

Bahçeşehir University, Istanbul, Türkiye
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, December 3, 2024**

Time: 14.00-15.00 (Istanbul) = 12.00-13.00 (Ghent) = 16.00-17.00 (Almaty)

Zoom link: <https://us02web.zoom.us/j/6678270445?pwd=SFNmQUlVTDtRaHlDa-VYrN3I5bzJVQT09>, **Conference ID:** 667 827 0445, **Access code:** 1

Speaker:

PhD candidate Sofwah Ahmad Idrus

Khalifa University, Abu Dhabi, UAE

Title: On the blowing up solutions of a system of fractional differential equations

Abstract: This talk focuses on the study of a system of fractional differential equations with power-type nonlinearity that arises in nature. Using the comparison method, we establish sufficient conditions for the non-existence of global solutions and analyze the growth rate of the blowing-up solutions near the critical time. A key challenge in analyzing the growth rate of solutions near the blow-up time arises from the presence of the (weakly) singular kernel involved in the fractional differential operator. This difficulty is addressed by extending the analysis to the complex plane, where we uncover detailed asymptotic behavior near the critical blow-up time.

Biography:

Sofwah Ahmad Idrus is a fourth-year PhD student in the Department of Mathematics at Khalifa University. Her research centers on fractional calculus, nonlinear differential equations, and inverse problems, with applications in population dynamics and medical modeling. She is particularly focused on the existence and asymptotic behavior of solutions to fractional systems and the role of fractional derivatives in complex nonlinear models.

Sofwah's doctoral research, supervised by Prof. Mokhtar Kirane, has led to notable achievements, including a study on blow-up phenomena in fractional differential systems published in *Discrete and Continuous Dynamical Systems Series S*. Another of her works, developing a fractional-order model for diabetes and its complications in the UAE, has been accepted in *Mathematical Methods in the Applied Sciences*.

She has undertaken research visits to Ghent University, Belgium, hosted by Prof. Michael Ruzhansky at the Ghent Analysis & PDE Center, and to the University of Wroclaw, Poland, hosted by Prof. Grzegorz Karch and Dr. Szymon Cygan.

At Khalifa University, under the Doctorate Research and Teaching Scholarship, Sofwah serves as a teaching assistant for both undergraduate and graduate-level courses. She also has prior teaching experience as an adjunct lecturer at the University of Indonesia and as a teaching assistant at the Bandung Institute of Technology.

Sofwah holds a Master's degree in Mathematics from the Bandung Institute of Technology and a Bachelor's degree from the University of Indonesia.