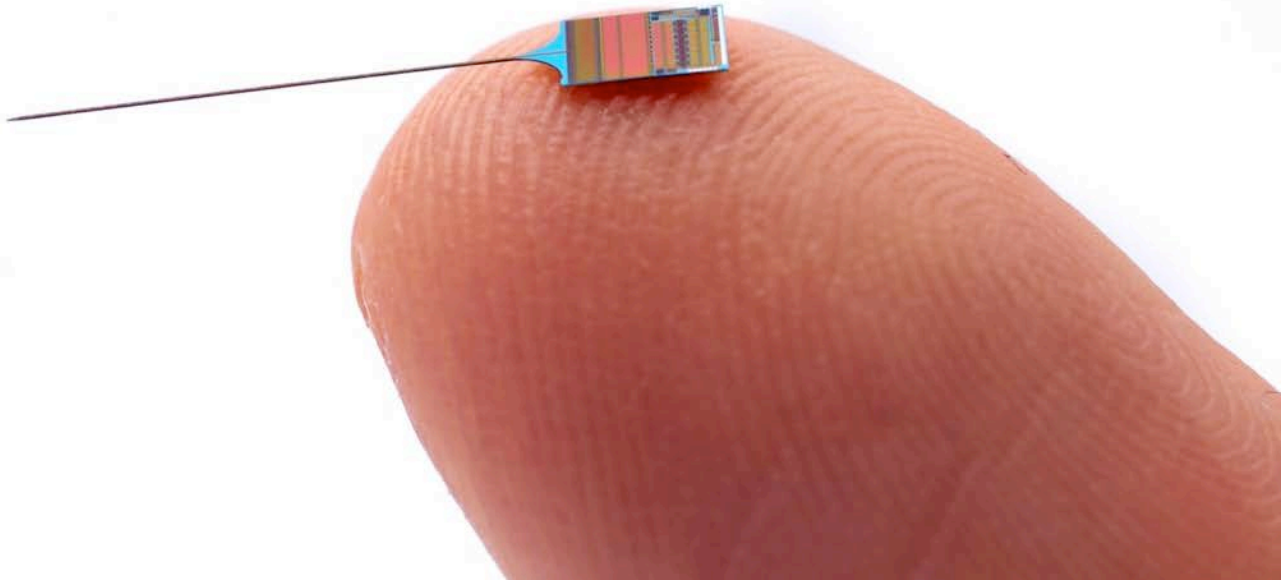
ADVANCING TECHNOLOGY IN AN OPEN INNOVATION MODEL

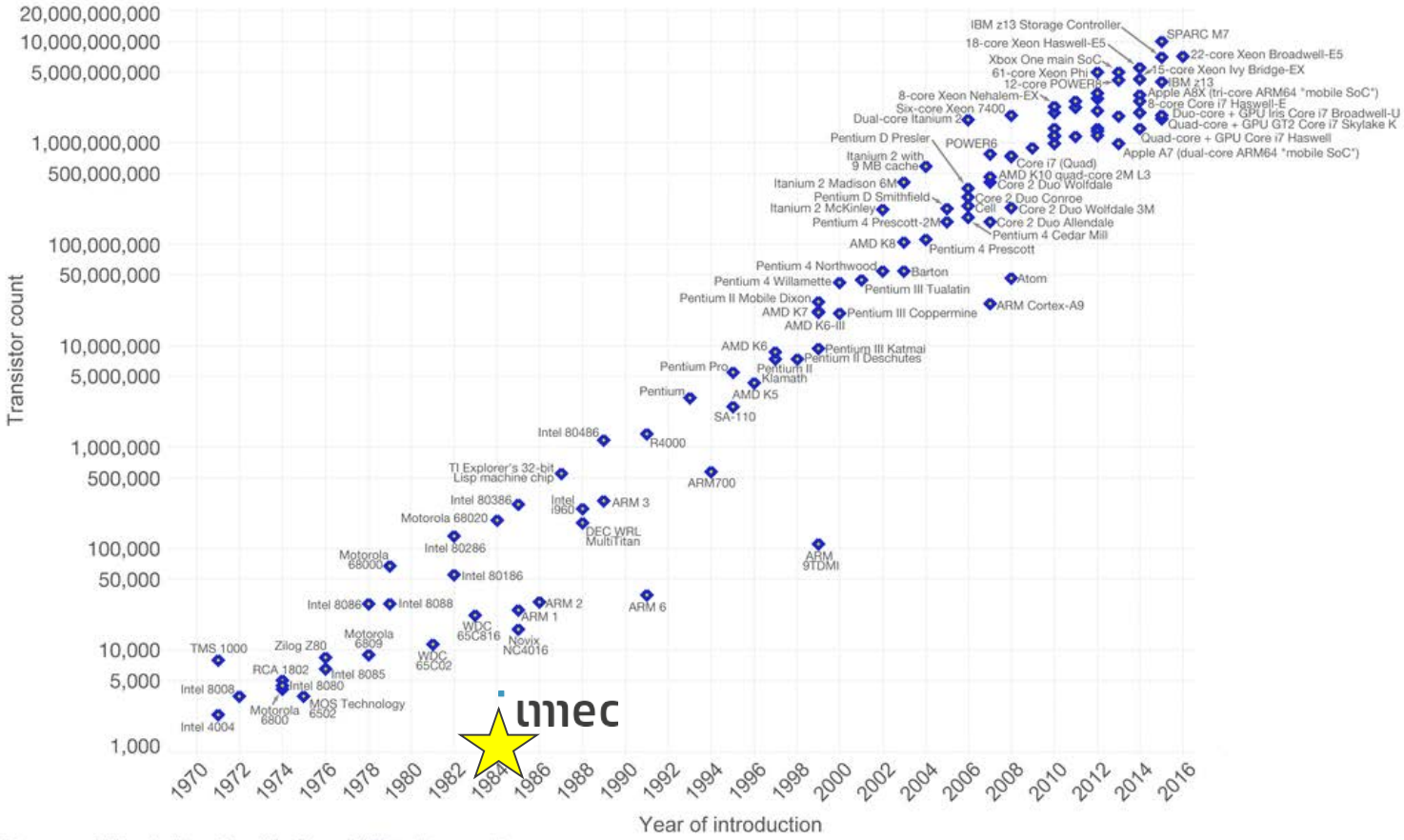
PETER PEUMANS
senior vice president life science technologies



Moore's Law – The number of transistors on integrated circuit chips (1971-2016)

