UCI Sue & Bill Gross Stem Cell Research Center

# 10th Annual Stem Cell Science Symposium
# Meet the Speakers

***Keynote Speaker:*** **Ali Brivanlou, PhD |** The Rockefeller University

Dr. Brivanlou is an international leader in the effort to understand the intricacies of human embryonic stem cells and to harness their therapeutic potential. He has played a key role in establishing scientific standards for human embryonic stem cell research. Fundamental studies in the Brivanlou laboratory are not only offering insights into human reproductive biology and development, but also into specific diseases. Using a self-organizing 3D colony of human cells that mimics the brain, the group has demonstrated that the origin of Huntington's disease can be traced to the earliest stage of development and the formation of the nervous system, and thus is a developmental disorder that ultimately manifests its destructive effects in adulthood.

**Claire Henchcliffe, MD, PhD |** University of California, Irvine

Claire Henchcliffe is the Chair and Stanley van den Noort Professor of Neurology, University of California, Irvine. Prior to this, she was Professor of Neurology and Neuroscience, and Vice Chair for Clinical Research in Neurology at Weill Cornell Medical College, New York Presbyterian Hospital, New York City. With undergraduate and graduate training at the University of Oxford, University of Cambridge, UK, and the University of California at Berkeley, she completed neurology residency training and movement disorder fellowship at the College of Physicians and Surgeons of Columbia University in New York City. Her clinical and research focus is on Parkinson's disease and related neurodegenerative disorders. She is a clinical trialist working to develop new Parkinson's disease therapeutics, including stem cell-based interventions and of gene therapy.

**Sydney Prange, PhD Student in Dr. Katherine Thompson-Peer's Lab |** University of California, Irvine

Across many neurodegenerative diseases, including Huntington's disease, amyotrophic lateral sclerosis, Alzheimer's disease, Parkinson's disease, and spinocerebellar ataxias, neurons exhibit a number of dendrite defects. Notably, these dendrite defects happen in early disease stages and are associated with symptom onset and pathogenesis, long before any mass neuronal death associated with late stages of disease. In my work, I aim to understand how we might take advantage of neurite regeneration pathways to regenerate dendrites lost in the early stages of neurodegenerative disease, and potentially delay or even reverse disease pathogenesis. I have found that subtle injury to a single primary dendrite branch induces a neuroprotective effect that can delay and sometimes even reverse dendrite degeneration in Drosophila models of neurodegenerative polyglutamine diseases. I have also found that the observed neuroprotective response is specific to dendrite injury and not axon injury, indicating that taking advantage of dendrite regeneration pathways in the absence of injury may present a potential therapeutic target for neurodegenerative disease treatment.

**Randolph Ashton, PhD |** University of Wisconsin-Madison

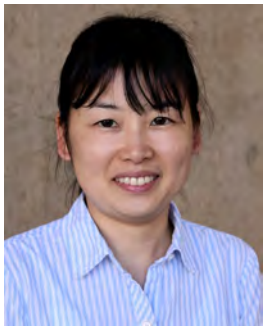
*Randolph S. Ashton received his B.S. from Hampton University (Hampton, Virginia, 2002) and Ph.D. from Rensselaer Polytechnic Institute (Troy, NY, 2007) in Chemical Engineering under Prof. Ravi Kane, and pursued his interest in stems cells and tissue engineering as a California Institute for Regenerative Medicine and a NIH postdoctoral fellow at the University of California Berkeley's Stem Cell Center in the lab of Prof. David Schaffer. In 2011, he was appointed to a faculty position in the Wisconsin Institute for Discovery at the University of Wisconsin–Madison and is now an Associate Professor of Biomedical Engineering and the Associate Director of the UW-Madison Stem Cell and Regenerative Medicine Center. The goal of Dr. Ashton's research is to bioengineering human tissues that can be used as tools or therapeutics to prevent or cure central nervous system (CNS) disorders. His lab currently melds state of the art biomaterial approaches with novel human neural stem cells derivation protocols to bioengineer brain and spinal cord cells and tissue models in vitro. In 2021, Prof. Ashton and collaborators embarked on a technology start-up, Neurosetta LLC, to translate the lab's innovations for developmental neurotoxicology, disease modeling, and drug discovery applications.*

**Jacob Deyell, PhD Candidate in Dr. Albert La Spada's Lab |** University of California, Irvine

Microglia, the resident immune cells of the central nervous system, are key players in neuroinflammation and have been consistently implicated in the pathogenesis of neurodegenerative diseases such as Alzheimer's disease (AD). Previous work in our lab has demonstrated a neuroprotective role for the ligand-activated transcription factor PPARδ in Huntington's disease models. A PPARδ agonist is also currently the focus of a Phase II Clinical Trial for AD. While much of the previous work done with PPARδ neuroprotection has focused on neurons, microglia express PPARδ at a much higher level. Preliminary RNA-seq data on microglia isolated from mice treated with a PPARδ agonist revealed a decrease in inflammatory and AD-related gene expression upon treatment. Our current work utilizes iPSC-derived microglia-like cells to study the mechanistic basis of PPARδ neuroprotection in microglia, including the involvement of liquid-liquid phase separation (LLPS) in PPARδ activation of downstream targets.

