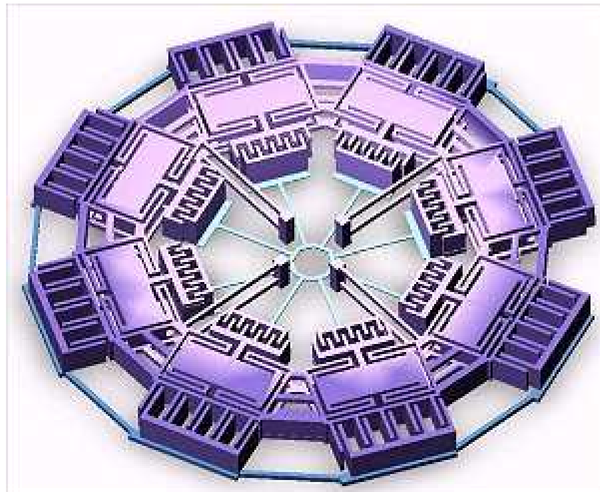
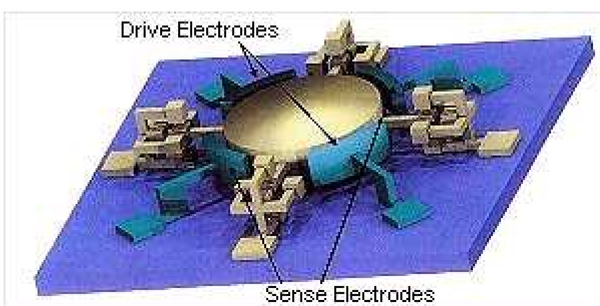
MMD contest winners take advantage of design agility



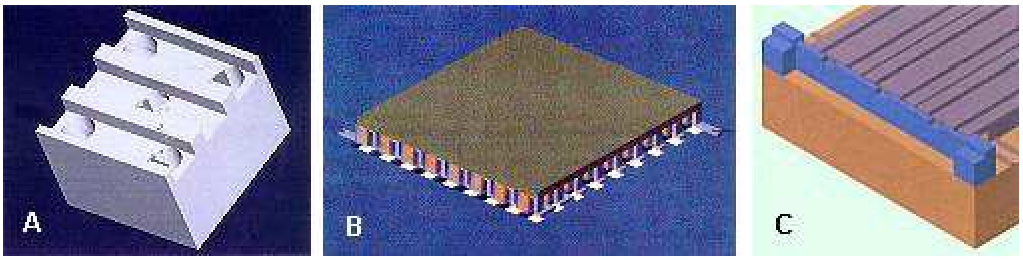
Microfabrica Inc. (formerly MEMGen) has announced the winners of its MEMS Design Challenge contest from a field of 132 entries from 24 countries. The company is commercializing the EFAB process (Electrochemical Fabrication) developed at the University of Southern California. It's a batch layered-fabrication technique that allows producing parts and assemblies from the micron scale up to the mesoscale of a few millimeters. The company says the method can produce parts with hundreds of layers, and the process is directly driven by any of the many CAD software applications that produce STL files.

Not surprisingly, the winners have taken advantage of these unique characteristics of the EFAB process. First prize went to Cenk Acar, a Ph.D. candidate from the University of California, Irvine. He'll receive $10,000 in cash, a prototype of the design and a SolidWorks(R) Office 2003 3-D CAD package. His winning entry, shown above, is for a distributed mass gyroscope. Acar says that the EFAB process allows for a customized suspension system which permits much higher sensitivities. He indicates that an added benefit is that structures can be incorporated into the design that prevent the device from being destroyed by extreme loads. This is one of the consequences of the deign freedom offered by EFAB in contrast to other MEMS fabrication processes, according to Microfabrica's President Vacit Arat. Applications for tiny gyros include a wide range of automotive, consumer and industrial products.



Second prize of $5,000 and a prototype, went to Jason Clark, a Ph.D. candidate from the University of

California at Berkeley. He submitted a floating electromechanical system, also known as a FLEMS. See photo directly above. Basically, it's a platform held in electrostatic suspension which can be used as the basis of a number of devices, such as accelerometers, high-Q filters, inertial navigation systems and the like. Since the active element of a FLEMS floats, it's less subject to shorting, parasitics, and is also very robust, according to Clark. He indicates that the EFAB process permitted more optimal electrode placement in the design. Third place of $2,500 and a prototype went to a tactical-grade micro-gyroscope designed by Said Emre Alper and Dr. Tayfun Akin. Alper is a research assistant at Middle East Technical University, Ankara, Turkey and Dr. Akin is an associate professor there. They indicate that the three-dimensional design freedom of EFAB was very important in making this a workable design.



All photos courtesy of Microfabrica Inc.

Three honorable mentions were also given. As shown above, they include a three dimensional micro-convective heat sink (A), a MEMS thermocooler (B) and a scanning mass spectrometer (C). The heat sink was submitted by Y. X. Tao, R. Moreno, and Y. Hao. The thermocooler and spectrometer were designed by Christopher Lee and Ezekiel Kruglick, respectively.

The table below shows a number of categorized entries to the contest and gives an idea of the broad range of applications. You can see pictures of many of these and learn more from Microfabrica's web-site.

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A Sampling of Additional Contest Entries

Sensors & Instrumentation	Motion Control and Generation	Power Sources	Fluidics
AC Current Sensor; Greece Electrical Probe Array; CA Soil Moisture Sensor; Portugal RF probe measuring plasma uniformity; DE Electrostatic Sensor; MI	Micro Stirling Engine Coquitlam; Canada Brownian-motion impact oscillator machine; Singapore SAW Motor; PR China Micro Bladeless Turbine; RI Synchronous micromotor; Russia	Micro Battery; CA Catalytic Fuel Cell Reactor; CA Micro Direct Methanol Fuel Cell; CA Differential Planar Heater; NC **Biomedical** Microsurgery Hinge for Pliers/Scissors; CA	Micropump With Low Pulsation Output Flow; India Microfluidic pressure and flow rate regulator; UK Variable Flow Valve; MI **Miscellaneous**

Surface Texture Sensor; Taiwan Micro-bolometer; FL Nanoindenter Force Sensor; Sweden **Passive Mechanical Devices** MEMS Velcro; CA Micro Clipper; TX Constant Force Gripper; MO	Micro Magneto Transport; CA Resonant Comb Drive Actuator; NH **Optical Devices** Torsion-Mirror Optical Actuator; PR China Compact MEMS Mirror Array; GA Fiber Alignment Microstructure; Malaysia Grating; PR China Optical Multiplexer; South Africa Widely Tunable Focal Plane Array; CA Lower-Voltage Free-Electron Laser; CA	Bio mass sensor; NY Voice box, Stint; MD Micro Vein-Cleaning Device; FL Artery Deplaquer; India Basic Articulated Finger Joint; India Drug Delivery Device; UK Bistable magnetic bead separator; OH Micro fish-type endoscope; Korea Micro DNA extractor; Mexico Articulating surgical Device; CA Active Cell sorter; MA	Intricate Miniature Jewelry; CO

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