Lack of computation in introductory geoscience courses

Many aspects of Geosciences are dependent on computational modeling, mantle dynamics on Earth and other planets, deep ocean hydrothermal circulation, and climate predictions are just some examples.

Incorporating quantitate methods is important in all college levels in science. Currently there is a lack of computational pedagogical resources that are easily adaptable and contains rubrics in laboratory classes. In such settings students can develop their own data set and strengthen their computational skills in a more meaning full way.

In introductory lectures I have incorporated use of new geoscience education tools such as visualizations and data analysis and interpretations using Microsoft Excel. Integrating computation in mid to upper level undergraduate courses can improve student quantitative and reasoning skills and add a new skill to their toolbox to prepare them for a career that involves data processing, analyzing and modeling.

I have participated in some computation focused courses, in which we followed the procedures provided in the textbooks and worked out chapter assignments. One of the major problems with such a method was that most of students’ focus was on making a bug free code and they get distracted from the main purpose of the activity. I’m very interested in learning about Matlab tools that aren’t only focused on coding but also on data visualization or analysis. I believe teaching computation will increase depth of understanding only if emphasized enough, for example modeling mantle convection might not seem very interesting to some students, but stating the importance of understanding mantle convection before getting deep into coding, provides perspective on the problem. Also I believe in earlier stages of learning computation, data interpretation is as important and students need to learn how to verify the data and translate it.