

**RSA**®Conference2015

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SESSION ID: ECO-F02

# Avoiding the 'Creepy Factor' in Biometric and Other Technologies

**Dr. Thomas P. Keenan, FCIPS, I.S.P., ITCP**

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Professor, Faculty of Environmental Design and Department of Computer Science

University of Calgary

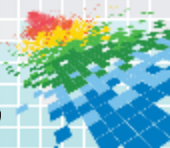
Research Fellow, Canadian Defence and Foreign Affairs Institute

@drfuture



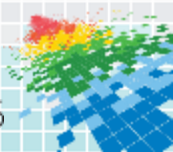
# Why Biometrics Will Rule The World

- ◆ Passwords are severely broken
  - ◆ Even the butt of jokes: “I needed a password eight characters long so I picked Snow White and the Seven Dwarves” – Comedian Nick Helm
- ◆ Convenience is king
- ◆ Technology is getting better
- ◆ It's true that e.g. hashes are collected, not full fingerprints
- ◆ Legal forces are pushing for non-repudiation
  - ◆ Oct 1, 2015: USA Fraud liability shifts to non-chip merchants
  - ◆ Already in Canada: shifted to consumer if PIN entered



# Why Biometrics Will Creep People Out

- ◆ It's so “you” – you can't change your fingerprint or retinal scan
- ◆ Snowden revelations about government tracking
- ◆ Revelations about business tracking
  - ◆ “Target Knows Teen is pregnant” is a great yarn but there are more realistic predictive analytic business cases (divorce prediction; likelihood you'll switch insurers; creditworthiness via your friends)
  - ◆ FBX and the like: I'm being pursued by a wall oven and a rental car
  - ◆ “Smart shelves” in supermarkets that guess your age, gender, BMI



# ID Tech Is Already Getting Under-On, Our Skin

VIVALNK

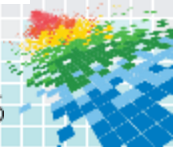
About Products Support

Digital Tattoo  
Unlock your phone  
in a single tap.

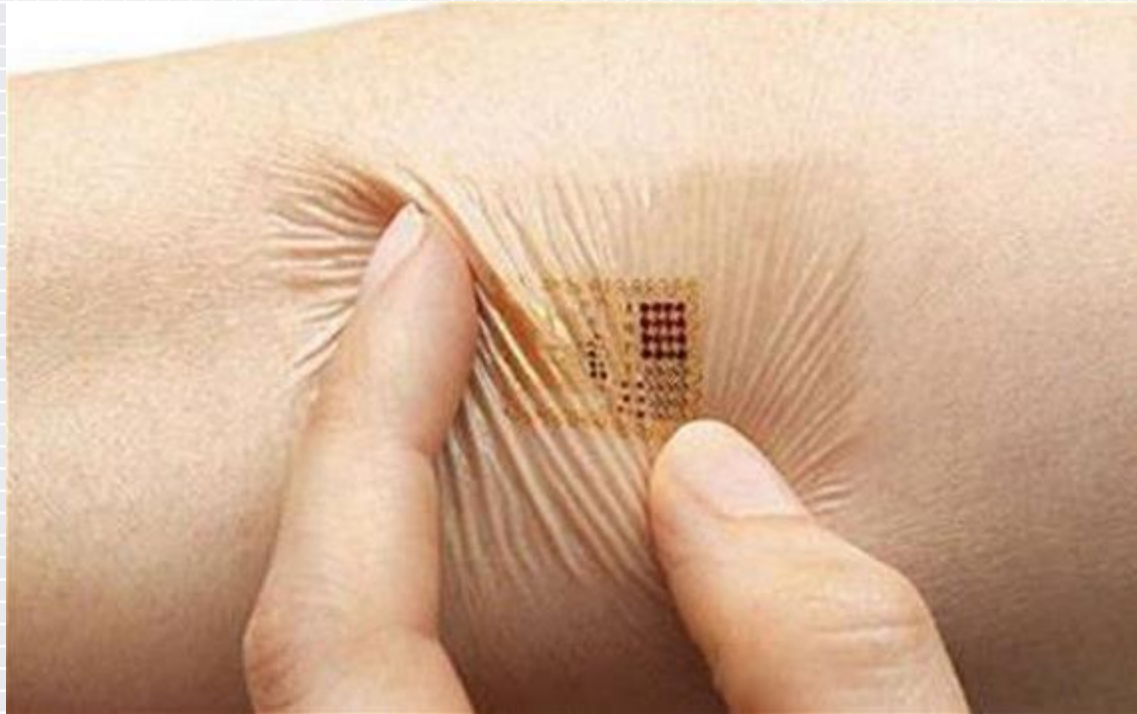
The image shows a person's hands holding a white smartphone. On the person's left wrist, there is a small, circular, brownish tattoo. The background is a blurred outdoor setting with green foliage. The website header is dark with white text for the brand name and navigation links.

