



**“Best Demo Ever!”**  
**Media Lab’s 10th Anniversary, 10/10/96**



## Chair research yields boon for infants

Robert J. Sales, News Office  
January 15, 1997

Professor Neil Gershenfeld has two excellent reasons to hope that sensors developed in the Media Laboratory alleviate the threat that activated automobile airbags pose to infants in rear-facing baby seats.

The reasons are Eli and Grace, twins born on October 10-not a bad birthday for the children of a digital thinker. They are the first-born of Professor Gershenfeld, head of the Media Lab's Physics and Media Group. The twins share their birthday with the Media Lab, which opened in 1985.

Professor Gershenfeld calls the baby seat project a "serendipitous" example of the unique ability of the Media Lab to use research from a fun experiment to solve a real-world problem. "Nobody set out with a business plan to develop a baby seat," he said.

The Physics and Media Group started exploring the relationship between electrical fields and the human body while developing sensors for a collaboration between cellist Yo-Yo Ma and Professor Tod Machover's group. Using this technology, Motorola Fellow Josh Smith created furniture that can "see" and Tom Zimmerman (now at IBM) devised a way to send data through the human body. Then research scientist Joe Paradiso worked with magicians Penn and Teller to develop the Spirit Chair, a device which literally channels a field through a performer's body to control music.

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November 1996  
Number 60

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MASSACHUSETTS INSTITUTE  
OF TECHNOLOGY

M

For more information  
on field sensing, visit:  
[http://physics.www.  
media.mit.edu](http://physics.www.media.mit.edu)

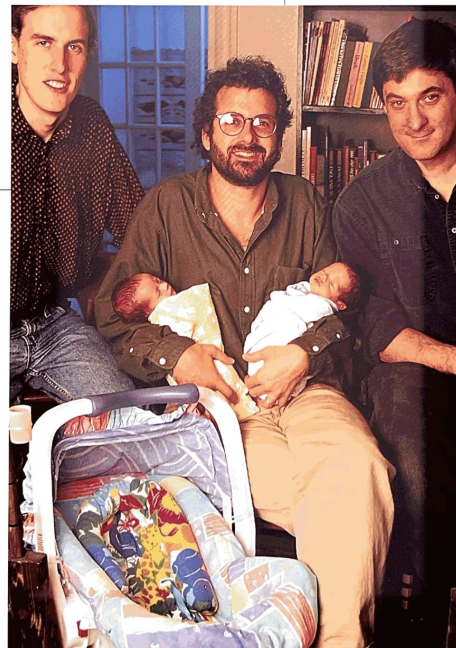
E

S

UNCOMMON SENSE

**AIRBAGS ARE LIFESAVERS—  
MOST TIMES.  
BUT FOR AN INFANT  
IN A REAR-FACING BABYSEAT,  
THE IMPACT OF  
AN EXPLODING AIRBAG  
CAN PROVE DEADLY.**

Work from the Media Laboratory's Physics and Media group may soon prevent these tragic fatalities. Professor Neil Gershenfeld, head of the group (and a new father of twins), research scientist Joe Paradiso, Motorola Fellow Josh Smith, and NEC Vice President for Automotive Electronics Phil Rittmueller, have come up with a unique solution based on the Lab's pioneering field-sensing technology. Electrodes embedded in a car's seat can distinguish between a rear-facing or forward-facing baby, and signal the airbag when not to deploy. The product incorporating this technology is now being presented to auto manufacturers as the NEC Passenger Sensing System.



Professor Neil Gershenfeld and his new twins, Elk (left) and Grace, with graduate student Josh Smith (left) and research scientist Joe Paradiso. Photo: Webb Chappell

## THE INTERACTION BETWEEN THE HUMAN BODY AND ELECTRICAL FIELDS

The Physics and Media group began exploring the interaction between the human body and electrical fields while developing new sensors for a collaboration between the cellist Yo Yo Ma and Professor Tod Machover's group. This invention led Josh Smith to create smart furniture that can "see" with fields in 3-D, and to the subsequent discovery by former student Tom Zimmerman of a way to send data through the human body. Working with the magicians Penn and Teller, Paradiso then designed the hardware for the Spirit Chair, a device that literally channels a field through a performer's body to control music.

When Rittmueller saw the Spirit Chair, he wondered whether similar technology could be used to address the babyseat problem.

Gershenfeld and Smith worked closely with NEC to develop the perfect car-seat sensor: one that would be inexpensive to produce, indestructible, and could reliably signal an airbag when it should—and should not—fire. The result was better than anyone had expected: The first application is for babyseat sensing, but the same technology has broader capabilities, and can be used to read any occupant's size and position, to determine the most effective airbag action.

