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MADALGO seminar by Jens-Christian Svenning, Aarhus University

Ecoinformatics – the computing approach to ecology

Abstract:

This talk introduces the novel ecoinformatics research field, outlines the ECOINF group's research in the field, and provides an outlook towards future aims and possibilities, notably the potential for biology-computer science collaborations.

Ecoinformatics is a novel quantitative computing approach to ecology and environmental science, analogous to the bioinformatics approach to genetics and evolutionary biology. The ecoinformatics approach relies on recent exponential gains in computing power and data storage capacity, advances in statistics and mathematics, and dramatic increases in availability of environmental, ecological, and biological data (including genetic data), resulting from large digitization efforts, and increasingly automated data capture. It involves the application of advanced techniques from computer science and statistics to manage and analyze large amounts of biological, environmental and geographical data. It is representative of the broader change from an experimental paradigm to a computing paradigm that is happening across science (see Nature's 2006 "2020 computing" and 2008 "Big data" special features).

Ecoinformatics is revolutionizing ecology and environmental science by making it possible effectively and comprehensively to investigate the complex and often large-scale problems that are at the core of this research field (such as "What determines species diversity?", which Science highlighted as one of the 25 most important topics for modern scientific research in its 125th anniversary issue in 2005) and/or that biology and ecology is increasingly expected to provide quantitative solutions for (such as climate change impacts, adaptation and mitigation possibilities)."