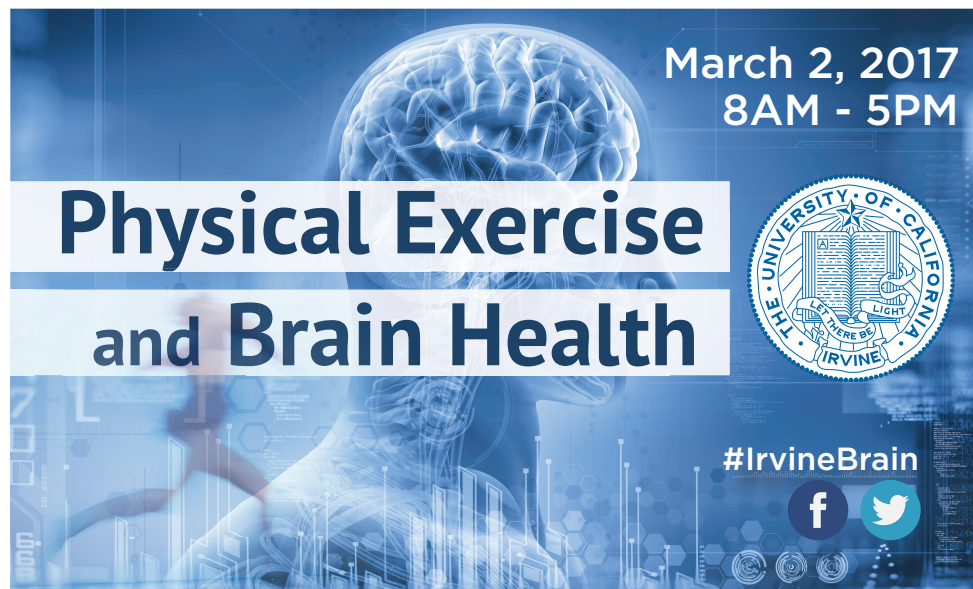


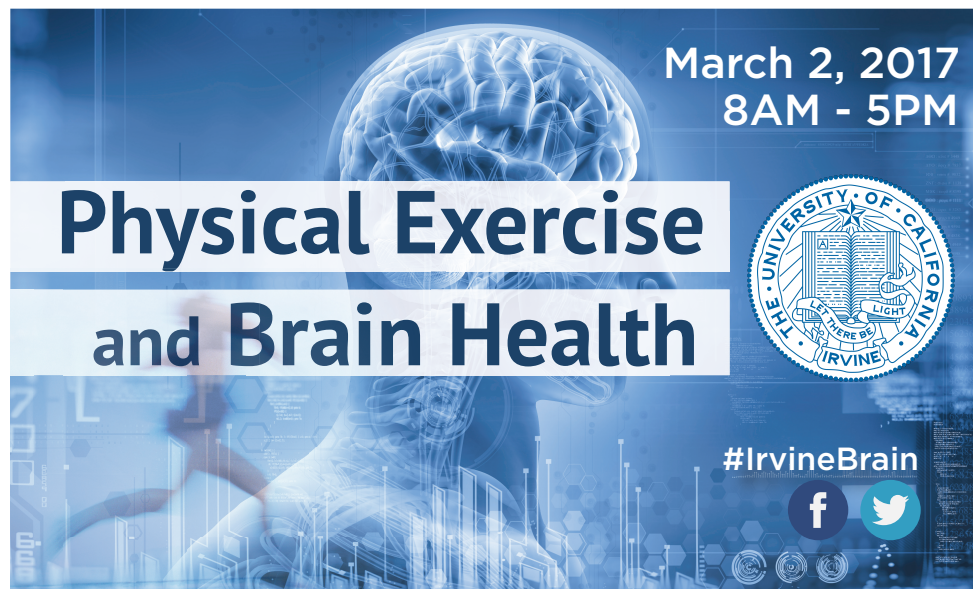
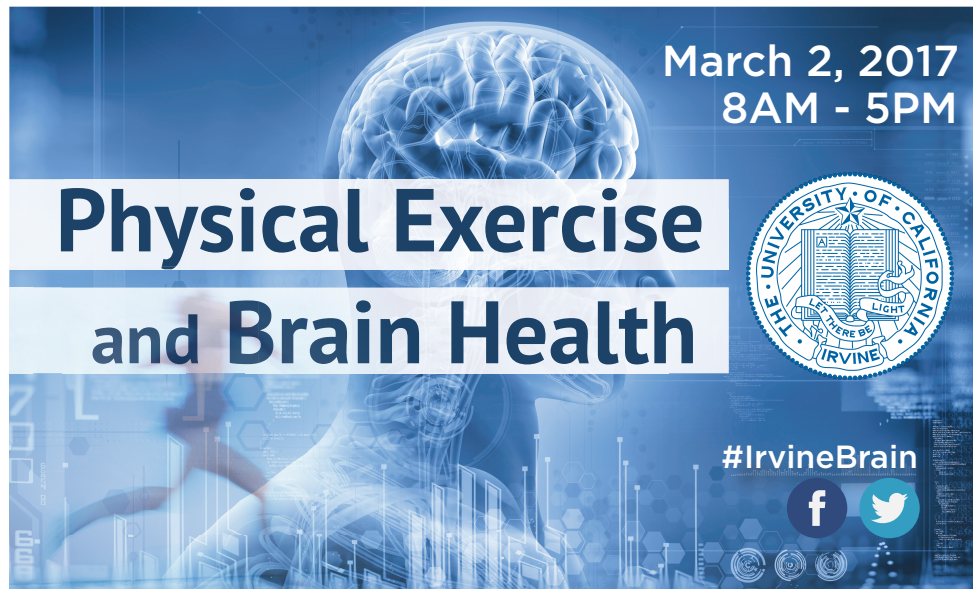


