

Design within the rules...

- Designed within 2008 Olympic constraints
- Compresses body at key drag points
- Makes swimmer smaller, sleeker, faster
- Worn by many gold medalists

Inventors: Engineers at Speedo



Step lively

- Computers in your shoes?
- Ideal for training
- Tracks distance, time and calories
- Customize your musical play lists for workouts
- Battery lasts 1000 hours

Inventors: Engineers at iPod/Apple and Nike

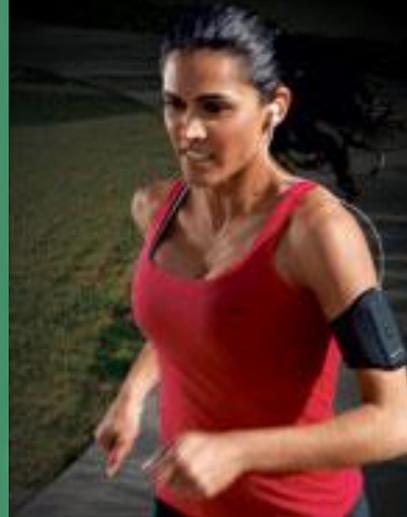
How to Use the Nike + iPod Sport Kit

Step 1.  Place the sensor in your left Nike+ shoe, in the built-in pocket beneath the insole. You can leave the sensor in your shoe even when you're not working out.

Step 2.  Attach the receiver to your iPod nano. The receiver fits snugly into the Dock connector, located on the bottom of your iPod nano next to the headphone jack.

Step 3.  Hit the ground running with workout-based voice feedback, Nike Sport Music content, and an iPod nano that stays in tune with every step.

Song capacity is based on 4 minutes per song and 128-Kbps AAC encoding. 1,000 songs refers to 4GB model.
The Nike + iPod Sport Kit will be available this summer for a suggested retail price of \$29 (US).



Examples of Engineering for the Olympics!



Down to the wire (really!)

- Support threads are like a suspension bridge
- Flywire replaces all heavy structure; ~3 oz
- Inexpensive — may be manufactured in US

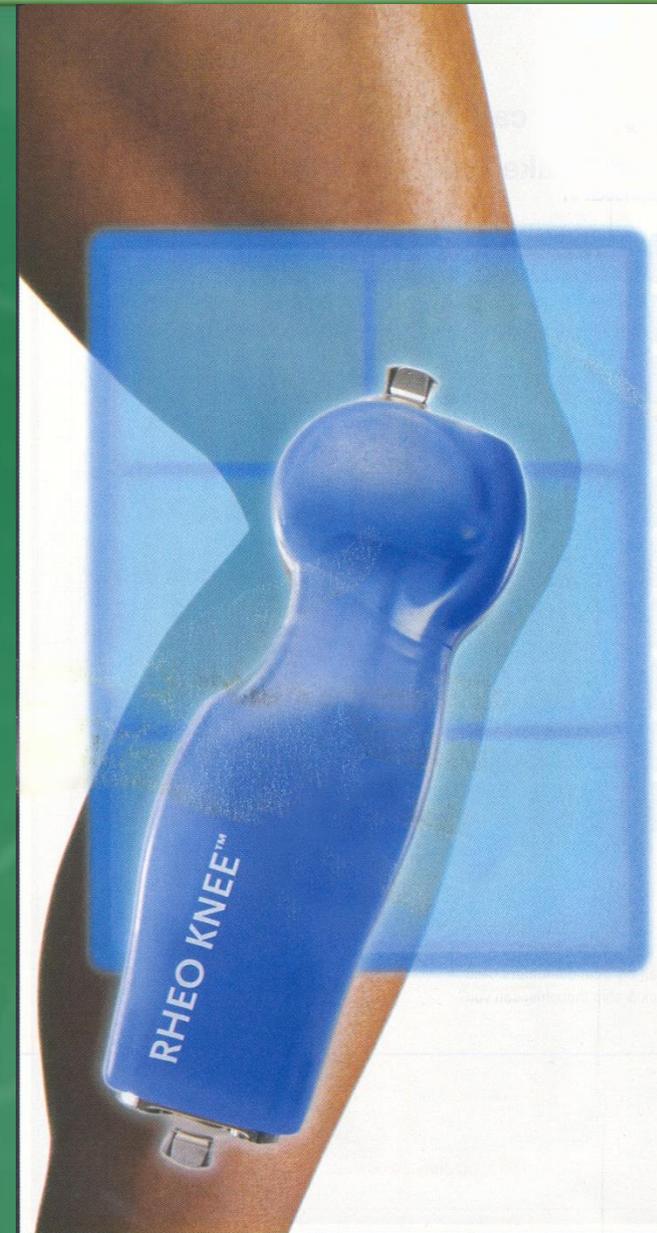
Inventors: Engineers at Nike



Smooth Operator

- “Smart” prosthetic joint
- “Learns” an individual’s movements and self adjusts
- Reduces hip and back strain
- Control module: made of sensors, a computer chip and software

