

**PEARL H. CHIU, PhD**

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**EDUCATION AND EMPLOYMENT**

1998 **Harvard University, Cambridge, MA**  
AB Field: Psychology and Biology, Track in Cognitive Neuroscience

1998 - 2000 **Harvard University, Cambridge, MA**  
Lab Coordinator Interpersonal Perception and Communication Lab (PI: Nalini Ambady, PhD)

2004 **Harvard University, Cambridge, MA**  
AM Field: Psychology

2005 - 2006 **Baylor College of Medicine, Menninger Department of Psychiatry & Behavioral Sciences and Human Neuroimaging Laboratory, Houston, TX**  
Intern Field: Clinical Psychology, Adult Neuroscience Track (APA Accredited Internship)

2006 **Harvard University, Cambridge, MA.**  
PhD Field: Psychology (Clinical Science)

2006 - 2007 **Baylor College of Medicine, Department of Neuroscience**  
Post-doc Fellow Human Neuroimaging Lab (PI: Read Montague, PhD)

2007 - 12/2010 **Baylor College of Medicine, Department of Neuroscience and Menninger Department of Psychiatry and Behavioral Sciences (Adjunct 2011 - 2013); Michael E. Debakey Veterans Affairs Medical Center (Research Scientist)**  
Assistant Professor

01/2011 - 06/2016 **Virginia Tech Carilion Research Institute & School of Medicine, Roanoke VA; Virginia Tech Department of Psychology, Blacksburg VA**  
Assistant Professor

2011 - present **Salem Veterans Affairs Medical Center, Salem VA**  
Research Scientist

07/2016 - present **Virginia Tech Carilion Research Institute & School of Medicine, Roanoke VA; Virginia Tech Department of Psychology, Blacksburg VA (with tenure)**  
Associate Professor

**AWARDS AND HONORS**

1998 **John Harvard Certificate of Merit.** University recognition of academic merit.

1998 **Certificate in Mind, Brain, Behavior.** University recognition of interdisciplinary research.

2000 - 2001 **Stimson Prize for Research,** Harvard University.

2001 **Bok Certificate of Distinction in Teaching,** Harvard University. 4.9/5.0 teaching rating.

2001 **Vincent Prize.** For Innovative Ideas for the Awareness & Treatment of Depression.

2001 - 2002 **Sackler Fellowship in Psychobiology.** Distinction for interdisciplinary research.

2003 - 2004 **Harvard University Graduate Society Dissertation Merit Fellowship.**

2004 **Student Poster Award,** Society for Psychophysiological Research.

2004 - 2005 **Dissertation Completion Merit Fellowship,** Harvard University.

2006 - 2007 **American Psychological Association Diversity in Neuroscience Postdoctoral Fellowship**

2010 **Biobehavioral Research Award for Innovative New Scientists (BRAINS),** National Institute of Mental Health.

2012 **Virginia Tech Scholar of the Week,** April 9.

2015 **National Public Radio, Source of the Week**

## PROFESSIONAL SERVICE

**Ad Hoc Reviewer:** Archives of General Psychiatry; Autism Research; Biological Psychiatry; Biological Psychology; Computational Psychiatry; Cognitive, Affective, and Behavioral Neuroscience; Emotion; Experimental Biology & Medicine; Health Psychology; Human Brain Mapping; Journal of Cognitive Neuroscience; Journal of Psychiatric Research; Nature Neuroscience; Neural Computation; NeuroImage; Neuron; Neuropsychologia; Neuroscience; Psychiatry Research: Neuroimaging; PLOS Computational Biology; Psychophysiology; Science; Scientific Reports; Conference Proceedings for Organization for Human Brain Mapping; Conference Proceedings for the Multi-disciplinary Conference on Reinforcement Learning and Decision Making.

**Service:** **National:** National Institute of Mental Health Special Emphasis Review Panels ZMH1 ERB - (L04), March 2011; ZMH1 ERB - (S04), March 2012; ZMH1 ERB - (L04), March 2013; ZMH1 ERB-S (02), December 2013; ZMH1 ERB-D (01), September 2015; ZMH1 ERB-S (01), November 2015; ZMH1 ERB-M (05), June 2016; ZMH1 ERB-M (01) S, November 2016; ZMH1 ERB-L (02), February 2017. National Institute on Drug Abuse Special Emphasis Review Panel ZDA1 MXL-F(08), July 2013. Department of Veterans Affairs MHBB 1 - Mental Health and Behavioral Science B Merit Review Panel, January 2017.

**International:** Reviewer, Swiss National Science Foundation (2014)

**Baylor College of Medicine:** Department of Neuroscience, Computational/Cognitive Faculty Search Committee (2006 - 2008); Group to define student competencies in quantitative skills (2007 - 2008); Seminar Series Committee (2008); Ad Hoc Committee on Graduate Admissions (2009); Executive Committee, Neuroscience Graduate Program (2010); Member, Translational Biology & Molecular Medicine Graduate Program (2010).

**Virginia Tech:** **Virginia Tech Carilion Research Institute** Distinguished Visiting Scholar Seminar Series Committee (2011 - 2012); Cardio/Cerebrovascular Faculty Search Committee (2011). **Virginia Tech** Center for Autism Research Steering Committee Member (2012 - present); Adaptive Brain and Behavior Steering Committee (2016 - present); **College of Science**, Neuroscience Faculty Search Committee (2012 - 2013, 2015 - 2016), Scholarship Reviewer (2015); **Department of Psychology**, Scholarly Productivity Committee (2012 - present); Diversity Committee (2016 - present). **Carilion Clinic:** **Carilion Clinic** Research Committee (2012 - 2013).

## PEER-REVIEWED PAPERS

Chiu, P, Ambady, N, & Deldin, P (2004). CNV to emotional in- and out-group stimuli differentiates high- and low- prejudiced individuals. *Journal of Cognitive Neuroscience*, 16, 1030-1039.

Deldin, P & Chiu, P (2005). Cognitive restructuring and EEG in major depression. *Biological Psychology*, 70, 141-151.

Chiu, PH & Deldin, P (2007). Neural evidence for enhanced error detection in major depressive disorder. *American Journal of Psychiatry*, 164, 608-616.

Commentary in: Oquendo, MA & Parsey, RV (2007). What have we learned about the neurobiology of major depression? *American Journal of Psychiatry*, 164, 540-542.

