BIOGRAPHICAL SKETCH

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NAME: Arpana Gupta

POSITION TITLE: Assistant Professor

eRA COMMONS USER NAME (credential, e.g., agency login): aagupta9

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
Edinboro University of Pennsylvania	BSc	05/98	Science
George Washington University	NMTC	05/98	Nuclear Medicine Technology
Wake Forest University	MEd	05/03	Community Counseling
University of Tennessee, Knoxville	PhD	08/10	Psychology
Semel Institute of Neuroscience and Human Behavior at UCLA	Post-Doc	08/12	Bio-behavioral & brain imaging outcomes of psychosocial environmental processes
Gail and Gerald Oppenheimer Family Center for Neurobiology of Stress (CNS), UCLA David Geffen School of Medicine	Post-Doc	08/15	Neurogenetics and multi-imaging modalities associated with stress related diseases (Obesity & Functional Gastroenterological Disorders)

A. Personal Statement.

I am an Assistant Professor, currently at the UCLA Oppenheimer Center of Neurobiological Stress (CNS), where I specialize in research that investigates the interactions between environmental and biological factors in shaping neurobiological phenotypes associated with stress and pain-based diseases such as functional gastroenterological disorders (FGIDs) [vuvlodynia, irritable bowel syndrome] and obesity. My current program of research broadly defined is based on developing a model that aims to understand the bidirectional interaction of the brain with those in the periphery (immune cells, gut microbiota-related metabolites), and the modification of these interactions by vulnerability factors (adverse life events, sex, race, socioeconomic status [SES]) in stress and pain-based disorders.

I have been principle investigator (PI) of four grant supported studies targeting (1) Influence of microbiota on brain signatures in obese individuals; (2) Neural responses associated with racial discrimination; (3) Functional consequences of intimate partner violence among South Asian women; (4) Mental and Physical health outcomes associated with HIV/AIDS among South Asian women. I have produced 31 manuscripts since I started working at the CNS (31 published/in press [10 as first author], 3 under review/revision [2 as first author]). The focus of my training has been on acquiring skill sets associated with analyzing complex data sets generated by psychophysiological, psychosocial, neuroimaging, and genetic studies. I have learned to design and efficiently manage patient-based research projects, and developed a broad range of practical research and analytical skills in the areas of psychology, physiology, and multimodal neuroimaging. In the past few years I served as a research investigator for Labus and Rapkin's parent R01 grant entitled, " Profiling Vulvodynia Based on Neurobiological and Behavioral Endophenotypes." In this capacity, I have been responsible for running all data analyses and for manuscript preparation and submissions. This puts me in a position to adequately continue with these responsibilities for the current application.

Peer reviewed publications most relevant to the current application:

1. **Gupta A**, Rapkin AJ, Gill, Z, Kilpatrick LA, Fling C, Stains J, Masghati S, Tillisch K, Mayer EA, Labus JS. Disease-Related Differences in Resting State Networks: A Comparison Between Localized Provoked Vulvodynia, Irritable Bowel Syndrome, and Healthy Control Subjects. **Pain**. 2015; 156(5):809-19. PMCID: PMC4402252
2. **Gupta A**, Rapkin AJ, Fling C, Stains J, Masghati S, Tillisch K, Mayer EA, Labus JS. Morphological Brain Alterations in Localized Provoked Vulvodynia (LPVD), International Association for the Study of Pain (IASP) 15th World Congress, Buenos Aires, Argentina, October 6-11, 2014.
3. Labus J, **Gupta A**, Gill HK, Posserud I, Mayer M, Raeen H, Bolus R, Simren M, Naliboff BD, Mayer EA. Randomised clinical trial: symptoms of irritable bowel síndrome are improved by a psycho-education group intervention. **Alimentary Pharmacology Therapeutics.** 2013; 37(3): 304-15. PMCID: PMC3829380.

