

Today, it takes 18 years on average from materials conception to commercialization. Unless we implement new approaches to the materials discovery and development process, we cannot expect to have a significant impact on our energy economy in the 20-30 year time frame needed to address the climate issues. One of the foremost reasons for the long process time in materials discovery is the lack of comprehensive knowledge about materials, organized for easy analysis and rational design. Materials innovation today is largely done by intuition and based on the experience of single investigators. In the seminar we will discuss how computational materials science can advance and accelerate materials discovery and development in many areas. Two examples will be highlighted:

The Materials Project (www.materialsproject.org) aims to leverage the information age for materials using the only tool that can efficiently scan multiple materials properties in a reasonable amount of time: computations. While *ab initio* computations have already started to show promise for accelerating the traditionally slow development process for new materials, integration with web-based free dissemination and a user-dynamic workspace will lead to a new paradigm for how materials science is performed. Through our project, both experimentalists and theorists will have materials properties of all known inorganic compounds and beyond at their fingertips to scan, analyze and provide inspiration for novel materials development.

We have applied the same methodology to advance materials research for energy storage applications. **Pellion Technologies Inc.** was founded in 2009 on the promise of computational discovery of high-energy storage materials for rechargeable magnesium batteries and received an ARPA-E award in 2010.