Inventors: Engineers at Ossur and MIT



Not your everyday jeans...

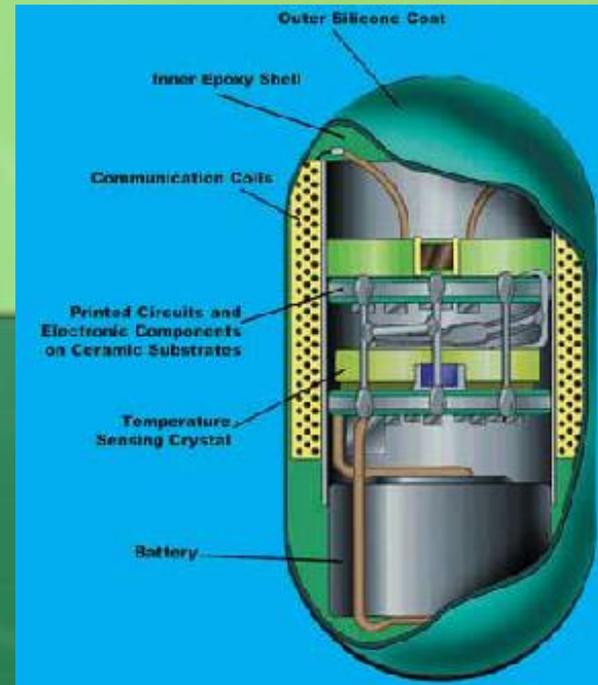
- 2010 Winter Olympics snowboarding uniforms for US, China & Finland
- Look like plaid flannel and worn denim, but are:
- ...next-generation fabrics made of waterproof membranes with breathable microporous holes

Inventors: GORE-TEX and Burton Boards



Ingestible computers for athletes (really!)

- “Thermometer Pill” transmits athletes’ core body temperature and heart rate data
- Alerts to heat exhaustion
- Quartz crystal sensor & micro-battery wrapped in silicon



Inventors: Engineers at NASA and Johns Hopkins University

Skiing armor

- Protects from high-speed wipeouts and 600mph gates
- Soft, thin and flexible material moves with body, but instantly hardens upon impact
- Spreads shock over surface area
- Uses shear thickening fluid reactive material

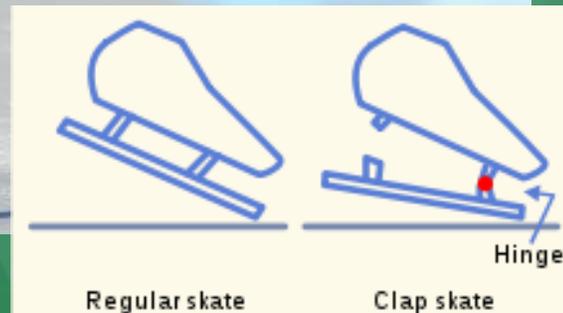


Inventors: Engineers at British firm d30 and Spyder



Skater's edge

- “Clap skates”
Back of blade hinged so stays on ice longer, evens out weight, legs generate more force



- Aerodynamic “swift suit” reduces air drag – Nike assures 1% faster times (close races!)
- Wind tunnel testing of suits and positions (arms behind backs, drafting, corner tilting)

Inventors: Engineers at Nike (suits) and many others

“Smart” clothing

- Fabric with embedded microscopic sensors and wireless networks
- Remotely monitors athlete’s heart rate, body temperature, hydration and more
- Extends to patient and soldier applications: Records and transmits real-time biometrics — from blood pressure to bullet wounds



Virtual home field advantage

- For 2010 Winter Olympics, mapped cross-country ski courses by designing a real-time kinematics global navigation satellite system
- Takes 20 measurements per second; accurate up to .4 inch
- Captured real skier velocities
- Programmed treadmill and added film footage for virtual race course roller-ski training



