

Data Science Seminar

Hosted by the Department of Mathematics and Statistics

- Date: Tuesday, April 18, 2023
- Time: 12:00pm - 1:00pm
- Room: Zoom
- Speaker: Dr. Konstantin G. Arbeev (Duke University)
- Title: Stochastic process models: Bringing biology to statistics to advance research on aging.

Abstract

Aging is a complex biological process with changes that happen in multiple systems and lead to health deterioration, increase in risks of adverse events such as onset of diseases and, eventually, death. Getting insights into potential causes and determinants of aging-related changes requires both relevant data (such as longitudinal measurements of dynamic variables that can be characteristics of aging, e.g., biomarkers and various omics data, etc., and follow-up information on events, e.g., diseases and mortality) and analytic approaches capable of analyzing such data. In this talk, I will present one of such approaches, the stochastic process model (SPM) of aging, which was developed specifically in the framework of research on aging and, respectively, it incorporates several relevant aging-related concepts in its structure. This model provides possibilities to get additional insights into the process of aging compared to traditional regression analyses. I will summarize recent developments and applications of SPM methodology in different research areas and discuss its perspectives in the rapidly changing landscape of human longitudinal studies of aging, health, and longevity.

Biography of the speaker: Dr. Konstantin G. Arbeev received his Ph.D. in Mathematics and Physics with a focus on Theoretical Foundations of Mathematical Modeling, Numerical Methods and Programming from Ulyanovsk State University (Russia) in 1999. His Ph.D. research primarily focused on applications of stochastic processes to modelling dynamics of different financial instruments in emerging markets. After completing a post-doctoral fellowship at Max Planck Institute for Demographic Research in Rostock (Germany) in 2000-2003 in the fields of demography, mathematical modeling of aging and population projections, he joined Duke University in 2004 where he is now an Associate Research Professor in Biodemography of Aging Research Unit of Social Science Research Institute. His research deals with advanced statistical analyses of large-scale human longitudinal data on aging that involve both phenotypic and genetic/omics information and development of mathematical models of aging, health and longevity (such as the stochastic process models of aging to be presented in this talk) and their practical applications to analyses of such data to find genetic and non-genetic determinants of aging, longevity and healthy lifespan. Dr. Arbeev authored and co-authored more than 150 publications in these areas.

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