Source: [vivalnk.com](http://vivalnk.com)

BUY NOW \$9.99

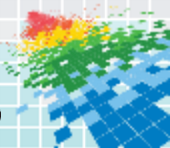


# They're even claiming a "cool factor"



That's a microphone!

Source: IC10, via telegraph.co.uk



# And, it's patented technology

## US PATENT & TRADEMARK OFFICE PATENT APPLICATION FULL TEXT AND IMAGE DATABASE

- [Help](#)
- [Home](#)
- [Boolean](#)
- [Manual](#)
- [Number](#)
- [PTDLs](#)
- [Hit List](#)
- [Prev](#)
- [Next](#)
- [Bottom](#)
- [View Shopping Cart](#)
- [Add to Shopping Cart](#)
- [Images](#)

( 6 of 9 )

United States Patent Application  
 Kind Code  
 Alberth, JR.; William P.

20130297301  
 A1  
 November 7, 2013

### COUPLING AN ELECTRONIC SKIN TATTOO TO A MOBILE COMMUNICATION DEVICE

#### Abstract

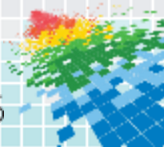
A system and method provides auxiliary voice input to a mobile communication device (MCD). The system comprises an electronic skin tattoo capable of being applied to a throat region of a body. The electronic skin tattoo can include an embedded microphone; a transceiver for enabling wireless communication with the MCD; and a power supply configured to receive energizing signals from a personal area network associated with the MCD. A controller is communicatively coupled to the power supply. The controller can be configured to receive a signal from the MCD to initiate reception of an audio stream picked up from the throat region of the body for subsequent audio detection by the MCD under an improved signal-to-noise ratio than without the employment of the electronic skin tattoo.

Inventors: **Alberth, JR.; William P.**; (*Prairie Grove, IL*)  
 Applicant: 

	Name	City	State	Country	Type
	Alberth, JR.; William P.	Prairie Grove	IL	US	

  
 Assignee: **MOTOROLA MOBILITY, INC.**  
 Libertyville  
 IL  
 Family ID: 48468791  
 Appl. No.: 13/462881

Source: uspto.gov



# Motorola/Google's "Password Pill"



"superpower"

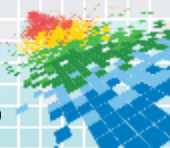
"cyborg"

"dystopian"

"mark to the  
beast"

"Google's  
creepiest idea  
ever" (bgr.com)

Source: slate.com



# My Research into Technocreepiness

- There are “wheels within wheels”
  - Facebook Exchange
  - Progressive Snapshot
  - 23andme data use
  - even good ol’ Furby
- Most people, don’t, won’t and perhaps even can’t understand exactly what’s going on

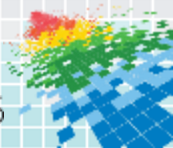


Tom Keenan photo

- Still, they have an uneasy feeling



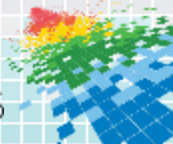
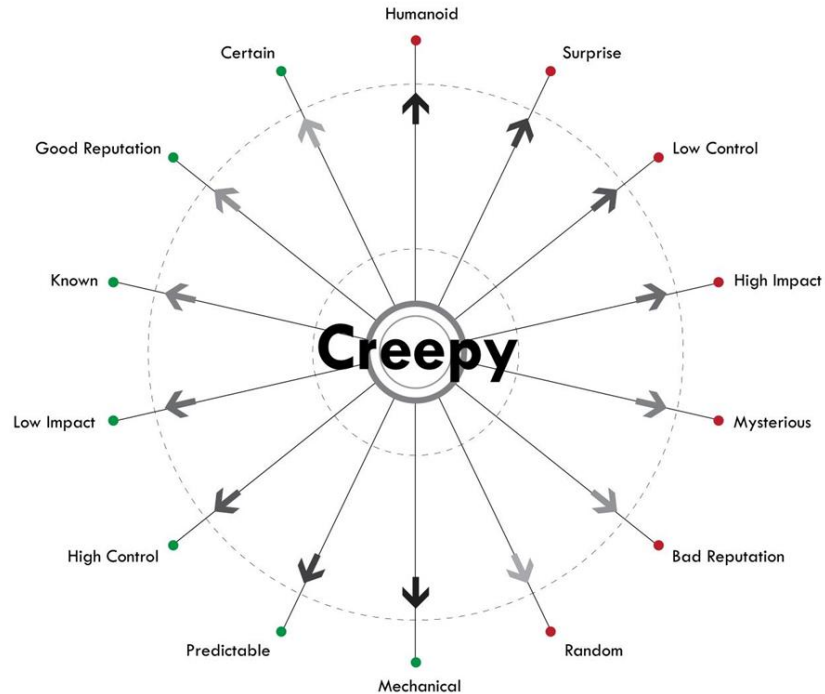
Source: Wikipedia



