



Technology Meets Health Care – and It's Going to be a Good Thing (Mostly)

Prostaid Calgary

November 9, 2021 via Zoom

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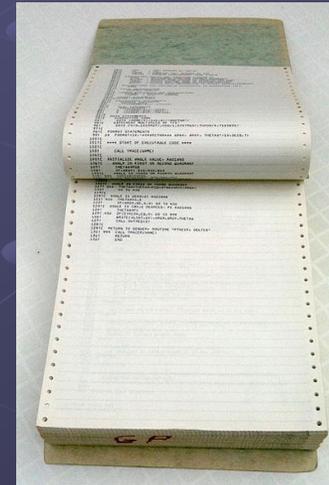
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Tech & Computer Security Have Been Very Good to Me



July 1972, near Lake Louise

“The Case
of the
Missionary
Unmasker”



COMPUTER
CONTROL
AND
SECURITY



OCTOBER 14, 1977



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Smart Communities

<http://smartcommunities.ic.gc.ca/>

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What is a Smart Community?

It's a community with a vision of the future that involves the use of information and communication technologies in new and innovative ways to empower its residents, institutions and regions as a whole.



Smart Community Info



Smart Start



Smart Tools

- Blue Ribbon Panel on Smart Communities 1999
- Govt of Canada's \$60M Smart Communities program 2000
- "Connect Calgary" project
- We are moving from "Smart" to "Intelligent"

Accessed via The Wayback Machine, Archive.org

Please Note

- I am not a (medical) doctor
- I am not a lawyer
- These views are my own

Some of the Best Stories Will Never Be on the Internet

- My friend Willard (Bill) Daggett, Ed.D.
- His father, in his late 50s, was a machinist
- “Sorry, Fred, but these new robot can cut with much more precision than you can”
- Figured he was too young to retire, so he took a job at McDonalds
- Then lightning struck twice.

Automated McDonald's at the Gas Pump

- Not such a great idea back in the 90s
- Has come of age now, sort of
- <https://youtu.be/0klGoTjwdtI>

Falling Walls Competition

Break down the wall of...



WINNER

ANA MONTALBAN-ARQUES

INEFFECTIVE CANCER THERAPIES

Ana Montalban-Arques, Winner of Falling Walls Lab Switzerland, won Breakthrough of the Year in the Emerging Talents category of Falling Walls with her pitch on Breaking the Wall of Ineffective Cancer Therapies. Her novel approach applies bacteria as a stand-alone therapy for colon cancer, a therapeutic approach that shows striking efficacy of bacteria as monotherapy.



Dr. Ana Montalban-Arques joined the University of Zurich in 2018. Since then she has been leading a project about gut microbiota and its influence on colorectal cancer development. In 2019, she received the CCCZ fellowship, which helped to develop her translational project. In 2020, she was awarded with the UZH Entrepreneur Fellowship and with the SNF/InnoSuisse BRIDGE PoC. This funding allows her to turn this translational research project into a spin-off company, with the aim of developing a live biotherapeutic product as an oral therapy for the treatment of colorectal cancer.

We have a previous winner at CSM



Dr. Lian Willetts

Faculty Member in Cell Biology and Anatomy
Instructor at the Cumming School of Medicine
University of Calgary

Dr. Willetts is a new faculty member in the Department of Cell Biology and Anatomy and an instructor for the Cumming School of Medicine. Lian is a member of the the Alberta Prostate Cancer Research Initiative (APCaRI). Her research focuses on the mechanism of cancer metastasis and clinical applications in the diagnosis and prognosis of metastasis. Lian and her team combine intravital “live cancer” imaging and model-based research to screen for biomarkers of cancer metastasis. Lian has won several prestigious awards for her work, including Postdoctoral Award from the US Department of Defense Prostate Cancer Program and a silver medal at the 2015 Falling Walls Lab and Conference in Berlin, Germany. Lian obtained her Ph.D. in Experimental Medicine at the University Alberta after a joint program with the Mayo Clinic in Phoenix, Arizona.

