Bahçeşehir University, Istanbul, Turkey
Analysis & PDE Center, Ghent University, Ghent, Belgium
Institute Mathematics & Math. Modeling, Almaty, Kazakhstan

"Analysis and Applied Mathematics"

Weekly Online Seminar

Seminar leaders:
Prof. Allaberen Ashyralyev (BAU, Istanbul),
Prof. Michael Ruzhansky (UGent, Ghent),
Prof. Makhmud Sadybekov (IMMM, Almaty)

Date: **Tuesday, February 8, 2022**
Time: 13.00-14.00 (Istanbul) = 11.00-12.00 (Ghent) = 16.00-17.00 (Almaty)

Zoom link: https://us02web.zoom.us/j/6678270445?pwd=SFNmQUlvT0tRaH-lDaVYrN3l5bzJVQT09, **Conference ID:** 667 827 0445, **Access code:** 1

Speaker:

Assist. Prof. Ardak Kashkynbayev
Nazarbayev University, Nur-Sultan, Kazakhstan

Title: Models of hormone treatment for prostate cancer: Can fractional models predict the outcomes?

Abstract: Prostate cancer is commonly treated by a form of hormone therapy called androgen suppression. This form of treatment, while successful at reducing the cancer cell population, adversely affects quality of life and typically leads to a recurrence of the cancer in an androgen-independent form. Intermittent androgen suppression aims to alleviate some of these adverse effects by cycling the patient on and off treatment. Clinical studies have suggested that intermittent therapy is capable of maintaining androgen dependence over multiple treatment cycles while increasing quality of life during off-treatment periods. We present several mathematical models of prostate cancer growth to study the dynamics of androgen suppression therapy and the production of prostate-specific antigen (PSA), a clinical marker for prostate cancer. Biologically crude models were based on the assumption of an androgen independent (AI) cell population with constant net growth rate. These models gave poor accuracy when fitting clinical data during simulation. More refined models presented hypothesizes an AI population with increased sensitivity to low levels of androgen and these models generate high levels of accuracy in fitting clinical data. In general, we found that biologically more plausible models can forecast future PSA levels more accurately.

Biography:

Ardak Kashkynbayev received his PhD from the Department of Mathematics, Middle East Technical University, Ankara, Turkey in 2016. He obtained his B.S. in Elementary Mathematics Education and a minor degree in Mathematics from the same university in 2010. After defending his PhD thesis, Dr. Kashkynbayev held a post-doctoral position at Electrical and Electronics Engineering Department, Bogazici University, Istanbul Turkey. Currently, he is a full-time faculty member at the Department of Mathematics, Nazarbayev University. His research interests include discontinuous dynamical systems, neural networks, mathematical biology, bifurcation and chaos theory. He has published several articles, book chapters and conference proceedings on neural networks, mathematical biology, bifurcation of discontinuous differential equations and chaos theory. During his PhD studies, he was awarded TUBITAK graduate scholarship, a scholarship given by Scientific and Technological Research Council of Turkey, and Nippon Foundation scholarship. Furthermore, he received the Prime Minister Scholarship of Turkey during 2005-2010.