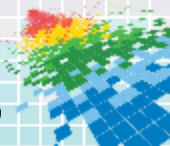


# Some Creepy Theory (Keenan, 2014)

## “Dimensions of Technological Creepiness”



# “This app takes creepy to new level” – NY Times



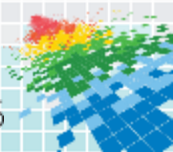
# Girls Around Me

## Creepy

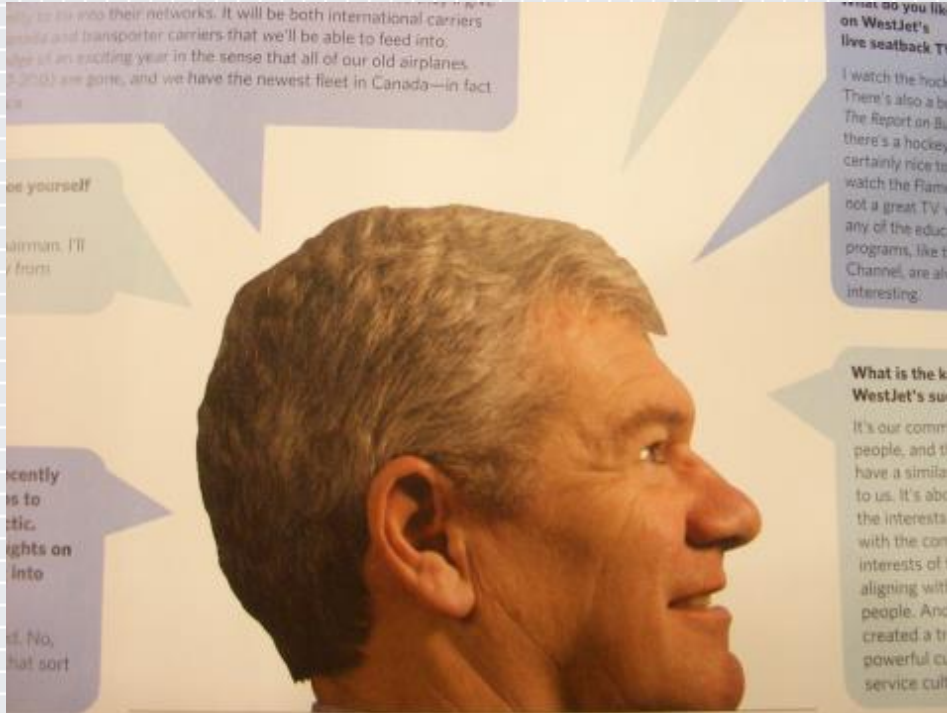
- ◆ Name: “Girls Around Me”
- ◆ Reputation: Bad once NYT got it
- ◆ Surprise: Definitely for the girl
- ◆ Control: Low for the Girl
- ◆ Mysterious: Came Out of the Blue

## Less Creepy

- ◆ Name: “New Friend Finder”
- ◆ Reputation: Could Have Managed
- ◆ Surprise: Maybe a Handshake
- ◆ Control: Shared consent
- ◆ Warnings on Facebook, Foursquare (unlikely!)



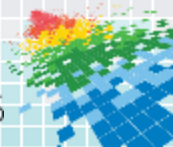
# Open Government Data Can Be Very Creepy... and How To Make it Less Creepy



**BEDDOE, CLIVE** 2 of 6  
1315 [redacted] [More information](#)  
Calga [redacted]  
(403)  
[Check out Clive Beddoe with Web Detective!](#)  
[Search School Yearbooks in Calgary AB](#)  
[Find Romance in Calgary at Date.ca](#)

