

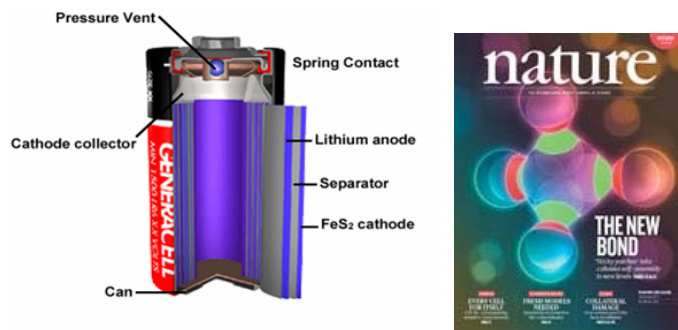
# Senior Projects 2016-2017

Dr. Lloyd Lee

1... Batteries for energy storage

2... Colloids and their microstructures  
(functionalized novel materials)

)



**Notes: My work is mostly on computational science and engineering. If you like computers, it will be great! Also you need to have a background in thermodynamics.**

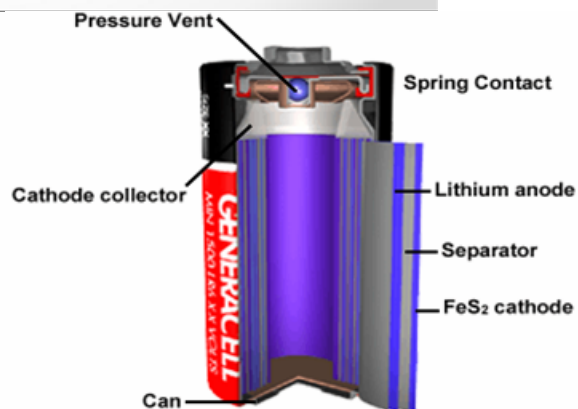
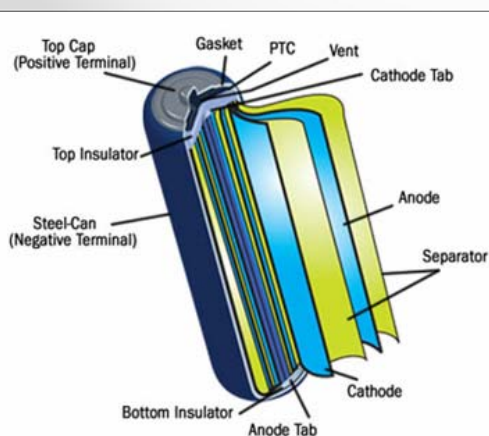
**Contact information:**

