A close-up photograph of a person's face, with a world map overlaid on it. The person's eye is visible, looking directly at the camera. The map shows the Americas on the right side of the frame.

Innovate-Educate-Lead: Michigan Pathways to Learning, Careers & Life

How the future works today™

JIM BRAZELL

jim.brazell@ventureramp.com



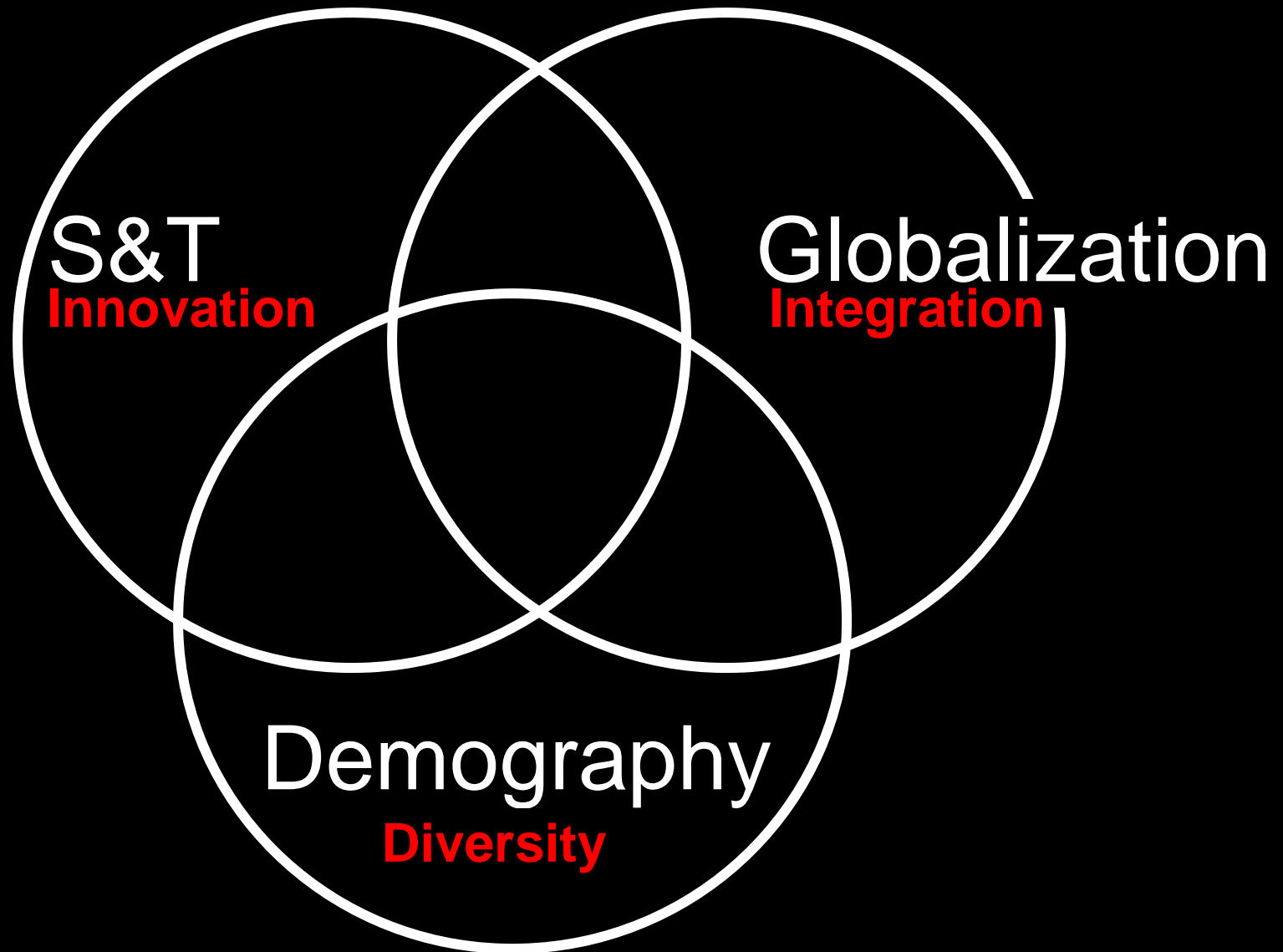
**October
4, 1957**



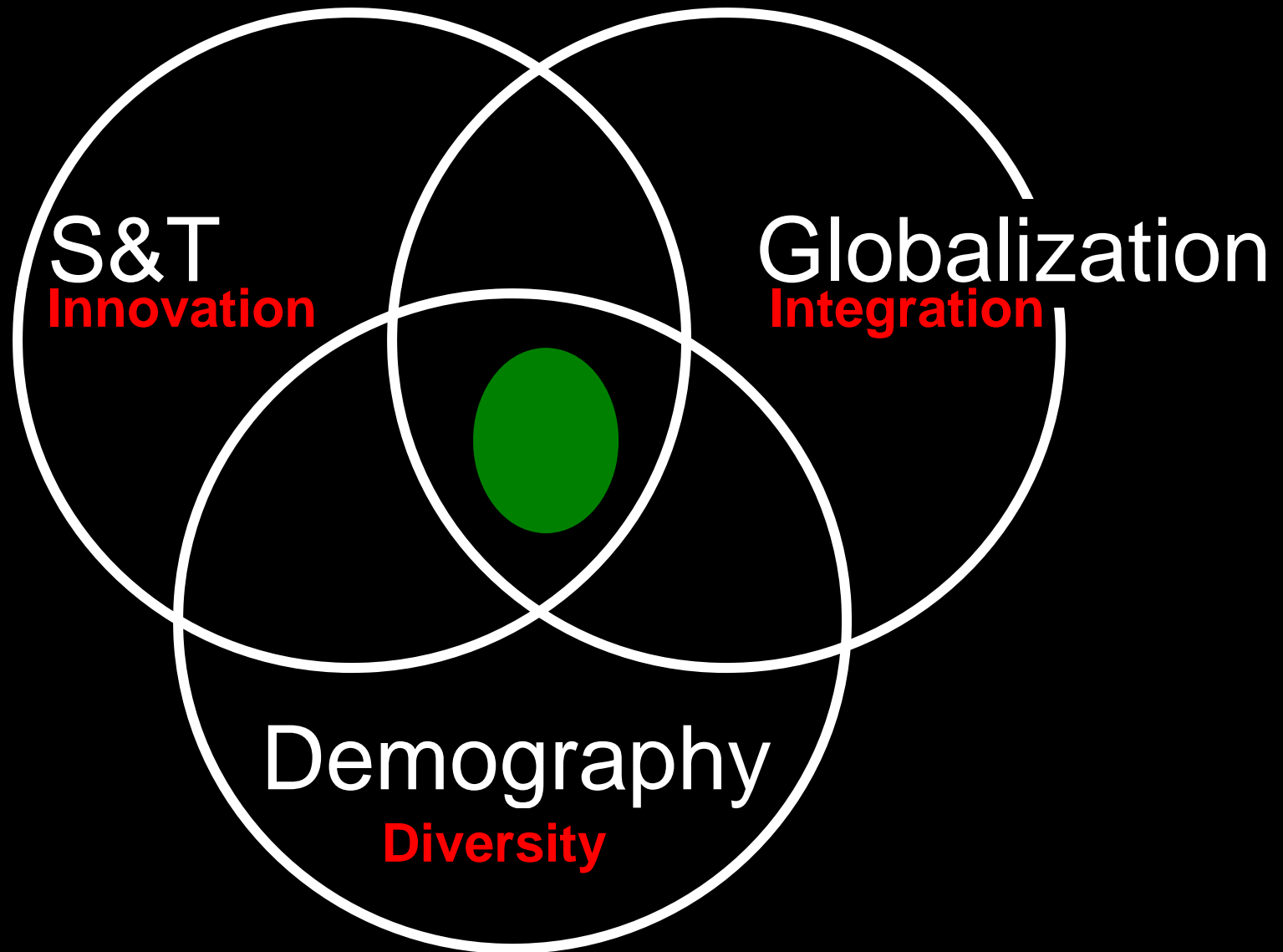
**October
4, 1957**



21st Century Sputnik (40-40)



21st Century Sputnik (40-40)







May 25, 2008

Phoenix Mars Probe

MARGARITAVILLE®

CONCOCTIONS

HOME NEWS SHOP CAFES CONCOCTIONS JIMMY BUFFETT PARROTHEADS TOUR DATES RADIO VIDEOS EMAIL UPDATES



It's **FIVE** O'CLOCK *somewhere*

Whether you want to blend the perfect margarita or just crack open a refreshing LandShark Lager, make sure you pair your favorite beverage with Margaritaville shrimp or chicken!

Choose an option below to learn more, and check out recipes that are sure to become party favorites:

LAND SHARK LAGER

SPIRITS

Margarita Mix

READY TO DRINK MARGARITAS

FOODS

FOOD RECIPES

DRINK RECIPES

“If the U.S. is to maintain its economic leadership and compete in the new global economy, the nation must prepare today’s K-12 students better to be tomorrow’s productive workers and citizens. **Changing workforce requirements mean that new workers will need ever more sophisticated skills in science, mathematics, engineering and technology ...**