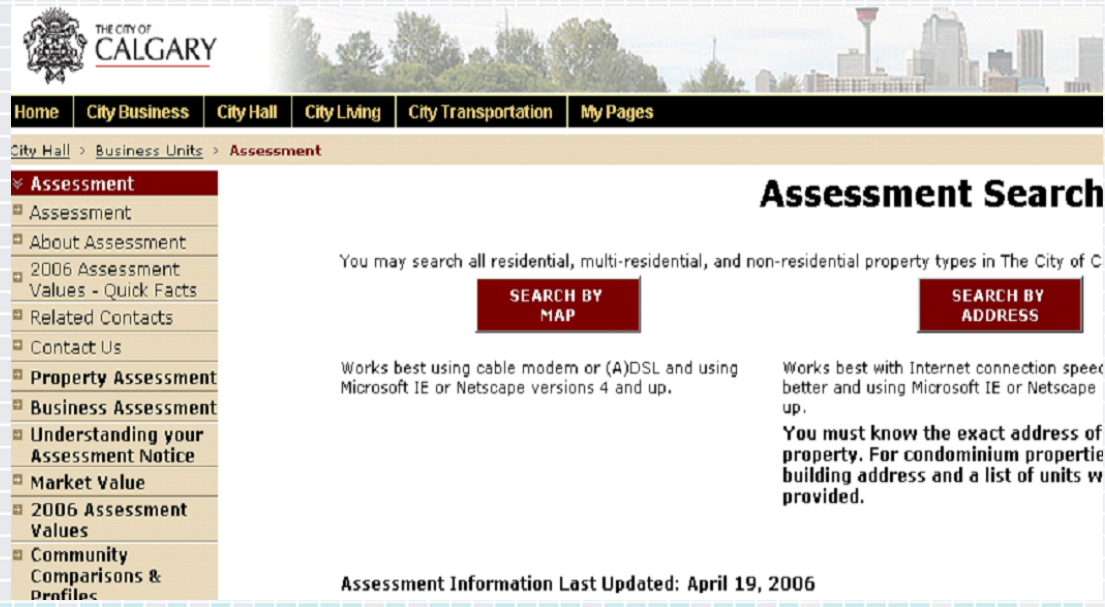
© 2005, Westjet

A famous guy (Westjet Airlines founder Clive Beddoe)

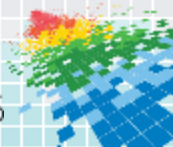


# City of Calgary “Fairshare” property Tax Systems

- ◆ You have a right to know how your neighbor is assessed
- ◆ Replaced a very flawed manual system



The screenshot shows the City of Calgary website's Assessment Search page. At the top left is the City of Calgary logo. Below it is a navigation menu with links for Home, City Business, City Hall, City Living, City Transportation, and My Pages. A breadcrumb trail reads: City Hall > Business Units > Assessment. On the left is a vertical sidebar menu with the following items: Assessment (expanded), About Assessment, 2006 Assessment Values - Quick Facts, Related Contacts, Contact Us, Property Assessment, Business Assessment, Understanding your Assessment Notice, Market Value, 2006 Assessment Values, and Community Comparisons & Profiles. The main content area is titled "Assessment Search" and contains the text: "You may search all residential, multi-residential, and non-residential property types in The City of C". Below this text are two red buttons: "SEARCH BY MAP" and "SEARCH BY ADDRESS". Under the "SEARCH BY MAP" button, it says: "Works best using cable modem or (A)DSL and using Microsoft IE or Netscape versions 4 and up." Under the "SEARCH BY ADDRESS" button, it says: "Works best with Internet connection speed better and using Microsoft IE or Netscape up. You must know the exact address of property. For condominium properties building address and a list of units w provided." At the bottom of the page, it says: "Assessment Information Last Updated: April 19, 2006".





# Assessment Summary Report

[Print Neighbourhood Map](#)

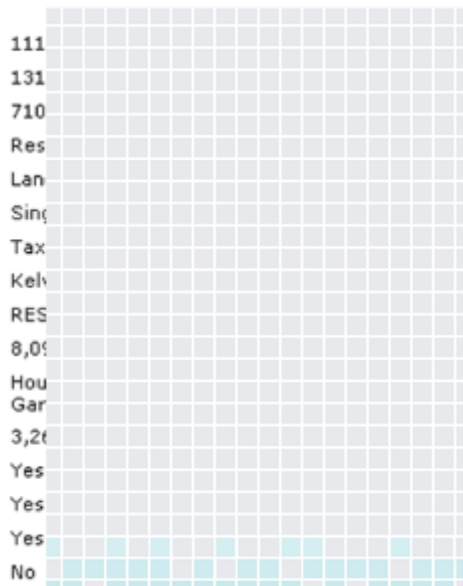
Date: April 20, 2006

Time: 12:02 AM

Assessment Information Last Updated: April 19, 2006

Your property assessment is based on The City of Calgary's estimate of the market value for your property on July 1, 2005 and characteristics and physical condition on December 31, 2005.

