

# Learning To Heal Through Regenerative Organisms



Eva-Maria Schoetz Collins

Assistant Professor, Physics and Cell and Developmental Biology, affiliated with Biocircuits Institute (BCI) and Bioengineering

## CURRENT RESEARCH

Studying freshwater hydras' and planarians' abilities to regenerate for new brain therapies

Dr. Eva-Maria Schoetz Collins is applying physical principles and techniques to investigate the fundamental biological processes of development and regeneration, with a focus on the nervous system. Dr. Collins' research is seeking answers to three important questions: 1. What is the role of mechanical interactions of cells and their environment for tissue and organ formation during early embryonic development, 2. How do environmental neurotoxins damage brain development and function, and what can we do to prevent or reverse it, and 3. What is the differentiation process of stem cells to neurons and how can new neurons integrate into existing circuits? Understanding how an initially unstructured suspension of cells is able to autonomously organize itself into separate tissues, organ systems, and ultimately organize a fairly complex organism has potential implications for tissue and organ engineering in the lab for use in humans. Deciphering the mechanism by which exposure to environmental toxins causes neurodevelopmental defects will help design better exposure guidelines for humans and inspire new preventive therapies. For neurons that cannot be salvaged and have been damaged or destroyed, understanding the process of neural regeneration via stem cells in planarians is crucial for understanding and controlling the process in humans. The hope is to one day be able to use stem cells for regenerative therapies for currently incurable neuronal diseases such as Parkinson's, Alzheimer's, and motor-neuron diseases.

Dr. Eva-Maria Schoetz Collins, Assistant Professor of Physics and Cell and Developmental Biology at the University of California, San...

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## AFFILIATION

 University of California, San Diego

## EDUCATION

- Ph.D., in Physics, 2007, Technical University Dresden, Germany
- Diploma, in Physics, 2004, University of Konstanz, Germany

## AWARDS

- Hellman Fellow, 2014
- Scialog Fellow, 2014
- Sloan Research Fellow (Physics), 2014
- Martin and Beate Block Award, 2012
- Burroughs Wellcome Career Award at the Scientific Interface (CASI) Award, 2011

## RESEARCH AREAS

Life Science, Neurological / Cognitive, Regenerative Medicine, Stem Cell

## FUNDING REQUEST

Your contributions will allow Dr. Collins to keep her talented team focused on their projects by supporting the human costs of her research. She is a firm believer in the importance of educating young scientists, and funding will go primarily toward their education. Other expenses in the lab include chemical and material supplies as well as the purchase of specialized equipment to further automate and optimize the Collins's lab screening abilities.