

BIOGRAPHICAL SKETCH

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NAME: Buckman, Jennifer F.

eRA COMMONS USER NAME (credential, e.g., agency login): JBUCK12

POSITION TITLE: Associate Professor

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

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
Rutgers University	BA	05/1992	Psychology
Oregon Health & Science University	MS	06/1996	Behavioral Neuroscience
Oregon Health & Science University	PhD	09/1998	Behavioral Neuroscience
University of Pittsburgh	Postdoctoral Fellow	09/2001	Pharmacology
Rutgers University	MBA	01/2006	Business

A. Personal Statement

I am a career research scientist in alcohol studies with a translational and transdisciplinary background that spans cell, animal, and human experimental models, and conceptual areas that include psychophysiology, neuroscience, pharmacology, and psychology. My career focuses on team science projects that seek to transform current perspectives on alcohol use and misuse. Our research focuses on the automatic physiological processes that interfere with conscious experience to support maladaptive lifestyle choices (e.g., drinking more than intended) and addictive behavior. It seeks to understand physiological mechanisms of behavior change and characterize optimal techniques – that are objective, easily taught and easily learned, not dependent on expensive laboratory or clinical equipment, non-pharmaceutical, and scalable – for measuring these change mechanisms. We are funded by multiple grants from the NIH.

The use of psychophysiology tools in human alcohol research has rapidly increased over the past 5 years, but few in our field have comprehensive training and experience in physiological systems, body-brain interactions, or cardiovascular control mechanisms. Over the past decade, I have immersed myself in these fields to increase our understanding of how bodily systems participate in neural processing and behavioral output. In addition to my currently funded studies, I have two pending projects. One that uses statistics to understand how to harness the brain through bodily systems, with a goal of promoting positive behavior change and/or mitigating negative behavior change. The second seeks to develop techniques to detect the physiological harms of alcohol earlier and more accurately.

B. Positions and Honors**Positions and Employment**

2003 - 2005 Research Associate, Rutgers Univ., Center of Alcohol Studies, Piscataway, NJ
 2005 - 2014 Assistant Research Professor, Rutgers Univ., Center of Alcohol Studies, Piscataway, NJ
 2014 - 2017 Associate Research Professor, Rutgers Univ., Center of Alcohol Studies, Piscataway, NJ
 2016 - 2017 Interim Director of Education & Training, Rutgers Center of Alcohol Studies, Piscataway, NJ
 2017 – Associate Professor, Rutgers Univ., Dept. of Kinesiology and Health, New Brunswick, NJ

Other Experience and Professional Memberships

2005 - 2015 Treasurer, Society of Addiction Psychology
 2012 - Treasurer/Board of Trustees, Collaborative Perspectives on Addictions Conference
 2012 - 2013 Program Chair, 2013 American Psychological Association (APA) Convention, Division 50
 2014 - Editorial Board, Psychology of Addictive Behaviors
 2015 - Assistant Field Editor, Journal of Studies on Alcohol and Drugs

2017-2018 President-Elect, Society of Addiction Psychology (APA Division 50)
2019-2019 President, Society of Addiction Psychology (APA Division 50)

Honors

1998 Individual Predoctoral NRSA Grant, NIAAA
1999 Institutional Training Grant support, NINDS
2000 Individual Postdoctoral NRSA Grant, NINDS
2013 Distinguished Service Award, Society of Addiction Psychology

C. Contribution to Science

1. Innovations in Studying the Physiology of Acute Alcohol Effects. One area of interest focuses on how persistent effects of alcohol on the cardiovascular system arise over time as the result of repeated bouts of acute intoxication and withdrawal. In our prior work, we have repeatedly demonstrated that novel methodological approaches, statistical strategies, and conceptual frameworks can advance the field. For example, we showed that physiological systems come into play early in one's drinking history, with college-aged binge drinkers showing signs of vascular dysregulation when compared to moderate drinkers and non-drinkers. We published a review that formalizes the role that psychophysiology plays in behavioral control and builds a conceptual framework for considering bodily systems in brain-behavior research (both basic and clinical). We reported novel methods for characterizing and visualizing systems-level adaptive responding during an alcohol challenge, introducing measures of coordination between cardiac and vascular control systems and metrics to characterize how cardiovascular subsystems reorganize in response to challenge.

