

1135-J1-89

John C Lang* (jclang@ucla.edu) and **PJ Lamberson**. *On the Shoulders of Giants: When is it better to work in sequence versus in parallel?*

In the past decade, there has been an explosion of research into the ability of teams of individuals to find solutions to complex problems that no single individual would be able to solve on their own. This broad field of study, which includes the study of collective intelligence and the wisdom of crowds, becomes ever more relevant as developed countries become increasingly reliant on the knowledge economy as a driver of productivity and economic growth. Here we study a seemingly simple and fundamentally important question in the context of teams of problem solvers: When is it better to build on the work of your predecessors (i.e. to work in sequence), and when is it better to start from scratch (i.e. to work in parallel)? This dilemma appears in one form or another in nearly every profession and research domain, including fields as diverse as economics, medicine, engineering, etc. Using elementary techniques from network theory, probability theory, and calculus, we develop a simple mathematical model that we analyze to show that for difficult problems it is always better for problem solvers to work in parallel rather than in sequence. Finally, we provide counter-examples showing cases where, for simple problems, it can be better for problem solvers to work in sequence. (Received July 25, 2017)