March 2, 2017  
8AM - 5PM

# Physical Exercise and Brain Health



#IrvineBrain

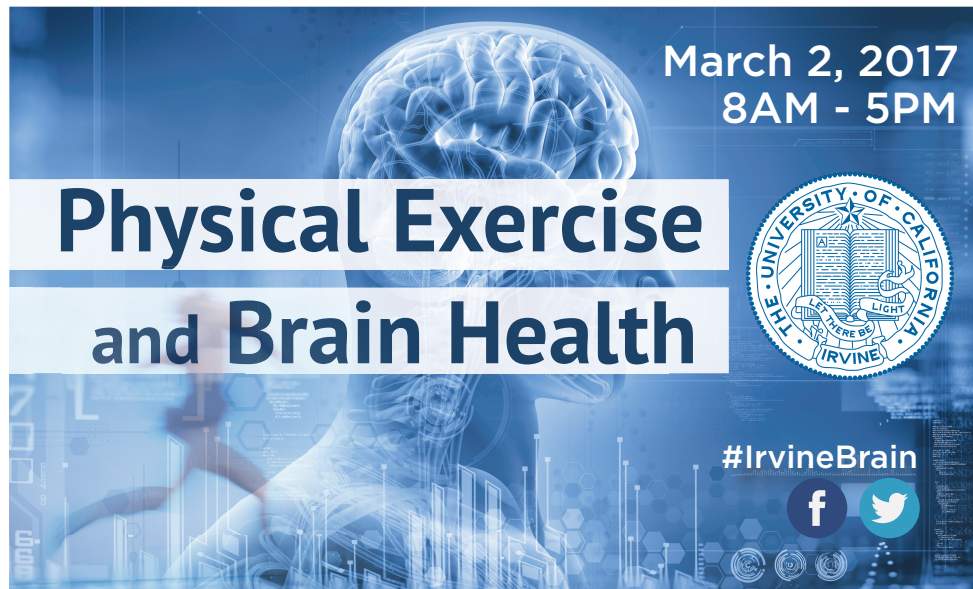
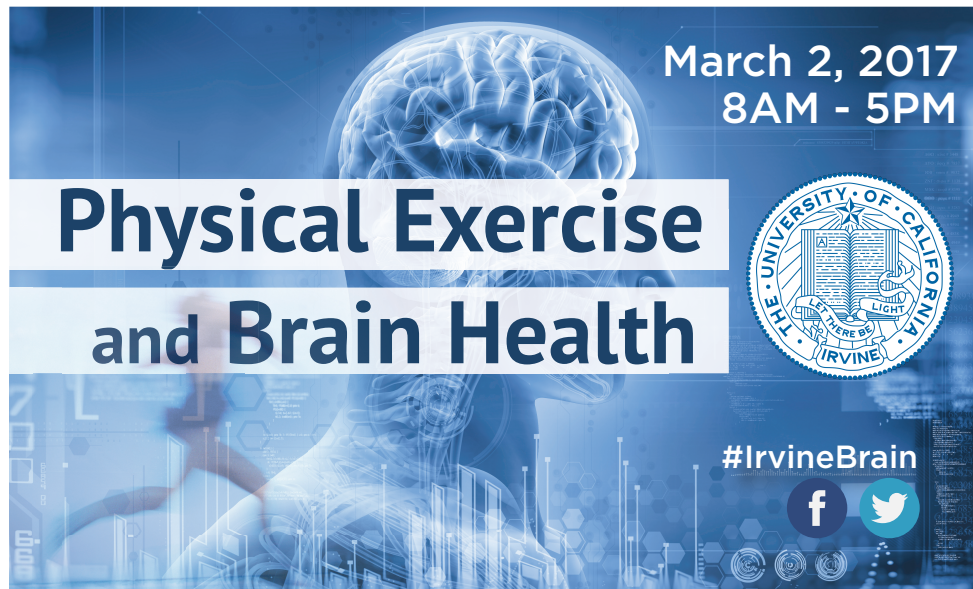