Chiu\*, PH, Kayali\*, MA, Kishida, KT, Tomlin, D, Klinger, LG, Klinger, MR, Montague, PR (2008). Self responses along cingulate cortex reveal quantitative neural phenotype for high functioning autism. *Neuron*, 57, 463-473.

Commentary in: Frith, CD & Frith U (2008). The self and its reputation in autism. *Neuron*, 57, 331-332.

Chiu\*, PH, Lohrenz\*, TM, Montague, PR (2008). Smokers' brains compute but ignore a fictive error signal in a sequential investment task. *Nature Neuroscience*, 11, 514-520.

- Chiu, PH, Holmes, AJ, Pizzagalli, DA (2008). Dissociable recruitment of rostral anterior cingulate and inferior frontal cortex in emotional response inhibition. *NeuroImage*, 42, 988-997.
- Lindsey, L<sup>#</sup>, King-Casas, B, Brovko, J, Chiu, PH (2009). Toward functional neurobehavioral assessment of mood and anxiety. *Conference Proceedings of the IEEE Engineering in Medicine and Biology Society*, 2009, 5393-5396.
- Herman, S, Archambeau, OG<sup>#</sup>, Deliramich, AN<sup>#</sup>, Kim, BSK, Chiu, PH, Frueh, BC (2011). Depressive symptoms and mental health treatment in an ethn racially diverse college student sample. *Journal of American College Health*, 59, 715-720.
- Tso, IF<sup>#</sup>, Chiu, PH, King-Casas, BR, Deldin P (2011). Alterations in affective processing of attack images following September 11, 2001. *Journal of Traumatic Stress*, 24, 538-545.
- D'Andrea, W<sup>#</sup>, Chiu, PH, Casas, BR, & Deldin, P (2012). Linguistic predictors of post-traumatic disorder symptoms following 11 September 2001. *Applied Cognitive Psychology*, 26, 316-323.
- King-Casas<sup>\*</sup>, B & Chiu<sup>\*</sup>, PH (2012). Understanding social function in psychiatric illness through multi-player economic games. *Biological Psychiatry*, 72, 119-125.
- White, SW, Mazefsky, CA, Dichter, GS, Chiu, PH, Richey, JA, Ollendick, TH (2014). Social-cognitive, physiological, and neural mechanisms underlying emotion regulation impairments: Understanding anxiety in autism spectrum disorder. *International Journal of Developmental Neuroscience*, 39, 22 - 36.
- Zhu, L<sup>#</sup>, Jenkins, AC, Set, E, Scabini, D, Knight, RT, Chiu, PH, King-Casas<sup>\*</sup>, B, Hsu<sup>\*</sup>, M (2014). Damage to dorsolateral prefrontal cortex affects tradeoffs between honesty and self-interest. *Nature Neuroscience*, 17, 1319 - 1321.
- Williams, W, Graham, D, McCurry, K<sup>#</sup>, Sanders, A, Eiseman, J, Chiu<sup>\*</sup>, PH, King-Casas<sup>\*</sup>, B (2014). Group psychotherapy's impact on trust in veterans with PTSD: A pilot study. *Bulletin of the Menninger Clinic*, 78, 335 - 348.
- Marsden, KE<sup>\*\*</sup>, Ma<sup>\*</sup>, WJ, Deci, EL, Ryan, RM, Chiu, PH (2015). Diminished neural responses predict enhanced intrinsic motivation and sensitivity to external incentive. *Cognitive, Affective, & Behavioral Neuroscience*, 15, 276 - 286.
- Chung, D<sup>#</sup>, Christopoulos, G<sup>\*\*</sup>, King-Casas, B<sup>\*</sup>, Ball, S, Chiu, PH (2015). Social signals of safety and risk confer utility and have asymmetric effects on observers' choices. *Nature Neuroscience*, 18, 912 - 916.
- Commentary in: Smith, DV & Delgado, MR (2015) Social nudges: utility conferred from others. *Nature Neuroscience*, 18, 791 - 792.
- Kim-Spoon, J, Kahn, R<sup>#</sup>, Deater-Deckard, K, Chiu, PH, Steinberg, L, King-Casas, B (2016). Risky decision making in a laboratory driving task is associated with health risk behaviors during late adolescence but not adulthood. *International Journal of Behavioral Development*. 40, 58 - 63.
- Kim-Spoon, J, Deater-Deckard, K, Holmes, C, Lee, J, Chiu, P, King-Casas, B (2016). Behavioral and neural inhibitory control moderates the effects of reward sensitivity on adolescent substance use. *Neuropsychologia*. 91, 318-326.
- Kim-Spoon, J, Kahn, RE, Lauharatanahirun, N, Deater-Deckard, K, Bickel, WK, Chiu, PH, King-Casas, B (2017). Executive functioning and substance use in adolescence: Neurobiological and behavioral perspectives. *Neuropsychologia*, 100, 79-92.
- Chung, D, Kadlec, K, Aimone, J, McCurry, K, King-Casas, B, Chiu, PH (2017). Valuation in major depression is intact and stable in a non-learning environment. *Scientific Reports*, 7, doi:10.1038/srep44374.

\* equal contribution

# trainee co-author

## CHAPTERS AND COMMENTARY

- Deldin, P, Shestyuk, A, & Chiu, P (2003). ERP indices of memory biases in depression. In M. Lenzenweger and J. Hooley (Eds.), *Principles of Experimental Psychopathology* (pp. 195-210). Washington, D.C.: APA.

- Ambady, N, Chiao, J, Chiu, P, & Deldin, P (2005). Race and emotion: insights from a social neuroscience perspective. In JT Cacioppo, PS Visser, CL Pickett (Eds.), *Social Neuroscience: People Thinking About People*. (pp. 209-228). Cambridge MA: MIT Press.
- Montague, PR & Chiu, PH (2007). For goodness' sake. [News and Views] *Nature Neuroscience*, 10, 137-138.
- Montague, PR & Chiu, PH (2009). Brain reward and fMRI. In Charney, D. and Nestler, E. (Eds.), *Neurobiology of Mental Illness* (pp. 846-866). New York NY: Oxford University Press.

