Physics-Informed neural networks (PINNs) are an emerging paradigm for solving and learning differential equations using machine learning tools. In this talk, I will cover old and new architectures that are, by construction, flow operators. As flow operators, these neural network architectures possess desirable properties that we naturally expect from the solutions of differential equations, but that classical PINNs do not possess naturally. Throughout the talk, I will show how these types of architecture may be superior in certain tasks, including on solving ordinary and partial differential equations, and applications in computer graphics.