March 2, 2017  
8AM - 5PM

# Physical Exercise and Brain Health



#IrvineBrain



# Symposium Program

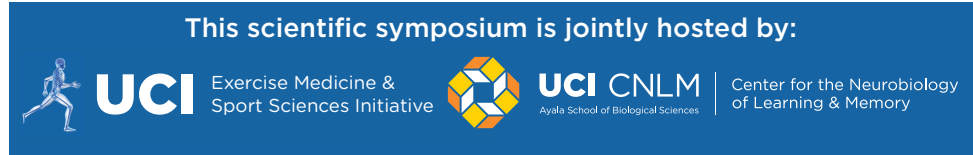


**Arnold and Mabel Beckman Center of the National  
Academies of Science and Engineering**

This scientific symposium is jointly hosted by:

 **UCI** Exercise Medicine & Sport Sciences Initiative

 **UCI CNLM** | Center for the Neurobiology of Learning & Memory  
Ayala School of Biological Sciences



This scientific symposium is jointly hosted by:

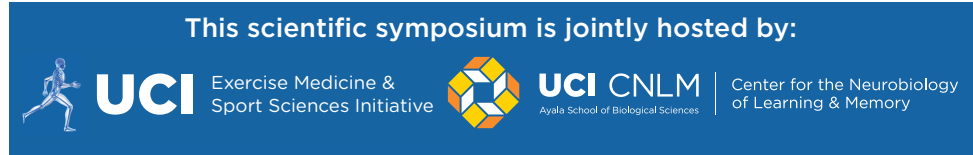
 **UCI** Exercise Medicine & Sport Sciences Initiative

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# Schedule

|          |                                                                                                                                                                                                                      |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8:00 AM  | Coffee and pastries                                                                                                                                                                                                  |
| 8:45 AM  | Welcome and Opening Remarks<br><b>Michael Yassa, Ph.D.</b><br>Director, Center for the Neurobiology of Learning and Memory<br><b>James Hicks, Ph.D.</b><br>Director, Exercise Medicine and Sport Sciences Initiative |
| 9:00 AM  | <b>Kirk Erickson, Ph.D.</b> , University of Pittsburgh<br>Fit body, fit brain: effects of exercise on brain imaging outcomes                                                                                         |
| 9:30 AM  | <b>Michelle Carlson, Ph.D.</b> , Johns Hopkins University<br>Linking physical and social activity to neurocognitive health                                                                                           |
| 10:00 AM | <b>Henriette van Praag, Ph.D.</b> , National Institute on Aging<br>The regulation of adult hippocampal neurogenesis by exercise                                                                                      |
| 10:30 AM | <b>Mark Mattson, Ph.D.</b> , National Institute on Aging<br>Bioenergetic challenges, mitochondrial plasticity, and neuronal resilience                                                                               |
| 11:00 M  | Poster viewing I                                                                                                                                                                                                     |
| 12:00 PM | Lunch                                                                                                                                                                                                                |
| 1:00 PM  | <b>Laura Baker, Ph.D.</b> , Wake Forest University<br>Exercise as medicine: How to slow cognitive impairment and reduce Alzheimer's pathology in adults with mild cognitive impairment                               |
| 1:30 PM  | <b>Carl Cotman, Ph.D.</b> , University of California, Irvine<br>Exercise and neuroscience: Exercise builds brain health                                                                                              |
| 2:00 PM  | <b>Wendy Suzuki, Ph.D.</b> , New York University<br>The effects of acute and long-term exercise on cognitive functions in healthy adults                                                                             |
| 2:30 PM  | Panel Discussion                                                                                                                                                                                                     |
| 3:00 PM  | Poster viewing II                                                                                                                                                                                                    |
| 4:00 PM  | <b>Keynote Lecture</b><br><b>Arthur Kramer, Ph.D.</b> , University of Illinois<br>Exercising your brain and mind                                                                                                     |
| 5:00 PM  | Concluding Remarks                                                                                                                                                                                                   |

