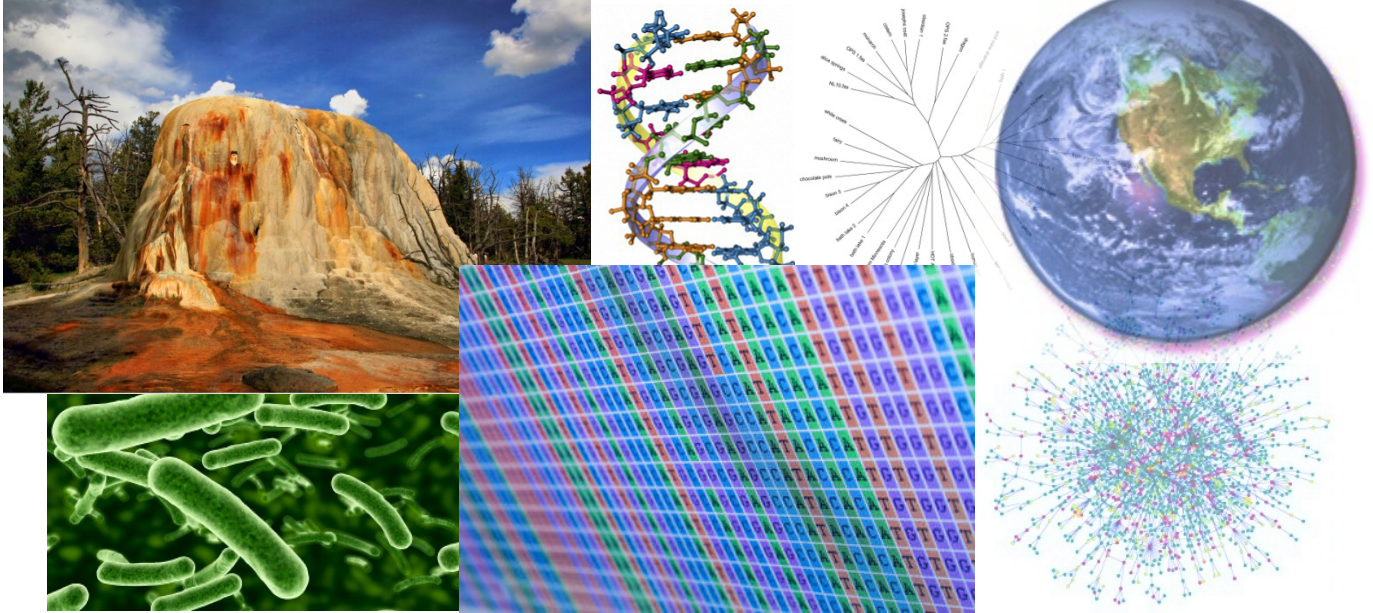


SPRING 2016 SEMESTER TR9-10:15AM

GLG/SES 495/598

ENVIRONMENTAL SYSTEMS BIOLOGY

Professor Jason Raymond (jason.raymond@asu.edu)



Course description: The goal of this course is to provide a rigorous introduction to the theories, tools, and applications of systems biology to understanding how life and environment interact with and shape one another. We will begin with an introduction to the principles and tools of systems biology, organized around the biological flow of information (i.e. the Central Dogma) from DNA to RNA to proteins, then extending into metabolic and cellular networks. Each component includes an introduction to experimental and high throughput technology used to generating large/___omics datasets and metadata that have propelled systems biology. We continue with the theory, algorithms, and computational methods for decrypting and integrating these data. These will be applied to analysis of real environments, drawing from geochemistry and thermodynamics, evolutionary biology, ecological stoichiometry, and network theory and complex systems analysis, with data coming from newly released datasets from research in SESE and from other systems biology research groups around the country.

-Two days per week, splitting time between lectures/directed reading, and computer lab exercises. Students are strongly encouraged to have their own laptops (contact Prof. Raymond about loaners).

-Course material will come from journal articles, wikis, "open university" lectures, and selected textbook chapters. Attendance of relevant talks in SESE, SoLS, and other Schools will be strongly encouraged.

-The first 8 weeks will be systems biology "boot camp": a rigorous introduction to mathematical and computational approaches in systems biology (probability/ statistics, graph+network theory, linear algebra, exact (differential equations) and inexact (numerical analysis) methods, and computer programming (e.g. Perl, Python, or "students choice" if they are already proficient in a language).