Experience and Professional Memberships:

1998- Reviewer for *JAMA*, *New England Journal of Medicine* (among others)
1998- Fellow, The Obesity Society [Fellow of The Obesity Society (FTOS), 2013]
1998- Member, Population Association of America
2002- Member, American Society for Nutrition

2011- Member, Kidney, Nutrition, Obesity & Diabetes (KNOD) study section
2014 Fellow of the American Heart Association (FAHA)
2016-18 Chair, Kidney, Nutrition, Obesity & Diabetes (KNOD) study section

National and Elected Offices:
2004-07 Scientific Meeting Planning Committee, The Obesity Society
2005-07 Scientific Council, Pediatric Obesity Section, The Obesity Society
2007-09 Secretary/Treasurer, Pediatric Obesity Section, The Obesity Society
2005-08 Scientific Council, The Obesity Society
2008-09 Chair, Pediatric Obesity Section, The Obesity Society
2012-14 Member-At-Large of the Lifestyle and Cardiometabolic Health Leadership Committee: Council of the American Heart Association
2013-15 Vice President, President-Elect, The Obesity Society
2015-16 President, The Obesity Society

Editorial Board Memberships:
2011- Associate Editor, *Pediatric Obesity*
2010- Associate Editor, *Health and Place*
2010- Editorial Board Member, *Nutrition and Diabetes*
2008- Editorial Board Member, *Annals of Human Biology*
2007-10 Editorial Board Member, *Annals of Behavioral Medicine*
2003-13 Editorial Board, *Obesity (*formerly *Obesity Research)*

Honors:
2002 William T. Grant Scholars Award (National Competition, one of 10 finalists)
2005 Delta Omega Society (Honorary Public Health Society)
2005 Obesity Research, Editor's Choice Reviewer Award
2010 Obesity, Top Reviewer Award
2010 Lilly Scientific Achievement from The Obesity Society

C. Contribution to Science

†Denotes a predoctoral trainee who is independently supported by Gordon-Larsen. *Denotes a postdoctoral trainee/early career scientist independently supported by Gordon-Larsen.

1. **Cardiovascular disease:** My work in this area has focused on novel determinants of cardiovascular disease risk factors, including environmental and -omics research. These studies emphasize contextual and biological factors in the etiology of cardiovascular disease to understand the most efficacious factors and strategies for reducing risk. I am particularly interested in heterogeneity in risk and understanding why some individuals who are overweight do not have diabetes, dyslipidemia, or hypertension, while some normal weight individuals do. In addition, my work involves using sophisticated statistical models for pathway-based analyses, addressing each piece of the complex system to investigate links between environments, behavior, and weight with cardiometabolic disease risk over time.

    a. Winglee K, Howard AG, Sha W, Gharaibeh RZ, Liu J, Jin D, Fodor AF, **Gordon-Larsen P**. Recent urbanization in China is correlated with a Westernized microbiome encoding increased virulence and antibiotic resistance genes. Microbiome 2017 5:121; https://doi.org/10.1186/s40168-017-0338-7. PMCID in Process.
    b. Meyer KA, Benton TZ, Bennett BJ, Jacobs DR Jr, Lloyd-Jones DM, Gross MD, Carr JJ, **Gordon-Larsen P**, Zeisel SH. Microbiota-Dependent Metabolite Trimethylamine N-Oxide and Coronary Artery Calcium in the Coronary Artery Risk Development in Young Adults Study (CARDIA). J Am Heart Assoc. 2016 Oct 21;5(10). pii: e003970. PMID: 27792658 PMCID in Process.
    c. **Gordon-Larsen P**, Adair LS, Meigs JB, Mayer-Davis E, Herring A, Yan SK, Zhang B, Du S, Popkin BM. Discordant risk: overweight and cardiometabolic risk in Chinese adults. Obesity (Silver Spring). 2013;21(1):E166-174. PMID: 23505200; PMCID: PMC3486953.
    d. **†**The NS, **†**Richardson AS, **Gordon-Larsen P**. Timing and duration of obesity in relation to diabetes: findings from an ethnically diverse, nationally representative sample. *Diabetes Care, 2013;36*(4):865-