# Message from the Chairs



Virtually every organism is dependent on movement. Regular physical activity imposes unique stresses on a broad spectrum of cell types, tissues, and organ systems. In so doing, exercise plays a key role in shaping fundamental biological processes necessary for maintaining health and preventing disease. In contrast, inactivity and a sedentary lifestyle are widely recognized as a significant factor in the development of a wide array of diseases and disabilities including brain disease. The effective role of exercise to improve brain health and to alter brain disease trajectories is gaining acceptance among health care professionals. However a complete mechanistic understanding of how regular physical activity works to alter brain function and health remains a mystery. The **Physical Exercise and Brain Health** symposium brings together renowned scholars to share discoveries on the impact of exercise on brain health and disease and discuss the state of the field and path forward. The symposium results from a partnership between the UCI Exercise Medicine and Sport Sciences Initiative (EMSSI) and the UCI Center for the Neurobiology of Learning and Memory (CNLM). We would like to thank our community supporters and advocates as well as our hard-working staff and students who make these educational activities possible. Welcome to the symposium!



**James Hicks, Ph.D.**  
Director  
Exercise Medicine and Sport  
Sciences Initiative



**Michael A. Yassa, Ph.D.**  
Director  
Center for the Neurobiology  
of Learning and Memory

# Distinguished Keynote Speaker



## Arthur Kramer, Ph.D.

Professor, Department of Psychology, University of Illinois  
Director, Beckman Institute for Advanced Science and Technology

Dr. Kramer served as director of the Beckman Institute for Advanced Science & Technology (2010-2016) and was Swanlund Chair and Professor of Psychology and Neuroscience at the University of Illinois. He is now Beckman director and professor emeritus. Kramer also serves as senior vice provost for research and graduate education at Northeastern University in Boston. He received his Ph.D. in cognitive/experimental psychology from the University of Illinois in 1984. He holds appointments in the Department of Psychology, Neuroscience program, and the Beckman Institute. Professor Kramer's research projects include topics in cognitive psychology, cognitive neuroscience, aging, and human factors. A major focus of his labs recent research is the understanding and enhancement of cognitive and neural plasticity across the lifespan. He is a former associate editor of Perception and Psychophysics and is currently a member of six editorial boards. Professor Kramer is also a fellow of the American Psychological Association, American Psychological Society, a former member of the executive committee of the International Society of Attention and Performance, and a recent recipient of a NIH Ten Year MERIT Award. Professor Kramer's research has been featured in a long list of print, radio and electronic media including the New York Times, Wall Street Journal, Washington Post, Chicago Tribune, CBS Evening News, Today Show, NPR, and Saturday Night Live.



# Speaker Profiles



## Kirk Erickson, Ph.D.

Associate Professor, Department of Psychology  
Center for the Neural Basis of Cognition  
University of Pittsburgh

Dr. Erickson received his Bachelor's degree in Psychology and Philosophy at Marquette University in 1999. He received his Ph.D. from the University of Illinois at Urbana-Champaign in 2005 and did post-doctoral work at the Beckman Institute for Advanced Science and Technology at the University of Illinois until 2008. Dr. Erickson's research interests range from cognitive neuroscience,

aging, neuroplasticity, genetics, and molecular mechanisms of cognitive function. He is currently the Principal Investigator of the BACH lab at the University of Pittsburgh and is continuing his research on how the brain changes in late adulthood and the factors that promote successful aging. In 2016, Professor Erickson received a \$21.8 million grant from the National Institute on Aging to study the link between exercise and brain health in older adults in a collaborative project with the University of Illinois, Northeastern University and the University of Kansas.



## Michelle Carlson, Ph.D.

Associate Professor, Mental Health, Epidemiology  
Johns Hopkins School of Public Health

Dr. Carlson's lab seeks to develop and apply the public health tools of the 21st century, integrating functional neuroimaging and mobile technologies, to identify risk and health profiles of activity - cognitive, physical, and social. She leads investigations to identify biomarkers of early dementia and evaluates both environmental and pharmacologic interventions of dementia risk. Dr. Carlson served as the Principal Investigator (PI) of the Women's

Health and Aging Study Cognitive Pathways study, and the Johns Hopkins site PI of the national Ginkgo Evaluation of Memory (GEMS) trial to prevent and delay dementia and cognitive aging. Dr. Carlson currently serves as the Johns Hopkins site PI of the national Cardiovascular Health Study (CHS), and as Project leader of the Po1-funded Baltimore Experience Corps Trial (BECT) to evaluate the impact of high-intensity service in elementary schools on older adults' cognitive, brain, and functional health. Within this trial, Dr. Carlson obtained funds to recruit a nested Brain Health Study (BHS) to evaluate the Experience Corps program's impact on brain health through changes in life style activity as measured by accelerometry and assisted GPS.