B. Positions and Honors

Employment

09/98 – 06/01	Nuclear Medicine Technologist, Department of Nuclear Medicine and Radiology, Supervisor: Donald Hixon, Georgetown Medical Center, Washington, DC (full-time)
10/01 – 06/02	Nuclear Medicine Technologist, Nuclear Medicine Department, Supervisor: Pamela Karr, Wake Forest University Hospital, Winston-Salem, NC (full-time)
05/03 – 07/04	Family Therapist, Psychology Associates, Supervisors: Dr. Jo Nagel, Ph.D. and Dr. Dan Price, Ph.D., Charlottesville, VA (full-time)
08/04 – 05/10	Graduate Research Assistant & Lecturer, Department of Psychology, Department Director Dr. Frederick Leong, University of Tennessee, Knoxville, TN (part-time)
01/05 – 05/06	Psychology Practicum, Supervisors: Dr. Melissa Bartsch, Ph.D.; Dr. Diana Monteiro, Ph.D.; Dr. Suzanne Molnar, Ph.D., University of Tennessee Counseling Center, Knoxville, TN (part-time)
08/06 – 12/06	Group Therapist, Adult Oncology, Supervisor: Dr. Dawn Szymanski, Ph.D., Baptist Hospital, Knoxville, TN (part-time)
08/07 – 08/08	Psychology Practicum, University of Tennessee Psychology Clinic, Supervisors: Dr. Lance Laurence, Ph.D. and Dr. Karen Swander, Ph.D., University of Tennessee, Knoxville, TN (part-time)
06/09 – 07/10	Intern & Research Assistant, Department of Psychiatry, Supervisors: Dr. Mark Blais, Psy.D.; Dr. Sheila O'Keef, Ed.D; Dr. Felicia Smith, MD.; Dr. Justin Sinclair, Ph.D., Dr. Michelle Jacobo, Ph.D.; Dr. Michael Dvorkin, Psy.D.; Dr. Amy Sweigenberg, Psy.D.; Dr. Ana-Maria Vranceau, Ph.D. Massachusetts General Hospital & Harvard Medical Center, Boston, MA (full-time)
07/10 – 08/12	Postdoctoral Research Fellow (NIMH T-32-MH017140), Department of Psychiatry, Supervisors: Dr. Andrew Leuchter, MD; Dr. Mary-Frances O'Connor, Ph.D.; Dr. Mark Cohen, Ph.D.; Dr. Gilbert Gee, Ph.D.; Dr. Gail Wyatt, Ph.D., Semel Institute at UCLA, Los Angeles, CA (full-time)
08/12 – 08/15	Postdoctoral Scholar, Oppenheimer Center for Neurobiology of Stress (CNS), Supervisors: Dr. Emeran Mayer, MD; Dr. Jennifer Labus, Ph.D.; Dr. Kirsten Tillisch, MD, David Geffen School of Medicine at UCLA, Los Angeles, CA (full-time)
08/15-Present	Assistant Professor, Oppenheimer Center for Neurobiology of Stress (CNS)

Honors

2006	ACT Summer Research Internship, Student Research Award
2007	University of Tennessee, Outstanding Counseling Psychology Student Research Award
2008	American Psychology Association, Division 17 (Counseling) Best Poster Award
2009	University of Tennessee, RFF Dissertation Award
2009	Asian American Psychological Association, Alice F. Chang Student Scholar Award
2010	Society of Personality Assessment Honorary Poster Award
2010	American Psychological Association, Minority Fellowship Program (Psychology Summer Institute)
2010	American Psychological Association, Society of Ethnic Minority Studies (Division 45), Best Poster Award
2010	American Psychological Association, Committee of Ethnic Minority Affairs Jeffrey S. Tanaka Memorial Dissertation Award

2010 UCLA HIV and Aids Training (HATT) Program, Scholar
2011 UCLA 'Friends of Semel' Travel Award
2012 UCLA Neuroimaging Training Institute (NITP-NIH sponsored), University of California, Los Angeles
2012 Invited press release at 2012 national Society of Neuroscience (SfN) conference
2013 UCLA, 11th Annual Center for Neurobiology of Stress Conference, Best abstract and poster.
2013 UCLA, Brain Research Institute/Semel Institute for Neuroscience Postdoctoral Research and Travel Awards for the annual Society for Neuroscience Conference.
2014 Gastroenterology Research Group (GRG) and American Gastroenterology Association (AGA) Fellow Travel Award for Digestive Diseases Week. Total amount $500.
2014 UCLA Chancellor Postdoctoral Research award
2014 American Neurogastroenterology and Motility Society (ANMS) Young Investigator Forum Award Bethesda, MD
2014 International Association for the Study of Pain (IASP) -15th World Congress, Postdoctoral Research Award, Buenos Aires, Argentina. Total amount $1,200.
2014 American College of Neuropsychopharmacology Trainee Award, Phoenix, AZ.
2015 UCLA Cure Annual Research Meeting Poster Award
2015 Gastroenterology Research Group (GRG) and American Gastroenterology Association (AGA) Fellow Travel Award for Digestive Diseases Week. Total amount $500.
2015 American College of Neuropsychopharmacology Trainee Award, Hollywood, FL.