- a) Vaschillo EG, Vaschillo B, Buckman JF, Heiss S, Singh G, Bates ME. Early signs of cardiovascular dysregulation in young adult binge drinkers. *Psychophysiology*. 2018 May;55(5):e13036. PMID: [29193139](#); PMCID: [PMC5899634](#).
- b) Buckman JF, Vaschillo EG, Fonoberova M, Mezić I, Bates ME. The translational value of psychophysiology methods and mechanisms: Multilevel, Dynamic, Personalized. *J Stud Alcohol Drugs*. 2018 Mar;79(2):229-238. PMID: [29553350](#). PMCID: *in progress*.
- c) Buckman JF, Eddie D, Vaschillo EG, Vaschillo B, Garcia A, Bates ME. Immediate and complex cardiovascular adaptation to an acute alcohol dose. *Alcohol Clin Exp Res*. 2015 Dec;39(12):2334-44. PMID: [26614647](#); PMCID: [PMC4971776](#).
- d) Bates ME, Buckman JF, Vaschillo EG, Fonoberov VA, Fonoberova M, Vaschillo B, Mun EY, Mezić A, Mezić I. The redistribution of power: neurocardiac signaling, alcohol and gender. *PLoS One*. 2011;6(12):e28281. PMID: [22164260](#); PMCID: [PMC3229550](#).

2. Physiological Mechanisms of Behavior Change. Individuals with substance use disorders often use alcohol and other drugs "automatically", unaware of the internal and environmental triggers that instigate continued use, relapse, and motivational failures. These automatic substance use behaviors are supported in part by physiological reactions to environmental cues filtered through the context of internal state. Such reactions, which happen involuntarily through prior associative learning, can initiate or exacerbate negative affective states that can serve to reinforce drinking even when conscious efforts to refrain from drinking are strong. We showed a link between significantly escalating alcohol use patterns over emerging adulthood and a pattern of less regulated HRV reactivity to emotional picture cues. We also reported on how HRV at rest as well as HRV reactivity during a breathing challenge are linked to lifestyles and health behaviors, such as alcohol use, exercise, and body mass index. We developed innovative methods to capture the functioning of all three baroreflex branches and a computational physiological approach to better understand, *in vivo*, how cardiovascular processes change when the baroreflex is challenged. We explored paced sighing to influence physiological oscillations in the very low frequency range, which has significant implications for "exercising" vascular tone in much the same way that HRV biofeedback paced breathing "exercises" cardiac tone.

- a) Vaschillo EG, Vaschillo B, Buckman JF, Nguyen-Louie T, Heiss S, Pandina RJ, Bates ME. The effects of sighing on the cardiovascular system. *Biol Psychol*. 2015 Mar;106:86-95. PMID: [25720947](#); PMCID: [PMC4386588](#).
- b) Udo T, Mun EY, Buckman JF, Vaschillo EG, Vaschillo B, Bates ME. Potential side effects of unhealthy lifestyle choices and health risks on basal and reactive heart rate variability in college drinkers. *J Stud*

Alcohol Drugs. 2013;74(5):787-96. PMID: [23948539](#); PMCID: [PMC3749321](#).

- c) Vaschillo EG, Vaschillo B, Buckman JF, Pandina RJ, Bates ME. Measurement of vascular tone and stroke volume baroreflex gain. *Psychophysiology*. 2012 Feb;49(2):193-7. PMID: [22092290](#); PMCID: [PMC3366428](#).
- d) Buckman JF, White HR, Bates ME. Psychophysiological reactivity to emotional picture cues two years after college students were mandated for alcohol interventions. *Addict Behav*. 2010 Aug;35(8):786-90. PMID: [20409645](#); PMCID: [PMC2872043](#).

3. Persistent Cognitive Deficits and Alcohol Use Disorders (AUD). There has been a surge of clinical and research interest in the relation of cognitive impairment to addiction treatment outcome, and in developing new ways to intervene in non-adaptive neurocognitive processes that may interfere with recovery. In our earlier work, we provided tools to identify individuals with cognitive deficits as they enter treatment, demonstrated that cognitive impairment disrupts mechanisms of behavior change both within (i.e., self-efficacy) and outside (i.e., social support) of AUD treatment. These findings suggest that clinical treatment strategies that tax higher-order cognitive processes may be less effective for those individuals with neurocognitive impairments and that identification of cognitive impairment at treatment entry may allow frontline clinicians to tailor treatment strategies to improve substance use outcomes and enhance cognitive recovery. We also reviewed the neurobiological and psychosocial impacts of cognitive impairment on addiction recovery and promising new interventions that may bolster neurocognitive functioning in tandem with existing evidence-based practices.