## Henriette van Praag, Ph.D.

Investigator, Neuroplasticity and Behavior Unit  
Laboratory of Neurosciences, National Institute on Aging

Dr. van Praag received her Ph.D. from Tel-Aviv University in 1992. She then conducted postdoctoral research on the role of nerve growth factors in brain injury at Robert Wood Johnson Medical School from 1992-1997. She continued her research in brain regeneration as a staff scientist at the Salk Institute for Biological Studies, where she discovered that exercise plays an important role in the production of new neurons in the adult rodent brain. She joined NIA

in 2007 where her lab is focused on understanding the mechanisms underlying synaptic and structural plasticity important for learning and memory, particularly the functional role and neural circuitry of new neurons in the adult hippocampus. Her lab uses behavioral assays, viral vector based neuroanatomical tracing and electrophysiology. She studies the regulation of neurogenesis by voluntary wheel running in rodents and has identified molecular, synaptic and circuit markers that are altered by exercise. This work has significant translational application for studies of brain disease and the utility of aerobic exercise for prevention and/or treatment of age-associated cognitive disorders such as Alzheimer's disease.



## Mark P. Mattson, Ph.D.

Sr. Investigator and Chief, Laboratory of Neurosciences  
National Institute on Aging  
Professor of Neuroscience, Johns Hopkins University

Dr. Mattson is currently Chief of the Laboratory of Neurosciences at the National Institute on Aging, and Professor of Neuroscience at Johns Hopkins University. He is Editor-in-Chief of Ageing Research Reviews and NeuroMolecular Medicine, a Section Editor for Neurobiology of Aging, and an Associate Editor for Trends in Neurosciences. In addition, he has edited 10 volumes

in the areas of mechanisms of brain function, stress responses, aging and age-related neurodegenerative disorders. Dr. Mattson is a Fellow of the American Association for the Advancement of Science, and has received numerous awards including the Metropolitan Life Foundation Medical Research Award and the Alzheimer's Association Zenith Award. He is considered a leader in the area of cellular and molecular mechanisms underlying neuronal plasticity and neurodegenerative disorders, and has made major contributions to understanding of the pathogenesis of Alzheimer's disease, and to its prevention and treatment. Dr. Mattson has published more than 400 original research articles and more than 200 review articles and commentaries.



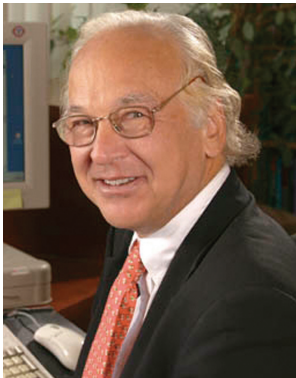


## Laura D. Baker, Ph.D.

Associate Professor, Gerontology and Geriatric Medicine  
Wake Forest School of Medicine

Dr. Baker received her Ph.D. from Washington University in 1995, and completed neuropsychology internship at San Antonio State Hospital, clinical neuropsychology residency at St. John's Mercy Medical Center, and fellowship in psychiatry at the University of Washington. She currently serves on the faculty at Wake Forest School of Medicine where she is associate professor in the Department of Internal Medicine,

Section on Gerontology and Geriatric Medicine, and of Public Health Sciences in the Department of Epidemiology and Prevention. Dr. Baker is a cognitive neuroscientist who is a nationally recognized leader in the areas of aerobic exercise and hormone supplementation as treatments for memory decline associated with preclinical and early stage Alzheimer's disease. In collaboration with Dr. Carl Cotman at the University of California, Irvine, she is currently leading a large-scale clinical trial investigating the efficacy of 2 different doses of exercise on memory and thinking and other measures of brain health. The study, which is named the Exert Trial, is currently enrolling participants in thirteen cities across the country.



## Carl Cotman, Ph.D.

Professor, Neurobiology and Behavior, Neurology  
University of California, Irvine

Dr. Cotman is a distinguished scholar, internationally known for his pioneering work on successful brain aging and Alzheimer's disease and is the Founding Director of the Institute for Brain Aging and Dementia, known today as the Institute for Memory Impairments and Neurological Disorders. Dr. Cotman's contributions to neuroscience have provided in-depth knowledge of how the human brain functions, how it ages, and how it is

changed by Alzheimer's disease. In particular, Dr. Cotman's seminal discoveries of the impact of exercise on the production of brain-derived neurotrophic factor have significantly influenced the field. Dr. Cotman's career at UCI began in 1968, and since that time, he has published over 750 peer-reviewed articles. He initiated the UCI Alzheimer's Disease Research Center in 1985, and it has been continuously funded since then. In 2008 Dr. Cotman received a lifetime achievement award for his research on Alzheimer's disease at the 11th International Conference on Alzheimer's Disease in Chicago. In 2015, he was awarded the Clinical Translational Scientist Career Achievement Award by the UCI Institute for Clinical and Translational Science at UC Irvine.