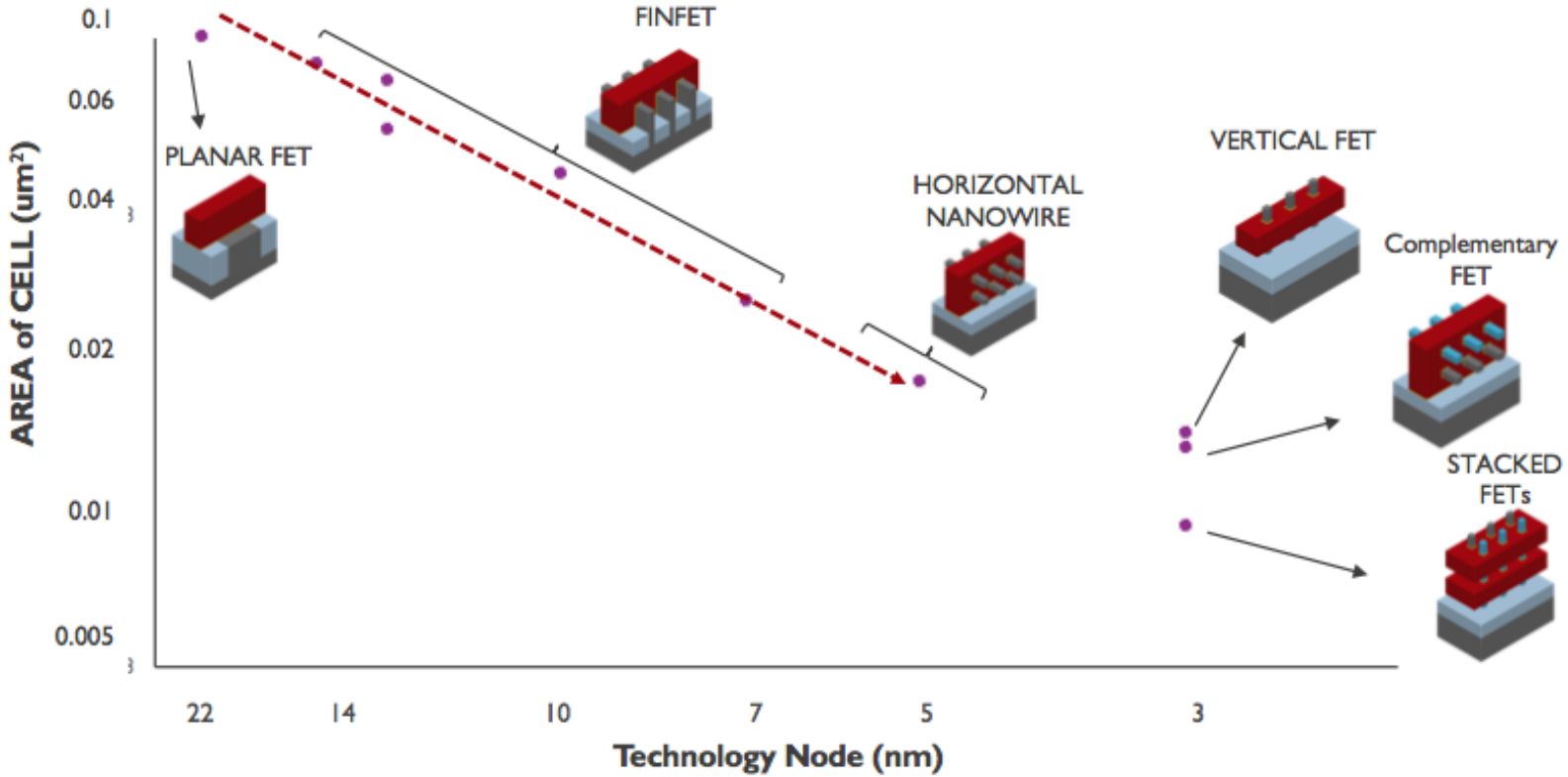
Our World in Data

Moore's law describes the empirical regularity that the number of transistors on integrated circuits doubles approximately every two years. This advancement is important as other aspects of technological progress – such as processing speed or the price of electronic products – are strongly linked to Moore's law.



Data source: Wikipedia (https://en.wikipedia.org/wiki/Transistor_count)
The data visualization is available at OurWorldinData.org. There you find more visualizations and research on this topic.

COMMON ROADMAP IS KEY



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imec

- Leading independent R&D center in **nano-electronics & digital technologies**