**Zahara Keulen, PhD Candidate in Dr. Blurton-Jones's Lab |** University of California, Irvine

Zahara is a PhD candidate of Neurobiology and Behavior at UCI. She completed her Bachelor of Science in Cellular, Molecular, and Developmental Biology at UC Santa Cruz and her Master of Science in Regenerative Medicine at Cal Poly San Luis Obispo. Zahara uses human stem cell-derived neurons and microglia to study how these cell types interact in healthy and degenerating brains.



**Momoko Watanabe, PhD |** University of California, Irvine

Momoko Watanabe earned a B.S. in Molecular, Cell, and Developmental Biology from the University of California, Los Angeles (UCLA) in 2006. She then pursued her doctoral studies at UC Irvine, where she studied the mechanisms of forebrain patterning and used in vivo developmental principles to derive choroid plexus epithelial cells from mouse and human pluripotent stem cells (PSCs) for cell-based therapeutic applications. Building on her excitement and experience with neural development and stem cell biology, she did her first post-doctoral training at RIKEN Center for Developmental Biology in Japan, to focus on the three-dimensional culture of cerebral cortex structures, so called brain organoids, generated from hPSCs. She then moved back to the U.S. and joined UCLA. Her project focused on the development of highly efficient and reproducible cerebral organoid methods to investigate the origins of cortical neural circuits and model neurodevelopmental disorders, including the Congenital Zika Syndrome. Building upon these accomplishments, she successfully received a NIH K99/R00 grant from the National Institute of Child Health and Human Development (NICHD). She was recently recruited to UC Irvine as a part of Faculty Hiring for Leveraged Research Excellence (FHLRE) "Stem Cells in Tissue Engineering" and started as an Assistant Professor at the Anatomy and Neurobiology Department in 2020. She is very excited to contribute to a synergistic interdepartmental concentration in stem cell-based engineering.

**Haley Masters, PhD Candidate in Dr. Edwin Monuki's Lab |** University of California, Irvine

The Choroid Plexus (ChP) produces the majority of CSF and forms the blood-CSF barrier and is relatively understudied in humans due to a lack of a model system to carry out studies. Based on an earlier proof-of-concept method, we devised a simple, efficient, and scalable protocol for CPEC differentiation from human pluripotent stem cells to establish a model system for human CPECs. Single cell transcriptome analysis of derived CPECs (dCPECs) identified novel diversifications at early and later stages into subtypes enriched for anabolic-secretory (type1a), catabolic-absorptive (type1b), and ciliogenesis pathways (type2). Using APOE isogenic iPSCs to model Alzheimer's disease showed CPECs have a reduced capacity to carry out expected functions in an AD state, allowing us novel insight into the relationship between CPECs and AD. These findings establish a robust human CPEC model system for basic studies and disease modeling while revealing CPEC subtype diversifications during prenatal human development.

**Bradley Olwin, PhD |** University of Colorado Boulder

My research is focused on the role of skeletal muscle stem cells in maintenance of skeletal muscle homeostasis. I focus on mechanisms that regulate skeletal muscle stem cell function in the niche and intracellular signals involved in cell fate determination. My laboratory investigates the changes in stem cells and their niche that occur in skeletal muscle disease and during aging using mouse molecular genetics, stem cell lineage tracing, stem cell transplantation and generation of muscle stem cells from human iPSCs. My long-term goals are to further understand the regulatory mechanisms that control skeletal muscle stem cell numbers and their function to evolve strategies for therapy development to treat skeletal muscle diseases and sarcopenia. I established my laboratory in 1988 and have maintained a productive well-funded research group for the past 33 years, successfully training 24 PhDs, 2MD/PhDs and 18 postdoctoral fellows with two under-represented minorities among my trainees; the majority have careers as independent scientists in academia and industry. I am committed to enhancing undergraduate research, encouraging undergraduates to pursue careers in research. Typically, I will have five to eight undergraduates pursuing research projects concurrently; with over one hundred undergraduates gaining research experience where a number have authorships on publications.