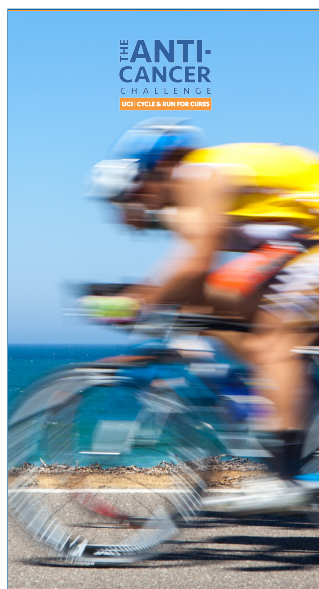


## Wendy Suzuki, Ph.D.

Professor, Neural Science and Psychology  
Center for Neural Science, New York University

Dr. Suzuki earned her Ph.D. in Neuroscience from U.C. San Diego in 1993 and completed a post-doctoral fellowship at the National Institutes of Health before accepting a faculty position at New York University in 1998. Her major research interest continues to be brain plasticity. She is best known for her extensive work studying areas in the brain critical for our ability to form and retain new long-term memories. More recently her work has focused

on understanding how aerobic exercise may improve long-term memory functions dependent on the hippocampus, executive functions dependent on the prefrontal cortex, mood and imagination/creativity. She has examined the effects of increased levels of aerobic exercise on cognitive functions in patient population groups including in participants recovering from addiction as well as patients with traumatic brain injury. Current studies in her lab are examining the effects of long-term increases in aerobic activity on a wide range of mood and cognitive functions in healthy young adults. A major goal is to understand how much, how long and what kind of exercise optimally improves brain functions in both healthy and patient population groups.



**June 10-11, 2017**

Angel Stadium  
[Anti-CancerChallenge.org](http://Anti-CancerChallenge.org)

**UCI** | Chao Family  
Comprehensive Cancer Center

### What is The Anti-Cancer Challenge?

The Anti-Cancer Challenge Cycle & Run For Cures is where the end of cancer begins. The Challenge is an exciting new event being held June 10-11, 2017 at Angel Stadium in Anaheim that features a cycling ride that ranges from 10 to 100 miles and a 5K fun run/walk to benefit the UC Irvine Health Chao Family Comprehensive Cancer Center, Orange County's only National Cancer Institute-designated comprehensive cancer center. All proceeds go directly to fund lifesaving cancer research.

### Anti-Cancer Challenge Festival in June

The weekend will begin June 10 with a free Anti-Cancer Challenge Festival that will include live entertainment, a children's ride, stationary bike event, food from local vendors, craft beer and exhibits. June 11 will feature a cycling ride that ranges from 10 to 100 miles and a 5K run/walk with a finish line festival.

For more info visit [Anti-CancerChallenge.org](http://Anti-CancerChallenge.org) or contact us at [Anti-CancerChallenge@uci.edu](mailto:Anti-CancerChallenge@uci.edu).



# Poster Presentations

## 1. Acute and Chronic Effects of High-intensity Resistance Exercise on the Executive Functions of Female College Students

Kyungae Kim<sup>1</sup>, and Hyukki Chang<sup>1,2</sup>

<sup>1</sup>Exercise Physiology Laboratory, Department of Human Movement Science, Seoul Women's University, Seoul, Korea; <sup>2</sup>Translational Neurobiology Laboratory, Department of Neurobiology and Behavior, Center for the Neurobiology of Learning and Memory, University of California, Irvine, CA.