72. PMID: 23223352; PMCID: PMC3609525.

2. **Genetics:** My initial genetics-related R01 (R01-HD057194) was the first gene-environment study in a racially/ethnically diverse longitudinal cohort that spanned the transition from adolescence to young adulthood. Specifically, I am investigating how genetic variation influences weight-related traits during the transition from adolescence to adulthood – a critical risk period for weight gain. The continuation of this grant focuses on exome variants and their role in obesity and cardiometabolic disease (MPI: Gordon-Larsen and North). Specifically, this work is aimed at assessing the association between weight-related traits and coding variants across a 15-year lifecycle period of dramatic weight gain between adolescence and adulthood. Another aspect of this work is contributing to several ongoing genetic consortia, most notably Cohorts for Heart and Aging Research in Genomic Epidemiology (CHARGE) and the Genetic Investigation of ANthropometric Traits (GIANT) consortia.

   a. **†**Richardson AS, North KE, *Graff M, Young KM, Mohlke KL, Lange LA, Lange EM, Harris KM, **Gordon-Larsen P.** Moderate to vigorous physical activity interactions with genetic variants and body mass index in a large US ethnically diverse cohort. Pediatr Obes. 2014;9(2):e35-46. PMID: 23529959; PMCID: 3707946
   b. *Graff M, **Gordon-Larsen P**, Lim U, Fowke JH, Love S-A, Fesinmeyer M, Wilkens LR, Vertilus S, Ritchie MD, Prentice RL, Pankow J, Monroe K, Manson JE, Le Marchand L, Kuller LH, Kolonel LN, Hong CP, Henderson BE, Haessler J, Gross MD, Goodloe R, Franceschini N, Carlson CS, Buyske S, Buzkova P, Hindorff LA, Matise TC, Crawford DC, Haiman CA, Peters U, North KE. The influence of obesity-related single nucleotide polymorphisms on BMI across the life course: the PAGE study. Diabetes. 2013;62(5):1763-7. PMID: 23300277; PMCID: PMC3636619.
   c. *Graff M, Ngwa JS, Workalemahu T, Homuth G, Shipf S, Teumer A, Volzke H, Wallaschofski H, Abecasis GR, Edward L, Francesco C, Sanna S, Scheet P, Schlessinger D, Sidore C, Xiao X, Wang Z, Chanock SJ, Jacobs KB, Hayes RB, Hu F, Van Dam RM, Consortium TG, Crout RJ, Marazita ML, Shaffer JR, Atwood LD, Fox CS, Heard-Costa NL, White C, Choh AC, Czerwinski SA, Demerath EW, Dyer TD, Towne B, Amin N, Oostra BA, van Duijn CM, Zillikens MC, Esko T, Nelis M, Nikopensius T, Metspalu A, Strachan DP, Monda KL, Qi L, North KE, Cupples LA, **Gordon-Larsen P**, Berndt SI. Genome-wide analysis of BMI in adolescents and young adults reveals additional insight into the effects of genetic loci over the life course. Hum Mol Genet. 2013;22(17):3597-607. PMID: 23669352; PMCID: PMC3736869.
   d. Turcot V, Lu Y, Highland HM, Schurmann C, Justice AE…. Lindgren CM, Hirschhorn JN, Loos RJF.. Protein-altering variants associated with body mass index implicate pathways that control energy intake and expenditure in obesity. Nat Genet. 2018 Jan;50(1):26-41. PMID: 29273807. PMCID in process.

3. **Lifecycle**: There are few nationally representative, population-based studies that span critical periods of risk for development of disease. All of the datasets I work with feature unique aspects that allow examination of risk across critical lifecycle periods. My work with the National Longitudinal Study of Adolescent Health has helped establish the transition from adolescence to adulthood as a major period of risk for development of obesity and cardiometabolic disease. My work with the Coronary Artery Risk Development in Young Adults study has enabled me to contribute to understanding factors that influence the development of cardiovascular disease as these diseases emerge during early adulthood. My work in China has allowed examination of the pathways from environment to cardiometabolic disease and to examine the periods of the lifecycle of greatest risk.