Professional Societies and Public Advisory Committees

2004 – Present Member, Asian American Psychological Association and American Psychological Association
2006 – 2008 Executive Board Member, Asian American Psychological Association
2007 – 2009 Lecturer, Doctoral Course on Counseling and Micro-skills Techniques, University of Tennessee
2007 – 2009 Lecturer, Graduate Course on Best Practices in Teaching "Infusion of Multiculturalism into Courses", University of Tennessee
2008 – 2009 Lecturer, Doctoral Course on Psychological Assessments, University of Tennessee
2008 – 2010 Executive Board Member, American Psychological Association (Division of Ethnic and Minority Affairs)
2011 – Present Member, Human Brain Mapping
2011 – Present Member, Society for Neuroscience
2012 – Present Member, American Gastroenterology Association
2012 – Present Member, International Association of the Study of Pain
2014 – Present Member, The Obesity Society
2014 – Present Reviewer Psychosomatic Medicine, Pain, Clinical Neuroimage, Brain Structure and Function, Journal for Health and Social Behavior

C. Contribution to Science

Early adversity and imaging genetics identify precursors that modulate emotion-arousal circuitry function and structure. Based on my early work identifying the alterations in the emotional arousal and salience circuitry during viewing of emotional faces, my work has examined the influence of specific genetic precursors associated with early adversity on these networks. This research indicated: 1) Sex differences in the alterations in resting state networks associated with early adversity, 2) Epigenetic modulation of glucorticoid gene expression impacts brain structure in a key emotional arousal region. In all these projects, I collaborated with members of the Center for Neurobiology of stress. My roles included generating the manuscript concepts, designed and implemented all statistical analyses, provided interpretation of results and contributed to the writing of the manuscript. I also was responsible for designing the experimental tasks during neuroimaging. **This work is particularly relevant for identifying candidate treatments (e.g., pharmacological, behavioral) aimed at improving symptoms in chronic visceral pain.**

1. **Gupta A**, Kilpatrick L, Labus J, Tillisch K, Braun A, Hong JY, Ashe-McNalley C, Naliboff B, Mayer EA. Early Adverse Life Events and Resting State Neural Networks in Patients with Chronic Abdominal Pain: Evidence for Sex Differences. **Psychosomatic medicine**. 2014; 76(6): 404-12. PMCID: PMC4113723.
2. **Gupta A,** Labus JS, Kilpatrick LA, Bonyadi M, Ashe-McNalley C, Heendeniya N, Bradesi S, Chang L, Mayer EA. Interactions of Early Adversity with Stress Related Gene Polymorphisms Impacts Regional Brain Structure in Females. **Brain Structure and Function.** 2015; 10.1007/s00429-015-0996-9 [Epub Ahead of Print].

3. **Gupta A***, Orand A*, Shih W, Presson AP, Hammer C, Niesler B, Heendeniya N, Mayer EA, Chang L. Catecholaminergic Gene Polymorphisms are Associated with GI Symptoms and Morphological Brain Changes in Irritable Bowel Syndrome. **PLOS ONE.** 2015 In Press. *Both **authors** (Gupta and Orand) share **first authorship** and contributed equally to this work.
4. Kilpatrick LA, **Gupta A**, Heendeniya N, Labus JS, Mayer EA.. Corticotropin Releasing Hormone Receptor 1 (CRH-R1) and Progestoerone Receptor (PGR) Polymorphisms Interact With Early Life Trauma in Healthy Controls (HC) and Patients With Irritable Bowel Syndrome (IBS). **Gastroenterology Supplement**, 2013; 144 (5):S121.

