Zall Hirschstein

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EDUCATION

Bard College

Annandale-On-Hudson, NY

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B.A. in Quantitative Psychology (with honors; GPA: 3.6)

2018

> Research Thesis: Towards Improving Learning with Real-Time, Closed-Loop, Electrophysiological Neurofeedback

RESEARCH POSITIONS

Columbia University

New York, NY

Laboratory Manager (Pl: Mariam Aly, Ph.D.)

July, 2020 - Present

Albany Medical College

Albany, NY

Research Technician (20 hours/week) (Pl: Damian Shin, Ph.D.)

March, 2019 - March, 2020

- Project I: Effect of peripheral ultrasound stimulation on activity of glucose-regulating hypothalamic neurons
- > Project 2: Altering gut-brain development of Parkinson's disease with ultrasound stimulation on vagus nerve
- Project 3: Ameliorating Inflammatory bowel disease with non-invasive ultrasound stimulation

<u>Duties</u>: Perform craniotomy surgeries on rats *in vivo*, 16-channel neuroelectrophysiological recordings, ELISAs, behavioral testing, suturing, injections; write manuscripts and grants; train research assistants

Laboratory Manager (30 hours/week) (PI: Patricia Grasso, Ph.D.)

September, 2018 - March, 2020

- Project I: Effect of novel peptide on development of Alzheimer's/dementia in type I diabetes mouse model
- Project 2: Mitigating development of Alzheimer's/dementia with peptide in mouse models of type 2 diabetes <u>Duties</u>: Section and stain tissue, quantify histopathological markers; perform dosing, cardiac puncture, ELISAs,

dissections, glucose and behavior testing; manage lab spaces and inventory; train lab personnel

Memory Dynamics Lab (Pl: Justin Hulbert, Ph.D.)

Annandale-On-Hudson, NY

Laboratory Manager

September, 2016 – June, 2018

- Project 1: Examining unintended costs of endogenous hippocampal inhibition (memory suppression)
- > Project 2: Selectively reactivating memories during sleep using real-time electrophysiology
- Project 3: Effect of cardiac rhythms and mindfulness training on endogenous hippocampal modulation ability

<u>Duties</u>: Supervised and trained 14 research assistants; developed, directed, and analyzed EEG and behavioral experiments; coordinated lab meetings, events, and conferences; managed lab spaces, website, equipment; wrote manuscript, and IRB and grant applications

Laboratory Assistant (promoted to manager September, 2016)

October, 2015 - June, 2016

Duties: Obtained and analyzed data from human participants; coded experiments; presented findings

Bard Summer Research Institute

Annandale-On-Hudson, NY

Research Assistant

Project: Developing a brain-computer interface to enhance learning

Summer, 2018

Duties: Trained research assistants on thesis procedure and theory; analyzed electrophysiological data

Project: Reactivating forgotten memories during sleep

Summer, 2017

<u>Duties</u>: Selectively reactivating memories in humans using real-time electroencephalography; built new lab space

Project: Mapping the temporal qualities of reversible amnesia

Summer, 2016

<u>Duties</u>: Coded, analyzed, and presented research outlining the time course of memory inhibition techniques

PEER-REVIEWED, ORIGINAL RESEARCH PUBLICATIONS

- I) <u>Hirschstein, Z.</u>, Vanga, G. R., Wang, G., Novakovic, Z. M., & Department of Control of Control
- 2) <u>Hirschstein Z.</u>, Novakovic Z.M., Grasso P. (2019). MA-[D-Leu-4]-OB3, a Small Molecule Synthetic Peptide Leptin Mimetic, Normalizes Glucose Tolerance and Episodic Memory in a Mouse Model of Type 2 Diabetes Mellitus and Alzheimer's Disease-Like Cognitive Impairment. International Journal of Peptide Research and Therapeutics. doi:10.1007/s10989-019-09995-0
- 3) Anderson B.M., <u>Hirschstein Z.</u>, Novakovic Z.M., Grasso P. (2019). MA-[d-Leu-4]-OB3, a Small Molecule Synthetic Peptide Leptin Mimetic, Mirrors the Cognitive Enhancing Action of Leptin in a Mouse Model of Type I Diabetes Mellitus and Alzheimer's Disease-Like Cognitive Impairment. International Journal of Peptide Research and Therapeutics. doi:10.1007/s10989-019-09929-w
- 4) Hulbert J.C., <u>Hirschstein Z.</u>, Brontë C.A.L., & Broughton E. (2017). Unintended side effects of a spotless mind: Theory and practice. Memory. doi:10.1080/09658211.2017.1354999

ORIGINAL RESEARCH PUBLICATIONS IN-PROGRESS

- I) Akhtar K.*, <u>Hirschstein Z.</u>*, Iannilli E., Ravi M., Mikkilineni S., Chua F.Y., Watkins H., Ashe J., Puleo C., Kao T.J., Shin D.S. (Forthcoming: Submitted to Experimental Physiology). Non-invasive Focused Ultrasound Neuromodulation Ameliorates Symptoms in Rat Model of Inflammatory Bowel Disease. [*co-first authors]
- 2) <u>Hirschstein Z.*</u>, Akhtar K.*, Madhavan R., Kao T.J., Damaraju M., Barenboim L., Maietta T., Ashe J., Puleo C., Cotero V., Shin D.S. (Forthcoming: data analyzed; manuscript in progress). Coincident Changes in Blood Glucose Level and Paraventricular Nucleus Neuronal Spiking Activity in Response to Non-invasive Focused Ultrasound Application on Liver In Vivo. [*co-first authors]
- 3) Sahai S., Effendi E., Mahoney E., Tucker H., Moolick B., Mamone G., Mikkilineni S., Gupta M., Nicholson A., <u>Hirschstein Z.</u>, Akhtar K., Molho E., Pilitsis J., Shin D.S., (Forthcoming: Submitted to Neuroscience Letters). Effects of Subthalamic Nucleus Deep Brain Stimulation on Neuronal Activity in the Substantia Nigra Pars Compacta in a Rat Model of Parkinson's Disease.
- 4) <u>Hirschstein Z.</u>, Wang A., Anderson B.M., Novakovic Z.M., Grasso P. (Forthcoming: Submitted to Peptides). MA-[D-Leu-4]-OB3, a Small Molecule Synthetic Peptide Leptin Mimetic, Improves Serum Lipid Profiles in Mouse Models of Type I and Type 2 Diabetes Mellitus.