   a. †Richardson AS, *Meyer KA, *Howard AG, *Boone-Heinonen J, Popkin BM, Evenson KR, Kiefe CI, Lewis CE, **Gordon-Larsen P**. Neighborhood socioeconomic status and food environment: a 20-year longitudinal latent class analysis among CARDIA participants. Health & Place. 2014;30:145-53. PMID: 25280107; PMCID: PMC4252601.
   b. **†**Boone-Heinonen J, **Gordon-Larsen P.** Life stage and sex specificity in relationships between the built and socioeconomic environments and physical activity. J Epidemiol Community Health. 2011;65(10):847-52. PMID: 20930092; PMCID: PMC3059385.
   c. †The NS, Suchindran CM, North KE, Popkin BM, **Gordon-Larsen P**. Association of adolescent obesity with risk of severe obesity in adulthood. JAMA. 2010;304(18): 2042-7. PMID: 21063014; PMCID: PMC3076068.

a. **Gordon-Larsen P**, †Hou N, Sidney S, Sternfeld B, Lewis CE, Jacobs DR, Jr, Popkin BM. Fifteen-year longitudinal trends in walking patterns and their impact on weight change. Am J Clin Nutr. 2009;89(1):19-26. PMID: 19056560; PMCID: PMC2715291.

4. **Health disparities and environmental effects:** Very early in my career, I became interested in how physical and social environments influence the development of obesity. I found that the early work in this area was restricted to small geographic areas and ignored fundamental issues of reverse causality related to residential selection. My early work in this area has been widely cited as we were the first team to develop a fine-grained geographic information system database at the individual-level spanning the entire U.S. and including longitudinal data. My team's work developing methodological approaches to handle residential selectivity bias, the biggest threat to causal inference in this research area, has pushed the field forward methodologically. In addition, my work on factors protective against weight gain and cardiometabolic disease risk has helped shape U.S. policy.

   a. *Meyer KA, Guilkey DK, Ng SW, Duffey KJ, Popkin BM, Kiefe CI, Steffen LM, Shikany JM, **Gordon-Larsen P.** Sociodemographic differences in fast food price sensitivity. JAMA Intern Med. 2014;174:434-42. PMID: 24424384; PMCID: PMC3963142.
   b. **Gordon-Larsen P.** Food availability/convenience and obesity. Adv Nutr. 2014;5(6):809-17. PMID: 25398746; PMCID: PMC4224220.
   c. Meyer KA, Guilkey DK, Tien HC, Kiefe CI, Popkin BM, **Gordon-Larsen P**. Instrumental-Variables Simultaneous Equations Model of Physical Activity and Body Mass Index: The Coronary Artery Risk Development in Young Adults (CARDIA) Study. Am J Epidemiol. 2016 Sep 15;184(6):465-76. doi: 10.1093/aje/kww010. Epub 2016 Sep 9. PMID: 27614300. PMCID in Process.
   d. **Gordon-Larsen P**, Harris KM, Ward DS, Popkin BM; National Longitudinal Study of Adolescent Health. Acculturation and overweight-related behaviors among Hispanic immigrants to the US: the National Longitudinal Study of Adolescent Health. Soc Sci Med. 2003 Dec;57(11):2023-34. PubMed PMID: 14512234.

5. **Global health:** My recent work has involved global health research that examines urbanization-related changes and their association with cardiometabolic disease in the world's largest population, China, which result in millions of affected individuals at enormous societal and economic cost. The unique contribution of my work in this area relates to the development of complex methods to address pathways to risk. For example, a large part of my work has involved the use of innovative latent class trajectory methods to characterize the patterns of weight change across 20 years to understand how the tempo and timing of weight gain influences cardiometabolic disease risk. In addition, I am using structural equation modeling strategies to capture rapid social, economic, and environmental changes that accompany urbanization in China to identify the multiple pathways through which such changes influence weight, central adiposity, and cardiometabolic risk across the lifecycle.