Mapping neural networks underlying obesity. Functional localization studies used to be the norm but these studies did not reveal anything about the communication, interdependency or interactions between active brain regions. My research has: 1) Demonstrated the power of multivariate methods in characterizing and testing alterations in brain structure, anatomical connectivity, and resting state networks in obesity in the extended reward network, 2) Provided strong support for the notion that sex-related differences in obesity are largely due to alterations in extended reward, cognitive control, emotional-arousal, and salience processing circuits. In all these projects, I collaborated with members of the Center for Neurobiology of stress. My roles included generating the manuscript concepts, designed and implemented all statistical analyses, provided interpretation of results and contributed to the writing of the manuscript. I also was responsible for designing the experimental tasks during neuroimaging. **This work was the first to identify alterations in specific brain circuits and networks underlying alterations in the extended reward network related to hedonic eating and suggest specific targets for treatment and further investigations in obesity.**

1. **Gupta A**, Woodworth DC, Labus JS, Sanmiguel CP, Tillisch K, Ellingson BM, Mayer EA. Anatomical Connections in the Brain based on Body Mass Index in Lean, Overweight, and Obese Individuals. **Gastroenterology**, 2015, 148:4:S-348.
2. Coveleskie K, **Gupta A**, Labus JS, Mayer ED, Ashe-McNalley C, Stains J, Kilpatrick LA, Mayer EA. Altered Functional Connectivity within the Central Reward Network in Overweight and Obese Women. **Nutrition and Diabetes**. 2015; 19:5:e148. doi: 10.1038/nutd.2014.45. [Epub ahead of print]. PMID: 25599560.
3. Sanmiguel CP, **Gupta A**, Labus JS, Coveleski K, Karagiannidis I, Alaverdyan M, Ashe-McNalley C, Stains J, Smith S, Tillisch K, Chang L, Mayer EA. Adiposity is Associated with Alterations within the Brain Reward System in Adult Subjects. **Gastroenterology**, 2015, 148:4:S-674.
4. Coveleski C, Kilpatrick L, **Gupta A**, Ashe-McNalley C, Stains J, Sanmiguel CP, Mayer EA. Effect of the GLP-1 Analogue Exenatide on Functional Connectivity Within Hedonic and Homeostatic Brain Networks in Lean and Obese Women. **Gastroenterology**, 2015, 148:4:S-12.

Big data analysis of multivariate neuroimaging studies furthers understanding of pathophysiological mechanisms in disease. Limitations exist to current patient care associated with symptom based diagnosis and treatment of disease. In order to provide new mechanistic insights into chronic visceral pain and obesity, I have helped apply large-scale neuroimaging and bioinformatic data processing and computational pipelines in our Center to specific disease groups. These time-efficient pipelines produce an enormous amount of data reflecting white matter properties, brain topology, gray matter morphometry, anatomical connectivity, and functional connectivity. Applying a bioinformatics approach, I have identified patterns or “signatures” based only on the brain that accurately discriminate individuals with visceral pain from healthy controls as well normal weight versus overweight. **This work marks an advance in technology, increasing the volume and diversity of neurobiological data available for analyses. Large-scale data analysis using bioinformatics tools provides the means to integrate and decipher large amounts of multivariate neuroimaging data to diseased groups based on objective biological markers, and characterize central nervous system alterations for further pathophysiological investigations targeting treatment of specific diseases.**

1. **Gupta A**, Mayer EA, Sanmiguel CP, Van Horn JD, Woodworth D, Ellingson BM, Fling C, Love A, Tillisch K, Labus JS. Patterns of Brain Structural Connectivity Differentiate Normal Weight from Overweight Subjects. **Neuroimage-Clinical**. 2015; 13(7): 506-17. doi:10.1016/j.nicl.2015.01.005 [Epub Ahead of Print]. PMCID: PMC4338207.
2. Labus JS, Van Horn JD, **Gupta A**, Alaverdyan M, Torgerson C, Ashe-McNalley C, Irimia A, Hong JY, Naliboff B, Tillisch K, Mayer EA. Multivariate morphological brain signatures predict chronic abdominal pain patients from healthy control subjects. **Pain**. 2015 Apr 20. [Epub ahead of print].
3. Labus J, Dinov ID, Jiang Z, Ashe-McNalley C, Zamanyan A, Shi Y, Hong J-Y, **Gupta A**, Tillisch K, Ebrat B, Hobel S, Gutman BA, Joshi S, Thompson PM, Toga AW, Mayer EA. Irritable Bowel Syndrome