## 2. Acute exercise modulates feature-selective responses in human visual cortex

Tom Bullock<sup>1,2</sup>, James C. Elliott<sup>1,2</sup>, John T. Serences<sup>3</sup>, Barry Giesbrecht<sup>1,2</sup>

<sup>1</sup>Department of Psychological and Brain Sciences, University of California, Santa Barbara, CA; <sup>2</sup>Institute for Collaborative Biotechnologies, University of California, Santa Barbara, CA; <sup>3</sup>Department of Psychology, University of California, San Diego, La Jolla, CA

## 3. Behavioral and Neural Correlates of Health and Lifestyle Factors in Older African-Americans

Ashlee Shaw, Neha Sinha, Mark A. Gluck  
Rutgers University-Newark, Newark, NJ

## 4. Associations between aerobic fitness and hippocampal subfield structure and function over a 12-week exercise intervention

Rachel K. Nauer<sup>1,2,3</sup>, Matthew F. Dunne<sup>3</sup>, Thomas W. Storer<sup>4</sup>, Karin Schon<sup>1,2,3</sup>

<sup>1</sup>Department of Psychological and Brain Sciences, Boston University, Boston, MA; <sup>2</sup>Center for Memory and Brain, Boston University, Boston, MA; <sup>3</sup>Department of Anatomy and Neurobiology, Boston University School of Medicine, Boston, MA; <sup>4</sup>Brigham and Women's Hospital, Harvard Medical School, Boston, MA

## 5. Post-Stress Glucose Consumption Facilitates Hormetic Preconditioning and Resilience to Trauma

Michael A. Conoscenti<sup>1,2</sup>, Traci N. Plumb<sup>3</sup>, Kayla A. Piiwaa<sup>1,2</sup>, Thomas R. Minor<sup>1,2,3,5,6</sup>

<sup>1</sup>Department of Psychology, University of California, Los Angeles, CA; <sup>2</sup>UCLA Behavioral Testing Core, Brain Research Institute, Los Angeles, CA; <sup>3</sup>Legacy Research Institute, Portland, OR; <sup>4</sup>Department of Psychiatry and Biobehavioral Sciences, Integrative Center for Learning and Memory, University of California, Los Angeles, CA; <sup>5</sup>Stress and Motivated Behavior Institute, New Jersey Medical School, Newark, NJ; <sup>6</sup>Veterans Affairs, Newark, NJ

## 6. The Epidemiology of Sports-Related Head Injury and Concussion in Water Polo

Robert S. Blumenfeld<sup>1,2</sup>, Jessica C. Winsell<sup>2</sup>, James W. Hicks<sup>3</sup>, Steven L. Small<sup>4</sup>

<sup>1</sup>Department of Psychology and Sociology, California State Polytechnic University, Pomona, CA; <sup>2</sup>Department of Neurology, University of California Irvine, Irvine, CA; <sup>3</sup>Department of Ecology and Evolutionary Biology, University of California Irvine, Irvine, CA; <sup>4</sup>Brain Circuits Laboratory, Biological Sciences III, University of California Irvine, Irvine, CA



## **7. Misremembering Past Affect Predicts Adolescents' Future Affective Experience during Exercise**

Melissa M. Karnaze, Linda J. Levine, Margaret Schneider

Department of Psychology and Social Behavior, University of California Irvine, CA

## **8. Aerobic fitness is associated with mnemonic discrimination as a mediator of physical activity effects: evidence for memory flexibility in young adults**

Kazuya Suwabe<sup>1,2</sup>, Kazuki Hyodo<sup>1,3</sup>, Kyeongho Byun<sup>1,2,4</sup>, Genta Ochi<sup>1,2</sup>, Takemune Fukuie<sup>1,2</sup>, Michael A. Yassa<sup>2,4</sup> and Hideaki Soya<sup>1,2</sup>

<sup>1</sup>Laboratory of Exercise Biochemistry and Neuroendocrinology; University of Tsukuba, Ibaraki, Japan; <sup>2</sup>Department of Sports Neuroscience, Advanced Research Initiative for Human High Performance (ARIHHP), Faculty of Health and Sport Sciences, University of Tsukuba, Ibaraki, Japan; <sup>3</sup>Physical Fitness Research Institute, Meiji Yasuda Life Foundation of Health and Welfare, Tokyo, Japan; <sup>4</sup>Department of Neurobiology and Behavior, Center for the Neurobiology of Learning and Memory, University of California, Irvine, CA

## **9. Mild exercise improves discrimination memory by boosting pattern separation-related DG/CA3 connectivity in young adults.**

Kazuya Suwabe<sup>1</sup>, Kyeongho Byun<sup>2,3</sup>, Zachariah M. Reagh<sup>3</sup>, Jared M. Roberts<sup>3</sup>, Akira Matsushita<sup>4</sup>, Kousaku Saotome<sup>4</sup>, Michael A. Yassa<sup>2,3</sup>, and Hideaki Soya<sup>1,2</sup>

