

2012-2013

Graduate Seminar Series

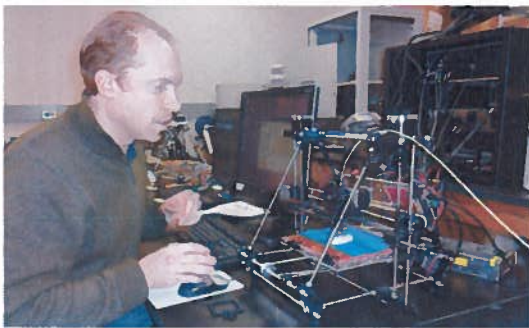
The Department of Mechanical Engineering – Engineering Mechanics

Proudly Presents

Dr. Joshua M. Pearce

Department of Materials Science & Engineering

Department of Electrical & Computer Engineering



Dr. Joshua M. Pearce received his Ph.D. in Materials Engineering from the Pennsylvania State University. He then developed the first Sustainability program in the Pennsylvania State System of Higher Education as an assistant professor of Physics at Clarion University of Pennsylvania and helped develop the Applied Sustainability graduate program while at Queen's University, Canada. He currently is an Associate Professor cross-appointed in the Department of

Materials Science & Engineering and in the Department of Electrical & Computer Engineering at the Michigan Technological University where he runs the Open Sustainability Technology Research Group. His research concentrates on the use of open source appropriate technology to find collaborative solutions to problems in sustainability and poverty reduction. His research spans areas of electronic device physics and materials engineering of solar photovoltaic cells, and 3-D printing, but also includes applied sustainability and energy policy.

Thursday, Mar. 7, 2013

4:00 – 5:00 p.m.

Room 112, ME-EM Bldg.

The Rise of Open-Source 3-D Printing (Or How We Can Make Everyone a Mechanical Engineer)

The benefits of this economy of scale have driven a historical trend towards large-scale manufacturing in low-labor cost countries (e.g. China), especially for the now ubiquitous inexpensive plastic products. However, advances in rapid prototyping with 3-D printing have challenged this cost savings paradigm. With the recent development of low-cost, open-source and self-replicating 3-D printers there is now a technically viable form of distributed manufacturing of many plastic products. The costs of the products are 10-100X less than commercial products and can be ultra-customized. In addition, using distributed open-source 3-D printing for manufacturing eliminates non-productive intellectual monopoly rents and associated encumbering overheads, almost all subtractive waste, allows for lower fill products, and cuts most embodied energy transportation, distribution and packaging-related pollution. This indicates that 3-D printing will not simply be a fad, but a fundamentally new way of providing goods to the world's population via a transition to local (e.g. U.S. or even U.P.) manufacturing. These properties are already attractive for a large percentage of the population and in the last few years the number of 3-D printer operators has grown rapidly, essentially democratizing mechanical engineering. However, this 'maker' movement is primarily made up of amateur DIY engineers and thus there exists an enormous opportunity for traditional engineers to help accelerate the technical progress. This seminar will summarize the state-of-the-art of open-source 3-D printers, the Michigan Tech Open Sustainability Research Group's work on distributed manufacturing, and conclude with an invitation to participate in what the *Economist* calls the "next industrial revolution".

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