## RESEARCH FUNDING

### Ongoing support

R01MH106756 NIH/NIMH Role: PI	Chiu (PI) Neural substrates of reinforcement learning and its training in depression Goal: Use neurocomputational methods to study and improve learning in depression	02/2016 - 12/2020
R21DA042274 NIH/NIDA Role: PI	Chiu and Chung (PIs) Neural mechanisms of social influence on risky decisions in cocaine dependence Goal: Identify neural substrates of social influence on risky decision making in addiction	04/2017 - 05/2019
R01DA036017 NIH/NIDA Role: Co-I	King-Casas and Kim-Spoon (PIs) Neurobehavioral determinants of adolescent substance use and HIV/STD behaviors Goal: Characterize the development of neural substrates of reward, risk sensitivity, cognitive control	07/2013 - 06/2018
DP7OD018428 NIH/OD Role: Co-I	Friedlander and Van Wart (PIs) Mentorship and development program for biomedical trainees Goal: Expand the training experiences of the nation's biomedical graduate students and postdoctoral fellows to prepare them for a diverse array of research-related roles	10/2013 - 09/2018

### Past support

T32-MH18882 NIH/NIMH	Chiu (Postdoctoral Fellow) American Psychological Association Program in Neuroscience Postdoctoral Fellowship	06/2006 - 07/2007
R21DA026086 NIH/NIDA	Chiu and LaConte (PIs) Localized and distributed real-time fMRI approaches to facilitate self-control in substance abusers	09/2008 - 06/2010
D7030R VA/RR&D Role: Co-I	King-Casas (PI) Neurobehavioral assessment of interpersonal functioning in PTSD Goal: Investigate neural correlates of interpersonal difficulties in veterans with PTSD	10/2009 - 09/2013
R33DA026086 NIH/NIDA Role: PI	Chiu and LaConte (PIs) Localized and distributed real-time fMRI approaches to facilitate self-control in substance abusers Goal: Develop an optimal neurofeedback signal to improve self-control in smokers	07/2010 - 06/2014
R01MH091872 NIH/NIMH Role: PI	Chiu (PI) Neuroimaging major depression and nicotine dependence on axes of valuation Goal: Use neuroimaging to map depression and substance dependence as disorders of motivation	06/2010 - 01/2016
R01MH087692 NIH/NIMH Role: PI	Chiu (PI) Neurobehavioral metrics for the assessment and treatment of depression Goal: Identify quantitative neural predictors of domain-specific response to cognitive behavioral therapy in depression	07/2010 - 01/2016

3R01MH091872-S1 NIH/NIMH	Chiu (PI) Diversity supplement to support training for Ms. Nina Lauharatanahirun	02/2011 - 03/2012
B7760P VA/RR&D Role: Co-I	Williams (PI) Neuroimaging the impact of treatment on neural substrates of trust in PTSD Goal: Investigate neural mechanisms of change following CBT in PTSD	04/2011 - 03/2013
Institute for Society, Culture, and Environment Virginia Tech	Kim (PI) Multi-level predictive modeling of risk decision-making and substance use in adolescence	03/2012-03/2013
Role: Co-I	Goal: Pilot study to examine multi-level predictors of risky decision-making in adolescents	

**TEACHING AND ADVISING**

**Undergraduate and postbaccalaureate training**

9/00 - 6/03      **Research Supervisor**, Department of Psychology, Harvard University. Supervised undergraduate research assistants and students conducting honors thesis research.

9/00 - 6/05      **Academic Advisor**, Department of Psychology, Harvard University.

9/00 - 6/05      **Senior Common Room Member** (non-resident advisor), Cabot House, Harvard University.

2007 - present  
Research Mentor      **Department of Neuroscience, Baylor College of Medicine.** *Undergraduate interns:* (1) Magdalena Wistuba, 2007 - 2010, Rice University; (2) Sam Soundar, 2008 - 2010, Rice University; (3) Christina Brovko, Summer 2008, UC Riverside; (4) Andrew Thompson, 2008 - 2009, Rice University; (5) Betsy Ohn, Spring 2009, Rice University; (6) Noemie Levy, Spring 2009, Rice University; (7) Karen Mardsen, Spring 2009 - present; (8) Allen Liao, Summer 2009, Rice University; (9) Chanel Matney, Summer 2009, UT Dallas, Summer Medical and Research Training (SMART) Program; (10) Jamie Sammis, 2009 - 2010, Rice University; (11) Spencer Boucher, Fall 2009 - 2011, Rice University; (12) Stephanie Regan, Summer 2010, Harvard University; (13) Grace Chang, Summer 2010, Rice University. *Post-baccalaureate research assistants:* (1) LaRaun Lindsey, 2007 - 2013 Postbaccalaureate Research Education Program (PREP); (2) Julie Brovko, 2007 - 2009; (3) April Sanders, 2008 - 2009; (4) James Sharp, 2009 - 2010; (5) Jessica Eiseman, 2009 - 2011; (6) Alex Acevedo-Rodriguez, 2009 - 2010, secondary mentor, (PREP); (7) Nina Lauharatanahirun, 2010 - 2011; (8) Cristina Tortarolo, Fall 2010; (9) Luz Martinez, 2010 - 2011 (PREP); (10) Katherine Gardner, 2010 - 2012.

**Virginia Tech Carilion Research Institute & School of Medicine and Virginia Tech Department of Psychology.** *Undergraduate interns:* (1) Phillip Kotlaba, Winter 2011, Virginia Tech; (2) Diandra Gordon, Summer 2011, McNair Scholars Program, US Dept of Education TRIO program; (3) Winston Kennedy, Summer 2011, McNair Scholars Program, US Dept of Education TRIO program; (4) Kathleen McLachlan, 2011, Virginia Tech; (5) Lydia Nguyen, Summer 2013 - present, Virginia Tech; (6) Jennifer Nguyen, 2013, Virginia Tech; (7) Kelly Kadlec, 2015 - present. *Post-baccalaureate research assistants:* (1) Katie McCurry, 2010 - 2012; (2) Jennifer Lent, 2011 - 2012; (3) Brittany Hamilton, 2011 - 2013; (4) Kathleen McLachlan, 2011 - 2013; (5) Cari Rosoff, 2012 - 2015; (6) Andre Plate, 2012 - 2014; (7) Allison McKinnon, 2013 - 2016 (8) Riley Palmer, 2014 - 2016; (9) Jennifer Nguyen, 2014, Virginia Tech; (10) Rachel Wallace, 2014 - 2015; (11) Lauren Reckling, 2015 - 2016; (12) Chris Anzalone, 2016 - present; (13) Brennan Delattre, 2016 - present.

