1086-VG-1071 **Seda Arat*** (sedag@vt.edu), 460 McBryde Hall, Department of Mathematics, Blacksburg, VA 24060, and **George Bullerjahn** and **Reinhard Laubenbacher**. *A Mathematical Model of Denitrification Metabolic Network in Pseudomonas aeruginosa.*

Lake Erie is one of the Great Lakes in North America and has a favorable environment for agriculture in which nitrate (NO_3) is widely used as fertilizers. For decades, Lake Erie has witnessed recurrent summertime low-oxygen dead zones and related microbial production of greenhouse gases such as nitrous oxide (N_2O). In fact, N_2O is an intermediate in complete denitrification, which is a microbial process of reduction of nitrate (NO_3) to nitrogen gas (N_2) via nitrogen oxides. We present a denitrification metabolic network as a discrete model for *Pseudomonas aeruginosa*, one of the taxa performing denitrification in Lake Erie. We analyze the long run behavior of the system by changing the concentration level of oxygen (O_2), nitrate (NO_3) and phosphate (PO_4). This work suggests that PO_4 highly affect the behavior of the network by inhibiting the major regulator of the system. (Received September 18, 2012)