<b>Roll number:</b>	111
<b>Property Location:</b>	131
<b>Property Assessment:</b>	710
<b>Assessment Class:</b>	Res
<b>Property Type:</b>	Lan
<b>Property Use:</b>	Sing
<b>Taxation Status:</b>	Tax
<b>Community Name:</b>	Kel
<b>Land Use Designation:</b>	RES
<b>Parcel Area:</b>	8,0f
<b>Building Description:</b>	Hou Gar
<b>Approx. Living Area above grade:</b>	3,2f
<b>Finished Area below grade:</b>	Yes
<b>Garage:</b>	Yes
<b>Fireplace(s):</b>	Yes
<b>Walkout Basement:</b>	No



# Oops! - A Creepy Secondary Industry Powered by City Tax Data Access #RSAC



**Assessment Advisory Group Inc.**

Tax Advisory & Consulting Services. We make your tax, our business.

ARE YOU PAYING TOO MUCH BUSINESS AND/OR PROPERTY TAX?

[HOME](#)

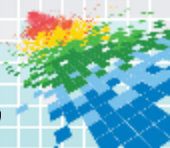
[SERVICES](#)

© 2014 Assessment Advisory Group, Inc.  
Used with permission

AV SW



© City of Calgary, 2006



# How Calgary Made the Fairshare System Less Creepy #RSAC

- ◆ Technical Safeguards
  - ◆ Log IP address
  - ◆ Limit inquiries per day (which causes other problems)
- ◆ New Protocol
  - ◆ Two tiers of information, public (just assessment \$) and registered user (more information)
- ◆ Legal Safeguards
  - ◆ Specific assertion of copyright
  - ◆ Prohibition against commercial use, data mining, robots, etc.



# What the Lawyers Came Up With

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For security reasons, enter the characters as displayed below (not case sensitive) into the text box and select "I Accept the Terms". To request a new challenge select "Generate New Image" and to hear an audio of the challenge select "Play Audio".

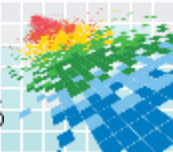


[Generate New Image](#)

[Play Audio](#)

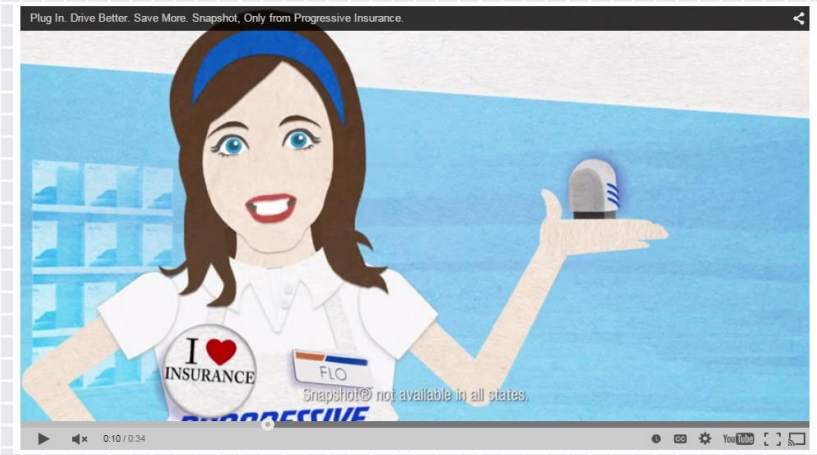
I Accept The Terms  I Do Not Accept The Terms

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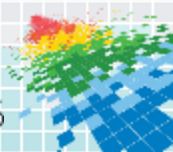
# A Private Sector Case: Usage Based Insurance

- ◆ UBI's appeal: "You might save \$"
- ◆ Progressive Snapshot®
- ◆ Free trial
- ◆ "No downside"



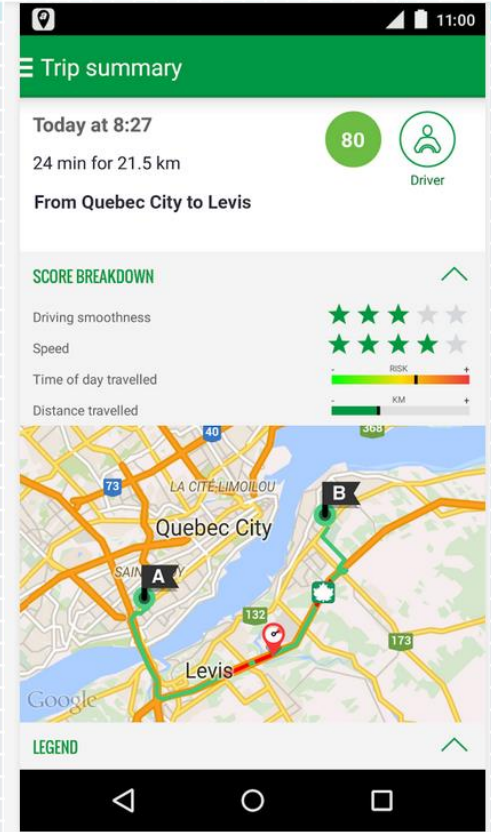
© 2015, Progressive Insurance

- ◆ Snapshot was *designed* to avoid creepiness
- ◆ Doesn't track *where* you drive, just when, how much, how hard



