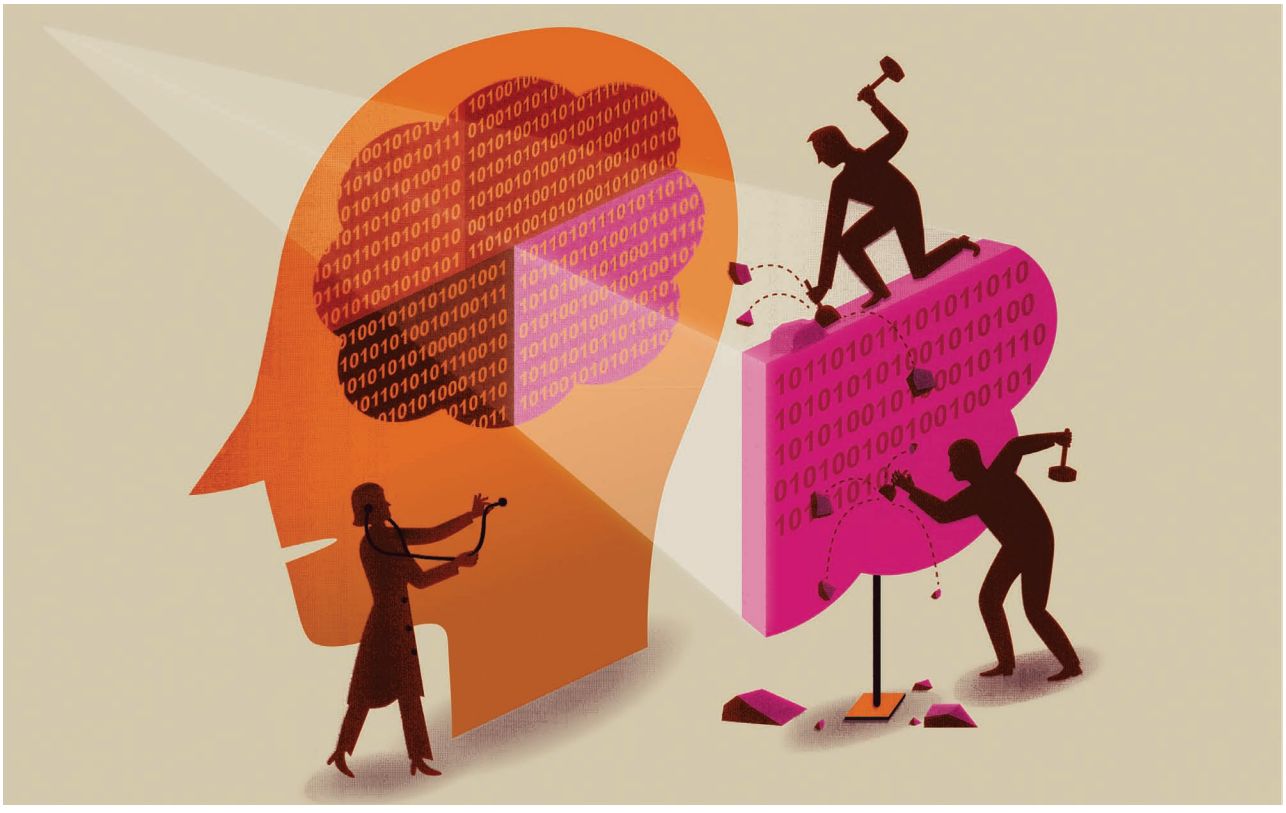
Medical Simulations



Medical simulation is a broad area of integrating computer simulation technologies with specific medical procedures. In such a blend, 3D graphical animation and virtual reality often play an important part. Many new medical procedures that involve computer simulations have emerged in recent years, and numerous advances in treatment of different aspects of human illness appear everywhere.

In this special issue, *CiSE* provides an opportunity for researchers to demonstrate and share some of their existing work and breakthroughs in medical simulation. The intention of this special issue is to bring together and report up-to-date research and applications in this growing and changing area. We believe that the accepted articles in this issue will be interesting to both medical researchers and computational scientists.

In the first article, "Automatically Assessing Limb Alignment and Hip Fracture Using 3D Models," Qi Xing and his colleagues assess and

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measure lower limb alignment and hip fractures. Their 3D feature-construction system automatically marks all of the features of the lower extremities, and it helps doctors with osteoarthritic analysis by providing quantitative descriptions of malformations such as varus or valgus alignments.

Next, Jihui Li and his colleagues employ computing and simulations that aid in giant cell tumor (GCT) removal surgery in their article, "Computer Simulation Techniques in Giant Cell Tumor Curettage and Defect Reconstruction." Interestingly, virtual patient-specific GCT surgical procedures are carried out for improving the actual surgical results.

In "Motion Simulation of Inner Hair Cell Stereocilia," Lin Yang and her colleagues study the microscale hair cells in the inner ear. They try to understand the essence of human hearing. This article mainly focuses on the preliminary mechanics and property measurement during simulation.

Yao-yao Fu and his colleagues present a virtual analytical software program called EarCanalDriller in "Evaluating Potential Ear Canal Reconstruction for Congenital Aural Atresia Patients." The software can evaluate congenital aural atresia as well as the likelihood of surgical success, and it can design possible surgical procedures.

Finally, in "Effectively Visualizing the Spatial Structure of Cerebral Blood Vessels," Yan-Lin Luo employs parallel GPU rendering for a stereoscopic view of cerebral vessels. This work extends current 3D visualization techniques by integrating GPU techniques and new depth calculations.

The authors have done a great job in discussing their results with illustrations. In our opinion, the topics presented here aren't enough to cover such a broad area and satisfy the large audience behind medical simulations. Nevertheless, we've tried to introduce the area and summarize the content here. We believe you'll find much more interesting information showcased in the articles themselves.

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