**Graduate student training**

- 3/08 - 2013      **Masters'/Prelim/Doctoral Committees**  
**Prelim/Doctoral Dissertation Committee, Baylor College of Medicine**, Dept of Neuroscience: (1) Erika Perez, advisor Mariella De Biasi; (2) Danny Jenson, advisor John Dani; (3) Josepheen De Asis Cruz, advisor Read Montague, PhD received 2013; (4) Alycia Yarnall, advisor John Dani, Masters' received 2011; (5) Yong Cui, advisors John Dani and Tom Kosten, PhD received 2012. **Virginia Tech**, Dept of Psychology: (1) Vanessa Brown (Chair); (2) John Wang (Chair); (3) Nina Lauharatanahirun; (4) Merage Ghane; (5) Marika Coffman; (6) Katie McCurry; (7) Andrew Valdespino; (8) Fang Wang; (9) Benjamin DeVore; (10) Andrew Valdespino. **Translational Biology, Medicine, & Health**: (1) Holly Toole; (2) Mark Orloff (Chair); (3) Zhuoya Cui. **Masters' Thesis Committee, Virginia Tech**: (1) Nina Lauharatanahirun; (2) John Wang (Chair); (3) Vanessa Brown (Chair); (4) Katie McCurry (Co-Chair); (5) Marika Coffman; (6) Shengchuang Feng (Co-Chair); (7) Michael Lewis.
- 9/11 - present      **Graduate student direct advisees, Virginia Tech**  
 John Wang (BA, University of Michigan; entered Biological Psychology Fall 2011)  
 Nina Lauharatanahirun (co-mentor; BA, Cal State Northridge; entered BP Fall 2011)  
 Vanessa Brown (BA, St Olaf College; entered Clinical Psychology Fall 2012)  
 Katie McCurry (co-mentor; BA, Rice University; entered Clinical Psychology Fall 2012)  
 Shengchuang Feng (co-mentor; entered BP Fall 2014)  
 Zhuoya Cui (co-mentor; entered Translational Biology, Medicine, and Health, Fall 2014)  
 Mark Orloff (BA, Virginia Tech; entered TBMH Fall 2015)
- 2/12 - present      **Medical students, Virginia Tech Carilion School of Medicine**  
 Primary mentor to: (1) Sohan Nagrani, 2011 - 2015 (BA, Virginia Tech); (2) Mercedes Robinson, 2015 - present (BA, Davidson College).  
 4<sup>th</sup> year research evaluator (Manek Aulakh, Sean Fletcher, James Joyner, Samuel Key)  
 2<sup>nd</sup> year research evaluator (Ehsan Dowlati, Steve Punzell, Alisha Tuteja, Omer Abdul Hamid, David Sabbagh, Varun Razdan, Shane Lince)

**Postdoctoral trainees**

- 11/08 - 04/11      Co-Mentor to George Christopoulos (PhD, 2008, Cambridge University); now Assistant Professor at Nanyang Business School, Nanyang Technical University, Singapore.
- 09/09 - 09/2011      Dharol Tankersley (PhD, 2008, Duke University); now senior business analysis at Enerpact LLC.
- 09/10 - 2013      Secondary mentor to Jeff Engelmann (PhD, 2010, University of Minnesota) on R25CA057730 (PI, Shine Chang, MD Anderson); now instructor at University of Texas MD Anderson Cancer Center.
- 12/10 - 2013      Secondary mentor to Cameron Craddock (PhD, 2009, Georgia Institute of Technology) on NARSAD Young Investigator Award (PI Craddock; “Neuro-feedback for default mode network regulation in major depression”); now Director of Imaging, Child Mind Institute, New York and Research Scientist, Nathan Kline Insitute, New York.
- 10/11 - present      Dongil Chung (PhD, 2011, Korea Advanced Institute for Science and Technology)  
 Lusha Zhu (PhD, 2011, University of Illinois at Urbana-Champaign); currently Assistant Professor of Psychology and McGovern Institute, Peking University, China.

**Courses**

- 2/01 - 6/01      **Teaching Fellow**, Laboratory in Psychophysiology (Psy 1856r), Harvard University.  
 Overall Teaching rating: 4.9/5.0
- 9/03 - 2/04      **Co-Head Teaching Fellow**, Abnormal Psychology (Psy 18), Harvard University.

Overall Teaching rating: 4.3/5.0

08/13 - 12/13 **Course Director**, Advanced Topics in Decision Neuroscience (Psyc 6954), Virginia Tech. Overall Teaching rating: 5.2/6.0

### Course Lectures

- 11/2008 **University of Texas Graduate School of Biomedical Sciences.** “Neural signals of decision-making in economic games: Applications to autism and addiction.” (Course number GS02 0043, “Introduction to fMRI”; Course Coordinator Michael Beauchamp).
- 4/2009 **Baylor College of Medicine.** “Neuroimaging healthy and debilitating emotion.” (Course number 350-444, “Brain Imaging from Cell to System”; Course Coordinator Peter Saggau).
- 5/2009 **Baylor College of Medicine.** “Neuroimaging endophenotypes for major depressive disorder.” (Course number 350-422, “Neurobiology of Disease”; Course Coordinator Michael Friedlander).
- 3/2010 **Baylor College of Medicine.** “Neurobehavioral metrics for assessing individual differences and understanding the influence of others.” (Course number 350-434, “Higher Brain Function”; Course Coordinator Mariella De Biasi).
- 5/2010 **Baylor College of Medicine.** “Neuroimaging endophenotypes for major depressive disorder.” (Course number 350-422, “Neurobiology of Disease”; Course Coordinator Michael Friedlander).
- 4/2013 **Virginia Tech.** “Translational neuroimaging: Perspectives from a clinical scientist.” (Course number PSYC 4364, “Introduction to Clinical Psychology”; Course Director Lee Cooper).
- 4/2014 **Virginia Tech.** “Neural substrates of reinforcement learning: Toward understanding & treating substance dependence.” (Course number NEUR 4984, “Neuroeconomics”; Course Director Sheryl Ball).
- 8/2014 **Virginia Tech.** “Depression: An introductory overview.” (Course number TBMH 5004, “Translational Biology, Medicine and Health: Gateway Course”; Course Director Michael Friedlander).
- 3/2015 **Virginia Tech.** “Neurobehavioral substrates of decision-making in depression.” (Course number TBMH 5014, “Fundamentals of Neuroscience”; Course Directors Michael Fox and Brooks King-Casas).
- 4/2015 **Virginia Tech.** Career discussion panelist (Course number PSYC 5374, “Health Psychology”; Course Director Richard Winett).
- 4/2016 **Virginia Tech.** “Cognitive neuroscience of healthy and debilitating emotion (parts 1 & 2).” (Course number TBMH 5014, “Fundamentals of Neuroscience”; Course Directors Michael Fox and Brooks King-Casas).
- 2/2017 **Virginia Tech.** “Computational approaches to psychiatric illness (parts 1 & 2).” (Course number TBMH 5014, “Fundamentals of Neuroscience”; Course Directors Michael Fox and Brooks King-Casas).
- 2/2017 **Virginia Tech.** Career discussion panelist (Course number PSYC 5374, “Health Psychology”; Course Director Richard Winett).