<http://www.nsf.gov/nsb/documents/2006/0502/testimony.pdf>

STEM is now **horizontal** in
terms of careers and
academics and it is also
fundamental to economic
prosperity, democracy,
freedom, civil society and the
American way of life.

jobs

civil life

education

STEM is *horizontal*
across all 15 of the
16 DOL clusters in
terms of *jobs*.

STEM is fundamental to
jobs, the economy,
democracy, and civil
society... Not to mention
the “*American way of life.*”

STEM

academic and CTE

“Growing evidence shows that [career] pathways hold promise for reducing high school dropout rates, increasing academic achievement and learning, and increasing students’ earning power when they graduate. Equally compelling, studies show that students enrolled in [career] pathways perform as well as their traditionally educated counterparts on key measures.”

http://www.connectedcalifornia.org/advance_copy/policy_paper.pdf

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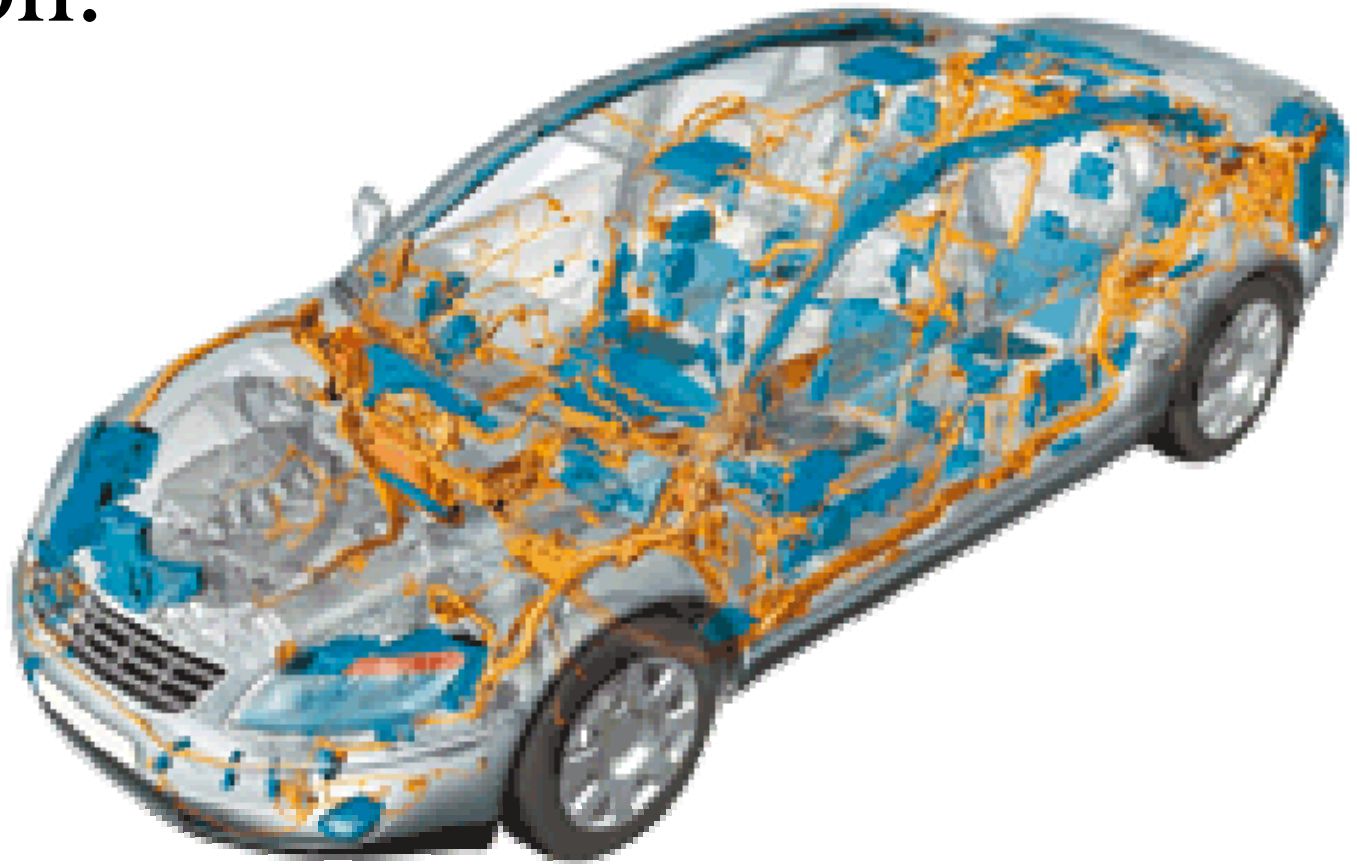
A close-up photograph of a person's face, where the skin is replaced by a world map. The person has a striking green eye, looking directly at the camera. The map shows continents in various shades of brown and green, set against a deep blue background representing the oceans. The person's lips are visible at the bottom right, painted in a dark purple or blue color. The overall image has a dramatic, high-contrast aesthetic.

