Chiptechnologie voor de Gezondheidszorg

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Wie of wat is imec?



MISSION

World-leading in **nano**electronics **R&D**

Scientific knowledge in global partnerships **in ICT**, **healthcare** and **energy**

Industry-relevant technology solutions

International top talent in a unique high-tech environment committed to provide building blocks for a better life in a sustainable society

FACTS & FIGURES

▶ Total revenue 2015: ~385M€



- > > I Billion € infrastructure
- 1659 publications in 2012
- 134 patents filed in 2012
- Partnerships with 600 companies
 - & 208 universities
- 35 spin-off companies
- Headcount: 2000
 - I 370 imec staff
 - 400 industrial residents
 - 230 PhD students
 - 72 nationalities

STATE-OF-THE-ART RESEARCH FACILITIES



Headquarters and pilot lines in Leuven, Belgium (20 min from Brussels airport)









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increase in

2010 \$500 28nm-sized switches 1,000,000,000 operations/sec

1950

\$6,000,000 cm-sized switches 5,000 operations/sec

Goal: enable revolutionary life science tools by customizing state-of-the-art semiconductor platform technologies



Advantages:

- Translatable technology: path to manufacturing
- Scalable technology with a roadmap
- Incredible performance through sound engineering

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Uitdagingen in de gezondheidszorg

GLOBAL HEALTHCARE SPENDING



HEALTH SPENDING DRIVERS



Data from Martin A.B., et al., Health Affairs, 2012.

PRODUCTIVITY COST

Economic value of DALYs lost (\$B) in 2008

Cancer		895.2
Heart disease		753.2
Cerebrovascular disease	298.2	
Diabetes mellitus	204.4	
Road traffic accidents	204.4	
Chronic obstructive pulmonary	203.1	
HIV/AIDS	193.3	
Perinatal conditions	192.8	
Suicide	140.8	of world
Lower respiratory infections	125.8	GDP
Liver cirrhosis	92.8	
Diarrhea	70.1	(2008)
Tuberculosis	45.4	
Malaria	24.8	
Measles	8.1	¥
Data from cancer.org	20	012: \$1250B

Data from cancer.org DALY = disability-adjusted life-year

DEVELOPING EFFECTIVE THERAPIES IS HUGELY EXPENSIVE



Data from a recent report by the President's Council of Advisors on Science and Technology and Steven M. Paul, et al., "How to improve R&D productivity: the pharmaceutical industry's grand challenge," *Nature Reviews* **9**, 203 (2010).

Technologie **TRENDS**

Analoge meetprincipes worden vervangen door digitale en schaalbare principes



SINGLE MOLECULE SEQUENCING INSTRUMENT





many \$500k machines

single, disposable chip

Enkel data van medische kwaliteit is bruikbaar

SAMSUNG SIMBAND BASED ON IMEC TECHNOLOGY



http://www.samsung.com/us/globalinnovation/innovation_areas/

Moleculair inzichten voor consumenten

Dirty Dozen list: Apples top 2014 list of most pesticide-contaminated produce



An apple picker picks new varieties of apple at the Cornell University Fruit and Vegetable Research Farm in Geneva, N.Y., Monday, Sept. 23, 2013. (AP / Heather Ainsworth)

http://www.ctvnews.ca/health/dirty-dozen-list-apples-top-2014-list-of-most-pesticide-contaminated-produce-1.1799569

The Story Behind China's Tainted Milk Scandal

Company feared going public with information as thousands of children were sickened.



A mother and a father hold their babies as they wait for treatment in a children's hospital in Beijing during China's toxic milk scandal.



In numbers: How Nestle India will destroy 27,000 tonnes of Maggi

③ 18 June 2015 India



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Patients fooled by fake drugs made with poison and brick dust

Search CNN

By Gena Somra, CNN

Updated 1218 GMT (1918 HKT) August 30, 2015 | Video Source: CNN



SOURCE WORLD HEALTH ORGANIZATION - 2012



WEARABLE HIGH-PERFORMANCE SPECTROMETER

Miniature spectrometer-on-a-chip with the performance of a benchtop instrument at a fraction of the size and cost

SiNx photonics



conventional benchtop Raman spectrometer with comparable sensitivity

1549-02

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Van lab naar de woonkamer

OUTCOMES DATA ARE A VITAL LEVER











Zeer grote datasets voor betere en vroegere diagnoses

TIME OF DIAGNOSIS HAS A HUGE IMPACT ON CANCER SURVIVAL

5-year survival rate for cervical cancer (US)



Data from: 7th edition of the AJCC staging manual from data collected by the National Cancer Data Base





ASPIRE INVENT ACHIEVE

