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**Developmental and Metabolite Transport Strategies to Optimize the Growth of Filamentous Cyanobacteria** AIDAN BROWN, ANDREW RUTENBERG, Department of Physics, Dalhousie University, Halifax, Nova Scotia, Canada — Individual cells of filamentous cyanobacteria share nutrients through cytoplasmic and/or periplasmic connections. Under conditions of low fixed-nitrogen some cells terminally differentiate into heterocysts, which fix nitrogen for the remaining photosynthetic vegetative cells. Heterocysts are observed to occur in a regular pattern separated by clusters of vegetative cells. Using a quantitative model of nitrogen uptake, consumption and transport together with vegetative cell growth and division, we explore how the overall growth rate of the filament depends on different heterocyst positioning patterns and on particular strategies of nitrogen transport.

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