

Stanford



Steven Hartley Collins

Associate Professor of Mechanical Engineering

Bio

BIO

Steve Collins received his B.S. in Mechanical Engineering in 2002 from Cornell University, where he performed research on passive dynamic walking robots with Andy Ruina. He received his Ph.D. in Mechanical Engineering in 2008 from the University of Michigan, where he performed research on the dynamics and control of human walking with Art Kuo. He performed postdoctoral research on humanoid robots with Martijn Wisse at T. U. Delft in the Netherlands. He was a professor of Mechanical Engineering and Robotics at Carnegie Mellon University for seven years. In 2017, he joined the faculty of Mechanical Engineering at Stanford University, where he teaches courses on design and robotics and directs the Stanford Biomechatronics Lab.

Prof. Collins' primary focus is to speed and systematize the design and prescription of prostheses and exoskeletons using versatile device emulator hardware and human-in-the-loop optimization algorithms (Zhang et al. 2017, Science). Another focus is efficient autonomous devices, such as highly energy-efficient walking robots (Collins et al. 2005, Science) and exoskeletons that use no energy yet reduce the metabolic energy cost of human walking (Collins et al. 2015, Nature). He is a member of the Scientific Board of Dynamic Walking and an Associate Editor of the International Journal of Robotics Research. He has received the Young Scientist Award from the American Society of Biomechanics, the Best Medical Devices Paper from the International Conference on Robotics and Automation, and the student-voted Professor of the Year in his department.

ACADEMIC APPOINTMENTS

- Associate Professor, Mechanical Engineering
- Member, Bio-X

LINKS

- Stanford Biomechatronics Laboratory: <http://biomechatronics.stanford.edu>
- Personal Website: <http://web.stanford.edu/people/stevecollins>
- Publications on Google Scholar: <http://scholar.google.com/citations?user=eF5vfBAAAAAJ>

Teaching

COURSES

2019-20

- Mechanical Systems Design: ME 104 (Win, Spr)

2018-19

- Biomechanical Research Symposium: ME 389 (Win)

- Current Topics in Exoskeleton and Prosthesis Research: ME 380 (Aut)
- Mechanical Systems Design: ME 112 (Win)
- The Future of Mechanical Engineering: ME 228 (Win)

2017-18

- Mechanical Systems Design: ME 112 (Win)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Nick Bianco, Cole Simpson, Patrick Slade, Cara Welker

Doctoral Dissertation Advisor (AC)

Gwen Bryan, Julia Butterfield, Patrick Franks, Erez Krinsky, Delaney Miller, Michael Raitor

Doctoral Dissertation Co-Advisor (AC)

Brian Jackson

Publications

PUBLICATIONS

- **Human-in-the-loop optimization of exoskeleton assistance during walking** *SCIENCE*
Zhang, J., Fiers, P., Witte, K. A., Jackson, R. W., Poggensee, K. L., Atkeson, C. G., Collins, S. H.
2017; 356: 1280-1284
- **Reducing the energy cost of human walking using an unpowered exoskeleton** *NATURE*
Collins, S. H., Wiggan, M. B., Sawicki, G. S.
2015; 522 (7555): 212-?
- **Efficient bipedal robots based on passive-dynamic walkers** *SCIENCE*
Collins, S., Ruina, A., Tedrake, R., Wisse, M.
2005; 307 (5712): 1082-1085