### **INVITED TALKS**

- 2007 **Baylor College of Medicine, Department of Neuroscience**, invited colloquium.
- 2008, 2009 **Baylor College of Medicine**, Imaging in Psychiatry, Residents’ Seminar Series.
- 2008 **Rice University**, Cognitive Research Seminar.

- 2008 **US Department of Defense and Humana Military Healthcare Services.** With Michael Friedlander and Read Montague. Washington, DC.
- 2008 **US Department of Defense and TriCare South Sub-Regional Meeting.** With Michael Friedlander. Nashville, TN.
- 2009 **Rush and Helen Record Forum.** “Translational fMRI: Applications for depression and addiction”
- 2009 **31st Annual International IEEE Engineering in Medicine and Biology Society Conference.** “Toward functional neurobehavioral assessment of mood and anxiety”
- 2010 **University of Southern California, Psychology Colloquium.**
- 2010 **Annual meeting of the Association for Behavioral & Cognitive Therapies, Symposium, Neuroeconomics and Psychopathology: Implications for treatment.** “Making ‘what might happen’ matter: Measuring and modulating control signals in smokers”
- 2011 **Virginia Tech Research Center-Arlington “Meet the Scientists”**
- 2011 **Salem VA Medical Center**
- 2011 **Nanyang Technological University, Culture Science Institute, Singapore**
- 2/2012 **University of Pennsylvania, Center for Cognitive Science Colloquium.** “Decision neuroscience from scan to practice: preliminary data from substance dependence”
- 6/2012 **University of Hawaii at Hilo.** "Translational decision neuroscience from function to practice: A brief overview"
- 8/2012 **Virginia Tech Center for Autism Research Conference.** "Toward neurobehavioral metrics of social function: Examples from autism"
- 9/2012 **Virginia Tech, Dept of Psychology, Clinical Research Forum.** "Translational neuroimaging: preliminary data & perspectives"
- 10/2012 **Blue Ridge Association of Clinical Psychologists.** "Neurobehavioral metrics for the assessment & treatment of depression"
- 3/2013 **Brain School, Brain Awareness Week, Virginia Tech Carilion Research Institute.** "When brains do (or feel!) things we'd rather they didn't"
- 9/2013 **Virginia Conversations, Virginia Public Radio (WVTF)**
- 10/2013 **Virginia Tech Carilion Research Institute European–U.S. Workshop on the Neuroscience of Cognition, Computation, and Decisions, Lugano, Switzerland.** "Neural markers of decision-making in psychiatric illness"
- 10/2013 **Computational Psychiatry 2013, Miami FL.** "Neurobehavioral metrics of decision-making under risk in health and substance dependence."
- 01/2014 **St. Albans Psychiatric Conference, Roanoke VA.** "Translational neuroimaging in psychiatry: An overview and examples from depression."
- 10/2014 **Virginia Tech Presidential Installation** of Timothy Sands, 16th President of Virginia Tech. Panel discussion: Harnessing Brain Power.
- 11/2014 **International Conference on Neuroeconomics and Neuromanagement, Hangzhou, China.** Keynote address: “Neural substrates of decision-making and its change: Examples from psychiatric illness.”
- 3/2015 **Brain School, Brain Awareness Week, Virginia Tech Carilion Research Institute.** "Building blocks of the social brain"
- 5/2015 **National Advisory Mental Health Council, National Institute of Mental Health.** “Toward a computational psychiatry,” Invited panel member, Biobehavioral Research Awards for Innovative New Scientists (BRAINS) Awardee Panel.
- 10/2015 **Society for Research in Psychopathology, New Orleans, LA.** “Understanding social functioning across psychopathologies through valuation and decision-making.”
- 5/2016 **Society of Biological Psychiatry, Atlanta, GA.** “Reinforcement learning parameters of behavioral treatment response in depression.”
- 6/2016 **Women’s Health Virginia, Annual Conference on Women’s Health.** “Depression and its neuroscience.”



## CLINICAL TRAINING

- 11/01 - 05/02  
Practicum **The Cambridge Hospital, Cambridge, MA.** Co-led out-patient anxiety reduction and psychopharmacology education groups. Participated in treatment formulation.  
Supervisors: Kate Dare-Winters, LicSW; Simon LeJeune, MD
- 09/00 - 06/05  
Research Assistant **Diagnostic Assessment, Harvard University, Cambridge, MA.** 350+ hours assessing controls and individuals with schizophrenia or major depression (e.g., Structured Clinical Interview for DSM-IV; Positive and Negative Syndrome Scale; McArthur Maudsley Delusion Assessment Scale; Calgary Depression Scale for Schizophrenia; battery of self-report measures). Supervisor: Patricia Deldin, PhD
- 09/03 - 02/04  
Practicum **Psychological Assessment, Harvard University, Cambridge, MA.** Acquired skills in administering, interpreting, and report-writing of standardized tests in the areas of intellectual and personality assessment (e.g., Wechsler Adult Intelligence Scale, Wechsler Memory Scale, Minnesota Multiphasic Personality Inventory).  
Supervisor: Ellsworth Fersch, PhD
- 10/03 - 08/04  
Practicum **Obsessive Compulsive Disorder Institute, McLean Hospital, Belmont, MA.** Provided one-on-one exposure and response prevention coaching to individuals with treatment-resistant obsessive-compulsive disorder. Co-led Contract Setting treatment groups; observed Cognitive-Behavioral Therapy and Body Dysmorphic Disorder groups.  
Supervisor: Deborah Osgood-Hynes, PsyD
- 09/04 - 06/05  
Practicum **Behavioral Health Partial Program, McLean Hospital, Belmont, MA.** Provided individual short-term therapy, group therapy, and specialized assessment to individuals with a range of severe psychiatric disorders transitioning from in-patient to out-patient facilities. Led and co-led a variety of treatment groups including: Self-Assessment, Medication Education, Depression & Anxiety Management, and Cognitive-Behavioral Therapy for Bipolar Disorder.  
Supervisors: Edmund Neuhaus, PhD; Mary Ellen Crowley, PhD; Nora Ilniczky, PhD
- 07/05 - 07/06  
Clinical Psychology Internship (APA Accredited) **Baylor College of Medicine, Menninger Department of Psychiatry, Human Neuroimaging Laboratory, Houston, TX. Adult Clinical Neuroscience Track.** Acquired training in fMRI study design, data analysis, and interpretation. Provided individual therapy and specialized cognitive, diagnostic, and personality assessment (e.g., SCID-I; Diagnostic Interview for Personality Disorders-IV; Kauffman Brief Intelligence Test-II; battery of self-report cognitive, personality, symptom measures) to individuals participating in research or seeking treatment at the BCM Psychiatry Clinic and Student Counseling Center.  
Supervisors: Read Montague, PhD; Lois Friedman, PhD; Laura Lomax, PhD