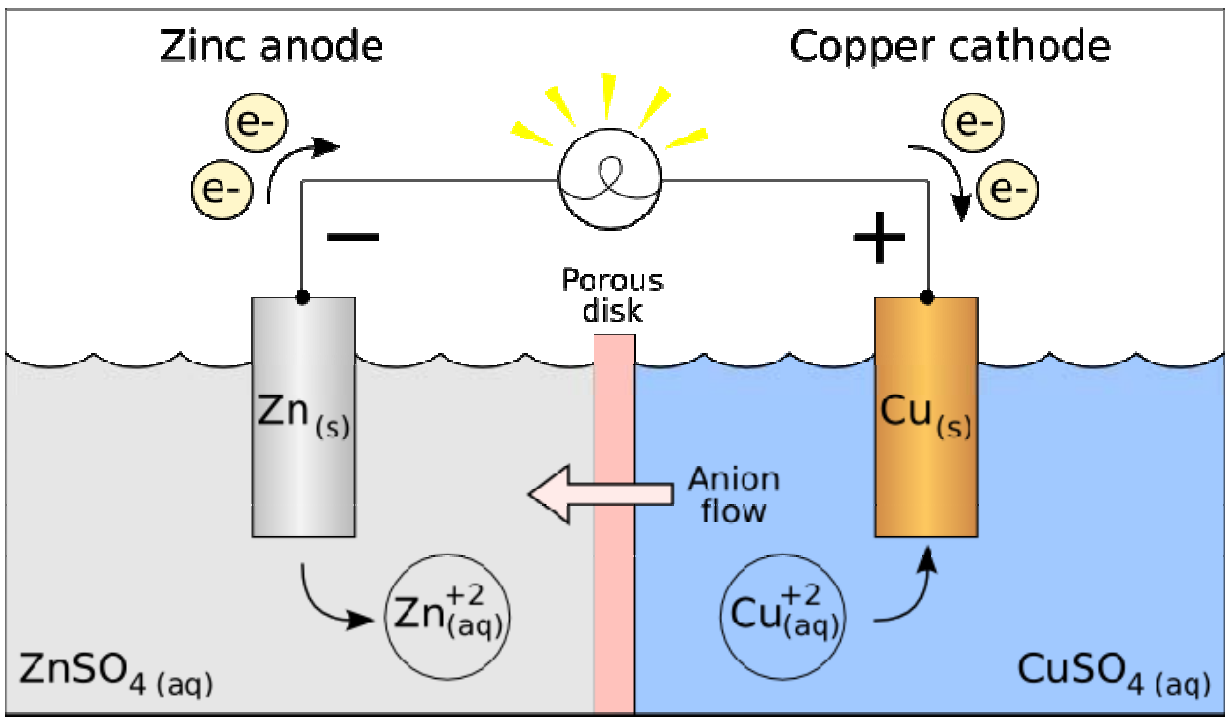
Dr. Lloyd L. Lee (Office: 17-2114, Phone: (909) 869-2423)

email: [lllee@cpp.edu](mailto:lllee@cpp.edu)

# (1)... Batteries:

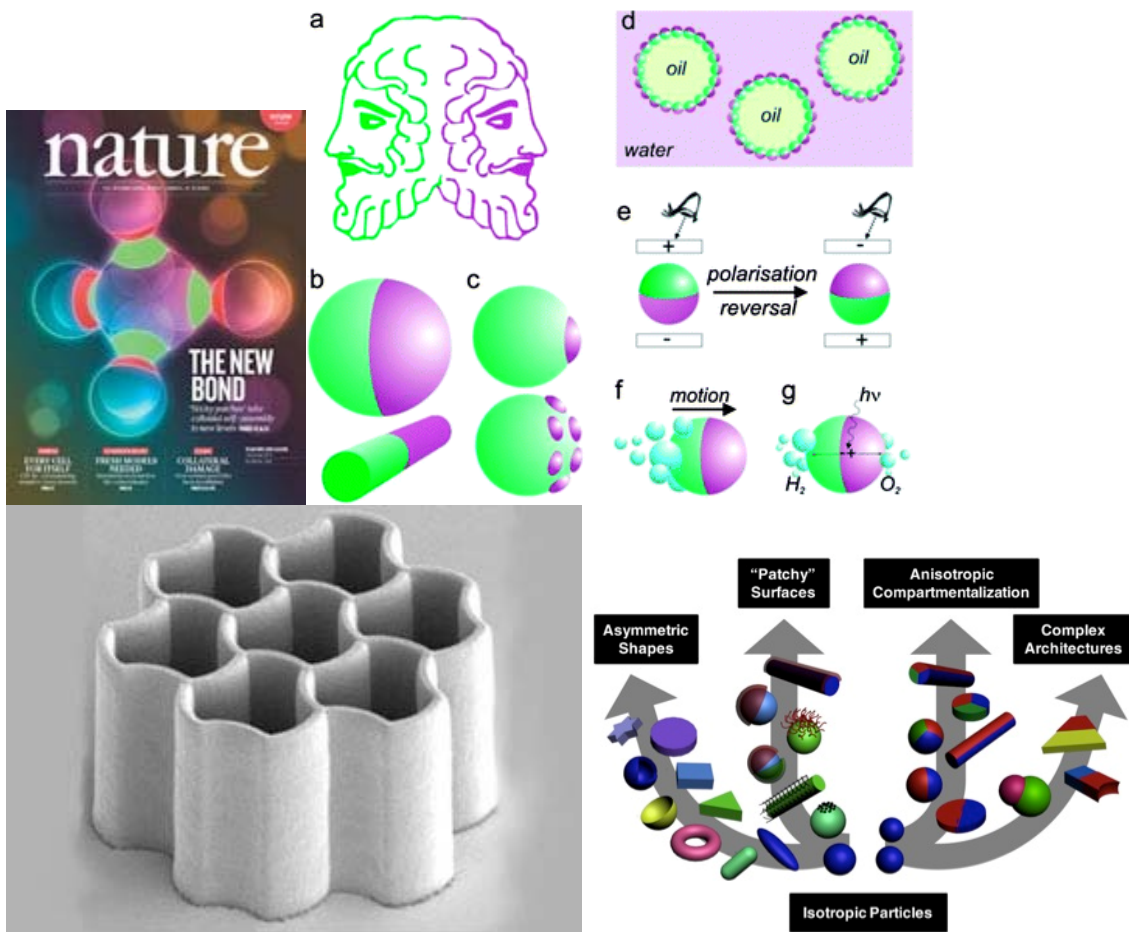
We talk about the energy future all the time. There are two important sectors in energy: **energy production and energy storage**. Batteries are important in energy storage (in any consumer electronics, electric cars, and large energy equipment). We are interested in increasing the **low-temperature efficiency of Lithium batteries**.

