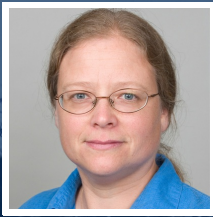


# Animals' Abilities Inspire Novel Engineering Solutions



Elizabeth Brainerd  
Professor, Ecology and Evolutionary Biology

## CURRENT RESEARCH


### XROMM technology produces accurate animations of 3D bones of living and extinct organisms

Accelerating from 0 to 60 in three seconds is a performance feat that even most sports cars cannot match. However, in the animal kingdom, the cheetah is hailed for its ability to do just that. In the oceans, baby blue whales can gain 200 pounds per day due to the high fat concentration in their mother's milk. Imagine the health benefits for premature babies if scientists were able to mimic such abilities! Dr. Elizabeth Brainerd, of Brown University, studies how animals are capable of amazing feats in the hopes that she may one day develop tools and technologies that can capitalize on animal's abilities. Her research is likely to lead to applications ranging from paleontology and the reconstruction of extinct animals to potential engineering applications for future technologies. In short, the new and unexpected solutions to engineering problems that stem from existing capacities of animals makes Dr. Brainerd's research not only curiosity driven, but also a thrilling way to yield unexpected insights into technology and our own human bodies.

The anatomical structures Dr. Brainerd is most interested in are bones, joints, and the muscles that produce movement at those joints. She and her team have developed a new technology, called X-ray Reconstruction of Moving Morphology (XROMM), which has allowed Dr. Brainerd to create precise and accurate animations of 3D bones moving in 3D space (see [www.xromm.org](http://www.xromm.org) for images and movies). This new XROMM technology is making it possible for Dr. Brainerd to study both the motion of ribs and intercostal muscles for breathing in addition to the motion of fish-bones and muscles for suction feeding. While Dr. Brainerd's laboratory remains...

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## AFFILIATION

 Brown University

## EDUCATION

- A.B., 1985, Harvard College
- Ph.D., 1991, Harvard University
- High School, 1981, The Putney School

## AWARDS

- Fellow, American Association for the Advancement of Science
- President Elect, International Society of Vertebrate Morphology
- CAREER Award, National Science Foundation
- Lilly Teaching Fellowship, University of Massachusetts Amherst
- Junior Fellowship, Harvard University Society of Fellows

## RESEARCH AREAS

Musculoskeletal, Technology, Computational Sciences / Mathematics, Robotics

## FUNDING REQUEST

Your contributions will support the continued research of Dr. Elizabeth Brainerd, of Brown University, as she harnesses the biological diversity of animals to inspire engineering solutions and learn more about our own human bodies. Donations will support the necessary \$200K per year required for personnel, \$50K to study a new species, and \$10K for high speed camera equipment. In choosing to donate, you will play a role in the development of amazing technologies motivated by the incredible abilities of the animal kingdom.