## MEMBERSHIPS

Society for Psychophysiological Research (2001 - 2008); Cognitive Neuroscience Society (2002 - present); American Psychological Society (2005 - present); Society for Neuroscience (2006 - present); Society for Neuroeconomics (2006 - 2009); Human Brain Mapping (2007 - present); Society of Biological Psychiatry (2017 - present).

## SYMPOSIA AND POSTER PRESENTATIONS (SELECTED FROM > 70)

- Gray, H, Ambady, N, Chiu, P, David, D, & Deldin, P (2002). Effects of gender priming on processing of mathematical and verbal stimuli: An ERP investigation. Poster, Society for Personality and Social Psychology, Savannah, GA.
- Ambady, N, Chiu, P, & Deldin, P (2002). High and low prejudiced individuals differ in the CNV to emotional in- and out- group faces. Symposium, Society for Personality and Social Psychology, Savannah, GA.

- Chiu, P & Deldin, P (2002). Cognitive restructuring of EEG asymmetries in depression. Poster, Society for Research in Psychopathology, Montreal, Quebec, Canada.
- Chiu, P & Deldin, P (2004). Motivated response monitoring in schizophrenia and depression. *Psychophysiology*, 41, S72. Poster, Society for Psychophysiological Research, Santa Fe, NM. \*Student poster award
- Chiu, P, Lohrenz, T, & Montague, PR (2006). Neural signals of sated and unsated smokers in a sequential investment game. Poster, NIDA Mini-Convention: Frontiers in Addiction Research, Atlanta, GA
- Chiu, P & Deldin, P (2006). Emotion-modulated response-monitoring in schizophrenia. Poster, Society for Psychophysiological Research, Vancouver BC, Canada.
- Chiu, P, Lohrenz, T, & Montague, R (2007). Neural responses of sated and unsated smokers on a sequential investment game. *JOCN*, Supplement, 271. Poster, Cognitive Neuroscience Society, New York, NY.
- Chiu, P, Kayali, A, Kishida, K, Tomlin, D, Klinger, L, Klinger, M, Montague, R (2007). Active interpersonal exchange evokes quantitative neural phenotype in autism. Poster, Society for Neuroscience, San Diego, CA.
- Lohrenz, T, Chiu, P, Montague, R (2007). Smokers compute but ignore a fictive error signal in a sequential investment task. Poster, Society for Neuroscience, San Diego, CA.
- Chiu, P, Kayali, A, Kishida, K, Tomlin, D, Klinger, L, Klinger, M, Montague, R (2008). Self responses along cingulate cortex reveal quantitative neural phenotype for high functioning autism. Poster, Cognitive Neuroscience Society, San Francisco, CA.
- Lindsey, L, Brovko, J, Chiu, P (2008). Quantitative characterization of neurobehavioral responses to affective stimuli. Poster, Society for Neuroscience, Washington DC.
- LaConte, S, King-Casas, B, Lisinski, J, Lindsey, L, Eagleman, DM, Cinciripini, PM, Versace, F, Chiu, PH (2009). Modulating real-time fMRI neurofeedback interfaces via craving and control in chronic smokers. Poster, Organization for Human Brain Mapping, San Francisco, CA.
- Chiu, P, King-Casas, B, Cinciripini, P, Versace, F, Eagleman, D, Lisinski, J, Lindsey, L, LaConte, S (2009) Real-time fMRI modulation of craving and control brain states in chronic smokers, Poster, Society for Neuroscience, Chicago, IL.
- Tankersley, D, Christopoulous, G, King-Casas, B, Chiu, P (2010) Punishment sensitivity predicts BOLD response to prediction errors in reward and avoidance learning, Poster, Organization for Human Brain Mapping, Barcelona, Spain.
- Chiu, P, Lisinski, J, King-Casas, B, Sharp, J, Eagleman, D, Versace, F, Cinciripini, P, LaConte, S (2010) Modulating “crave” and “don’t crave” brain states with real-time fMRI neurofeedback in smokers, Poster, Organization for Human Brain Mapping, Barcelona, Spain.
- McCurry, K, Brown, G, De La Garza, R, Newton, T, Chiu, P, King-Casas, B (2010) Neural correlates of aggression in cocaine dependent individuals. Poster, Society for Neuroscience, San Diego, CA.
- Lindsey, L, McCurry, K, Patel, H, LaConte, S, De La Garza, R, Newton, T, King-Casas, B, Chiu, P (2010) Neural substrates of drug use, craving, and executive control in cocaine users. Poster, Society for Neuroscience, San Diego, CA.
- Tankersley, D, McCurry, K, Christopoulos, G, Newton, T, De La Garza, R, King-Casas, B, Chiu, P (2010) Reward and punishment learning associated with differential response to positive and negative prediction errors in stimulant-dependent subjects. Poster, Society for Neuroscience, San Diego, CA.
- Eiseman, J, Graham, D, Frueh BC, Kosten, T, Chiu, P, King-Casas B (2010) Neural substrates of interpersonal function in post-traumatic stress disorder. Poster, Society for Neuroscience, San Diego, CA.
- Lindsey, L, Eiseman, J, Graham, D, Frueh, BC, Kosten, T, King-Casas, B, Chiu, P (2010) Neuroimaging affective phenotypes in depression and post-traumatic stress disorder. Poster, Society for Neuroscience, San Diego, CA.
- Boucher, S, Tankersley, D, Chiu, P (2010) Affective phenotypes exhibit distinct neural response magnitude and duration to emotional sounds. Poster, Society for Neuroscience, San Diego, CA.
- Gordon, D, McCurry, K, King-Casas, B, Chiu, P (2011) People’s addiction to people: Quantifying trust in interpersonal relationships. Poster, McNair Scholars Summer Research Program Conference, Virginia Tech, Blacksburg, VA.
- Kennedy, W, Lauharatanahirun, N, McCurry, K, Chiu, P, King-Casas, B (2011) The effects of risk preference on risk pooling. Poster, Presented at the McNair Scholars Summer Research Program Conference at Virginia Tech, Blacksburg, VA.