Technology

Jobs, Jobs, Jobs

Next Generation CTE

Today's cars have more computing power than was used to put man on the moon.





In 1994 a single super computer with the power of an X-box did not exist.



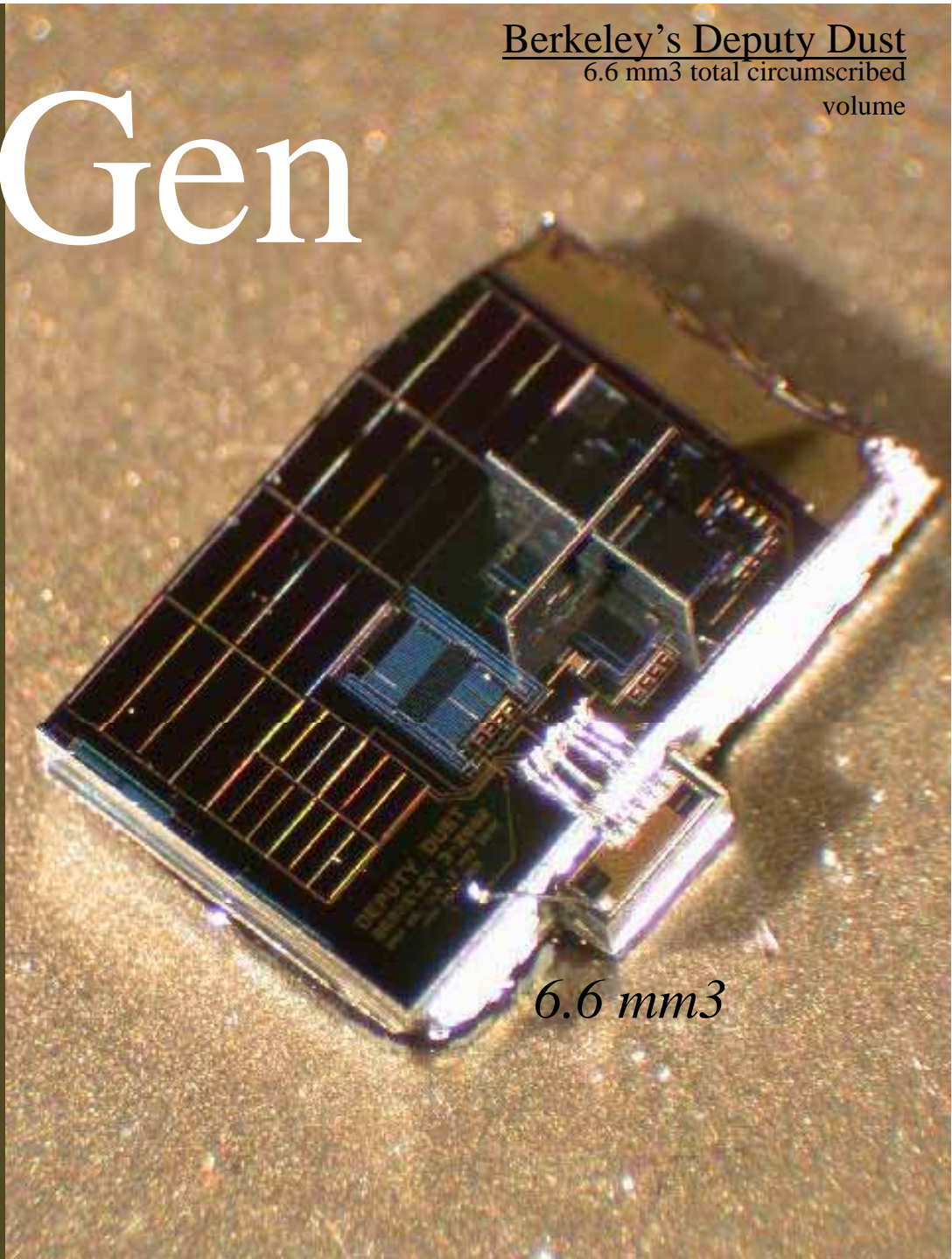
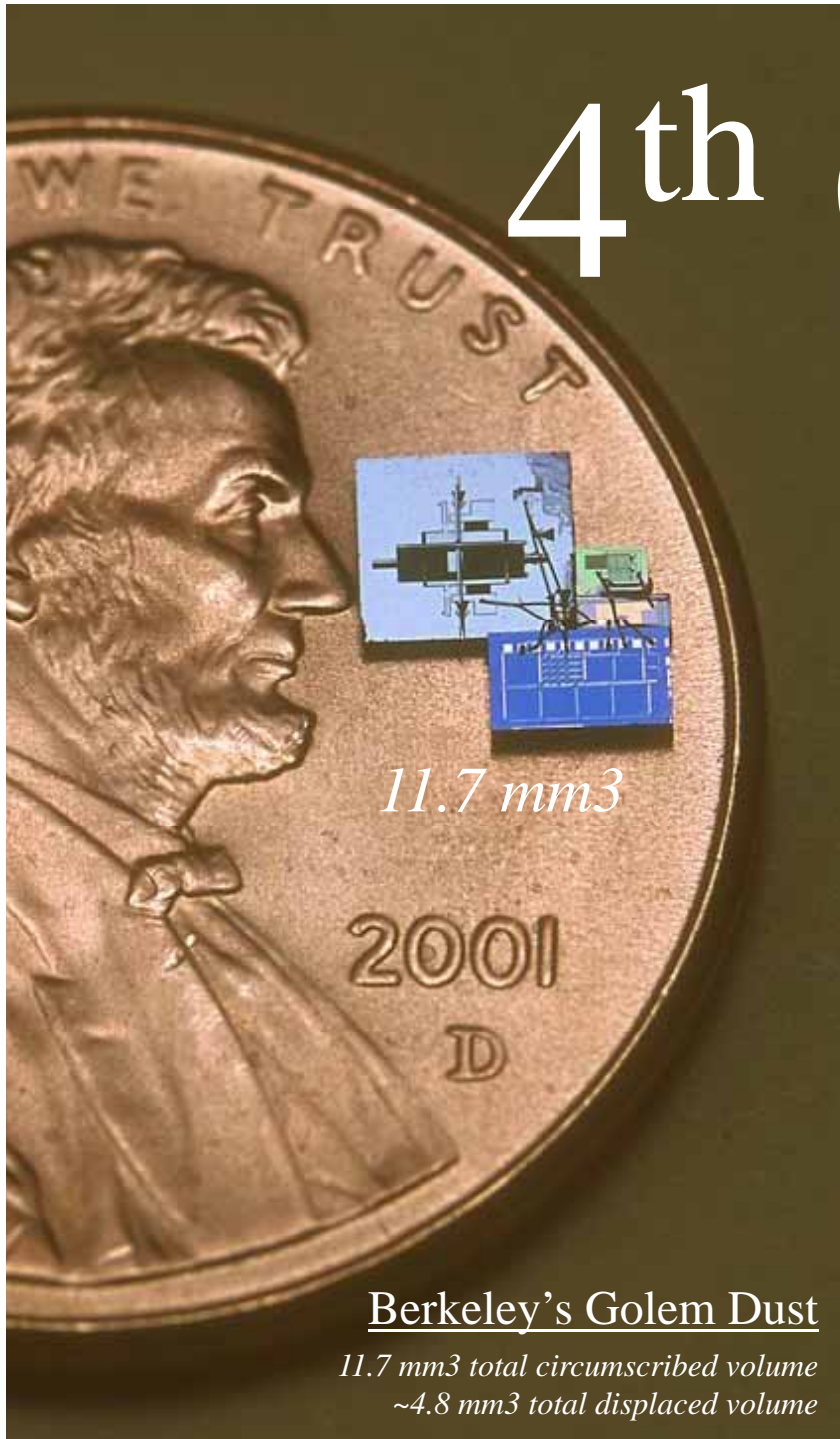