Calgary's 2018 Winner Who Went to Berlin



Dr. Joseph (Gang) Wang, PhD

University of Calgary

BREAKING THE WALLS OF SMALL INTESTINE SAMPLING

Joseph received his B. Eng in Bioengineering from the National University of Singapore, in 2010, and his PhD degree in Biomedical Engineering at the University of Calgary, in 2017. He has expertise in wearable and ingestible medical device design. Joseph co-founded M Diagnostics with Drs. Martin Mintchev and Orly Yadid-Pecht in 2014, which was acquired by M Pharmaceutical, a TSX-venture listed company in 2015. Dr. Wang received Eyes High International Doctoral Scholarship, FGS Doctoral Scholarship, FGS Entrepreneurship and Innovation Scholarship, and UCalgary Board of Governors Graduate Scholarship. He completed an entrepreneurship training course in the Summer Incubator Program at Innovate Calgary and the Hunter Hub for Entrepreneurial Thinking.

Why His Idea is So Brilliant

- Samples the Small Intestine, which is medically important
- Does it through mechanical means (triggered by pH changes) not expensive electronics
- Costs \$10!

- MORAL: Solve a problem that will help an ever-increasing number of people in an innovative way and good things will come to you

Trend 1: Simplicity is a Good Thing

Albertan researchers believe urine could provide key to detecting concussions

By Erik Bay • Global News
Posted October 22, 2021 4:11 pm



Head injuries have become a hot-button issue in sports, with increased rules and protocols dedicated to protecting the brain. As Erik Bay tells us, two University of Lethbridge researchers are now working on technology to better diagnose concussions through urine. – Oct 22, 2021



Peeing into a cup might soon become commonplace at your local sports complex — not to check for steroids, but for [concussions](#).

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Research group patenting urinary analysis to diagnose concussion and enhance recovery protocols

Thursday, October 21, 2021

Sport-related concussion (SRC) or traumatic brain injury (TBI) has become one of the most important issues in sport, affecting everyone from multi-million-dollar athletes to children playing at the minor level. From health to economics, SRC now influences the way games are played and governed and yet, the actual tools available to diagnose concussions are limited and mainly subjective.

Researchers at the Universities of Lethbridge and Calgary are looking to insert objectivity into that equation with a non-invasive test that examines specific metabolites in a player's urine. The results not only indicate whether a player is concussed but determine when a player can return to sport and even possibly aid in personalized therapeutic strategies to enhance recovery.

Drs. Gerlinde Metz (Canadian Centre for Behavioural Neuroscience, University of Lethbridge), Chantel Debert (University of Calgary, Alberta Health Services) and Tony Montina (Department of Chemistry & Biochemistry, Director Magnetic Resonance Facility, U of L) have an approved provisional patent that allows them to focus on a panel of 18 specific urinary metabolites, which together give a biomarker signature for diagnosing SRC.



Trend 2: Personalized Medicine

- Have you had your genome analyzed?
- 23andme, Ancestry.com etc. only analyze a small fraction (typically 0.02%) of the whole genome
- George Church & colleagues at Harvard founded Veritas Genetics and pioneered whole genome sequencing
- Veritas is now focused on COVID-19, but Nebula Genomics (nebula.org) is taking its place



Whole Genome Sequencing Options



Basic

Whole Genome Sequencing

\$99 ~~\$299~~

Good choice if you want to start exploring your family history and learn about predisposition to common traits and conditions.

Add to cart



Best value

Deep

Whole Genome Sequencing

\$299 ~~\$999~~

The best choice for most users. It gives deep insight into ancestry and allows you to learn about common as well as rare traits and conditions.

Add to cart



Ultra high accuracy

Ultra Deep

Whole Genome Sequencing

\$999 ~~\$2999~~

The most advanced DNA test on the market that decodes your entire genome with ultra-high accuracy enabling most comprehensive and accurate reports.

