DASSAULT SYSTEMES

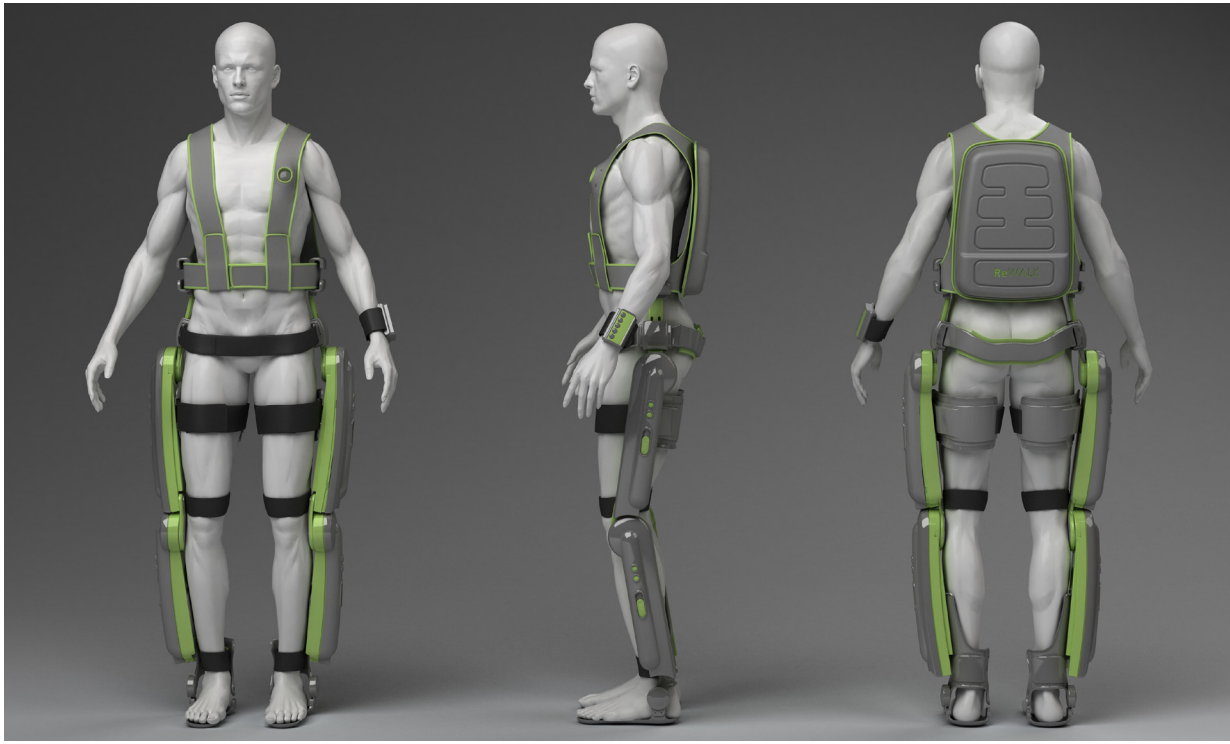
A CLOSER LOOK AT PERSONALIZED HEALTH

IMPROVE HEALTHCARE AND THE PATIENT EXPERIENCE WITH UNIFIED 3D DESIGN, SIMULATION AND ADDITIVE MANUFACTURING TECHNOLOGIES

Healthcare is changing. That's never a surprise. The need to improve treatments, save lives, and blunt the impact of disease drives a tremendous commitment of intellectual and material capital to advance medical knowledge and capabilities. At the same time, the emergence and maturation of new technologies empowers researchers, practitioners, medical device developers, and others to explore and pursue an expanding range of possibilities, and to drive innovations that would have seemed impossible only a few short years ago.

