ARISTOTLE UNIVERSITY OF THESSALONIKI
FACULTY OF SCIENCES
SCHOOL OF PHYSICS
LABORATORY OF NONLINEAR SYSTEMS, CIRCUITS & COMPLEXITY

PRESENTATION OF POSTDOCTORAL RESEARCH

On Tuesday 17th of July 2024 at 10:00

the postdoctoral researcher of the School of Physics

Dr. Ioannis Kafetzis

will give a public talk on the results of his postdoctoral research, on:

"Design of Chaotic Systems and their Quantum Versions for the Development of Cryptography and Secure Signal Transmission Methods"

Supervisor: Christos Volos, Associate Professor

The event will be held virtually over the ZOOM platform, using the following link:

https://authgr.zoom.us/j/4957807556?pwd=MUYwenFGVVJDSC9yblRjWHVrYkUwUT09

The increasing volume of information transmitted in modern communication, particularly via the internet, makes the secure transmission of signals an urgent necessity. Chaotic cryptography is a promising approach in this area due to its potentially low computational cost and high encryption speed without compromising the system's security.

This postdoctoral research examined the problem of using discrete chaotic maps in constructing cryptographic systems for secure signal transmission, applicable under real-world conditions. The research pillars included the design of new chaotic maps and their quantum versions, the automation of the dynamic analysis of chaotic maps, their use in designing pseudo-random number generators, the design of encryption schemes and verification of their cryptographic strength, as well as the design of prototypes that confirm the applicability of these methods in real-world scenarios.

Additionally, during the postdoctoral research, open-source computational frameworks were developed to simplify the dynamic analysis of chaotic systems, accelerate chaotic cryptography schemes, both existing and new, through parallel signal processing, and automate the design of electronic analogs for continuous-time chaotic systems.