**My daughter's first computer at
age—30 minutes.**

4th Gen



Our product line is inventions.”
–Dan O’Connel, CEO



HNU·SOLAR
www.hnusolar.com



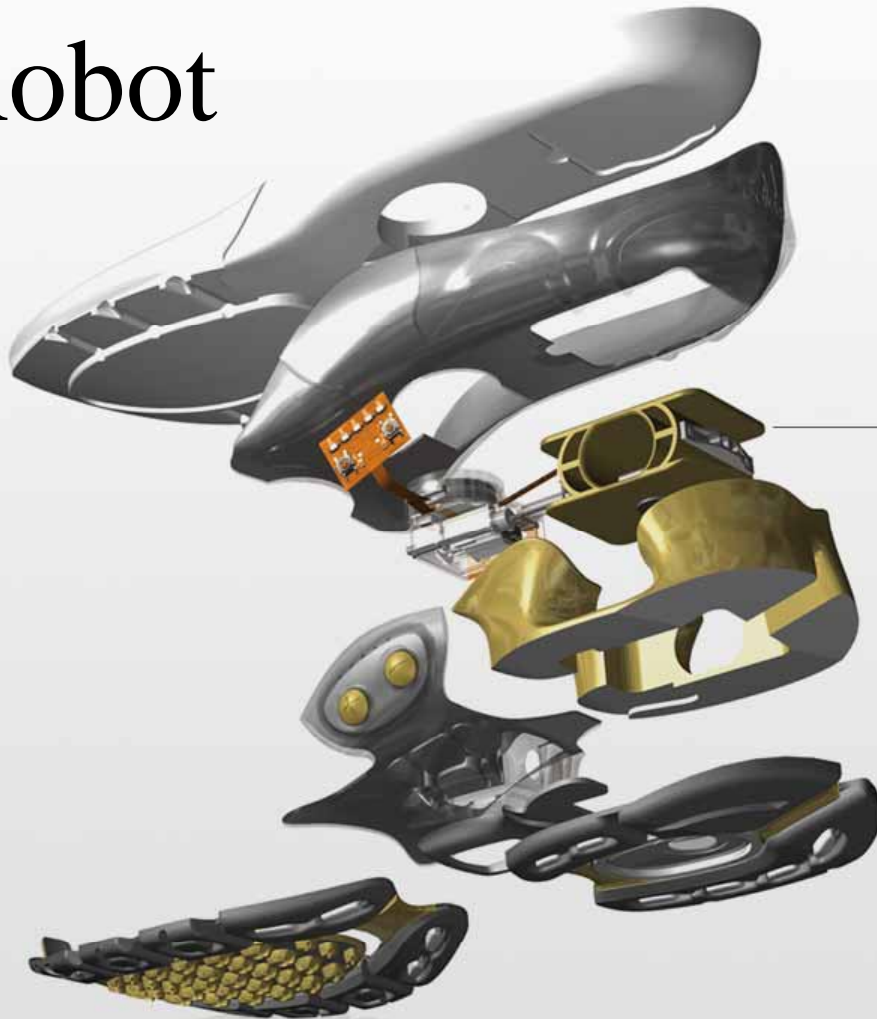
<http://www.msnbc.msn.com/id/7643818/>

Richard Drew / AP

Adidas 1 Running Shoe



Wearable Robot



- 1,000th of a second sensor measures gap between heel and a magnet
- 20-MHz microcontroller measures changes in compression
- Motor spins at 4000 rpm turns a screw loosens cable
- Environmentally and operator adaptive shoe sole

THE FUTURE OF RUNNING IS HERE.