Perhaps the most significant change has been surrounding medical care—particularly, challenging the idea that treatments must necessarily be generalized to serve broad numbers of patients. While historically, medical research has necessarily been focused primarily upon "macro" solutions to large-scale problems—such as the development of antibiotics to combat communicable disease—there is a growing understanding that highly specialized "micro" solutions are possible, practical, and desirable. Researchers and practitioners are increasingly working to develop treatments and solutions keyed to the needs of certain types of populations and, in some cases, individual patients, with the goals of optimizing treatment efficiency and improving treatment outcomes while containing costs.

Researchers are now developing treatments keyed to the needs of individual patients, showing that highly specialized healthcare solutions are now possible, practical, and desirable.



A convergence of diverse circumstances is driving these changes—and making them possible. Throughout the developed world, there is an increasing emphasis on proactive, patient-centered therapy, with the quality of the patient experience and improved treatment outcomes deemed to be of greatest importance. At the same time, the business climate has enabled a new generation of agile, venture-funded startup firms to pursue development of innovative and highly specialized medical treatments, devices, and products. Perhaps most significantly, new technology—often drawn from realms outside of traditional medical practice—is making pursuit of these innovations possible, practical, and affordable.

3D design, simulation, and additive manufacturing technologies are central to these developments. Traditionally employed in sectors such as aerospace, defense, and consumer products, these technologies are now being employed directly and indirectly to repair and restore the most complex machine of all: the human body. In so doing, they are unlocking new possibilities within life sciences, and creating the potential for a new era of patient-centric medical practice and treatments. Innovations made possible through 3D technologies are already generating powerful results across a wide spectrum of medical specialties, resulting in improved health and quality of life.

THE ERA OF MULTI-DIMENSIONAL THERAPY

In the quest to cure or compensate for the effects of injury, aging and disease, doctors and scientists continually struggle to push past the limitations of knowledge and tools available to them. The emergence of 3D design and simulation technologies as a viable tool for researchers and clinicians empowers these professionals to adopt a new approach to their work. As a consequence, this generates a new, multi-dimensional approach to treatment. The expanded range of design, testing, simulation, and additive manufacturing capabilities these technologies make possible, along with the gains in speed and efficiency in executing them, helps to bring a tantalizing new possibility within reach: the prospect of truly personalized care, devices, and treatments.

THE PROJECTED ANNUAL COST OF CANCER CARE IS ESTIMATED TO RISE TO

$157

BILLION IN 2020

STAT SOURCE: JOURNAL OF THE NATIONAL CANCER INSTITUTE/NATIONAL INSTITUTES OF HEALTH

HTTPS://WWW.NCBI.NLM.NIH.GOV/PMC/ARTICLES/PMC3107566/

There is more acceptance than ever before that personalized care is desirable and necessary – and an expanding recognition that technology is making it possible. There is a growing body of evidence emerging from across a spectrum of life sciences and health care specialties that 3D design, simulation, and additive manufacturing technologies are having a transformative effect upon patient care and treatment outcomes. Cardiology, oncology, orthopedics, audiology, prosthetics, dentistry – all are undergoing rapid transformation as a result of these technologies' influence.

The following sections will explore an array of new personalized therapies, devices, and treatments with the power to transform the quality of care and improve the patient experience. These include:

- **Individualized Cancer Care** – 3D design, simulation, and additive manufacturing technologies are changing the face of cancer care by optimizing both internal and external radiotherapy treatment regiments for individual patients
- **Accelerated Innovation** – New 3D technologies facilitate efficient and effective collaboration, enabling the rapid development of new devices and treatments
- **Sharing Learning and Knowledge** – Unified design, simulation, and analysis platforms foster closer working relationships between researchers, medical practitioners, device manufacturers, enabling development of a new generation of diagnostic and learning tools
- **Engineering the Invisible** – Advanced simulation technologies enable users to model chemical behaviors and outcomes at the atomistic level to develop new pharmaceutical therapies

Companies are utilizing 3D design, simulation, and additive manufacturing technologies to individualize personal healthcare. Explore the ways throughout the ***Designing Personalized Healthcare ebook.***