THE
PAUL G. ALLEN
FRONTIERS GROUP

EMBARGOED FOR RELEASE UNTIL MARCH 23, 2016 AT 2:00PM EASTERN TIME

THE PAUL G. ALLEN FRONTIERS GROUP NAMES UC SAN DIEGO'S ETHAN BIER A NEW ALLEN DISTINGUISHED INVESTIGATOR

Pioneer of active genetics will explore how to design and create principle-based biological innovations

WASHINGTON, D.C. — **March 23, 2016** — The Paul G. Allen Frontiers Group today named Ethan Bier, Ph.D., at the University of California, San Diego, an Allen Distinguished Investigator (ADI) with an award for research at the frontier of evolutionary developmental biology titled "Biological Innovation and Active Genetics." The ADI award will fund his work in genetic engineering to explore changes in the genome that lead to large-scale evolutionary shifts in complex traits like body size, wing shape, and unique structures, and then study the patterns to determine the design principles behind evolutionary development. If successful, the work will have major implications for medicine, agriculture and environmental science. The grant is funded at $1.5 million over three years.

"Ethan Bier's vision holds the potential to transform how we think about biological innovation," says Tom Skalak, Ph.D., Executive Director of The Paul G. Allen Frontiers Group. "Executing large-scale genome editing in a systematic way could dramatically shift our current textbook understanding of how variations arise in nature, and expand our capability to cure disease and achieve environmental sustainability."

Over evolutionary time, changes in certain genes are responsible for many large-scale biological design shifts, including the transformation of an arm or a wing. Understanding how many and what types of changes can make these dramatic shifts would unlock the potential to design and create organs or organisms with useful functions, such as improving carbon dioxide fixation in land plants to enhance their yield, or understanding cancer drug resistance in tumors.

"We still know very little about the genetic programs responsible for larger leaps in species transformations over millions of years," says Bier, Professor of Cell and Developmental Biology at UC San Diego. "Understanding the principles of evolution well enough to guide complex synthetic design will lead to a whole host of powerful new ways to imagine and create biological design innovations."

Synthetic biology currently allows for the redesign of single cells to perform new functions, but large-scale changes in organisms have proved elusive because existing gene editing technologies have not yet been harnessed to make sweeping physical changes while maintaining species viability and fertility. Active genetics, a field pioneered by Bier, will use modified Crispr-Cas9 technology to increase the size and speed with which genome segments can be replaced, without species limitations.

"We are very pleased to see Ethan Bier's pioneering work in biological innovation recognized and furthered by this award," says Pradeep K. Khosla, Chancellor at UC San Diego. "We anticipate this work will have a significant impact, solving many problems in the biological sciences."

The Paul G. Allen Frontiers Group seeks to open new frontiers in science, and the ADI program supports early-stage research and pioneering explorers with the potential to reinvent entire fields. Through an exploration of

how changes in the genome lead to shifts in body plans and organs across species, Bier's work will uncover the design principles used in evolution. The practical application of this work promises to guide complex synthetic design that could revolutionize medicine, agriculture and care of the environment.

About The Paul G. Allen Frontiers Group

The Paul G. Allen Frontiers Group is dedicated to exploring the landscape of science to identify and fund pioneers with ideas that will advance knowledge and make the world better. Through continuous dialogue with scientists across the world, The Paul G. Allen Frontiers Group seeks opportunities to expand the boundaries of knowledge and solve important problems. Programs include the Allen Discovery Centers at partner institutions for leadership-driven, compass-guided research, and the Allen Distinguished Investigators for frontier explorations with exceptional creativity and potential impact. The Paul G. Allen Frontiers Group was founded in 2016 by philanthropist and visionary Paul G. Allen. For more information visit allenfrontiersgroup.org.

# # #

Media Contact:
Rob Piercy, Sr. Manager, Media Relations
206.548.8486 | press@alleninstitute.org