   a. **Gordon-Larsen P**, †Koehler E, *Howard AG, †Paynter L, Thompson A, Adair L, Mayer-Davis E, Zhang B, Popkin B, Herring A. Eighteen year weight trajectories and metabolic markers of diabetes in modernising China. Diabetologia. 2014;57(9):1820-9. PMID: 24891020; PMCID: PMC4119243.
   b. **Gordon-Larsen P**, Wang H, Popkin BM. Overweight dynamics in Chinese children and adults. Obes Rev. 2014;15(Suppl 1):37-48. PMID: 24341757; PMCID: PMC3951516.
   c. **Gordon-Larsen P**, Jones-Smith J. Challenges in ameliorating hunger while preventing obesity. Lancet. 2012;380(9844):787-9. PMID: 22770477.
   d. †Attard S, Herring AH, Mayer-Davis EJ, Popkin BM, Meigs JB, Gordon-Larsen P. Multilevel examination of diabetes in modernizing China: What elements of urbanization are most associated with diabetes? Diabetologia. 2012;55(12):3182-92. PMID: 22923063; PMCID: PMC3483108.

Complete list of publications: http://www.ncbi.nlm.nih.gov/pubmed/?term=Gordon-Larsen+P+[Author]

D. Research Support (Selected)

Ongoing Research Support

R01HD057194 (MPI Gordon-Larsen, North) 09/30/08-08/31/19
NIH/NICHD

Exome Variants Underlying Weight Gain from Adolescence to Adulthood
The objective of this research is to investigate how genes, environment, and gene-environment interactions influence temporal changes in body mass index (BMI) at vulnerable periods of the life cycle.
Role: PI

R01DK104371 (Gordon-Larsen) 09/17/15-06/30/19
NIH/NIDDK
Transition to a Western Diet and Cardiometabolic Risk: Biomarkers Derived from the Microbiome
In a sample of adults from rapidly modernizing China, we will examine whether gut microbiota and plasma metabolites differ depending upon when, within the 25-year period, diet changes occur, and if they are associated with health outcomes. In our longitudinal subsample we examine changes in markers of Western diet in relation to concurrent changes in microbial diversity and community composition, and in metabolites.
Role: PI

Gillings Innovation Lab (Gordon-Larsen) 02/01/15-01/31/17 (NCE)
Gillings Family Foundation
Accelerating Trans-disciplinary Collaborative Clinical Care Locally and Globally to Improve Diabetes Outcomes
The program will prepare providers in clinical teams in the UNC Clinic Physician Network (UNCPN) to effectively collaborate and coordinate and manage treatment using the latest evidence-based guidelines and strategies for diabetes care, which will be translated and tailored for use in a Chinese clinical setting.
Role: PI

UNC Creativity Hub (Gordon-Larsen) 07/01/18-06/30/20
University of North Carolina, Carolina Blueprint for Next
Heterogeneity in Obesity: Transdisciplinary Approaches for Precision Research and Treatment.
Leveraging the strengths of Carolina's schools of medical and health sciences, its affiliated research centers and institutes, and its prowess in big data management, the Heterogeneity in Obesity Creativity Hub will take a novel approach to assess the underlying causes of obesity, tapping information that has not been traditionally studied to unlock new, targeted ways to treat the disease.
Role: PI

R01HD030880 (Popkin) 06/01/14-05/31/19
NIH/NICHD
Monitoring Social Change: Health, Reproduction, Aging
The China Health and Nutrition Survey (CHNS) is a multipurpose panel survey following more than 34,000 individuals in 288 communities throughout China across nine exams from 1989 to 2011. This follow-up survey will collect a second wave of biomarker data that will provide data to examine incidence in a variety of cardiovascular-, nutrition-, and toxicological-related outcomes, coupled with continued heterogeneity in social, economic, and health status across time in modernizing China.
Role: Co-Investigator

Completed Research Support (Selected)

R01HL108427 (Gordon-Larsen) 03/01/12-02/28/16
NIH/NHLBI
Emergence of Cardiometabolic Risk Across the Lifecycle in China
Using complex structural models, we examined complex pathways through which community-, household-, and individual-level factors affect behaviors, weight, and cardiometabolic risk across the lifecycle.
Role: PI

R01HD057194 (Gordon-Larsen) 09/30/08-06/30/14
NIH/NICHD
Gene-Environment Interactions and Weight Gain
The objective of this research is to investigate how genes, environment, and gene-environment interactions influence temporal changes in body mass index (BMI) at vulnerable periods of the life cycle.
Role: PI