# UBI Smartphone Apps ARE Creepy

- ◆ Allstate Insurance Drivewise® in U.S.
- ◆ Desjardins Insurance Ajusto in Canada
  - ◆ Tracks where you drive as well as speed, posted speed limit, acceleration, braking, distance, time of day
  - ◆ 40% of new customers in ON and QC opted in
  - ◆ Advertises savings up to 25% but typically 8%
  - ◆ Won't sell info, however subject to subpoena
  - ◆ Gameified: “challenge your friends” with “free app”
  - ◆ “Trading privacy for (possible) savings”

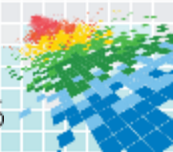


© 2015 Desjardins Insurance


RSAC Conference 2015

# Watchback and Data Aggregation

- ◆ “Your Porn is Watching You”, Motherboard article by Brian Merchant, April 6, 2015
  - ◆ “According to Alexa, the analytic service, XVideos is the 43rd most visited website in the world. By way of comparison, Gmail is 66th. Netflix is 53rd.”
  - ◆ “Ghostery revealed that each site has tracking elements installed, and thus is transmitting data to a number of third-party corporations, including Google, Tumblr, and industry-specific ad services like Pornvertising and DoublePimp.”
  - ◆ If you’re famous, and even if you’re not, you might not want this information shared too widely




# Data Aggregation: Not Just for Big Companies



NAME EMAIL PHONE USERNAME ADDRESS

Sign up Login

Current
Court
Historical



Like 0 Tweet 0 +1 0

- ✓ Profile Details  
Full name, phone, email address, age
- ✓ Location History  
Current & previous addresses, home values
- ✓ Family Background  
Family members, relatives, spouse info
- ✓ Photos & Social Profiles  
Photos, videos, and social network profiles
- ✓ Neighborhood  
Neighbors, nearby home values, public safety

See Full Results


USA
Jordan Keenan

Full results found successfully!

## Jordan Keenan ✓

See Full Results

✓ 100% Satisfaction Guarantee

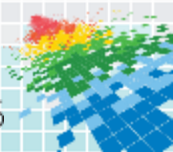
Jordan Keenan, Age 20's


Current Address	✓ <a href="#">***** W 113th St</a>
Phone Numbers	✓ <a href="#">See Full Phone Number</a>
Email Address	✓ <a href="#">See Full Email</a>
Marital Status	✓ <a href="#">See Available Results</a>
Family Members	✓ <a href="#">See Available Results</a>
Location History	✓ <a href="#">New York, NY</a> <a href="#">1 Location Found</a>

To see all of **Jordan Keenan's** personal information [click here](#).

See Full Results

✓ 100% Satisfaction Guarantee



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## What is Coming Down the Line in Biometrics and Biocreepiness



# Here come the digital bloodhounds

## Body odor as a biometric identifier

Researchers at the UPM along with the Ilía Sistemas company are making progress on the development of a new biometric technique that would allow us to identify people through their personal odor.

The research of the Group of Biometrics, Biosignals and Security (GB2S) of the Universidad Politécnica de Madrid (UPM) in collaboration with Ilía Sistemas SL unveils that there are recognizable patterns of each person's body odor that remain steady. Therefore, every person has his/hers own odor and this would allow his/her identification within a group of people at an accurate rate higher than 85%. This result leads the way to improve personal identification that is less aggressive than other biometric techniques being used today.

Nowadays, our identity verification in most airports or border checkpoints is based on our physical resemblance to our ID card or passport photo. Even though the new electronic passports are difficult to forge, the usage of biometric techniques based on a person's physical features would increase the safety effectiveness of the border control checkpoints.