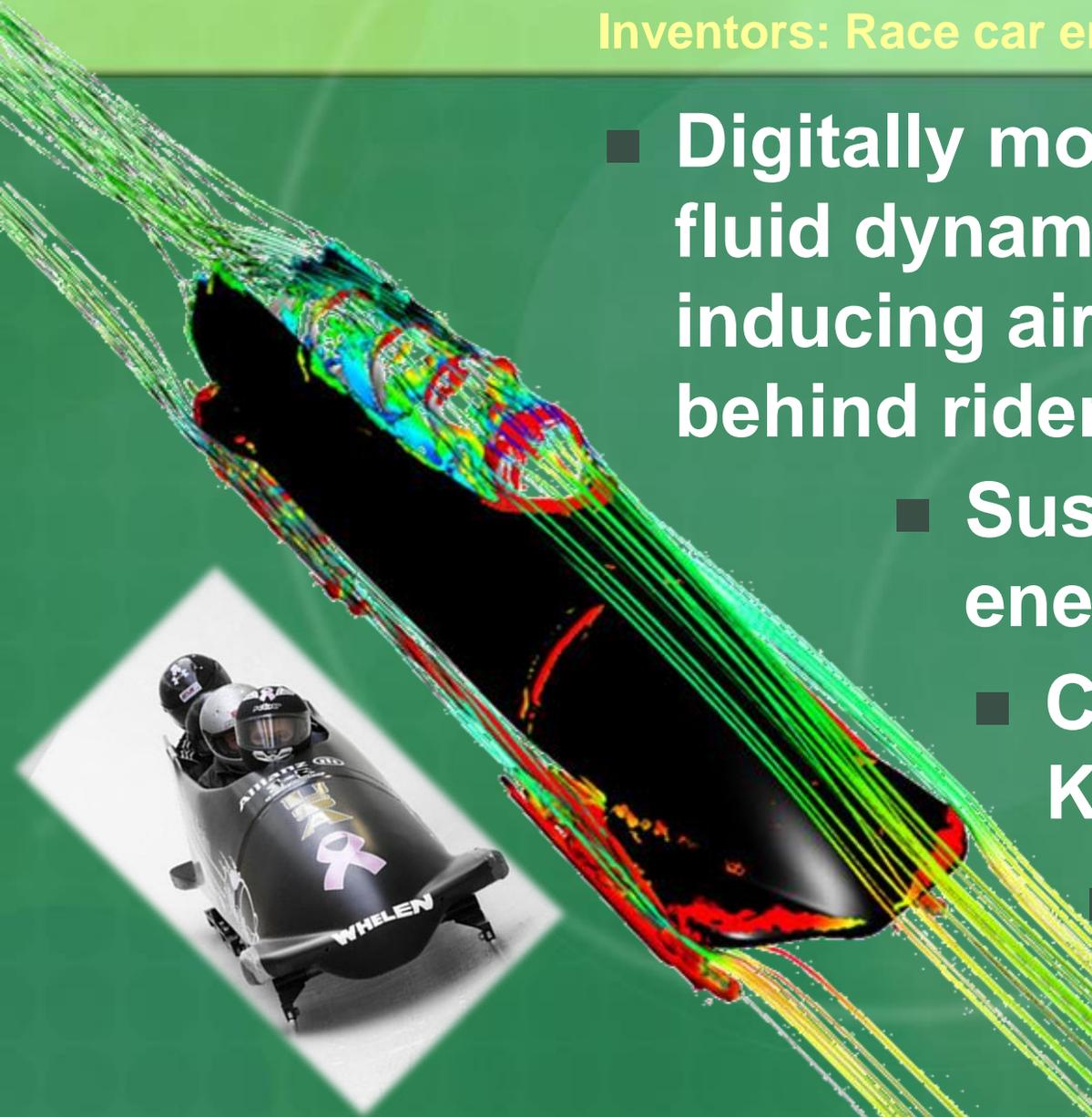
Inventors: Engineers at the Swedish Winter Sport Research Center

Examples of Engineering for the Olympics!