Add to cart

Or, If You Just Can't Wait



Why Should We Care

- A number of drugs behavior differently in people with specific genetic differences
- Genetic counselling for the next generation
- Something else to worry about 😊

Trend 3: The Measured Self

- I already track a few things every day like weight, BP, etc.
- When COVID-19 came along I added temperature
- I also do a crossword puzzle each morning to make sure I haven't suffered brain damage overnight
- Haven't bothered to get a FitBit yet...

Your Fuelband Knows When You're Having Sex



Adam Clark Estes

Filed to: SEX 7/12/13 12:42pm

109,375 🔥 4 ★ ⌵



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.

Your fitness wristband knows when you're having sex. If it's sensitive enough to detect minute movements while you're sleeping, it can certainly pick up on the patterns of intercourse. Plus how else do you explain getting a half hour of exercise late at night without taking a single step.

WHY WEARABLES CAN TRACK SEX

Dr. Alex Koch, a professor of exercise science at Lenoir-Rhyne University, confirms that it's possible for a Fitbit **TO TRACK SEX**.

“[Wearables] work by using two built-in devices: an accelerometer, which estimates whole-body motion from device’s vibration, and a photoplethysmograph, which measures heart rate,” Koch tells *Inverse*. “Sexual activity would show up as some form of activity, through both an increase in heart rate and an increase in motion.”

“The software in the devices does its best guess interpreting vibrations on the device itself to the movement of the whole body.”

The problem is — there’s no way of differentiating sex from other exercises.



Trend 4: The “real world” will get creepier

Mondelēz Pursuing Point of Purchase Interactivity



Pilot of smart shelf checkout counter display units. Sensor technology, analytics and video will combine to deliver demographically appropriate ads and promotions



People

Machine

People



Consumer stands in front of display at checkout counter



Camera sensor analyzes facial structure and other characteristics to determine age and gender. Weight sensors know when and what product has been picked off shelf



Sensors alert display to feature video or promotion relevant for this consumer segment

Those voices in your head may be real!



YouTube CA

0:29 / 1:04

All Good Fair-trade Bananas - Listen to your conscience.flv

Holosonics

Subscribe 105

65,890

The creepiest place in America



And in
China?

Any public
street!

Bad driving and debt could get you downgraded in the social ranking system



Beijing, China. Donat Sorokin\TASS via Getty Images

Like private credit scores, a person's social score can move up and down depending on their behavior.

The exact methodology is a secret — but examples of infractions include bad driving, smoking in non-smoking zones, buying too many video games, and posting fake news online, specifically about terrorist attacks or airport security.

Trend #5: Thought Reading

- fMRI machines can monitor brain activity
- Used for terrorist interrogation
- Also for testing TV commercials and shows



Prof. Jack Gallant's Work

- State of his work in 2011



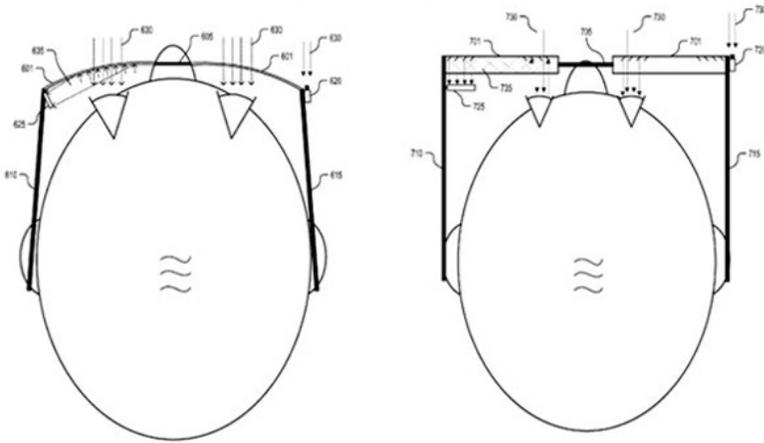
- “Picopulse imaging”

Gaze Tracking

- Twitter was reported to be timing gaze
- Google got a patent on pay-per-gaze advertising

How Pay-Per-Gaze Advertising Could Work With Google Glass

BY NICK BILTON AND CLAIRE CAIN MILLER AUGUST 20, 2013 3:38 PM 20



Google was awarded a patent for a system that could capture and analyze exactly what a Google Glass user was looking at. Google

Email Google wants to see what you see. And then, of course, make money from those images.