- a) Nguyen-Louie TT, Buckman JF, Ray S, Bates ME. Drinkers' memory bias for alcohol picture cues in explicit and implicit memory tasks. *Drug Alcohol Depend*. 2016;160:90-6. PMID: [26811126](#); PMCID: [PMC4855832](#).
- b) Bates ME, Buckman JF, Nguyen TT. A role for cognitive rehabilitation in increasing the effectiveness of treatment for alcohol use disorders. *Neuropsychol Rev*. 2013; 23(1):27-47. PMID: [23412885](#); PMCID: [PMC3610413](#).
- c) Buckman JF, Bates ME, Morgenstern J. Social support and cognitive impairment in clients receiving treatment for alcohol- and drug-use disorders: a replication study. *J Stud Alcohol Drugs*. 2008; 69(5):738-46. PMID: [18781249](#); PMCID: [PMC2575395](#).
- d) Bates ME, Pawlak AP, Tonigan JS, Buckman JF. Cognitive impairment influences drinking outcome by altering therapeutic mechanisms of change. *Psychol Addict Behav*. 2006;20(3):241-53. PMID: [16938062](#); PMCID: [PMC2965453](#).

4. Innovating to capture change in neurons and behavior: real time, over time, and on small scales. Change cannot be fully understood when measured as a series of disconnected snapshots of biological and behavioral processes across time. Change also is not most accurately defined when measured at the level of the group mean or defined through a retrospective lens. Several research studies that have spanned my scientific career address these issues with innovations to improve our understanding of change as it occurs within an individual over time. As a post-doctoral fellow, I captured dynamic mitochondrial behavior in real-time in cultured neurons and astrocytes. We reported (previously undescribed) widespread, low-amplitude fluctuations in mitochondrial membrane potential that reflected partial, transient depolarizations that served a normal, inherent physiological function. More recently, we examined change in cognitive and physiological function at the level of the individual to overcome the tacit assumption that individual change occurs in the same form, and to the same extent and rate, as average change. Using descriptive empirical growth plots of cognitive recovery data, we showed that not only did a large proportion of participant's cognitive change trajectories differ from the modal trajectory, the manner in which they differed varied. We used computational modeling to show three dynamic parameters (splanchnic peripheral compliance, arterial receptor gain on sympathetic control of heart period, and minimum left ventricular elastance) demonstrated large, but highly varied, reactions when the baroreflex mechanism was challenged by resonance breathing; many non-modal response patterns were observed.

- a) Fonoberova M, Mezić I, Buckman JF, Fonoberov VA, Mezić A, Vaschillo EG, Mun EY, Vaschillo B, Bates ME. A computational physiology approach to personalized treatment models: the beneficial effects of slow breathing on the human cardiovascular system. *Am J Physiol Heart Circ Physiol*. 2014 Oct 1;307(7):H1073-91. PMID: [25063789](#); PMCID: [PMC4187074](#).
- b) Bates ME, Buckman JF, Voelbel GT, Eddie D, Freeman J. The mean and the individual: integrating variable-centered and person-centered analyses of cognitive recovery in patients with substance use

disorders. *Front Psychiatry*. 2013;4:177. PMID: [24399976](#); PMCID: [PMC3870950](#).

- c) Buckman JF, Reynolds IJ. Spontaneous changes in mitochondrial membrane potential in cultured neurons. *J Neurosci*. 2001 Jul 15;21(14):5054-65. PMID: [11438581](#).
- d) MitoTracker labeling in primary neuronal and astrocytic cultures: influence of mitochondrial membrane potential and oxidants. *J Neurosci Methods*. 2001 Jan 15;104(2):165-76. PMID: [11164242](#).

5. Collegiate Athlete Substance Use and Other Health Risks. My research on college athletes has shown that they behave much like their emerging adult non-athlete peers: They often engage in high risk drinking behaviors and social-recreational drug use, and allow contextual and peer influences to outweigh logic in decision making. This was true in relation to alcohol use and concussion reporting. My research has suggested that current psychoeducational programs aimed at athletes have been successful in educating athletes about concussions, but not drug classifications and drug interactions. My collaboration with the National Collegiate Athletic Association (NCAA) showed that athletes may mix illicit drugs, banned substances, and even permissible supplements in a way that can damage cardiovascular or other biological systems, as well as athletic performance. Interestingly, this study showed that athletes who engage in performance enhancing substance use (ostensibly to improve performance) are also more likely to engage in social-recreational substance use that is widely viewed as harming performance. Other research studies from my group have suggested that college athletes drink about the same quantity per week as nonathletes, but do so over fewer drinking occasions and likely achieve much higher blood alcohol levels on these occasions. These factors contribute to the perception that college athletes are a high-risk sample in terms of lifestyle choices and health behavior and identify this sample as one that requires unique and tailored prevention and intervention programs to support long-term quality of life. My two New Jersey state-funded grants on this topic sought to connect substance use behaviors with risk for concussion and other injuries and participants from these studies are included in the present application.