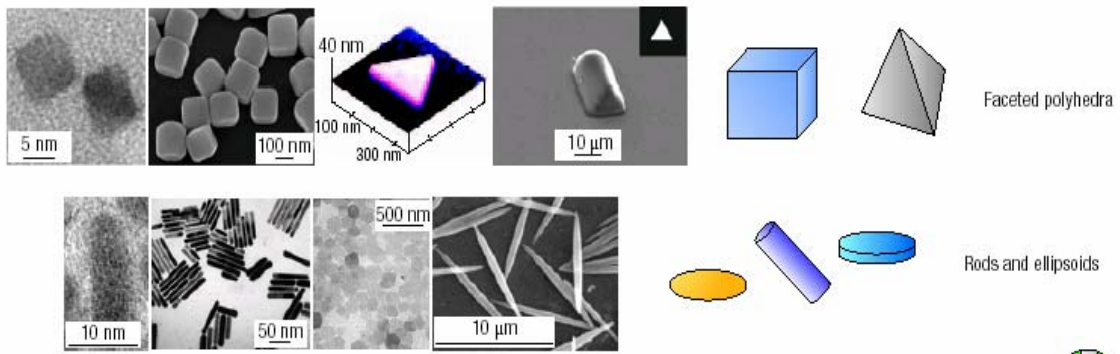
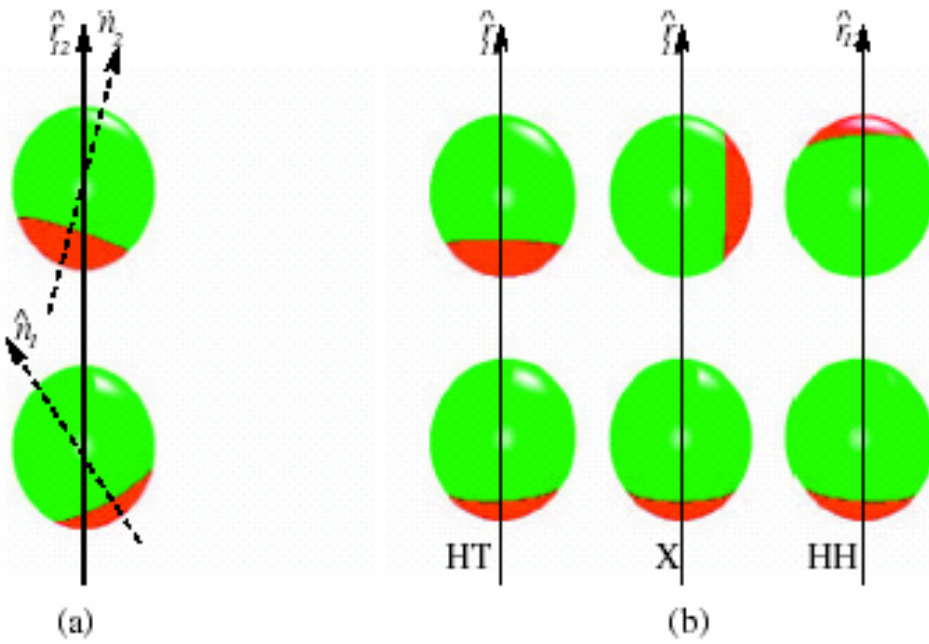