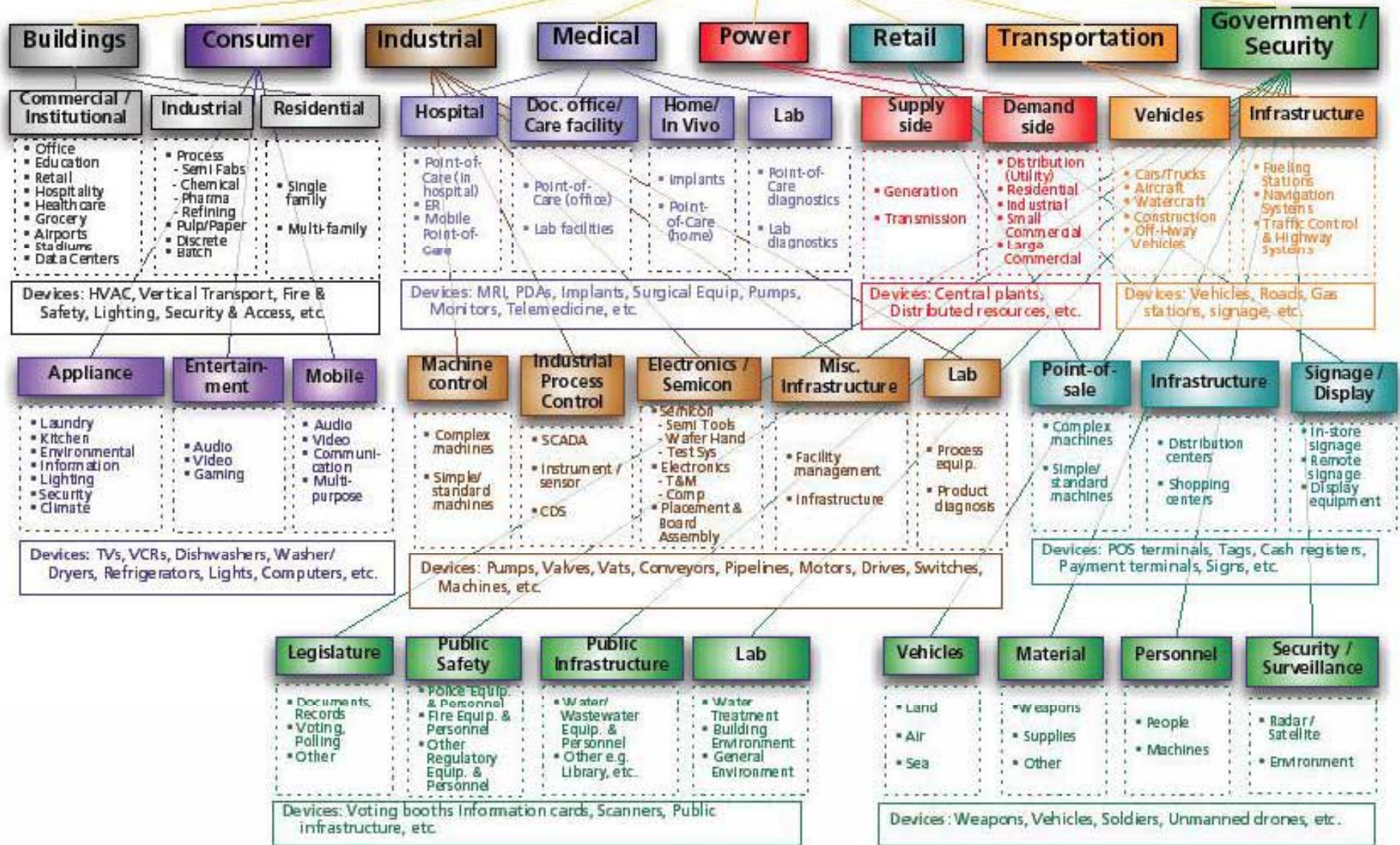
PUT ON A PAIR OF adidas_1 AND JUST FOUR STEPS FROM THE FRONT DOOR, YOUR SHOES HAVE ALREADY ANALYSED YOUR SPEED, WEIGHT AND THE TERRAIN UNDERFOOT AND HAVE DETERMINED THE PERFECT LEVEL OF CUSHIONING FOR YOUR NEEDS.

[http://www.adidas.com/campaigns/
adidas_1/content/downloads/adidas_1](http://www.adidas.com/campaigns/adidas_1/content/downloads/adidas_1)

MARKETS

M2M

Source: Harbor Research, 2003



FOUR MEN AND ONE WOMAN ON
THE MOST FANTASTIC, SPECTACULAR
AND TERRIFYING JOURNEY
OF THEIR LIVES ...

FANTASTIC VOYAGE

A CINEMASCOPY FILM COLORED BY DE LUXE

STEPHEN BOYD · RAQUEL WELCH
EDMOND O'BRIEN · DONALD PLEASANCE
ARTHUR O'CONNELL · WILLIAM REDFIELD
and ARTHUR KENNEDY

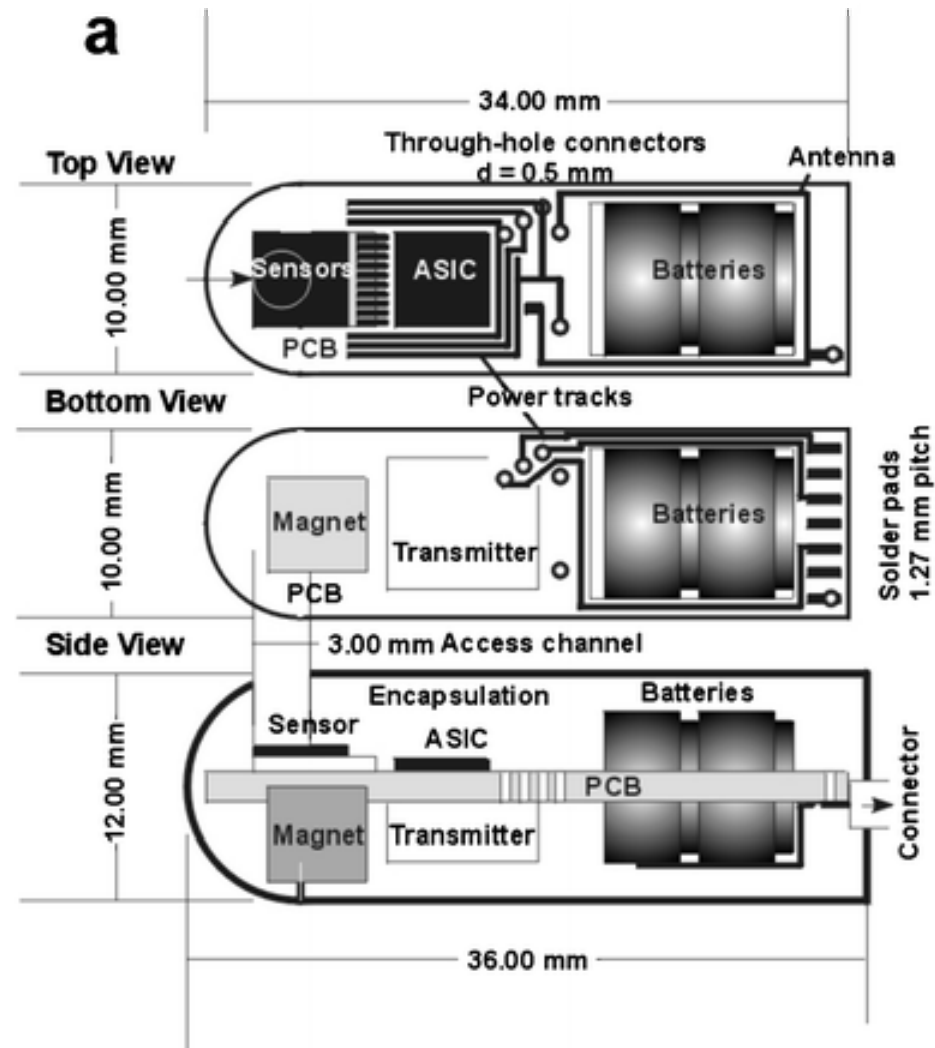
PRODUCED BY SAUL DAVID · RICHARD FLEISCHER
DIRECTED BY HARRY KLEINER · DAVID DUNCAN
BASED ON A STORY BY OTTO KLEMENT · JAY LEWIS BIXBY