**Michael Hicks, PhD |** University of California, Irvine

Dr. Michael Hicks joined UC Irvine in 2020 as an Assistant Professor of Physiology and Biophysics. His research seeks to better understand how skeletal muscle regenerates. He studies the basic biology of how muscle stem cells are supported, and how to generate skeletal muscle from human pluripotent stem cells. His current research applies emerging technologies to address how muscle stem cells interact with myofibers to build niches to support regeneration, and how diseased microenvironments influence stem cell self-renewal. Dr. Hicks hopes to translate his research towards cell therapies for muscle wasting diseases. Dr. Hicks' training has included skeletal muscle development with Dr. Jeanne Rawls at ASU, muscle and stromal cell niche interaction with PhD advisor Dr. Paul Standley, and muscular dystrophy, gene editing, and pluripotent stem cells during his postdoc with Dr. April Pyle at UCLA. Dr. Hicks now serves as co-director of the UCI Muscle Biology and Disease Research Center with Dr. Armando Villalta. He has received numerous awards including through Cure Duchenne, a NIH U54 Wellstone, the Broad Stem Cell Research Center, the Muscular Dystrophy Association, an NIH/ICTS KL2, and others at UC Irvine.

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# 10th Annual Stem Cell Science Symposium

**Thursday, February 16, 2023**

**Science Symposium:**
Gross Hall, Thorp Conference Center
845 Health Sciences Rd.
Irvine, CA 92697
*Time: 9 AM to 4 PM*

**Featured Community Lecture (Evening):**
The Beckman Center
100 Academy Way
Irvine, CA 92617
*Time: 7 PM*

## Science Symposium: Gross Hall (All-Day)

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| 9:00-9:10 AM | Aileen Anderson, PhD – Introduction |
| **9:10-9:50 AM** | **Keynote Speaker: Ali Brivanlou, PhD**<br>***Synthetic Embryos: Emergence of the Human Brain and Progression of Neurodegenerative Diseases*** |
| 10:10-10:35 AM | Break (25 Minutes) |
| **10:35-11:05 AM** | **Claire Henchcliffe, MD, PhD**<br>***Stem Cell Therapies for Parkinson's Disease: Promises and Pitfalls*** |
| **11:05-11:20 AM** | **Sydney Prange, PhD Student in Dr. Katherine Thompson-Peer's Lab**<br>***Dendrotomy, But Not Axotomy, Induces Neuroprotection in Drosophila Models of polyQ Disease*** |
| **11:20 AM-12:00 PM** | **Randolph Ashton, PhD**<br>***Bioengineering Human CNS Morphogenesis for Regulatory Science, Disease Modeling, and Prophylactic Drug Discovery Applications*** |

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| **12:00-12:15 PM** | **Jacob Deyell, PhD Candidate in Dr. Albert La Spada's Lab**<br>***The Neuroprotective Role of PPARδ in Microglia*** |
| 12:15-1:15 PM | Lunch (1 hour) |
| **1:15-1:30 PM** | **Zahara Keulen, PhD Candidate in Dr. Mathew Blurton-Jones's Lab**<br>***Neuronal Tau Pathology Alters Human Microglial Morphology, Transcriptome, and Function*** |
| **1:30-2:00 PM** | **Momoko Watanabe, PhD**<br>***Human Brain Organoids: New Models to Study Neural Development and Disease*** |
| **2:00-2:15 PM** | **Haley Masters, PhD Candidate in Dr. Edwin Monuki's Lab**<br>***Sequential Emergence of Epithelial Subtypes in the Prenatal Human Choroid Plexus Revealed by a Stem Cell Model*** |
| 2:15-2:40 PM | Break (25 minutes) |
| **2:40-3:20 PM** | **Bradley Olwin, PhD**<br>***Assessing Satellite Cell Function by Quantitative Lineage Tracing and Single Nuclear Sequencing*** |
| **3:20-3:50 PM** | **Michael Hicks, PhD**<br>***Making and Breaking the Skeletal Muscle Stem Cell Niche*** |
| 3:50 PM | Closing Remarks |

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## Featured Community Lecture: The Beckman Center (Evening)

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| 6:15 PM | Doors Open<br>*Check-In to The Beckman Center<br>**Please have proof of vaccination ready, more information about Beckman Center's vaccination policy below* |
| 6:45-7:00 PM | Seating for Featured Community Lecture |
| **7:00 PM** | **Featured Community Lecture Begins with Keynote Speaker, Ali Brivanlou, PhD** |

***Important note from the Beckman Center:**

*Effective Oct. 4, 2021, the National Academies requires that all visitors to the Beckman Center be fully vaccinated against COVID-19. Visitors must show their official COVID-19 Vaccination Record Card (or a digital photo of the card) before entering the building. Masks are currently optional for those that are up to date on their vaccinations. Up to date means a person has received all recommended doses in their primary series of COVID-19 vaccine.*