- a) Conway FN, Domingues M, Monaco R, Lesnewich LM, Ray AE, Alderman BL, Todaro SM, Buckman JF. Concussion symptom underreporting among incoming National Collegiate Athletic Association Division I college athletes. *Clin J Sport Med*. 2018 Jan 11; PMID: [29329116](#). PMCID: *in progress*.
- b) Olson RL, Brush CJ, Ehmann PJ, Buckman JF, Alderman BL. A history of sport-related concussion is associated with sustained deficits in conflict and error monitoring. *Int J Psychophysiol*. 2018 Jan 27; PMID: [29355581](#). PMCID: *in progress*.
- c) Buckman JF, Farris SG, Yusko DA. A national study of substance use behaviors among NCAA male athletes who use banned performance enhancing substances. *Drug Alcohol Depend*. 2013;131(1-2):50-5. PMID: [23688842](#); PMCID: [PMC3763820](#).
- d) Buckman JF, Yusko DA, White HR, Pandina RJ. Risk profile of male college athletes who use performance-enhancing substances. *J Stud Alcohol Drugs*. 2009;70(6):919-23. PMID: [19895768](#); PMCID: [PMC2776121](#).

Complete List of Published Work:

<http://www.ncbi.nlm.nih.gov/myncbi/jennifer.buckman.1/bibliography/40704535/public/?sort=date&direction=ascending>

D. Additional Information: Research Support and/or Scholastic Performance

Ongoing Research Support

K02AA025123, National Institute on Alcohol Abuse and Alcoholism

07/01/17 – 06/30/2022

Buckman, Jennifer F. (PI)

Deconstructing the Temporal and Multi-Level Influences of the Baroreflex Mechanism on Alcohol Use Behaviors.

This career award provides salary for protected research time to allow examination of the baroreflex mechanism's temporal nature and multi-level influence on physiology, cognition, and behavior.

R13 AA022858

02/01/17-01/31/20

Hoepfner, Bettina (PI), Role: Co-Investigator

Enhancing Dissemination and Career Development via the APA Annual Convention

A conference grant that supports alcohol-related convention activities at the APA meeting.

R01 AA023667

02/20/15-12/31/19

Buckman, Jennifer F. (PI) & Bates, Marsha E (PI)

Project IMPACT: In-the-Moment Protection from Automatic Capture by Triggers

This randomized clinical trial (RCT) assesses a physiological-based intervention that is added to behavioral treatment as usual to validate the operation of the baroreflex as a biobehavioral change mechanism.

Completed Research Support

CBIR14IRG020, NJ Commission on Brain Injury Research

06/01/14-06/30/18 (NCE)

Buckman, Jennifer F. (PI)

Validating HRV as an Objective Clinical Measure of TBI Symptom Severity and Recovery to Inform Physicians' Return-To-Play Decisions

This project measures heart-brain signaling following a sports-related TBI to improve predictions of symptom recovery and add neurocardiac evidence to support clinical return-to-play decisions.

CBIR13IRG028, NJ Commission on Brain Injury Research

06/01/13-05/31/17 (NCE)

Buckman, Jennifer F. (PI)

Developing a Comprehensive Clinical Profile of TBI in Concussed Athletes using Advanced Statistical Approaches

This project applies advanced statistical strategies to pre- and post-injury clinical data from Rutgers Sports Medicine to build predictive models of recovery following a sports-related TBI.

R13 AA017107/AA022858

06/01/07-01/31/17

Buckman, Jennifer F. (PI)

Enhancing Dissemination and Career Development via the APA Annual Convention

This conference grant supports convention activities organized by the Society of Addiction Psychology at the APA meeting that promote information exchange between clinical and research communities.

R21AA022748, National Institute on Alcohol Abuse and Alcoholism

01/01/14-12/31/16

Bates, Marsha E. (PI), Role: Co-Investigator

fMRI and Integrated Neurocardiac Control of Alcohol Cue Reactivity

This project simultaneously captures brain reactivity and cardiovascular changes (ECG) during cue reactivity tasks in non-treatment seeking emerging adults with alcohol dependence and matched controls.

K01 AA017473

07/10/09-06/30/15

Buckman, Jennifer F. (PI)

Exploring Genetic Influences on Alcohol Use using Novel Statistical Methods

This project focuses on developing statistical approaches for identifying the interrelationship of polymorphisms in neurobiological genes and intermediate phenotypes of drug and alcohol use.

R21AA020367

02/01/12-01/31/15

Vaschillo, Evgeny G. (PI), Role: Co-Investigator

Examining the Vascular Tone Baroreflex as a Target for Alcohol Use Intervention

This grant investigated the vascular tone baroreflex as a physiological mechanism that links the vascular actions of alcohol to adaptive behavior.