



BIO MEDICAL

Assistive technologies

Sandia is teaming with assistive device companies to help develop technical solutions to problems experienced by mobility-impaired people. Two such devices help wheelchair users prevent skin damage and spinal problems. Sandia applies its expertise in design, materials, batteries, actuators, sensors, reliability, safety, manufacturing, and



The Generic Total Contact Seat, which can be retrofitted to any wheelchair, adjusts automatically to prevent potentially deadly pressure sores.

software to help the industrial partners produce safe and effective products at reasonable prices.

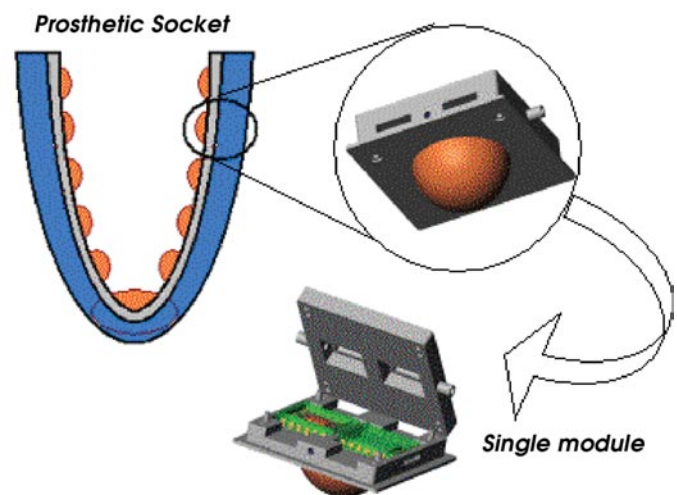
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Prostheses

Sandia is developing an above knee prosthetic socket that automatically conforms throughout the day to the varying



The Dynamic Socket uses a sleeve insert that contains several MEMS based bladders. The array of bladders distributes pressure over amputee residual limb.

size and shape of the residual limb. This will be achieved by using Micro-Electro-Mechanical System (MEMS) valves to measure the pressure and deliver fluid through channels to vary the bladder's volume. The automated socket will contain its own power unit (minimal consumption), controller, and allow integration with standard lower limb systems. The socket will sense and respond to redistribution of fluids of the residual limb and changes in pressure that occur during the gait cycle.

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Screening Mammography

Sandia has developed image analysis and pattern recognition software tools to aid radiologists in screening mammograms for cancer. A clinical trial has demonstrated that the software increases the odds of spotting certain cancers without increasing the risk of unnecessary biopsy or follow-up. The pattern recognition algorithms are based on the Sandia-invented concept of "dense feature maps," and are generally applicable to voluminous, noisy, and highly correlated data.

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Sandia's microvalve technology is uniquely able to route extraordinarily small fluid volumes in a wide variety of microfluidic systems, including those with harsh solvents, high pressures, and high electrokinetic fields. Taken together, these technologies allow for sophisticated control of fluid flow in an unparalleled variety of chemical analysis, chemical synthesis, and fluidic microactuation systems.

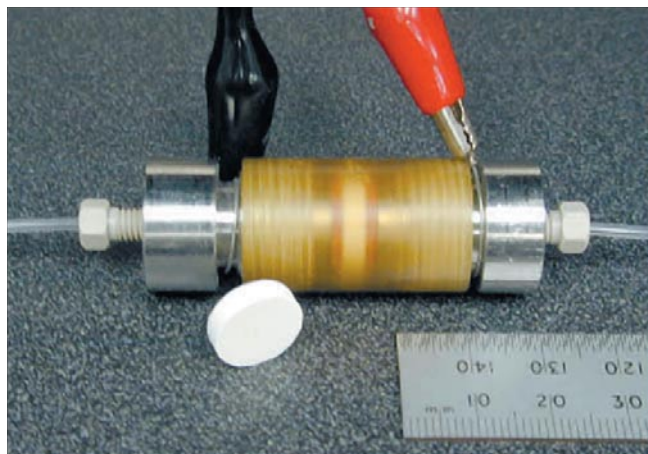
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Microvalves and Pumps

Sandia is a leader in novel techniques for pumping and routing fluids on microfluidic chips. Sandia's electrokinetic



Electrokinetic pump: voltages applied across porous matrices allow generation of extremely high pressures for microfluidic analysis or actuation.

pumps have no moving parts and can generate pressures exceeding 9,000 pounds per square inch in microchannels. These pressures have been used for high-pressure chromatography or for actuating microscale devices.



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