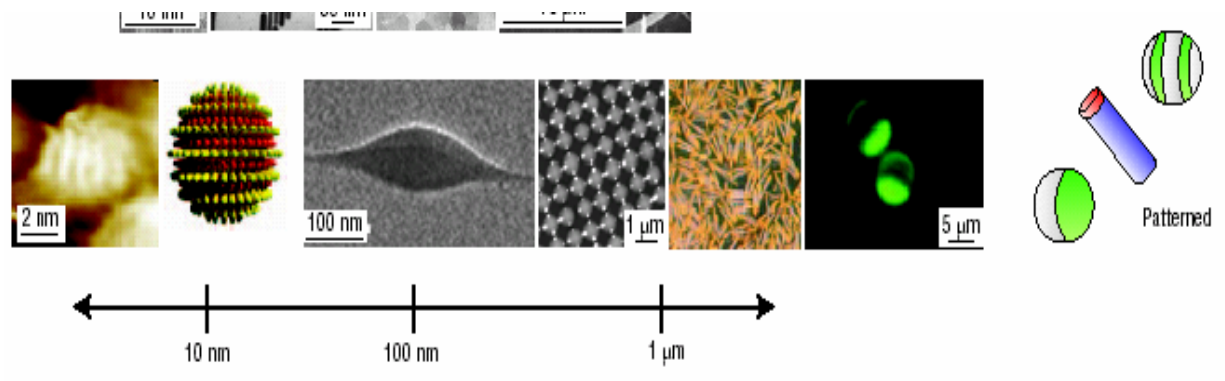


## (2)...Colloids (soft-matter structures and organizations):

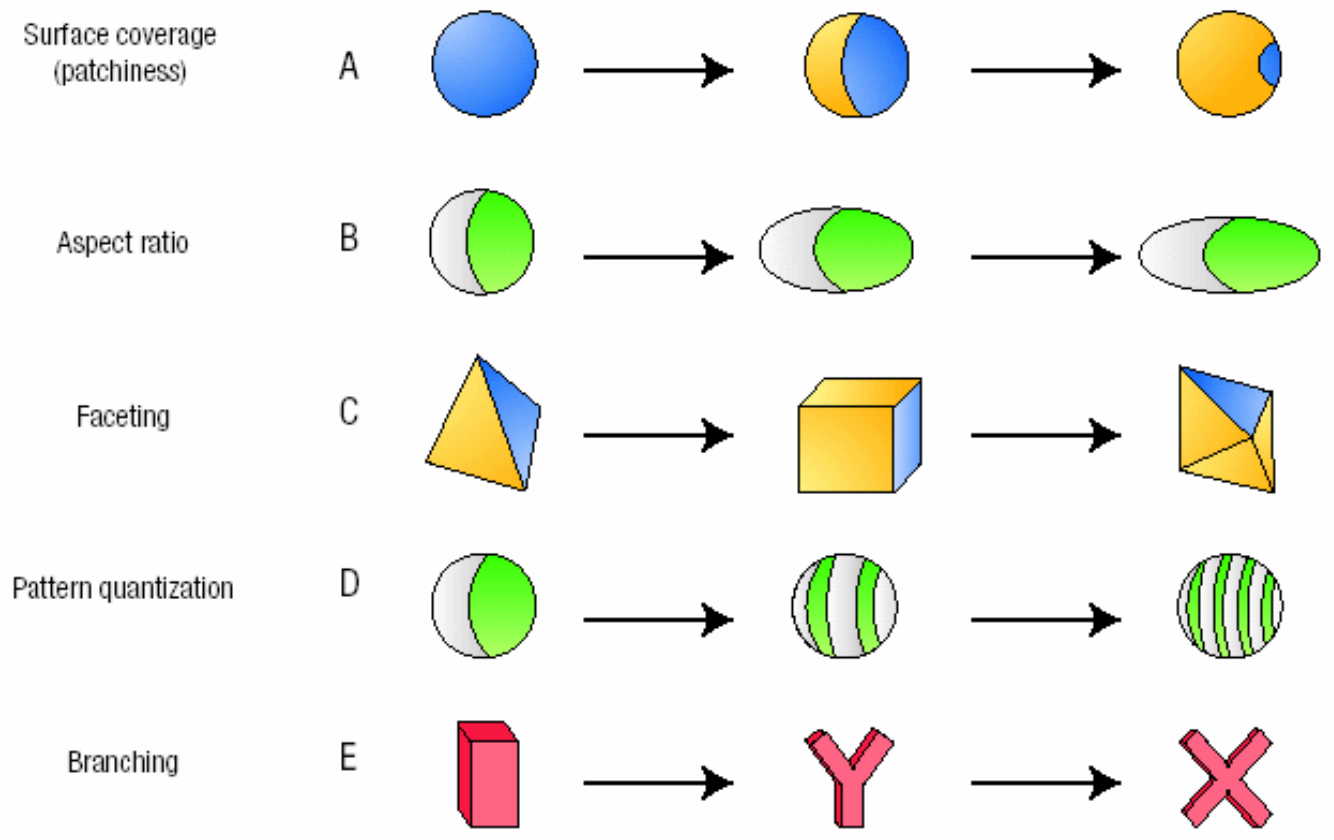
We examine the aggregation and phase transition of colloidal particles. They are important in biological processes (blood plasma and albumins), foods and beverages, pharmaceuticals and cosmetics, among many other fields. Now the technology has advanced to the making of functionally-designed microstructures out of colloidal coagulations.







