

GREAT PROBLEMS SEMINARS

Lecture Series



MAKING A SUSTAINABLE WORLD: CHALLENGES AND OPPORTUNITIES TO REALIZE SUSTAINABLE PRODUCTION

AUGUST 27, 2009, 5 PM

ALDEN MEMORIAL, WPI CAMPUS
ADMISSION IS FREE AND OPEN TO THE PUBLIC

Consumption of non-fuel materials in the United States is approaching 10 billion tons per year. One of the great challenges of the 21st century will be grappling with the impacts associated with levels of production necessary to satisfy an increasing and increasingly wealthy world population. Solving a problem of such scope will require new ways of thinking and working. No one will be better positioned to meet that challenge than the scientists, engineers, and technology decision-makers being educated today.

This talk will explore why now is the time to focus on reducing the footprint of production. Fortunately, real strategies exist to reduce that footprint and we will survey the challenges and opportunities associated with three: selecting more benign materials, dematerializing production, and mining existing waste streams. Professor Kirchain will conclude by demonstrating the importance of systems modeling to uncover real sustainable solutions using examples concerning the recycling of two very different materials: light metals and platinum.

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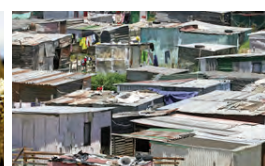
POWER THE WORLD



HEAL THE WORLD



FEED THE WORLD



GRAND CHALLENGES



RANDOLPH E. KIRCHAIN

Associate Professor of Engineering Systems
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The choice of material has sweeping implications on the realization of a product. Materials dictate available production processes, and therefore the physical constraints within which a designer must work. Similarly, the synergism of design, materials, and process affect the environmental impacts associated with a product's manufacture, its use, and its ultimate disposal. As such, understanding the implications of a materials-technology decision requires characterizing the effects that occur throughout every stage of the material/product life-cycle.

To address this, Kirchain's research deals with the development of methods to model two critical aspects of technological performance: 1) life cycle economics and 2) materials system sustainability—particularly resource efficiency and recyclability. To date such methods, have been developed for and applied to issues associated with every major life-cycle stage.

Kirchain has authored over 70 publications in refereed journals and conferences. He has been awarded the American Iron and Steel Institute's Top Technical Achievement Award, the General Motors Technical Achievement Award, and the TMS Recycling Technology Award. Kirchain is currently North American co-chair for the United Nations' Solving the eWaste Problem (StEP) Initiative and co-chair of the MIT Communications Technology Roadmap program.

