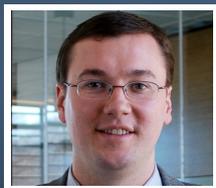


# Nature Reveals Unprecedented Technologies



Ryan Hayward

Assistant Professor, Polymer Science and Engineering Associate Professor, Polymer Science and Engineering

## CURRENT RESEARCH

### Using biologically-inspired approaches to endow synthetic materials with adaptive properties

Nature has made a tremendous diversity of remarkable inventions, adaptations, and designs that have provided humanity with inspiration for engineering applications, including design of spacecraft and submarines. However, many valuable abilities possessed by organisms have been difficult to replicate because of their complexity. Dr. Ryan Hayward, of the University of Massachusetts, Amherst, focuses on the design of biologically-inspired materials that can change their properties upon demand of the user, or that automatically adapt to changes in their environment. In so doing, Dr. Hayward is able to create new materials that impact our lives in many different capacities while mimicking the abilities of natural organisms.

While Dr. Hayward is motivated by fundamental principles, there are many areas in which his research may have a lasting impact. Dr. Hayward and his team expect their technology to be used to create materials for biomedicine that may allow faster healing, less invasive procedures, or more effective interfaces with man-made devices, materials that save energy by turning optical transmission of windows or enable low-power displays, and consumer products including apparel, packaging, and tactile interfaces that can be made with improved properties and in inexpensive ways. In short, using a combination of new approaches to fabricate materials and basic principles of mechanics and geometry, he and his team are able to yield a unique approach to bioinspired materials. Dr. Hayward's mentorship of future scientists in which he helps design experiments and uses creative solutions for longstanding problems in addition to working at a conceptual level that allows his team to create new hypotheses and...

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## AFFILIATION

 University of Massachusetts Amherst

## EDUCATION

- Ph.D. in Chemical Engineering 2004, University of California Santa Barbara
- B.S.E. in Chemical Engineering 1999, Princeton University

## AWARDS

- Dudley A. Saville Lecturer, Princeton University, 2014
- American Physical Society John H. Dillon Medal, 2014
- Journal of Polymer Science Innovation Award, 2013
- ACS Division of Colloid and Surface Chemistry Unilever Award, 2011
- Presidential Early Career Award for Scientists and Engineers, NSF, 2010

## RESEARCH AREAS

Technology, Materials Science / Physics

## FUNDING REQUEST

Your contributions will support the continued research of Dr. Ryan Hayward as he develops new technologies based upon biological inspiration. Donations of any amount can make a big difference for Dr. Hayward and his team. While smaller donations can help to fund undergraduate researchers for summer employment and purchase new equipment, larger donations can support a part of the roughly \$500K per year required for operation of the Hayward Lab.