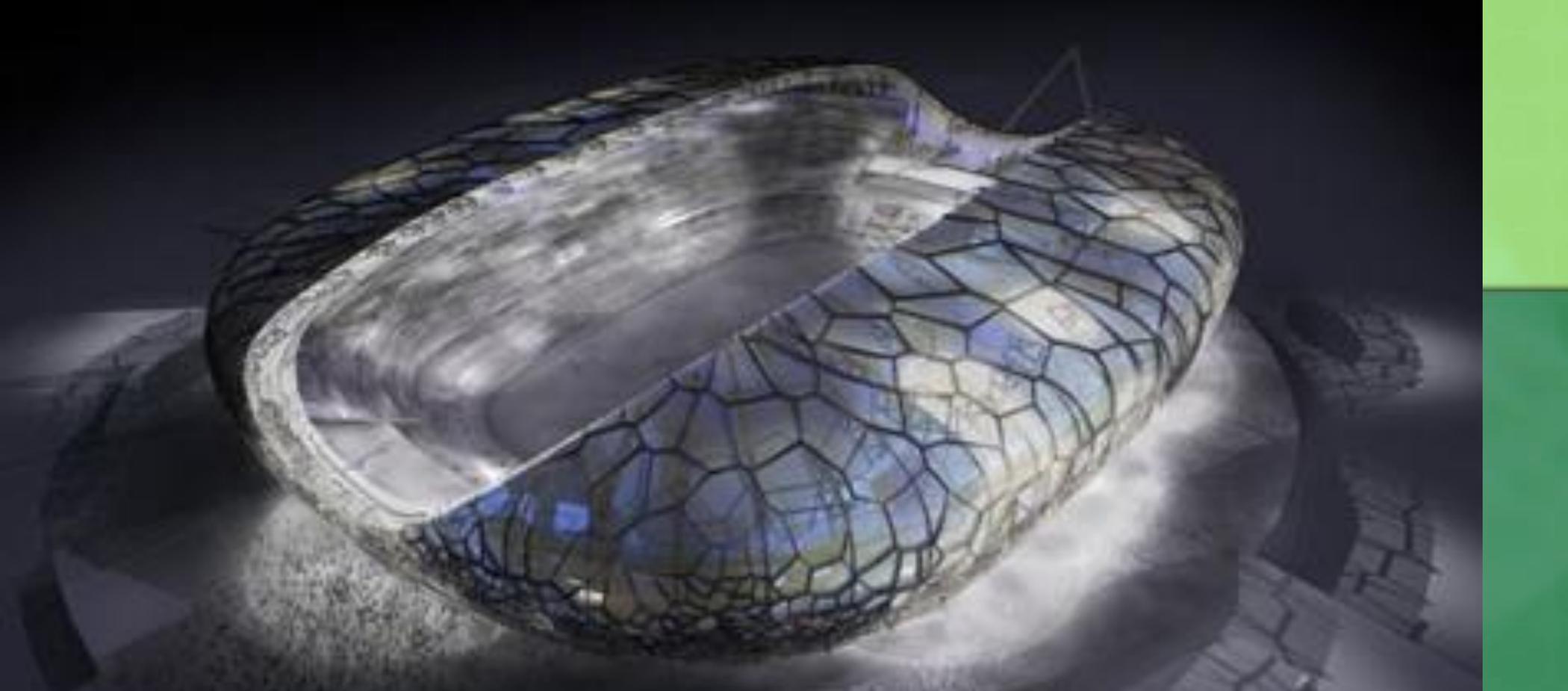
Most aerodynamic sled ever

Inventors: Race car engineers at Exa Corporation

- Digitally modeled the bobsled's fluid dynamics to minimize drag-inducing air vortexes that form behind riders' heads
 - Suspension minimizes energy-draining vibration
 - Chassis of fiberglass, Kevlar and carbon fiber
 - Adjusts for weather, track conditions, metal fatigue



2010 Olympics coach: "1/3 of team's success due to engineering"



2014 Winter Olympics Stadium

- In Sochi, Russia
- Stadium for 40,000 in the shape of a pebble
- A segmented, semi-transparent skin resembling a dragonfly wing

Inventors: Engineers and architects at Populous

Source information Feb 2010 (Winter Olympics)

- **Not your everyday denim...**
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- **Bobsledding**
<http://www.cbsnews.com/stories/2010/02/22/tech/main6231849.shtml> and <http://www.popularmechanics.com/outdoors/sports/4345010.html?page=3>
- **Russian 2014 stadium design:** <http://www.tuvie.com/2014-winter-olympic-stadium-and-paralympic-games-in-sochi-russia/>