The Wonders of Digital Art and Fractals:
A Project on Visualizations Using R

Eric Lewis, Yanna Chen, Ricky Hardiyanto

Faculty advisor: Boyan Kostadinov

In this talk, we present several visualization projects designed to mix programming, mathematics and experimentation by creating complex digital art patterns inspired by superpositions of contour and image projections of 2D surfaces. We also developed compact functional programming procedures for visualizing complex fractal systems such as the classical Sierpinski carpet and triangle and the Heighway Dragon, as well as some new fractals that we created. We also implemented some classical chaotic dynamical systems, and developed some interactive 3D visualizations, based on the rgl R library, which we also demonstrate in this presentation. All visualization projects are implemented using the high-level, open-source and free computational environment R. This work is supported by a MSEIP Grant from the Department of Education.