MUSIC BY LEONARD ROSENMAN



**Wesley Medical Center, Butler Community College
April 7 to 11, 2008**





b

Lab-in-a-Pill



<http://www.rsc.org/ej/LC/2006/b507312j/b507312j-f2.gif>

<http://www.rsc.org/ejga/LC/2006/b507312j-ga.gif>

IRON MAN





Hal 3 may
some day
replace the
wheel chair
for many
people..

<http://www.terremoto.ca/images/exoskeleton.jpg>

HAL 3

Robotic assistance for elderly or infirm people, or those with disabilities

Backpack

Contains a computer with a wireless network connection

Battery

Actuators

Electric motors provide powered-assisted movement to the limbs

Angular sensor

Detects the angle of the hip, knee and ankle joints

Bioelectric sensors

Sensors attached to the skin monitor nerve impulses from the brain to the muscles indicating that a movement like standing or walking is about to take place. The signal is relayed to the computer, where it is analysed and used to launch the actuators even before the suit's wearer moves

Floor reaction force sensor

Detects the user's centre of gravity







1 Sound Processor

- captures sound from the environment
- processes sound into digital information
- transmits to the implant over a transmitting antenna or headpiece
- held in place by magnets in both the headpiece and implant



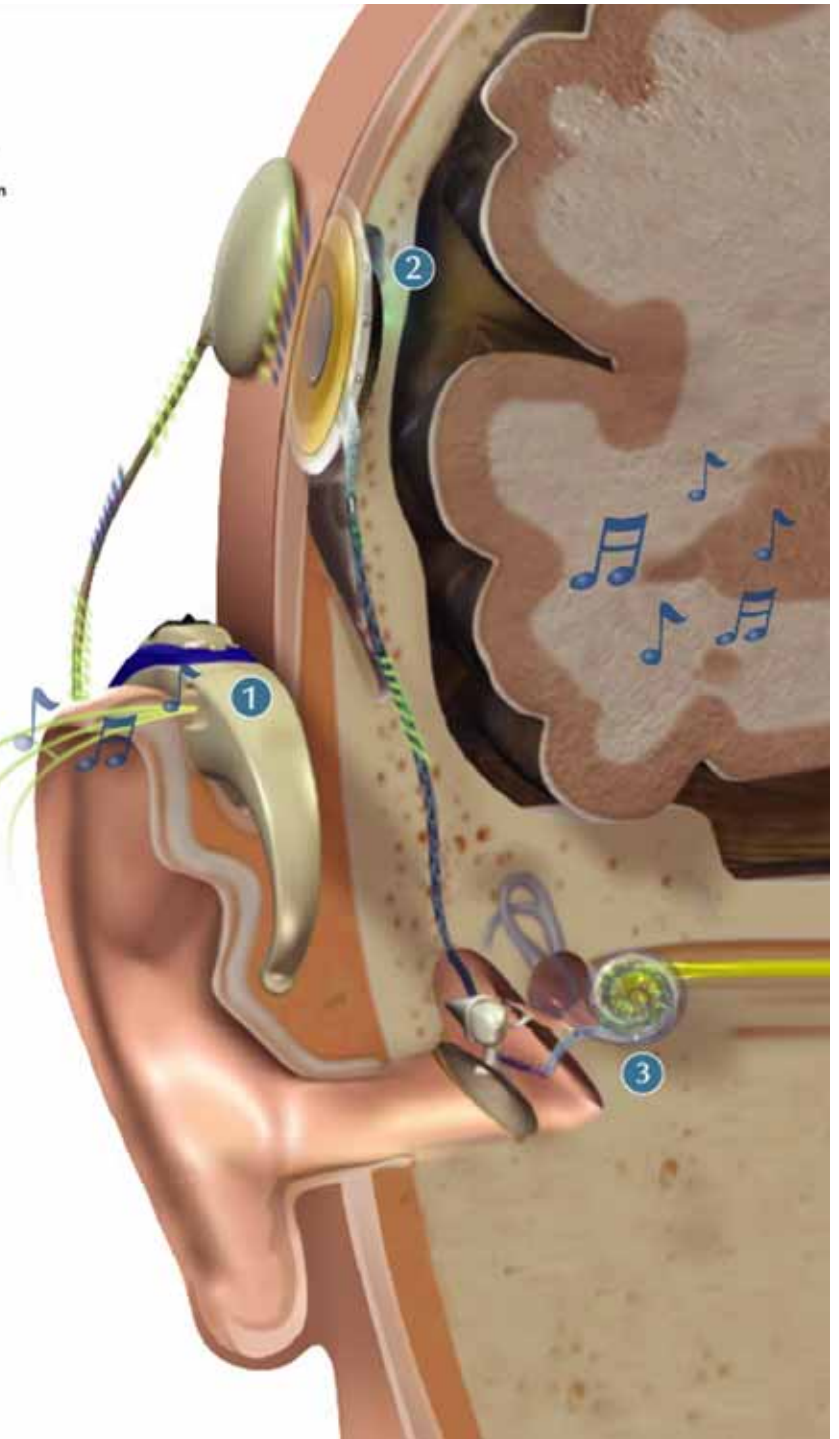
2 Implant

- converts transmitted information into electrical signals
- sends signals down tiny wires to the electrode array in the inner ear