## IDENTIFYING THE UNEXPECTED

"The history of this project is a good example of the unusual flexibility in the Media Lab—following an idea from creative performance, to basic physics, to practical application, and showing how this environment helps identify unexpected implications of research," says Gershenfeld.

Eventually, combined with Professor Rosalind Picard's work in affective computing, such a system could even be used to detect when a driver is sleepy, drunk, or just lost, and could feed this information back to the car's computational systems for response.

**MAKES SENSE.**



**Learning to  
multitask**



# WHEN THINGS START TO THINK



NEIL GERSHENFELD



**Page 13: Eli the cyborg**



# **The Un-Private House Exhibit at MOMA, 1999**

**Interactive  
Multitouch  
Table**



**Interactive Welcome Mat**

Int



**New Year's Eve at the White House, 1999**







THE WHITE HOUSE  
WASHINGTON

February 4, 2000

Dr. Neil Gershenfeld  
Room 15-495  
20 Ames Street  
Cambridge, Massachusetts 02139

Dear Neil:

Hillary and I want to thank you for the role you played in making *America's Millennium* such an overwhelming success.

We will never forget the excitement and spectacle of the "celebration for the nation" during New Year's weekend. We were especially pleased that so many Americans, particularly young people and families, participated in this wonderful series of events that showcased our nation's creativity, history, and democracy. When you look back on the year 2000, you can be proud to know that your involvement helped to make this celebration possible.