in female patients is associated with alterations in structural brain networks. **Pain**, 2014 Jan;155(1):137-49. PMCID:PMC4100785.
4. Jiang Z, Dinov ID, Labus J, Shi Y, Zamanyan A, **Gupta A**, Ashe-McNalley C, Hong J-Y, Tillisch K, Toga AW, Mayer EA. Sex-related differences of cortical thickness in patients with chronic abdominal pain. **PLoS ONE**. 2013, 8(9):e73932. PMCID: PMC3764047.

Brain-Gut-Axis in health and disease. It has long been recognized that the brain and gut have bidirectional communication through which gut function and psychological state are linked. More recently it has become clear that the brain-gut axis extends to the gut microbiota and to peripheral inflammatory molecules. Most recently, I have applied systems biology approaches to provide evidence that alterations in the salience network are altered by inflammatory markers from peripheral blood mononuclear cells (PBMCs) and have effects that are different in individuals with IBS compared to healthy controls. **This work has great potential for understanding and revealing the complex interactions between the gut, brain, and microbiota/inflammatory markers.**

1. Mayer EA, Tillisch K, **Gupta A**. Gut-Brain Axis and the Microbiota. **Journal of Clinical Investigation.** 2015; 125(3): 926-38. doi: 10.1172/JCI76304. [Epub ahead of Print]. PMID: 25689247.
2. Sanmiguel CP, **Gupta A**, Mayer EA. Gut Microbiome and Obesity: A Plausible Explanation for Obesity. **Current Obesity Reports**. 2015; In Press.
3. **Gupta A**, Cole S, Labus JS, Nguyen TJ, Joshi SM, Kilpatrick LA, Tillisch K, Chang L, Mayer EA. Gene Expression Profiles in Peripheral Blood Mononuclear Cells (PBMCs) Correlate with Structural and Functional Brain Networks in Chronic Visceral Pain. **Gastroenterology**, 2015, 148:4:S-165.

Complete List of Published Work:
http://www.ncbi.nlm.nih.gov/sites/myncbi/1v_1kl872tPQf/bibliography/46222127/public/?sort=date&direction=descending

D. Research Support.

Ongoing Research Support

American Psychological Foundation (APF) Visionary Grant Gupta (PI) 12/01/2014 - Present
Mind Altering Microorganisms: The Influence of Gut Microbiota on Brain Signatures in Healthy Subjects.
Role: PI

Completed Research Support

UCLA Center for Aids Research Seed Grant Gupta (PI) 06/30/11 – 05/30/2012
Mental and Physical health outcomes associated with HIV/AIDS among South Asian women
The goal of this proposal is to investigate the interactions between psychosocial/environmental and cultural factors on physical health outcomes, HIV/AIDS, and sexual behaviors among South Asian women.
Role: PI

UCLA HIV/AIDS Translational Training Program Seed Grant Gupta (PI) 05/01/11 – 05/01/2012
Neurological and functional consequences of intimate partner violence among South Asian women
The goal of this proposal is to investigate the influence of psychosocial factors on intimate partner violence among South Asian women.
Role: PI

T32 MH017140 Leuchter (PI) 08/01/10 – 07/31/12
Neural and functional responses associated with adverse social experiences
The goal of this proposal was to investigate functional and structural brain outcomes related to adverse social experiences such as intimate partner violence, racism, and discrimination.
Role: Trainee (Postdoctoral Fellow)

UC Center for New Racial Studies Seed Grant Gupta (PI) 04/01/11 – 08/30/12
The Social Environment Impact: Brain Activation and Distress During Imagery of Racial Discrimination Experiences
This proposal investigated the neural responses to experiences of racial discrimination.
Role: PI