Share The company was recently [awarded a patent](#) that puts forth an idea for pay-per-gaze advertising — a way in which people interacting with ads in the real world could be analyzed in the digital world.

Tweet

Trend 6: Biometrics Everywhere

◆ WSJ NEWS EXCLUSIVE | TECH

Apple Is Working on iPhone Features to Help Detect Depression, Cognitive Decline

Company is working with UCLA, Biogen to see if sensitive data like facial expressions, typing metrics could signal mental-health concerns



Using an array of sensor data, researchers hope they can tease out digital signals associated with the target conditions.

PHOTO: LOIC VENANCE/AGENCE FRANCE-PRESSE/GETTY IMAGES

By [Rolfe Winkler](#)

Sept. 21, 2021 5:30 am ET

UPCOMING EVENTS

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21
2021
3:00 PM - 3:30 PM EDT
Ask WSJ: The Top U.S. Colleges

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Women In The Workplace Forum

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WSJ Jobs Summit

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2. Here's Why Covid-19 Shots Don't Last a



US Visit is Not a Tourist Promotion!



Trend 7: Genetic Tinkering

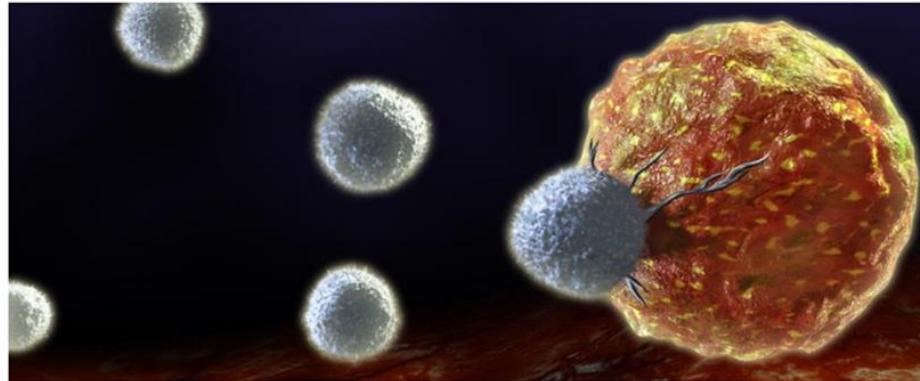
HEALTH INNOVATION UNION

Engineering human immunity to take on cancer

13 November 2013

by Rex Merrifield

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A digital illustration of a T cell attacking a cancer cell. T cells are a type of white blood cell crucial to the human immune system. © Shutterstock/ Andrea Danti

Medical researchers are using genetic engineering to revolutionise the treatment of cancer.

Developments in genetic engineering make it possible to 're-programme' the human immune system so that T cells – white blood cells that normally fight viruses – recognize and kill cancer cells. This approach, which directly harnesses the potency of the immune system, holds the prospect of a powerful new weapon in the fight against cancer.

'This is really a very different kind of treatment, with almost endless engineering possibilities unimaginable with a drug or a protein,' said Dr Martin Pulè, of University College London (UCL), UK, who is the scientific coordinator of the EU-funded ATECT consortium. 'These engineered cells can be thought of as highly complicated little robots.'

Genetically Engineered CAR T Cells Prove Highly Effective Against Blood Cancers

February 17, 2016 | Arthur N. Brodsky, Ph.D.



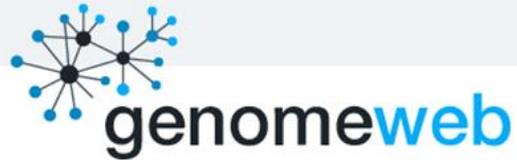
This past Sunday, at the American Association for the Advancement of Science's (AAAS) annual meeting in Washington, D.C., researchers revealed the most promising results yet regarding a "revolutionary" cancer treatment. The treatment—known as chimeric antigen receptor (CAR) T cell therapy—belongs to a relatively new class of cancer treatments called immunotherapy, which empowers a patient's immune system to eliminate cancer.

