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## **Animate (In)Animate — Emerging Technologies on the Edge of Life**

Saturday, February 21, 2004

10am – 4pm

Cowell Theater at Fort Mason Center

A public symposium presented in conjunction with the Exploratorium's Traits of Life Exhibition

The delineations between nature and the man-made are becoming indistinct.

Long used to making easy distinctions between the natural and the artificial, the organic and the inorganic, humanity has now created new technologies that are blurring these comfortable boundaries in unexpected ways. In addition to well-publicized breakthroughs in genetics, a growing frontier of biotechnological innovation is creating new classes of "near-life" phenomena and "semi-living" technologies that occupy a gray area between inanimate matter and animate life.

The Exploratorium presents Animate (In)Animate: Emerging Technologies on the Edge of Life, a public symposium exploring innovations in hybrid, "semi-living" technologies at the Cowell Theater, Fort Mason Center, Saturday, February 21, 2004, from 10am to 4pm. The symposium, which brings together an outstanding panel of researchers, artists, entrepreneurs, and visionaries, will serve as a forum for public inquiry and understanding. Tickets are \$12.00; \$10.00 for Exploratorium members and students. Scholarships are available. Call (415) 561-0308 for reservations and advance tickets. Presented in conjunction with the Exploratorium's Traits of Life exhibition. Made possible by the National Science Foundation.

This symposium will explore the mechanisms and processes that have historically defined the animate and focus on emerging discoveries in areas such as organic electronics, biocomputing, tissue engineering, nanotechnology, and biologically-inspired art and materials design. The conference will also provide a forum both for discussing the impact of these innovations on our

cultural values and for examining our hopes and fears about a future increasingly shaped by powerful biotechnological forces.

Panelists include, among others:

Brian Sager is a pioneering nanotechnology developer, biotechnology consultant, and entrepreneur. Nanosolar, his Palo Alto company, has developed a new generation of self-assembling, nano-engineered solar cells. Sager is also affiliated with Global Business Networks, a worldwide membership organization that engages in a collaborative exploration of future innovative tools. He has published more than 20 research articles, has 14 patents pending, and is intimately familiar with high-throughput experimentation.

Oron Catts is the Artistic Director of Sydney-based SymbioticA, an arts and science research laboratory that uses biotechnology as a medium for artistic expression. Housed inside The School of Anatomy & Human Biology at The University of Western Australia, SymbioticA is the first research laboratory of its kind, enabling artists to engage in wet biology practices in a biological science department. SymbioticA artists use media such as molecular biology, tissue culture, neuroscience, biomechanics and biological imaging to create iconic, thought-provoking art.

Professor Vladimir Mironov is the Director of the Shared Tissue Engineering Lab at the Medical University of South Carolina. An innovator and researcher in the field of tissue engineering, he is best known for his co-invention of a modified inkjet printer that can print three-dimensional tubes of living tissue. Using cartridges filled with cell suspensions instead of ink, the printer can output layers of complex cells, a precursor to organ printing. Vladimir Mironov has also championed a proposal to NASA to feed astronauts lab-grown “meat” made from myoblasts, protein cells that live at the edges of muscle fiber.

Professor Evelyn L. Hu is a member of the Electrical and Computer Engineering Department at U.C. Santa Barbara, and is also the director of the California NanoSystems Institute (CNSI). Hu examines processes critical for the fabrication and operation of superconducting, electronic, and optical devices. In particular, she focuses on ion-assisted chemical etching techniques.

Professor Carlo Montenegro holds the Roy and Carol Doumani Chair in UCLA’s biomedical engineering department. Montenegro is co-director of the UCLA Institute for Cell Mimetic Space Exploration (CMISE), and recently won the Feynman Prize in Nanotechnology at the 11th Foresight Conference on Molecular Nanotechnology. His interests include nanoscale biomedical systems, hybrid living/non-living device engineering, and micro-robotics; in 2000, he helped create a biological motor many orders of magnitude smaller than the width of a human hair.

Professor Erik Winfree is an Assistant Professor in Computer Science and Computation and Neural Systems at California Institute of Technology. Winfree studies molecular computation and DNA-based computers. His research concerns the theory and engineering of autonomous biochemical algorithms using in-vitro systems of DNA and enzymes, including programmable DNA self-assembly, DNA and RNA conformational switches and devices, and RNA transcriptional circuits. In 1999, Winfree was selected as one of the top 100 young innovators by

MIT Technology Review Magazine; in 2000, he was awarded a MacArthur Fellowship, like his father before him; in 2001, he became an ONR Young Investigator and an NSF CAREER awardee.