SKILLS

Non-Computational Research Skills:

- <u>Electrophysiology</u>: EEG recording and signal processing, single- and multi-channel *in vivo* signal recording and processing (MAPs, Omniplex); event-related potentials (ERPs) and electrocardiography (ECG)
- Histology: Sectioning, staining, imaging; quantification (Neurolucida, Image]/FIJI) and analysis
- <u>Behavior</u>: Human behavioral paradigm (Think/No-Think, Stop-Signal, n-Back, Stroop Test, Visual Search; survey design) and rodent behavioral paradigm (Open Field, Sucrose Preference, Y-maze, Morris Water Maze, Novel Object Recognition, Limb-Use Asymmetry Test) design, execution, and analysis
- <u>Animal</u>: Rat/mice experience: dosing (intraperitoneal, subcutaneous, intracerebroventricular, oral gavage), craniotomy/stereotactic surgery, tissue collection (brain, colon, nerve, liver), suturing, trans-cardiac perfusion, exsanguination via cardiac puncture, euthanasia (thoracotomy, cervical dislocation)
- Analytics: General statistical proficiency, cell sorting/quantification, machine learning and signal processing
- Writing: IACUC (animal) and IRB (human) applications, grants (including 3 R01s), manuscripts, websites

• Biochemistry: ELISAs, immunostaining, BCA

Computational Skills:

- Cross-platform proficiency (Mac OSX, Windows, Linux; Android, iOS)
- Proficient with:
 - Matlab (and add-ons, e.g., PsychToolbox, FieldTrip, EEGLab, dmlt, wave_clus)
 - o Python, Prism, NeuroExplorer, Any-Maze, Microsoft Office/OpenOffice, Origin Pro, Sigmaplot
 - o Adobe Creative Cloud (Photoshop, Illustrator, InDesign, Lightroom, Premiere, etc.)
- Experience with E-Prime, SPSS, R, JavaScript, and SurveyGizmo
- Hardware and software troubleshooting experience, including electrophysiological/eye-tracking equipment (e.g., OpenVibe, Emotiv, BioPac, AcqKnowledge, Neuroexplorer, Tobii) and basic computer repair

PRESENTATIONS

- I) <u>Hirschstein Z.</u> (February, 2019). Introduction to EEG: Neurophysiological to methodological (and a thesis). Invited lecture to Bard College cognitive psychology course introducing the neurophysiological basis of EEG methods, culminated in presentation of undergraduate thesis. Annandale-On-Hudson, New York.
- Hulbert J.C., Libby N.W., Greenberg M.B., Zhang Z., Agosto M., Prusky S., Parum H., <u>Hirschstein Z.</u> (February, 2019). Sleep's repercussions: Reactivating deprioritized memories during naps. Poster Presented at the Eastern Psychological Association Annual Meeting. New York City, New York.
- 3) Zhang Z., Depietro B., Agosto M., Machen J., Libby N.W., <u>Hirschstein Z.</u>, Thuyein M., Sandbank L., Hulbert J.C. (March, 2018). Reminders of the forgotten: Targeted reactivation of deprioritized memories during sleep. Poster presented at Fenway Psychology Research Conference. Boston, Massachusetts.
- 4) Libby N.W., <u>Hirschstein Z.</u>, Hulbert J.C. (September, 2017). An unnoticed note to forget: Targeted reactivation of deprioritized memories during naps. Poster presented at the 3rd Annual Society for Neuroscience (Hudson-Berkshire Chapter) Meeting. Scotia, New York.
- 5) <u>Hirschstein Z.</u>, Baker-Blake B. Murphy S., Hodge Z., Hulbert J.C. (March, 2017). When forgetting the past induces amnesia for the present: Temporal dynamics of the amnesic shadow. Poster presented at the International Conference of Psychological Science. Vienna, Austria.
- 6) Baker-Blake B., <u>Hirschstein Z.</u>, Hodge Z., Murphy S., Hulbert J.C. (September, 2016). Forgetting the past induces amnesia for the present: Temporal dynamics of the amnesic shadow. Poster presented for the Bard Summer Research Institute. Annandale-On-Hudson, New York.

NON-RESEARCH INTERESTS AND LEADERSHIP

Graphic Arts and Photography

2007 - Present

- Freelance graphic design work: logos, pamphlets, splash screens, etc.
- Featured in IBPA Benjamin Franklin Gold Award Winner Book Silk Weavers of Hill Tribe Laos (2018)

Bard College
Captain of Bard Ultimate (Frisbee) Team

Annandale-On-Hudson, NY

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2017 – 2018

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Mines Advisory Group

Outreach Assistant

Laos / Vietnam / Oregon

2008 – 2015

• Educated and fundraised for MAG's mission to remove unexploded ordnance in Southeast Asia

Audiophobia Eugene, OR Vocalist and guitarist 2009 – 2014

Recorded 4 studio albums; performed on West Coast; managed image, merchandise, profits