- McCurry, K, Eiseman, J, Gardner, K, Chiu, P, Williams, W, King-Casas, B (2011) Impact of group psychotherapy on neural correlates of trust in veterans with PTSD. Poster, Society for Neuroscience, Washington, DC.
- McCurry, K, Lauharatanahirun, N, De La Garza, R, Newton, T, Chiu, P, King-Casas, B (2011) Neurobehavioral effects of cocaine use in a social dominance task. Poster, Organization for Human Brain Mapping, Quebec City, Canada.
- Teng, EJ, Newsome, MR, Hiatt, EL, Lindsey, L, Chiu, PH (2011) Neural correlates of threat words in PTSD with comorbid panic: A functional MRI case study. Poster, International Society for Traumatic Stress Studies, Baltimore, MD.
- Williams, W, Eiseman, J, McCurry, K, Chiu, P, King-Casas, B (2011) The effectiveness of group psychotherapy in improving trust in veterans with PTSD. Poster, International Society for Traumatic Stress Studies, Baltimore, MD.
- Chung, D, Christopoulos, G, McCurry, K, Newton, T, De La Garza, R, Chiu, P (2012) Neurobehavioral substrates of peer influence on risk preferences of cocaine addicts. Poster, Organization for Human Brain Mapping, Beijing, China.
- Craddock, RC, Lisinski, J, Chiu, P, Mayberg, H, LaConte, S (2012) Real-time tracking and biofeedback of the default mode network. Oral presentation, Organization for Human Brain Mapping, Beijing, China.
- Wang, J, Zhu, L, Tankersley, D, Christopoulos, G, King-Casas, B, Chiu, P (2012) The interaction of feedback and context on learning preferences. Poster, Organization for Human Brain Mapping, Beijing, China.
- Aimone, J, McCurry, K, McNamara, R, Frueh, B, Chiu, P, King-Casas, B (2012) Neural substrates of interpersonal dysfunction in PTSD: Trust without reward. Poster, Society for Neuroscience, New Orleans, LA.
- Chung, D, Christopoulos, G, McCurry, K, Newton, T, De La Garza, R, Chiu, P (2012) Social influence on risky decision-making affects both risk preference and risk perception. Poster, Society for Neuroscience, New Orleans, LA.
- Marsden, K, Ma, W, Deci, E, Ryan, R, Chiu, P (2012) Neural predictors of intrinsic motivation and the impact of external incentive. Poster, Society for Neuroscience, New Orleans, LA.
- McCurry, K, Lindsey, L, McNamara, R, LaConte, S, Frueh, B, King-Casas, B, Chiu, P (2012) Brain state classification of PTSD and comorbid conditions using neural responses to emotional images. Poster, Society for Neuroscience, New Orleans, LA.
- Wang, J, Zhu, L, Tankersley, D, De LaGarza, R, Newton, T, McCurry, K, King-Casas, B, Chiu, P (2012) Neural substrates of learning and valuation in cocaine dependent individuals. Poster, Society for Neuroscience, New Orleans, LA.
- Zhu, L, Chiu, P, King-Casas, B (2012) Neural computations underlying actions in social hierarchy. Poster, Society for Neuroscience, New Orleans, LA.
- Brown, V, Wang, J, Zhu, L, McNamara, R, Rosoff, C, McCurry, K, King-Casas, B, Chiu, P (2013) The neural substrates of reward and punishment learning in major depression. Poster, Organization for Human Brain Mapping, Seattle, WA.
- Chiu, P, Lisinski, J, Plate, A, King-Casas, B, Eagleman, D, Cinciripini, P, LaConte, S (2013) Modulating 'crave' and 'don't crave' brain states using real-time fMRI neurofeedback. Poster, Organization for Human Brain Mapping, Seattle, WA.
- Chung, D, Xu S, Gu, X, Gao, Z, Wang, X, Chiu, P (2013) Causal roles of dorsal anterior cingulate and insula on peer-influenced decision making under risk. Poster, Organization for Human Brain Mapping, Seattle, WA.
- Zhu, L, Rosoff, C, McNamara, R, McCurry, K, Chiu, P, King-Casas, B (2013) Aggression in social contests in veterans with post-traumatic stress disorder. Poster, Organization for Human Brain Mapping, Seattle, WA.
- Aimone, J, Williams, McCurry, K, Frueh, B, Graham, D, Chiu, P, King-Casas, B (2013) Cognitive processing therapy remediates neural social prediction error signaling in PTSD. Poster, Society for Neuroscience, New Orleans, LA.