<sup>1</sup>Laboratory of Exercise Biochemistry and Neuroendocrinology; University of Tsukuba, Ibaraki, Japan; <sup>2</sup>Department of Sports Neuroscience, Advanced Research Initiative for Human High Performance (ARIHHP), Faculty of Health and Sport Sciences, University of Tsukuba, Ibaraki, Japan; <sup>3</sup>Department of Neurobiology and Behavior, Center for the Neurobiology of Learning and Memory, University of California, Irvine, CA; <sup>4</sup>Center for Cybernetics Research, University of Tsukuba, Ibaraki, Japan

## **10. Relationship of physical exercise and aerobic fitness with episodic associative learning and hippocampal volume in healthy older adults**

Rachel Clark<sup>1</sup>, Tim Weng<sup>2</sup>, Conner Wharff<sup>2</sup>, Lauren Reist<sup>2</sup>, Lyndsey DuBose<sup>3</sup>, Warren Darling<sup>3</sup>, Phillip Schmid<sup>4</sup>, Gardar Sigurdsson<sup>4</sup>, Vincent A Magnotta<sup>1,4</sup>, Gary Pierce<sup>3</sup>, Michelle Voss<sup>1,2</sup>

<sup>1</sup>Interdisciplinary Graduate Program in Neuroscience; <sup>2</sup>Department of Psychological and Brain Sciences; <sup>3</sup>Department of Health and Human Physiology; <sup>4</sup>Carver College of Medicine, University of Iowa, Iowa City, IA

## **11. Positive Expectations Regarding Aging Are Associated with Higher Levels of Physical Activity over Two Years**

Ryan Andrews, Michelle Carlson

Departments of Mental Health and Epidemiology, Johns Hopkins School of Public Health, Baltimore, MD

## **12. Changes in working memory filtering efficiency during acute bouts of exercise**

Lindsey Purpura, Barry Giesbrecht

Psychological and Brain Sciences, University of California, Santa Barbara, CA





**UCI CNLM**  
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Center for the Neurobiology  
of Learning & Memory

# The Persistence of Memory

The 30th Annual Conference on the  
Neurobiology of Learning and Memory

**April 13-14, 2017**

**Herklotz Conference Center | UC Irvine**  
**Register online**  
<http://cnlm.uci.edu/springmeeting>

## Speakers

|                  |                                     |
|------------------|-------------------------------------|
| Christie Fowler  | University of California, Irvine    |
| Julie Lauterborn | University of California, Irvine    |
| Gary Lynch       | University of California, Irvine    |
| Stephen Mahler   | University of California, Irvine    |
| Stephen Maren    | Texas A&M University                |
| Courtney Miller  | Scripps Research Institute, Florida |
| Helen Scharfman  | New York University                 |
| Michael A. Yassa | University of California, Irvine    |

Sessions moderated by Tallie Z. Baram, James L. McGaugh and Marcelo Wood



## Neuroscience of Dance

Integrating science and art

**Coming Fall 2017. Stay tuned!**

To receive advance notice of open registration, please  
subscribe online: <http://cnlm.uci.edu/neurodance>

This event will be open to the community and jointly hosted by the Center for the Neurobiology of Learning and Memory, the Exercise Medicine and Sport Sciences Initiative, and the Claire Trevor School of Arts.

# Find out more about us...



## UCI

Exercise Medicine &  
Sport Sciences Initiative

The Exercise Medicine and Sport Sciences Initiative (EMSSI) is a unique multidisciplinary program established in 2015 that promotes scholarly activities and innovative discoveries in all fields associated with movement, including exercise and sport sciences, exercise medicine, and rehabilitation. The EMSSI's mission is to enhance human health and wellness through undergraduate and graduate teaching, basic and translational research, development of innovative technologies, service to the community, and clinical activities.

To find out more about how you can support exercise science at UCI or to join our re:action newsletter mailing list, please contact us.

Director: James Hicks, Ph.D.

[emssi@uci.edu](mailto:emssi@uci.edu) • [emssi.uci.edu](http://emssi.uci.edu) • [@uciemssi](https://twitter.com/uciemssi)



**UCI CNLM**  
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Center for the Neurobiology  
of Learning & Memory

The Center for the Neurobiology of Learning and Memory (CNLM) was established by the UC Regents in 1983 as the world's first research institute dedicated exclusively to the multidisciplinary study of the brain mechanisms underlying learning and memory. CNLM faculty use state-of-the-art approaches integrating cellular/molecular, systems, cognitive, and behavioral neuroscience to examine the brain at all levels. The CNLM has been a worldwide leader in learning and memory and has played a critical role in advancing global discovery in the neurosciences.

To find out more about how you can support brain science at the CNLM or to join our NeuroTimes mailing list, please contact us.

Director: Michael Yassa, Ph.D.

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