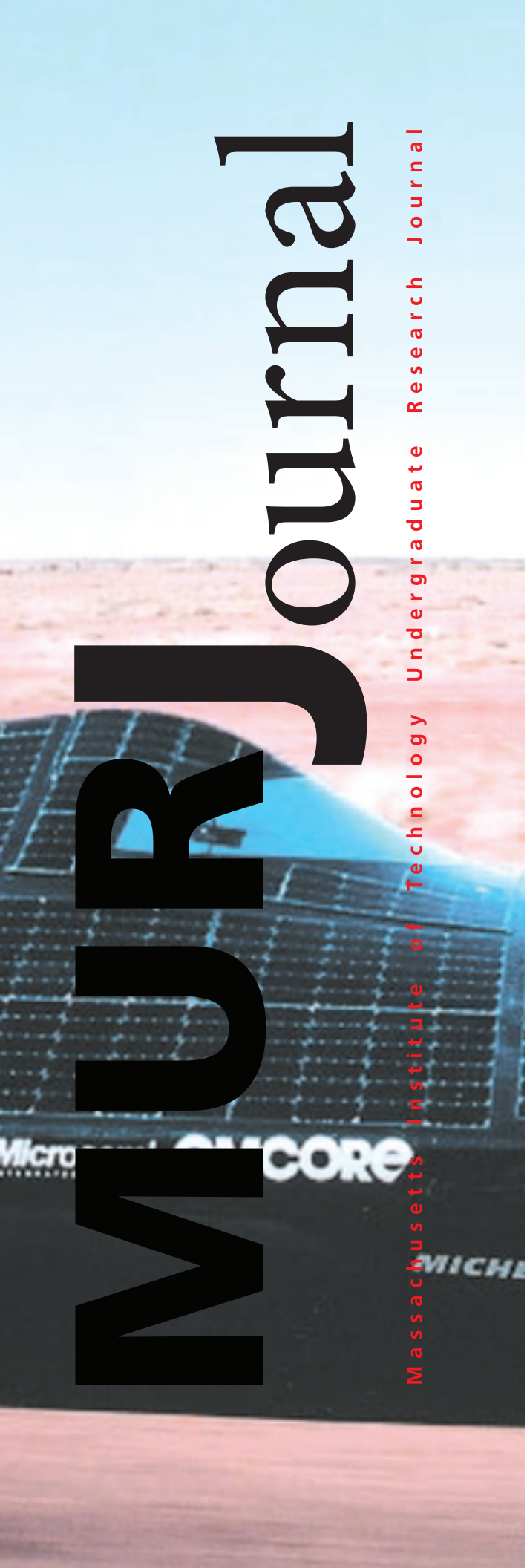

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Massachusetts Institute of Technology

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Cover: A photo taken by Alexander Hayman. This is a picture of Tesseract during the 2003 World Solar Challenge in Australia. It's a bright day, and the solar array is probably producing about 1800 Watts of power. With this power, the vehicle can maintain a speed of around 60 mph.

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It gives me great pleasure to introduce this, the fifteenth edition of the MIT Undergraduate Research Journal. MIT's Latin motto, "Mens et Manus," means "Mind and Hand," and it represents the commitment to integrating research and education with practice that has been a defining feature of the Institute since its founding. It is not surprising, then, that so many MIT undergraduates undertake research of the highest quality and greatest significance: more than 85 percent of them participate in our pioneering Undergraduate Research Opportunities Program by the time they graduate. The impact of MIT student research extends far beyond campus: Biodiesel@MIT, for example, work that is profiled in this issue, recently won the national Ecomagination challenge sponsored by GE and MTVu to advance student-led projects for campus sustainability.

The focus of this issue on energy and sustainability is especially timely, since MIT's new Energy Initiative grows out of passionate interest from our faculty and students. Our goal is to leverage MIT's historic strengths in mission-oriented research, teaching, innovation and technology transfer to address one of the greatest challenges of our time, meeting the increasing demands for energy with sustainable and environmentally sound technology and policy. And our approach reflects MIT's combination of intellectual discovery and practical, hands-on impact, our profoundly interdisciplinary approach, and our history of advancing ideas into action by working with decision makers in government and industry. I believe the time is right for us to take on this challenge —not only because of the challenges energy offers, but also because of new opportunities in a sector that is poised for "disruptive" technologies.

The varied approaches to energy and sustainability on view in this issue of MURJ suggest the importance of developing a portfolio of new technologies and policies to meet a set of problems that have no single solution. The articles in this issue also exemplify the importance of student involvement in MIT's research. There is a lot of talk these days about the importance of new ideas and new approaches if we are to meet the world's burgeoning energy needs. There is no question in my mind that the most productive source of new ideas and approaches will be today's MIT students.

Susan Hockfield