



HONR 399: Introduction to the Science of Information

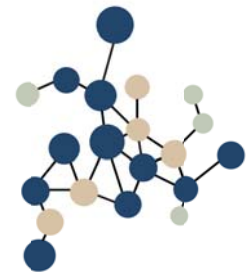
Fall 2011

Dr. Mark Daniel Ward

Information is a unifying theme in our world. It is creatively used as the foundation of many technologies, e.g., the Internet, DVDs, iPods/iPads, etc. People all over the globe are storing and exchanging massive amounts of information in different languages and contexts, across time and space. “The Science of Information” has made many technological advances possible, and it has also opened the door to many questions and viewpoints!

The goal of this course is to investigate information from a very interdisciplinary viewpoint, ranging from fundamental theory to applications that might include:

- information substrates,
- biological pathways,
- communication algorithms and networks,
- data compression, encryption, and privacy,
- economics and value, and
- complex social networks and systems.



We will particularly emphasize the development of rigorous principles guiding the

- extraction,
- manipulation, and
- exchange of information.

We will consider *information* with regard to space, time, structure, semantics and context.

We will consider questions of widespread interest, which cannot be answered within the confines of just one discipline. These questions are of interest to the general public (some have recently appeared, for instance, in the New York Times) and also to researchers in many scientific and engineering fields, such as

- How can we quantify consciousness in terms of bits?
- How is information extracted from massive biological data and then utilized?
- How can information be used in broad applications that benefit society?

The course will feature guest lectures from leaders in many research areas.

The course will allow students to independently investigate the introductory research literature in topics related to the science of information. As students conduct exploratory work, they will make presentations and will lead discussion. The interests of the students will shape the course!

This course is offered as a part of the new \$25 million NSF initiative on “Emerging Frontiers of Science of Information.” All students are welcome to contact Dr. Ward anytime: (765) 496-9563 or mdw@purdue.edu