- Chung, D, Christopoulos, G, Newton, T, De La Garza, R, King-Casas, B, Chiu, P (2013) Cocaine addicts show increased susceptibility to social influence during risky decision making. Poster, Society for Neuroscience, New Orleans, LA.
- Jenkins, A, Zhu, L, Set, E, Scabini, D, Knight, R, Chiu, P, King-Casas, B, Hsu, M (2013) Dissociable neural mechanisms underlying honesty and altruism. Poster, Society for Neuroscience, New Orleans, LA.
- Lauharatanahirun, N, Kim-Spoon, J, Walters, J, Farley, J, Deater-Deckard, K, Bickel, W, Chiu, P, King-Casas, B (2013) The interaction of reward sensitivity and executive function predicts substance use and neural signature of risk processing in adolescents. Poster, Society for Neuroscience, New Orleans, LA.
- Zhu, L, Rosoff, C, McCurry, K, Frueh, B, Chiu, P, King-Casas, B (2013) Aggression in social contests in veterans with post-traumatic stress disorder. Poster, Society for Neuroscience, New Orleans, LA.
- Zhu, L, Set, E, Hsu, M, Ball, S, Chiu, P, King-Casas, B. (2013) The value of honesty: Neural evidence for lie-averse preferences. Poster, Society for Neuroscience, New Orleans, LA.
- Brown, V, Wang, J, Zhu, L, King-Casas, B, Chiu, P (2014) Disrupted reinforcement learning in posttraumatic stress disorder. Poster, Organization for Human Brain Mapping, Hamburg, Germany.
- Chung, D, Aimone, J, Nguyen, L, McKinnon, A, Plate, A, King-Casas, B, Chiu, P (2014) Neural substrates of trust and diminishing motivations of generosity. Poster, Organization for Human Brain Mapping, Hamburg, Germany.
- Lauharatanahirun, N, Kim-Spoon, J, Chiu, P, King-Casas, B (2014). Neural correlates of risk processing and expectation of uncertainty in adolescents. Poster, Organization for Human Brain Mapping, Hamburg, Germany.
- McCurry, K, Lisinski, J, LaConte, S, Chiu, P, King-Casas, B (2014) Development of a group affective brain model for use in real-time fMRI. Poster, Organization for Human Brain Mapping, Hamburg, Germany.
- Wang, J, Zhu, L, De La Garza, R, Newton, T, McCurry, K, King-Casas, B, Chiu, P (2014) Cocaine use modulates neural substrates of loss aversion in a probabilistic learning task. Poster, Organization for Human Brain Mapping, Hamburg, Germany.
- Brown, V, Wang, J, Zhu, L, Rosoff, C, King-Casas, B, Chiu, P (2014) Reinforcement learning predictors of response to CBT in depression. Poster, Association for Behavioral and Cognitive Therapies, Philadelphia, PA.
- Nagrani, S, Chung, D, Chiu, P (2014) A study of risky decision-making in major depressive disorder. Poster, Society for Judgment and Decision Making, Long Beach, CA.
- Lauharatanahirun, N, Ball, S, Aimone, J, Chiu, P, Kim-Spoon, J, King-Casas, B (2015) Neuroeconomic predictors of health risk behaviors in adolescents. Poster, Organization for Human Brain Mapping, Honolulu, HI.
- Chung, D, De La Garza, R, Newton, T, McCurry, K, King-Casas, B, Chiu, P (2015) Neurobehavioral evidence for cognitive enhancement in cocaine dependent individuals. Poster, Organization for Human Brain Mapping, Honolulu, HI.
- Kim-Spoon, J, Chiu, P, Deater-Deckard, K, Farley, J, Lauharatanahirun, N, Bickel, W, King-Casas, B (2015) A neurobehavioral study of the interaction between risk sensitivity and cognitive control predicting adolescent risk taking. Poster, Society for Research on Child Development, Philadelphia, PA.
- Kim-Spoon, J, Kahn, R, Faris, K, Deater-Deckard, K, Chiu, P, King-Casas, B (2015). The association between laboratory risky decision-making and real-life health risk behaviors among adolescents and adults. Poster, Society for Research on Child Development, Philadelphia, PA.
- Kahn, R, Kim-Spoon, J, Deater-Deckard, K, Chiu, P, King-Casas, B (2015). An examination of the interaction between risk sensitivity and inhibitory control related to young adults' substance use. Poster, Society for Research on Child Development, Philadelphia, PA.
- Zhu, L, Chiu, P, King-Casas, B (2015). Neural computations underlying actions in social hierarchy. Talk, 5th Annual Interdisciplinary Symposium on Decision Neuroscience, Cambridge, MA.
- Zhu, L, Wang, J, Ball, S, Hsu, M, Chiu, P, King-Casas, B (2015). The value of honesty: Neural evidence for lie-averse preferences. Poster, 5th Annual Interdisciplinary Symposium on Decision Neuroscience, Cambridge, MA.

- Chung, D, Christopoulos, G, King-Casas, B, Ball, S, Chiu, P (2015). Others' choices increase subjective value and explain asymmetric alignment with safety and risk. Poster, 5th Annual Interdisciplinary Symposium on Decision Neuroscience, Cambridge, MA.
- Feng, S, Brown, VM, Wang, JM, King-Casas, B, & Chiu, P (2015). Disrupted reinforcement learning in smoking and depression. Poster presented at the annual Virginia Tech Carilion Research Institute Retreat, Roanoke, VA.
- Brown, VM, Zhu, L, Wang, JM, Frueh, BC, King-Casas, B, Chiu, PH (2016). Heightened neurobehavioral substrates of associability-based learning in posttraumatic stress disorder. Poster, Society of Biological Psychiatry, Atlanta, GA.
- Brown, VM, Zhu, L, Wang, JM, Solway, A, King-Casas, B, Chiu, P (2016). Neurobehavioral effects of cognitive-behavioral therapy on depression-related disruptions in reinforcement learning. Talk presented at FENS Brain Conference on New Insights into Psychiatric Disorders through Computational, Biological and Developmental Approaches, Copenhagen, Denmark.
- McCurry, K, Frueh, BC, Chiu, P, King-Casas, B (2016). Opponent effects of hyperarousal and re-experiencing on habituation to emotional information in PTSD. Poster, Association for Behavioral and Cognitive Therapies, New York, NY.
- McCurry, K, Lisinski, J, LaConte, S, Chiu, P, King-Casas, B (2016). Development of a neural model of affective states for use in real-time neurofeedback. Poster, Neurocognitive Therapies/Translational Research Special Interest Group at the annual meeting of the Association for Behavioral and Cognitive Therapies, New York, NY.
- Brown, VM, Wang, JM, Zhu, L, King-Casas, B, Chiu, P (2016). Clinical, behavioral, and neural correlates of reinforcement learning in depression. Poster, Association for Behavioral and Cognitive Therapies, New York, NY.
- Brown, VM, King-Casas, B, Chiu, P (2016). From reinforcement learning to behavioral treatment of depression. Talk presented at Society of Biological Psychiatry, Atlanta, GA.
- McCurry, K, Brown, VM, King-Casas, B, Chiu, P (2017) Neuroimaging biomarkers of treatment response in major depressive disorder: An Activation Likelihood Estimation (ALE) meta-analysis. Poster presented at Society of Biological Psychiatry, San Diego, CA.
- Brown, VM, Lee, JI, King-Casas, B, Chiu, P (2017) Towards targeted training of reinforcement learning alterations in depression. Poster presented at Society of Biological Psychiatry, San Diego, CA.