ABSTRACT

Computational Ecology and Visualization Technologies

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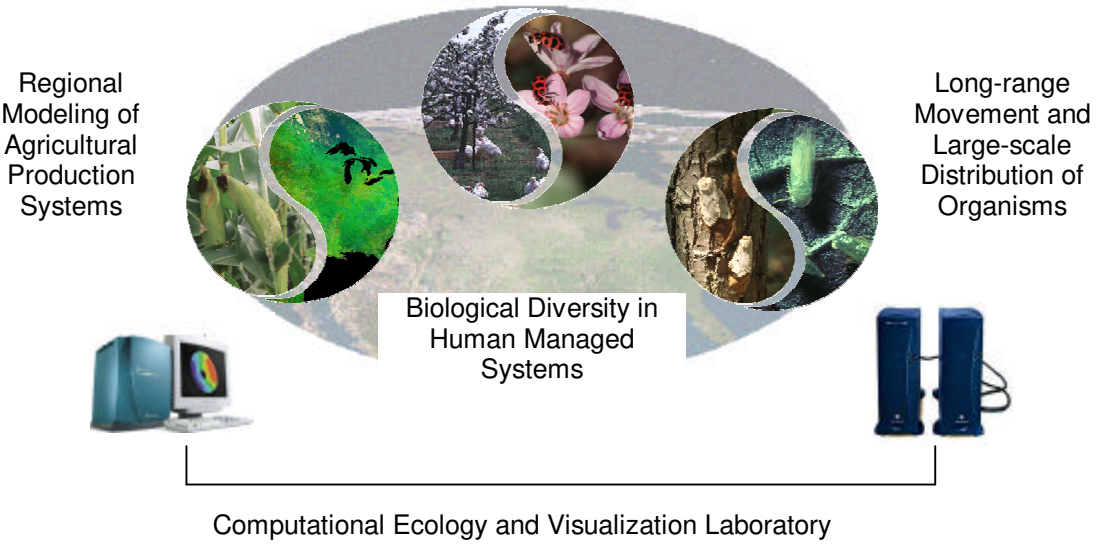
The Computational Ecology and Visualization Laboratory (CEVL) was established in 1998 to focus on the analysis and visualization of patterns and processes in human managed ecosystems at large spatial and long temporal scales. The CEVL, designed to facilitate the linkage between ecology and computational technology, encourages discussion between faculty and students to initiate research and development of applications in ecology to better comprehend the dynamics of biological phenomena at multiple scales. The computational capabilities in the laboratory enables faculty and students to use mathematical models and visualization systems to address local, regional and global environmental issues.

The establishment of long-term studies in ecology has been recognized as a necessary step to address processes that take place over long periods of time, have a periodicity of five or more years, present high variability within and between seasons, and are driven by many interacting factors. As the temporal scale expands, the spatial framework for ecological phenomena needs to be expanded from the plot to the landscape or beyond to encompass regional scales.

The research interests of the CEVL are primarily focused on ecological management issues including regional crop productivity; biodiversity in agroecosystems; and long range movement and large-scale distribution of organisms. A regional framework provides a perspective on the interactions between ecological and management systems, and allow for identification of research needs and the optimization of conservation policies.

Educational initiatives associated with the CEVL include development of courses like “Introduction to Earth System Science and Advanced Earth System Science” with a focus on the Biosphere. Another course, “Biological Information Systems”, focuses on the interrelationships between biology and computational technology. The CEVL has also established a linkage with national and international organizations that involve modeling and visualization.