**Figure 1: Colloids with surface patches can form various structures.**  
 (Sharon GLOTZER 2007 Nature Materials)



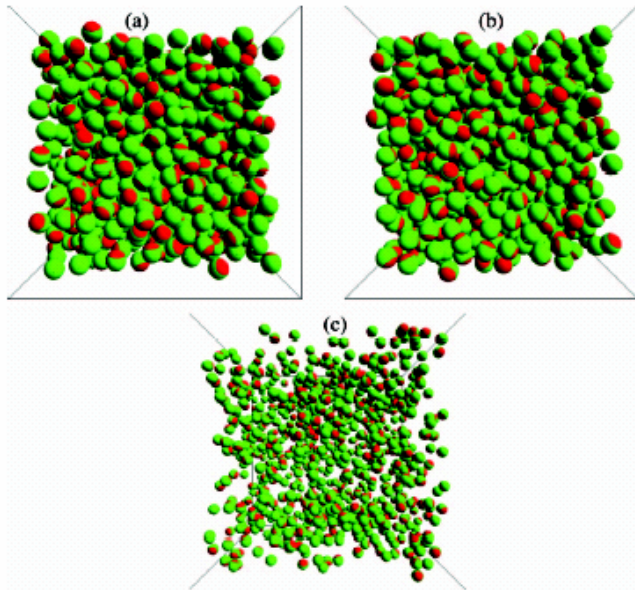


FIG. 5. Snapshots of two 80% coverage configurations with  $\rho^* = 0.68$  and temperatures (a)  $T^* = 0.65$  and (b)  $T^* = 1.0$ . The last panel (c) depicts a corresponding low-density case with  $\rho^* = 0.1$ ,  $T^* = 1.0$ . The three selected state points are the same values considered in previous figures.

