

Simple Solutions for (and from) Materials Science

Prof. Ludovico Cademartiri
Materials Science Engineering
Iowa State University

Seminar on January 16, 2018 at 10:00 am in 2004 Black
Faculty Host: Mark Mba-Wright

Abstract

In this seminar I will discuss the apparent correlation between impact – whether academic, technological, or scientific – and simple solutions. While defining “simplicity” is a notoriously poorly defined problem that is maybe more suited to philosophy than science, defining “simple solutions” can be, we contend, done effectively and, more importantly, usefully: i.e., it can be defined in a way that facilitates its pursuit. For example, simple solutions can be defined in terms of their potential virtues, e.g., low cost, reliability, and “stackability” (i.e., they can be combined and compounded with little increase in complexity).

If you believe that impact is correlated with “simple solutions” and that we now have a useful way to define them, the question becomes “how do we pursue them?”. While simple solutions can be easily distinguished when first used, it is notoriously hard, especially in research, to devise a systematic approach to pursuing them. Over the past 5 years we have been interested in developing simple solutions for materials science or through materials science: we have witnessed first-hand the difficulty of this task and our experience might be valuable to those that have similar interests.

In this talk I will therefore describe what we have learnt about the pursuit of simple solutions by discussing examples (published and unpublished) of simple solutions from our own laboratory concerning five problems of general scientific and technological interest:

1. How do we produce materials with completely programmed nanostructure?
2. How do we synthesize nanomaterials on a large, industrial, scale?
3. How do we produce superhydrophobic coatings on large areas outdoors?
4. How do we produce transparent soil to enable the study of the soil environment?
5. How do we redesign the Petri dish to enable the study of organismal interactions?

This seminar counts towards the ME 600 seminar requirement for Mechanical Engineering graduate students.

www.me.iastate.edu