Prof. Michael C. Mackey, *McGill University, Montreal, Quebec, Canada*
Prof. Mackey has an undergraduate degree in Mathematics and made his doctorate in Physiology and Biophysics in Washington. Currently he is a Joseph Morley Drake professor of Physiology and the director of the Centre for Nonlinear Dynamics in Physiology and Medicine at McGill University in Montreal, Canada. Before going to McGill University in 1971, Prof. Mackey did research at the National Institutes of Health (NIH). His current research involves dynamical systems theory applied to physiological systems including the regulation of cell proliferation and differentiation as well as gene regulatory networks. Additionally, Prof. Mackey works on problems related to the origins of microscopic irreversibility and foundational issues inn non-equilibrium statistical mechanics.

Keynote: Using mathematical modeling to understand and treat periodic hematological disease
There are a range of fascinating periodic hematological diseases in humans. These are characterized by oscillations in the numbers of one or more blood cell types (white blood cells, red blood cells, or platelets) with periods ranging from days to months. Extensive mathematical modeling efforts over the past 30 years have yielded progressively more detailed models for the regulation of blood cell production that now allow us, in some instances, to pinpoint the location of the dynamic defects that lead to there periodic hematological diseases. All of the defects that have been identified have been associated, in one way or another, with derangements of cellular death mechanisms (apoptosis) and have given rise to supercritical Hopf bifurcations. In this talk I will discuss three of these: cyclical neutropenia, periodic leukemia, and cyclical thrombocytopenia. In the case of cyclical neutropenia the mathematical modeling has actually offered insight into how the clinical symptoms can be brought under control (though not eliminated).