3 Electrode Array

- delivers electrical signals across an array of tiny contacts, or electrodes, to the hearing nerve
- the hearing nerve carries the sound information to the brain, where it is heard



Cochlear Ear Implant

<https://www.carle.com/Hospital/about/images/Ear%20Diagram3.jpg>



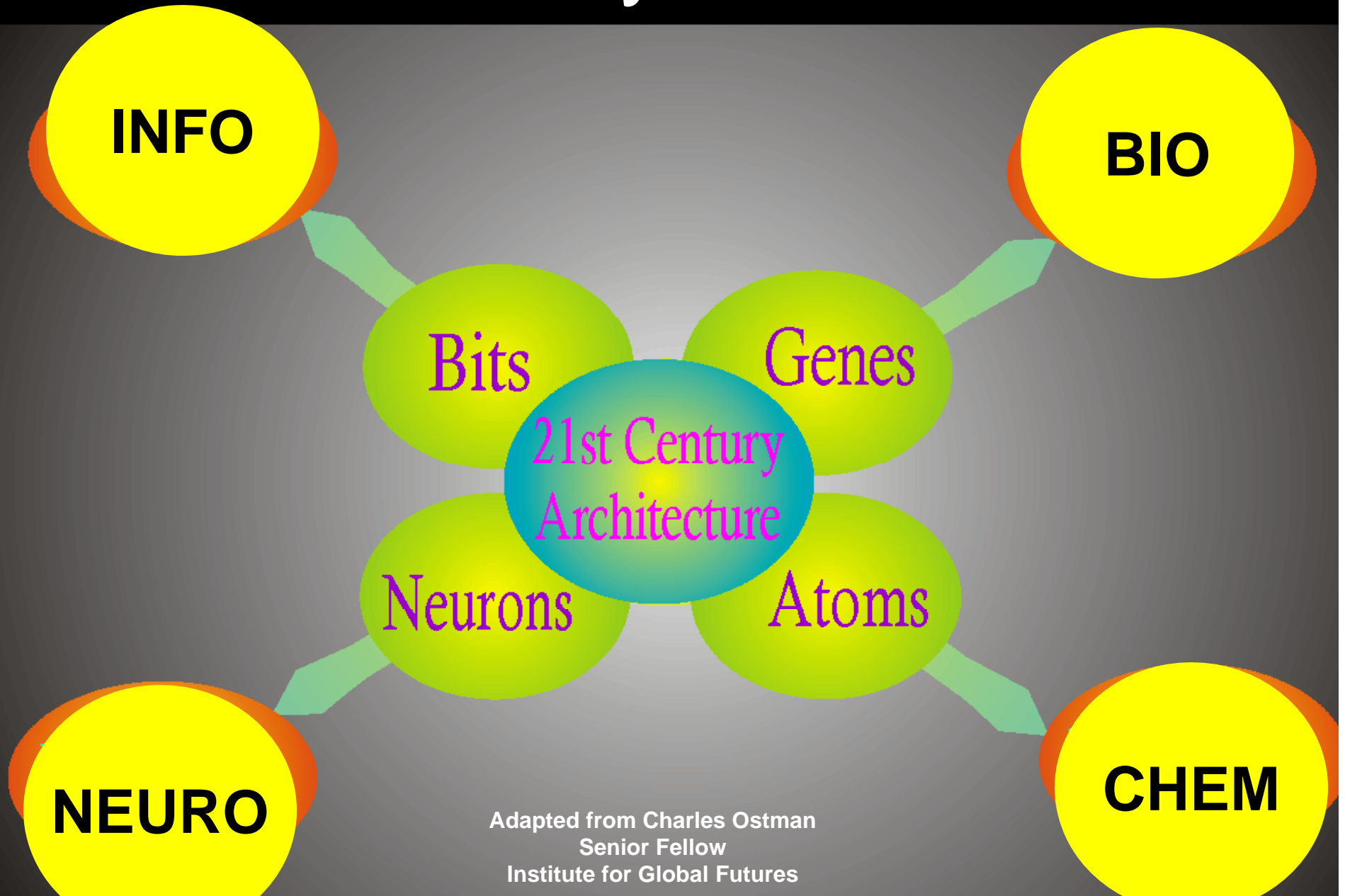
Nano- Mechatronics

An artificial red cell – the respirocyte [41]. Designer
Robert A. Freitas Jr. ©1999 Forrest Bishop.