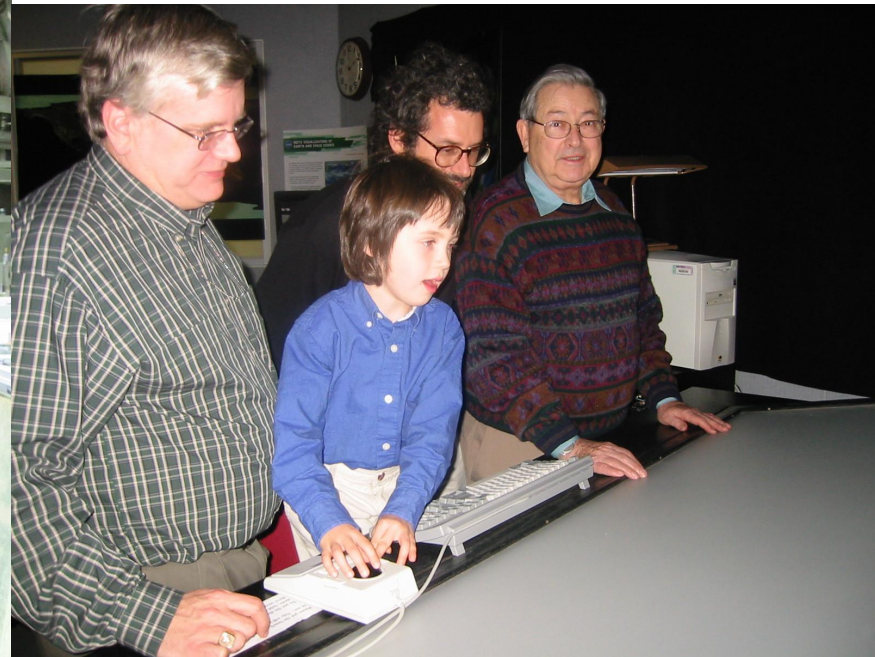
Sincerely,

*Bill Clinton*

**New Year's Eve, Y2K**



**Neil and Eli visit NASA Goddard, c. 2000**



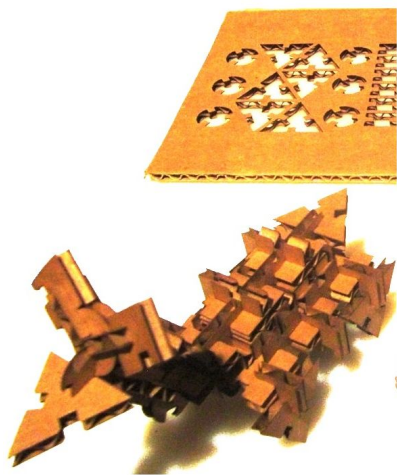
**Neil's dad (Grandpop!) came along**

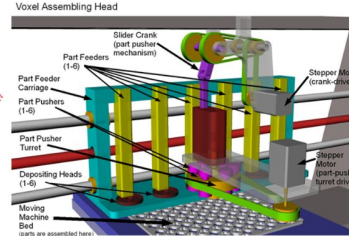
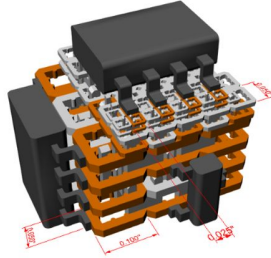
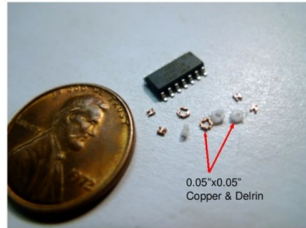
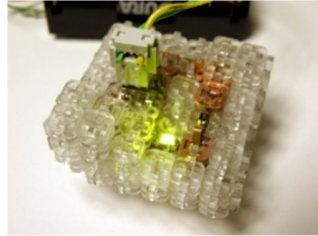
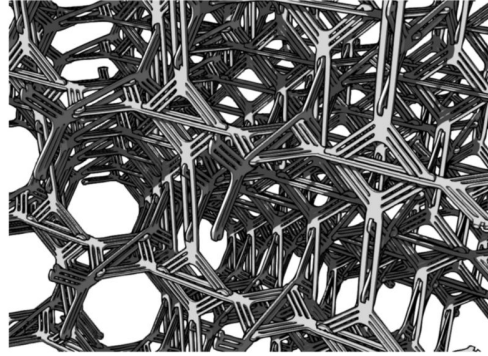
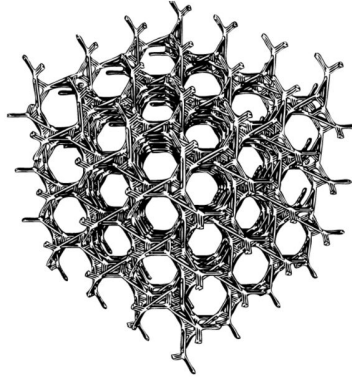
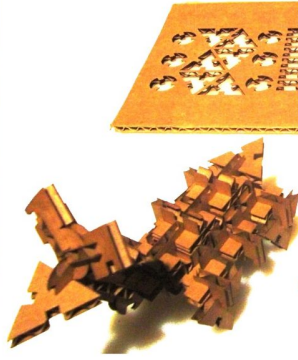
# Flying Karamazov Brothers Virtual Juggling





