Despite years of hard work and dedicated champions, software engineering’s educational and industrial constituents have not only failed to converge, the gap between them continues to grow.

Some disciplines, like circuit and genetic engineering, seem to evolve from theory to practice relatively responsibly. Software engineering, on the other hand, while not yet at the guillotine, has suffered a decided lack of direction. It may be time to storm the gates. It is never too late for a revolution, and circuit and genetic engineering provide two worthy role models.

Scientists need a certain degree of faith to bolster their confidence in the arduous quest for truth; lacking such faith, science would not have come so far so fast. But when researchers reflexively deny any evidence and arguments that challenge their faith, they violate the scientific spirit.

Although we have grown up in a period of explosive scientific and technological progress, reflected by such measures as Moore’s law, science—especially pure science—might be entering an era of diminishing returns. Science itself tells us that there are limits to our knowledge.

Both predictable and unpredictable hazards await the spacecraft, robots, and scientific instruments that humans dispatch to explore our solar system. The toughest hazard may be the known presence of unknown bugs in even rigorously tested software.

By exploring new technologies and approaches to develop provably reliable software within tough constraints, NASA has a chance to advance the state of the art, contributing to computer science as well as software engineering. In addition, any successful spin-off that improves reliability while cutting development time and costs could, in principle, generate savings for US industry equal to the nation’s budget for space exploration.

Holograms can reconstruct complete optical wavefronts, capturing images that have a three-dimensional appearance and can be observed from different perspectives. Museum exhibits often use optical hologram technology because it permits presentation of 3D objects with almost no loss in visual quality. Optical holograms are static, however, and lack interactivity. Combining 3D computer graphical elements with stereoscopic presentation techniques provides an alternative that allows interactivity.