



## Joe Noel

**Biochemistry:** Dr. Joe Noel currently leads the biochemistry and genetics of aquatic plants as part of a larger harnessing plants initiative at the Salk Institute. Joe is an expert in the evolution and manipulation of plant secondary metabolic pathways.

Joe Noel holds the Arthur and Julie Woodrow Chair, and is professor and director of the Jack H. Skirball Center for Chemical Biology and Proteomics. Noel is an expert on the evolution and manipulation of plant metabolic pathways, especially those that produce plant phytochemicals, hormones and specialized metabolites used by plants for stress resistance and by humans for medicines, healthy diets and biomaterials. Dr. Noel uncovered the design principles that plants employ to manufacture diverse terpenes, the anti-aging compound resveratrol, commonly found in red wine, and the enzymes responsible for plant polyketide scaffolds and modifications. This technological breakthrough has been used to arm many plants against pathogens while offering potential benefits to humans through diet. In characterizing stress-tolerant plants, the Noel lab showed that phaseic acid, a breakdown product of the plant hormone ABA, is not a waste product but regulates drought tolerance of plants by altering the chemistry of plant roots. Together with the Chory lab at the Salk, he identified chemical mechanisms that coordinate different metabolic pathways in plants to make sure their parts grow at the appropriate times when light levels change and after wildfires when plant respond to chemicals in burnt plant material to signal seed germination. Dr. Noel employs chemistry, biochemistry and structural biology to understand and predictably manipulate these plant systems. The Noel lab's work has paved the way to intelligently engineer a new generation of plants using natural genetic and biochemical programs. Many of these specialized metabolic pathways supply key chemical building blocks for plant suberin, a key biopolymer in plant roots. Dr. Noel received his PhD in Chemistry and Biochemistry from Ohio State University. After his Postdoctoral training in Structural Biology at Yale University, he joined the Salk Institute in 1994. Dr. Noel is a fellow of the American Association for the Advancement of Science.