Previously, another type of CAR T cell therapy enabled young Emily Whitehead—whose story you can read [here](#)—to conquer her life-threatening leukemia. Now, a new version has shown amazing effectiveness in patients with other blood cancers.

In a new study led by Stanley Riddell, M.D.—a member of the Cancer Research Institute's (CRI) Scientific Advisory Council and former CRI-funded investigator—93% of patients with acute lymphoblastic leukemia (ALL) achieved remission after receiving treatment, while 63% of non-Hodgkin lymphoma patients also saw improved outcomes. Many of these patients had tumors that were resistant to chemotherapy.

Cancer cells often employ evasive tactics to avoid destruction via immune T cells. To overcome this, CAR T cell immunotherapy works by harvesting a patient's own T cells, genetically modifying them to improve their ability to identify and destroy harmful cancer cells, and then putting them back in the patient. This video below provides great visuals on how the technology works.

Risks, both Medical and Ethical



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For Better Odds

Sep 20, 2021

 Save for later

A couple turned to the company Genomic Prediction to help select which IVF embryo to implant, possibly the first time that polygenic risk scores were used in such a way, [according to Bloomberg](#). It adds that the parents chose the embryo with the lowest odds of developing heart disease, diabetes, and cancer.

The father, Rafal Smigrodzki, a neurologist with a doctorate in human genetics, tells Bloomberg that they hoped to give their child the best chance in life. "Part of that duty is to make sure to prevent disease — that's why we give vaccinations," he adds there. "And the polygenic testing is no different. It's just another way of preventing disease."

In 2018, [the Asbury Park Press reported](#) that Genomic Prediction received the go-ahead from the state of New Jersey to [sell its pre-implantation](#) genetic test, and in 2019, [New Scientist reported](#) that the test had been used in [at least one pregnancy](#).

Such testing is controversial — the Hastings Center's Erik Parens and Paul Appelbaum and Wendy Chung, both at Columbia University argued at [Stat News in 2019](#) that the approach [is unethical](#). As Bloomberg additionally notes, a recent report in [the New England Journal of Medicine](#) has also pointed out ethical and other issues with testing, such as the data's focus on European populations, the number of unknowns, and its likelihood of exacerbating gaps between those who can afford and benefit from testing and those who cannot.

Breaking News

- Personal Genome Diagnostics, Cleveland Clinic Join Forces to Advance Liquid Biopsy
- PhenoTips Raises C\$2.5M in Seed Funding
- Fauna Bio Raises \$9M in Seed Money
- Phosphorus Wins Conditional New York State Approval for GeneCompass Consumer Test
- Helix, Medical University of South Carolina Partner for Population Genomics Program
- European Commission Objects to Illumina Pushing Through Grail Purchase, Mulls Response

CAR T-cell therapy: Canadian patient in landmark trial shares his story



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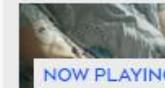


Solarina Ho CTVNews.ca Writer
@shtweet | [Contact](#)

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CTV National News: New treatment for cancer



Canada is now joining an international scientific movement to use a patient's own immune cells to fight cancer. CTV's Avis Favaro explains.

<https://www.ctvnews.ca/health/car-t-cell-therapy-canadian-patient-in-landmark-trial-shares-his-story-1.5656172>

FREE TO GOOD HOME



Beautiful 6 mo.
old male kitten -
orange &
caramel tabby,
playful, friendly,
very affectionate.
Ideal for family
w/kids.

↔
OR
↔

Handsome 32 yr.
old husband -
personable,
funny, good job,
but doesn't like
cats. Says he
goes or
cat goes.

Call Jennifer - 265-5543 - come
see both & decide which you'd like.

Thank you!
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