- **3500** international R&D top talents
- **>$2B** invested in **leading-edge semiconductor fabs**
- Focused on **industry relevant** solutions serving 500+ companies
- **$640M revenue: 70%** industry
- Created **40 spin-off** companies and incubated **100+ start ups**
- **8** sites worldwide

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LEVERAGING MOORE'S LAW FOR LIFE SCIENCE INSTRUMENTATION

Pacific Biosciences RSII

7x faster
3x smaller
2x lower cost

Pacific Biosciences Sequel
(announced Oct 2015)

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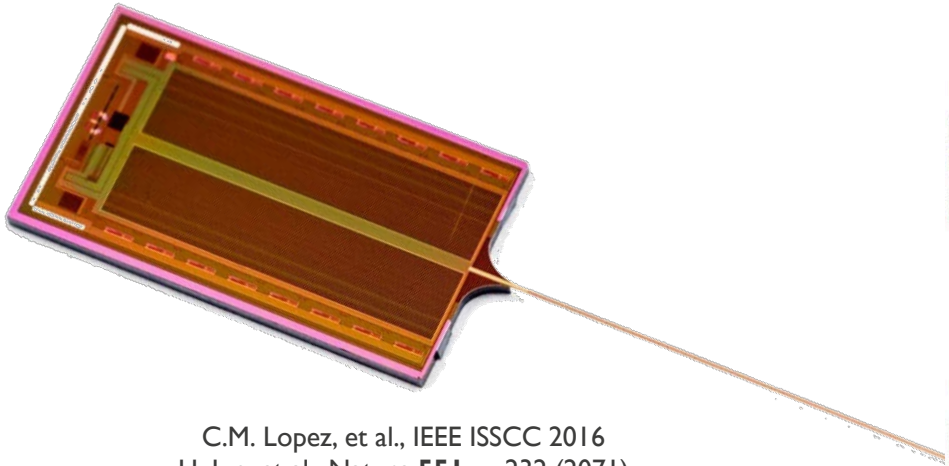
LEVERAGING MOORE'S LAW FOR LIFE SCIENCE INSTRUMENTATION



