System-level mechanical simulation is widely practiced today in well-established industries such as automotive and aerospace, but not so much in the life sciences. The Living Heart Project (LHP) is a collaborative project between Dassault Systèmes, life sciences industrial companies, researchers and medical practitioners in which virtual models of the human heart are created. This talk describes how the LHP came to be, the components of the models, and the evolution of the project. A variety of applications are shown, such as pacemakers, LVADs or heart valves. These applications testify to the wealth of perspectives brought in by the participants in the project.

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Nuno Rebelo received his PhD in Mechanical Engineering from the University of California at Berkeley in 1980. For most of his professional life he has been involved in both the software development and industrial application of finite element methods. From 1984 to 2001, he was a member of the development staff of the Marc and Abaqus finite element codes, during which time he worked on contact algorithms, material modeling and stabilization methods. From 1989 to 2018, he founded and was the director of technical sales of what became the SIMULIA West Center of Excellence. In 2018 he retired and continues to do consulting work through Nuno Rebelo Associates, LLC. For more than 15 years he has been involved with FEA of medical devices, and he wrote the Nitinol material model available in Abaqus.