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Modeling the population dynamics of phytoplankton in lacustrine ecosystems TERRY JO LEITERMAN, St. Norbert College — Phytoplankton are microscopic plants, diverse in shape, and form the basis of aquatic ecosystems. Through both photosynthesis and respiration, they produce organic compounds and contribute notably to the Earth's carbon cycle, which make the population dynamics of phytoplankton important in discussions on climate change. In this talk, we introduce a model that predicts the vertical distribution of phytoplankton in freshwater lakes. The growth of phytoplankton is intimately connected to nutrient and light availability. Quantifying the growth due to light availability requires quantifying the seasonal settling velocity of the particles. Careful consideration is paid to the interaction between the forces of buoyancy, gravity, and drag. To accurately formulate settling velocity, the low Reynolds nature of the system is exploited and added to an experimental, laboratory component. The laboratory research is guided by the use of a sedimentation tank and a collection of vertical cylinders that allow the characterization of particle separation and settling velocity for sparse phytoplankton populations of both spherical and slender shape.

Terry Jo Leiterman
St. Norbert College

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