<http://www.imminst.org/freitas.html>

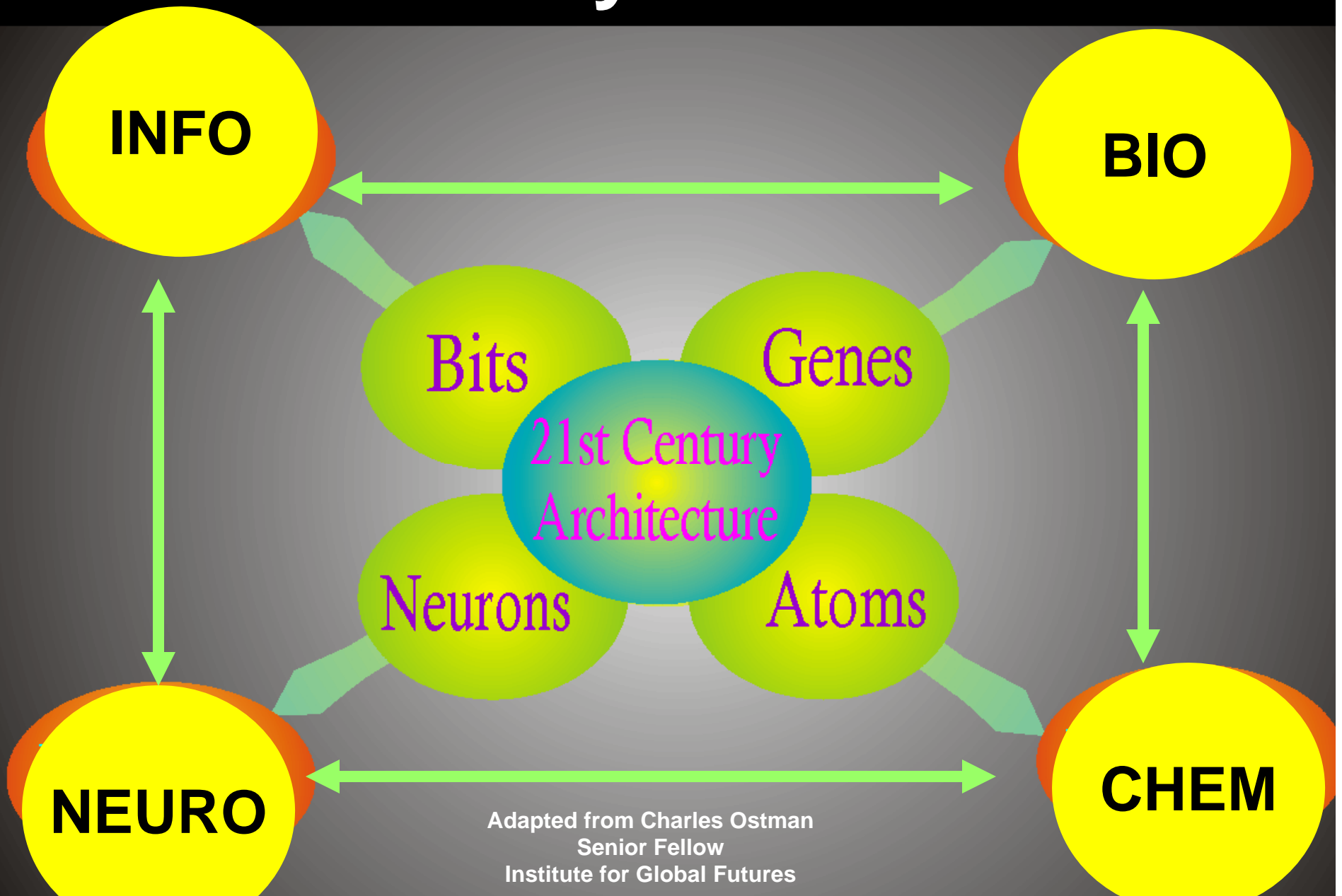
Implications

21st Century Architecture



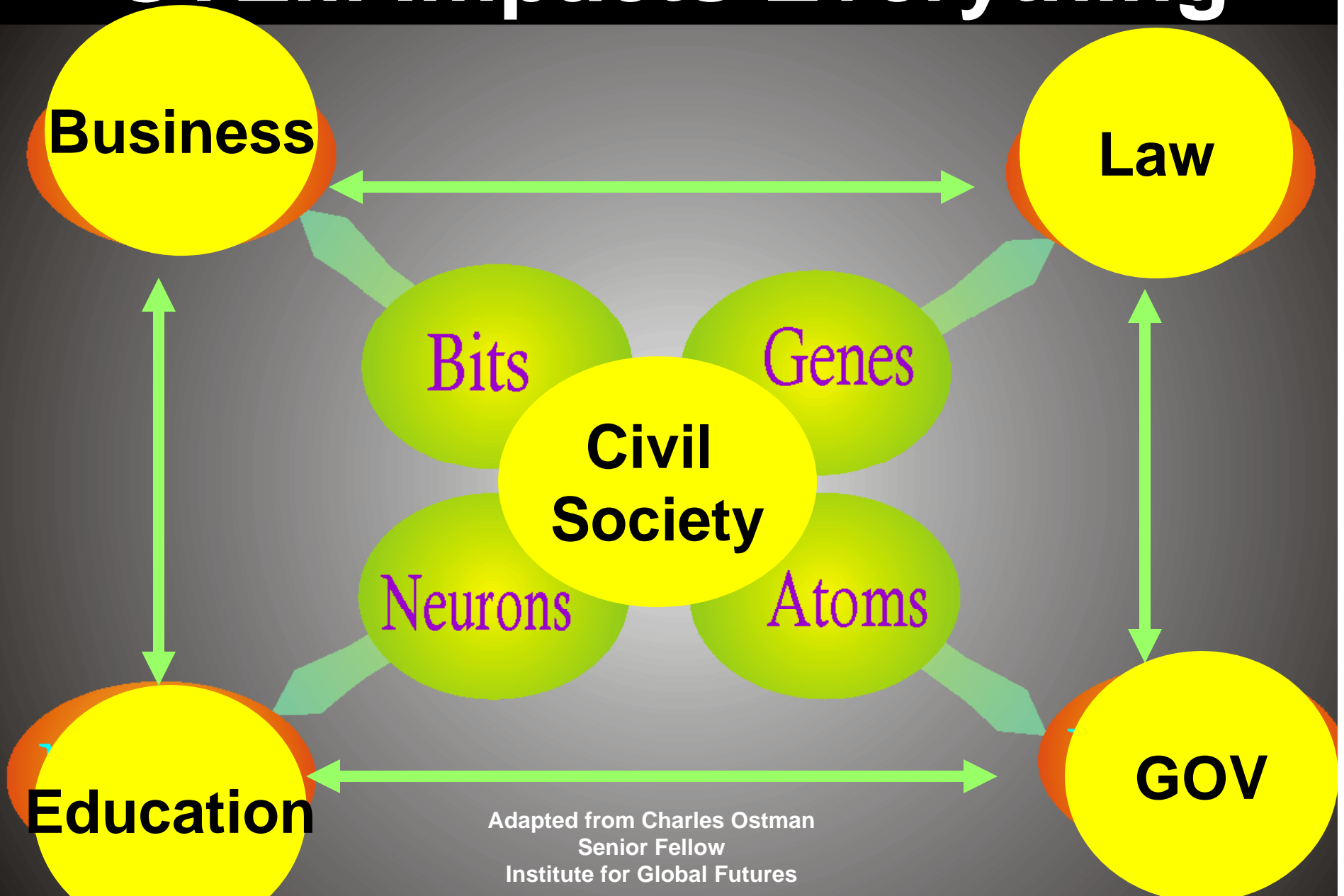
Adapted from Charles Ostman
Senior Fellow
Institute for Global Futures

Systems



Adapted from Charles Ostman
Senior Fellow
Institute for Global Futures

STEM Impacts Everything



Adapted from Charles Ostman
Senior Fellow
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STEM is fundamental to
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A close-up photograph of a person's face, where the skin is painted with a world map. The person has a striking green eye. The map is rendered in shades of blue, green, and brown, with the continents clearly visible. The person's lips are painted a deep purple color. The background is dark, making the face and the map stand out.

Technology

Jobs, Jobs, Jobs

Next Generation CTE

Part II

Learning in Action: A Learning Theory for CTE & 21st Century Learning

What are the **key**
requirements of
21st century work?