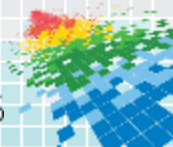
Source: UPM

Several biometric techniques like the iris and fingerprint have a low error rate. However, these two techniques are usually related to criminal records and for this reason when a

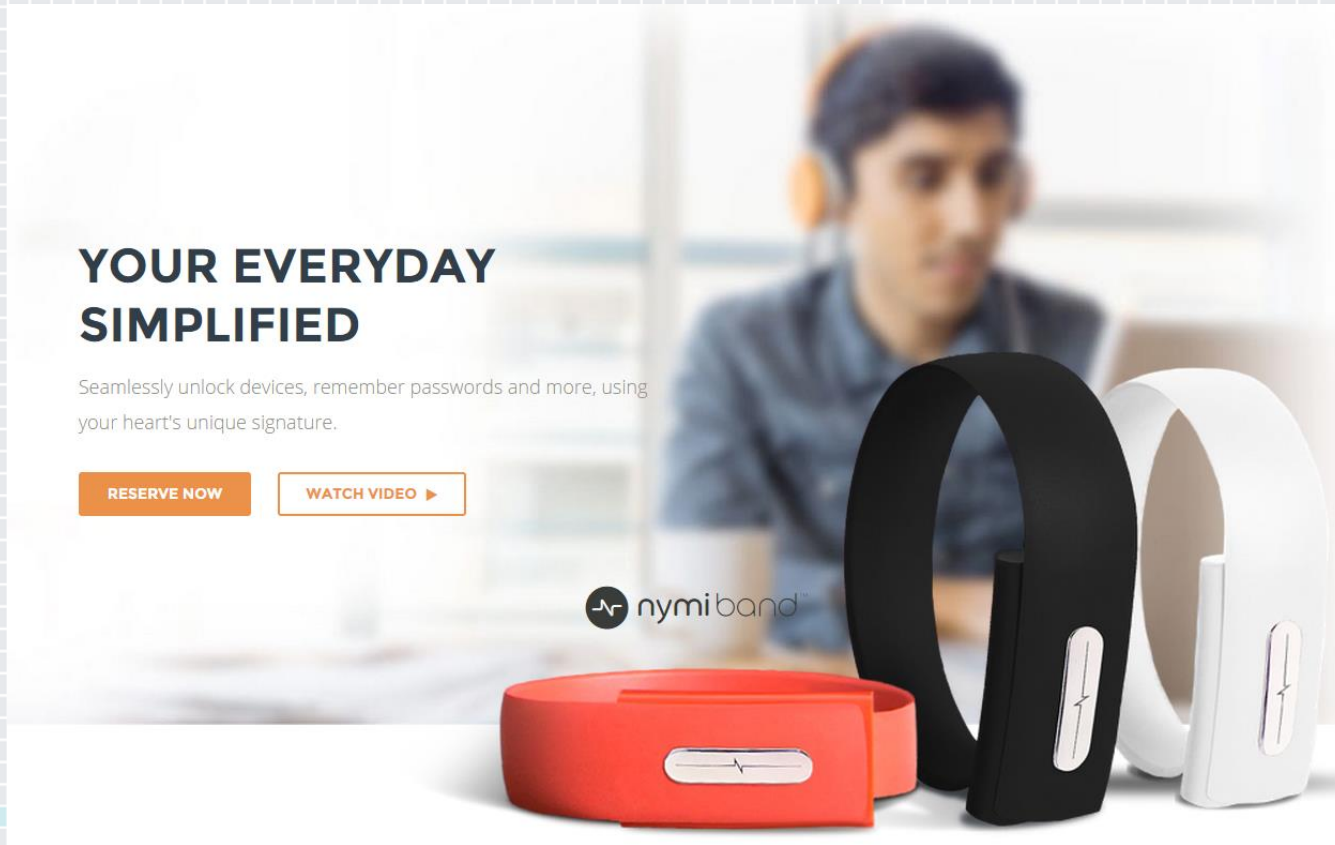
person is required to identify himself is reticent to collaborate. On the other hand, other recognized biometric techniques like the face recognition have a high error rate. Therefore, the development of new sensors that allow the capture of body odor can provide a less aggressive solution because the identification could be at the same time when crossing the system stall.



Source:  
Universidad  
Politécnica de  
Madrid © 2015




# Does logging on make your heart skip a beat?



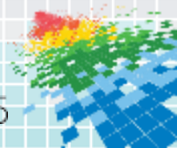
**YOUR EVERYDAY SIMPLIFIED**

Seamlessly unlock devices, remember passwords and more, using your heart's unique signature.

[RESERVE NOW](#) [WATCH VIDEO ▶](#)

 nymi band™

Source: nymi.com



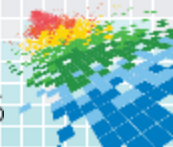


# Typing Rhythm

- ◆ I did a “proof of concept”, funded by Canada’s NSERC in 1980s
- ◆ Other researchers, such as Wes Masri, Ali El-Hajj and Ravel Jabbour of the American University of Beirut raved about Key Pattern Analysis in 2011 to double-validate passwords
- ◆ Seeds of its own demise: The longer (hence likely stronger) the password, the harder it was to type consistently



Source: Wikipedia



# The Problem of Promising Too Much



Nexus: Iris scan with an issued (but not read) card

## Malfunctioning Nexus machines spark traveller complaints



### Nexus machine malfunctions spark complaints



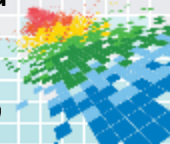
Many frequent travelers turn to a trusted traveller program like Nexus to get through customs more quickly.