# Grace and Eli invent GIK (the Great Invention Kit)





**GIK  
inspires  
work at  
CBA:  
using 2D  
shapes  
to make  
3D  
objects**



**2002 Salt Lake Olympics,  
courtesy of Sensormatic**

# Visiting SETC





**Important scientific  
scribbles on the  
whiteboard in Neil's  
office**



**Fab2,  
Jan. 2005**

**Tromso,  
Norway**

**and**

**Viking  
Fab Lab**





**Eli getting a lesson  
from Haakon**



**Provisioning up**



**Inside our cozy cabin**



**Night skiing at  
the local ski  
slope**



**Honorary  
doctorate  
from  
Swarthmore  
May 2006**

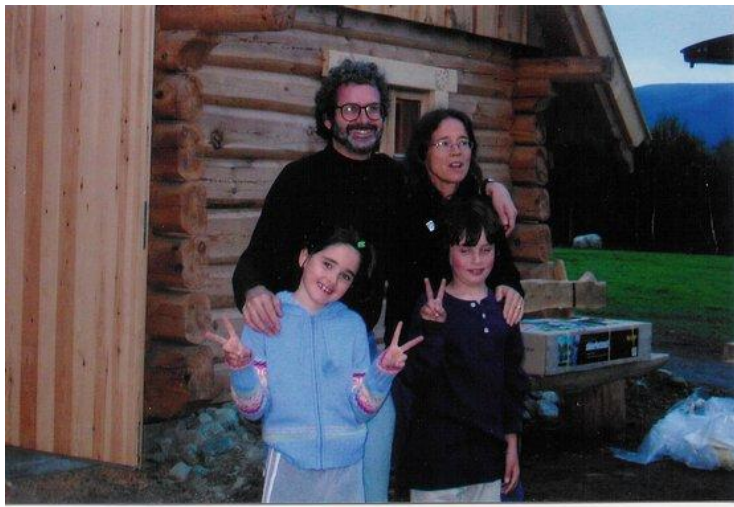


**Fab3, 2006**  
**Pretoria, South Africa**

**Visiting Shoshanguve Township**

# On safari after Fab3





**Return visit to Viking Fab  
Lab, summer 200?**



# Meetings in Tromso

# Side trip to Svalbard with Haakon







**Happy  
times at  
Haystack**









# Fab4, Chicago, 2007



# Collaboration with Peter Gabriel ~ 2009





**Fab6, Amsterdam, 2010:  
Boat races (oops!)**

**Fab7, Lima, Peru, 2011**



**Fab8, New Zealand, 2012**



# Fab9, Yokohama, 2013



**Feb10, 2024: Barcelona**





**Jan. 2019: FabLab opening in Puerto Williams**

## CBA News & Notes, April 28, 2019

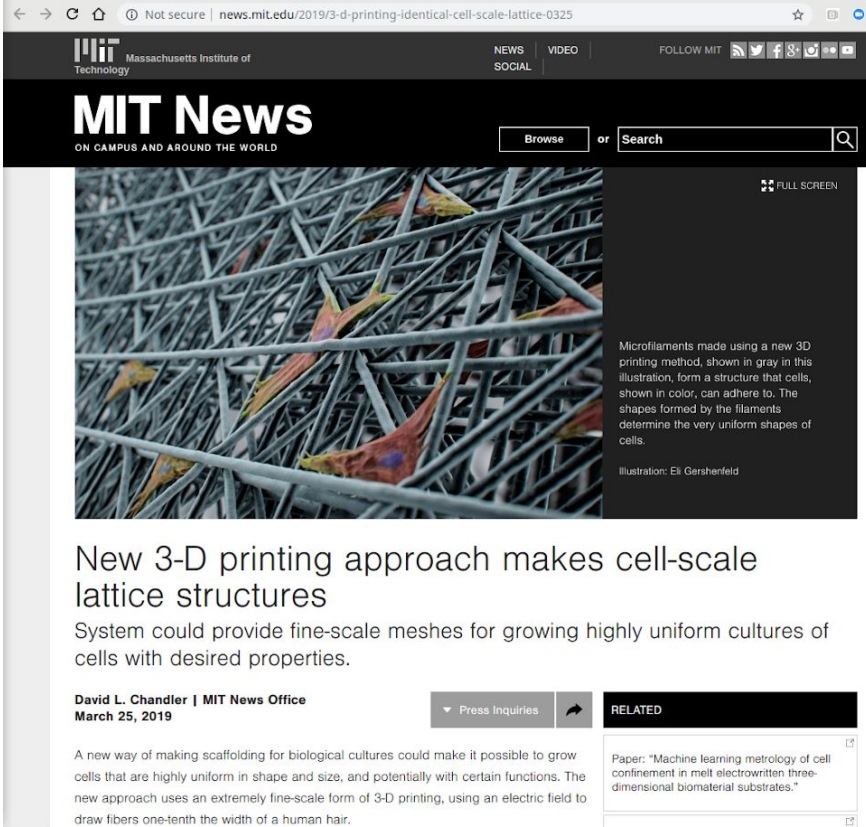
- CBA had two articles featured on MIT's home page, one on a project with NASA on morphing aerostructures, led for CBA by Ben Jenett:

<http://mit.edu/archive/spotlight/shape-changing-plane-wing/>

and one on a project growing cells in printed nanostructures, led for CBA by Filippos Tournomousis:

<http://mit.edu/archive/spotlight/cell-scale-3-d-printing/>

The concept art for both was done by Eli Gershenfeld; the latter project was selected for the cover of *Nature Microsystems & Nanoengineering*.



The screenshot shows the MIT News website interface. At the top, there's a navigation bar with the MIT logo, "Massachusetts Institute of Technology", and links for "NEWS", "VIDEO", and "SOCIAL". A search bar is also present. The main headline reads "MIT News ON CAMPUS AND AROUND THE WORLD". Below this is a large image of a 3D printed lattice structure with cells growing on it. To the right of the image, there's a text box that says "FULL SCREEN". Below the image, the article title is "New 3-D printing approach makes cell-scale lattice structures". The sub-headline is "System could provide fine-scale meshes for growing highly uniform cultures of cells with desired properties." The author is "David L. Chandler | MIT News Office" and the date is "March 25, 2019". There are buttons for "Press Inquiries" and "RELATED". The "RELATED" section shows a paper titled "Machine learning metrology of cell confinement in melt electrowritten three-dimensional biomaterial substrates."

MIT News  
ON CAMPUS AND AROUND THE WORLD

Microfilaments made using a new 3D printing method, shown in gray in this illustration, form a structure that cells, shown in color, can adhere to. The shapes formed by the filaments determine the very uniform shapes of cells.

Illustration: Eli Gershenfeld

### New 3-D printing approach makes cell-scale lattice structures

System could provide fine-scale meshes for growing highly uniform cultures of cells with desired properties.

David L. Chandler | MIT News Office  
March 25, 2019

▼ Press Inquiries

RELATED

Paper: "Machine learning metrology of cell confinement in melt electrowritten three-dimensional biomaterial substrates."

Fab15, 2019: El Gouna, Egypt





Fab23: Bhutan



## Hiking up to Tiger's Nest (barely)



# Fab24, Mexico: Grace photographing the mayhem



**Thanks, Walter!**







# Fab25: Czech Republic





**Backstage, about to pitch Fab26 in BOSTON**