Date: Friday, 1 October 2021

Time: 3:00pm – 4:00pm

Speaker: Professor Nalini Joshi (University of Sydney).

Venue: Zoom

Title: Motion and monodromy.

Abstract: Newton was inspired by Kepler’s laws of planetary motion to study motion on curves. This led him immediately to transcendental functions, that is, functions that cannot arise as solutions of polynomial equations. A century and a half later, the identification of new transcendental functions became a major topic in mathematics. I will give an overview of these results before considering monodromy: the study of how a function changes as its independent variable moves around a singularity. These two themes come together in the study of solutions of the Painlevé and discrete Painlevé equations. They arise in a wide range of applications and have surprisingly rich mathematical properties, lying at the intersection of many directions in mathematics, including analysis, dynamical systems theory, number theory, and algebraic geometry. But there remain tantalizing open questions. In this talk, we touch upon what we know, and more importantly, what we don’t know about these functions.

Bio: Payne-Scott Professor Nalini Joshi obtained her PhD from Princeton University in 1987, and is currently in the Department of Mathematics and Statistics at the University of Sydney, where she the Chair of Applied Mathematics, as well as a Georgina Sweet Australian Laureate Fellow. Her research interests include integrable systems, lattice equations, and nonlinear waves.