That's a hard computer science problem (lookup vs. validation)

They malfunctioned in an "interesting way"

Have been replaced

Source: CTV News



# Concern: Who's Getting all this Bio-Information?

## GIZMODO

+ FOLLOW

### Your Fuelband Knows When You're Having Sex

Adam Clark Estes  
Filed to: SEX 7/12/13 12:42pm

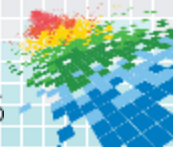
109,236 🔥 4 ★

Recommend



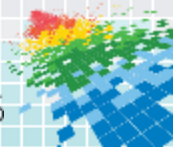
Everybody loves these Fuelbands and other activity trackers because they supply you with troves of data about your everyday life. Sometimes, however, it's a little bit too much information.

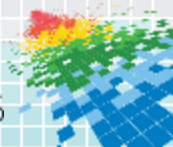
Source: Gizmodo.com, ©2013



# Workplace issues

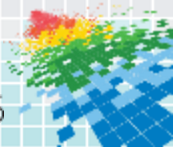
- ◆ Companies are giving fitness monitors and other wearable to employees as part of fitness programs
- ◆ “Four out of five employees would use company-provided wearable that tracks health and wellness and provide that data to their employer.” (<http://www.cornerstoneondemand.com/SOWP14>)
- ◆ Perks might include discounts on fitness programs, extra vacations days, a bonus
- ◆ BUT...





# Others concerns re “my biometrics”

- ◆ Could be used to see if employee got a good night’s sleep
- ◆ If Google can make smart contact lenses for diabetics, are continuous drug tests far away?
- ◆ Genetic information, if shared, can reveal many hidden facts, health risks, even things about relatives
- ◆ Providing biometrics could become “*de facto* mandatory”
  - ◆ Lenddo sets interest rate based on your Facebook friends
  - ◆ Progressive Insurance provides discounts if you use Snapshot®
  - ◆ And, my favorite...



# “The Creepiest Place in America”



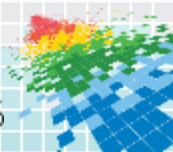
MyMagic+ RFID (tracking) wristband

Not only are you tracked in the park, you are led around by the nose!

The Smellitzer®



Source: [findingmickey.com](http://findingmickey.com)



# And, hey, that information can be stolen

**threatpost** CATEGORIES FEATURED PODCASTS VIDEOS

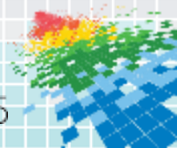
03/06/15 9:46 | Slight update with comments from Adobe - @Adobe Starts Vulnerability Disclosure Program on HackerOne: <http://t.co/Z2B9Q0as5T>

Welcome > Blog Home > Microsoft > How a \$10 USB Charger Can Record Your Keystrokes Over the Air



**HOW A \$10 USB CHARGER CAN RECORD YOUR KEYSTROKES OVER THE AIR**

by Dennis Fisher Follow @dennisf January 13, 2015, 7:03 am





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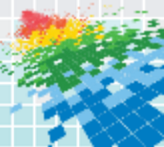
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## What Is to Be Done?



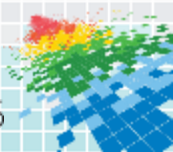
# Summary: How to Make This Presentation “News You Can Use” Right Away

- ◆ Even before you get back to the office, list technologies that you use or are considering using that have biometric components
- ◆ Apply this “creepy lens” to identify ways in which each might upset people, now or in the future
- ◆ Think about ways in which the information might be combined with other sources to the detriment of privacy, or even perceived privacy
- ◆ Come up with alternatives that will produce “pretty good information”  
A sign-in sheet at the company gym will track attendance, if not effort, as well as a fitness band.
- ◆ Think: What do you really need to collect? Why do you want it?



# Longer term application of what you have learned today

- ◆ Check your data retention policies (example: videotapes should usually be erased after 7 days if not requested)
- ◆ Consider whether some data should be de-identified (which can be difficult!) or collected anonymously or not at all
- ◆ View every new technology through the creepy lens and make sure the benefits outweigh the risks
- ◆ Don't Be Creepy!



# Thank you!

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