C.M. Lopez, et al., IEEE ISSCC 2016
J.J. Jun, et al., Nature **551**, p. 232 (2071)

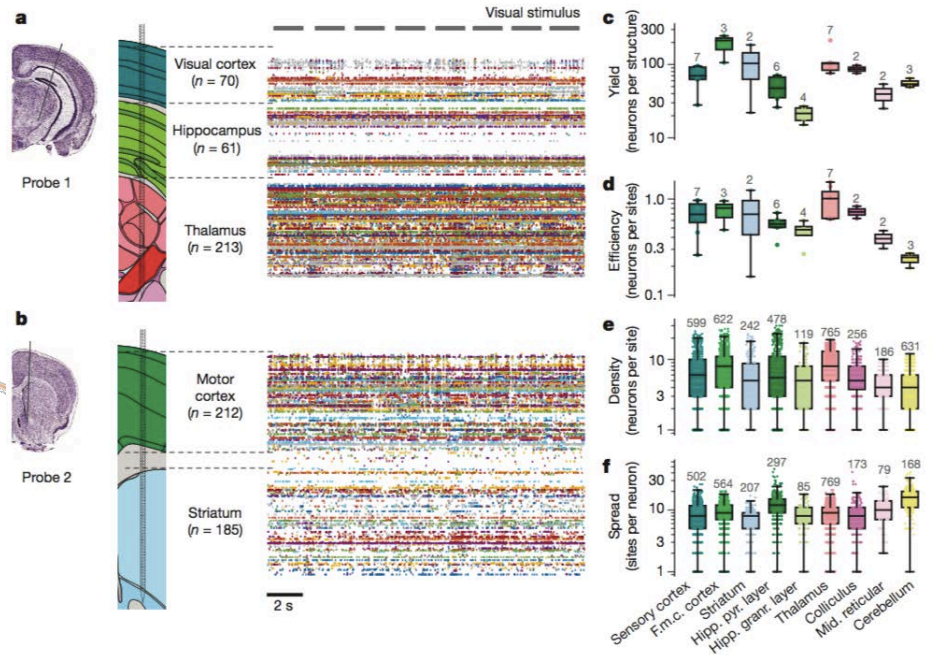
hhmi | janelia Research Campus

ALLEN INSTITUTE for BRAIN SCIENCE

wellcome trust

GATSBY

>10x more neurons
>100x reduction in cost/neuron



J.J. Jun, et al., "Fully integrated silicon probes for high-density recording of neural activity," Nature (551) 2017: pp. 232-236.

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WEARABLE SOLUTIONS BASED ON CIRCUITS AND ALGORITHMS

Surface EEG monitoring

Investigational devices with access to raw data

Mobile Cardiac Outpatient Telemetry

FDA APPROVED

BioTelemetry

Cuff-less Blood Pressure monitoring

SAMSUNG

imec

LOOKING BEYOND WHAT IS AVAILABLE TODAY

- We may need bespoke solutions developed by cross-disciplinary teams starting from the particular needs
  - What would an AD wearable look like?
  - Can we develop an always-on camera that is inherently private and secure, e.g. using in-device machine learning?

- We need better ways to measure the brain directly
  - Earlier diagnosis and monitoring of disease progression
  - Speed up trials

- We need better tools in the preclinical phase to improve our understanding of neurodegenerative disease and to improve translational success
  - Humanized (e.g. iPSC-based)
  - Programmable
  - High-resolution read-out

AN INNOVATIVE PARTNERSHIP TO DECODE DEMENTIA

UZ LEUVEN

EU fastest approval clinical trials
World 2nd clinical test per capita

imec

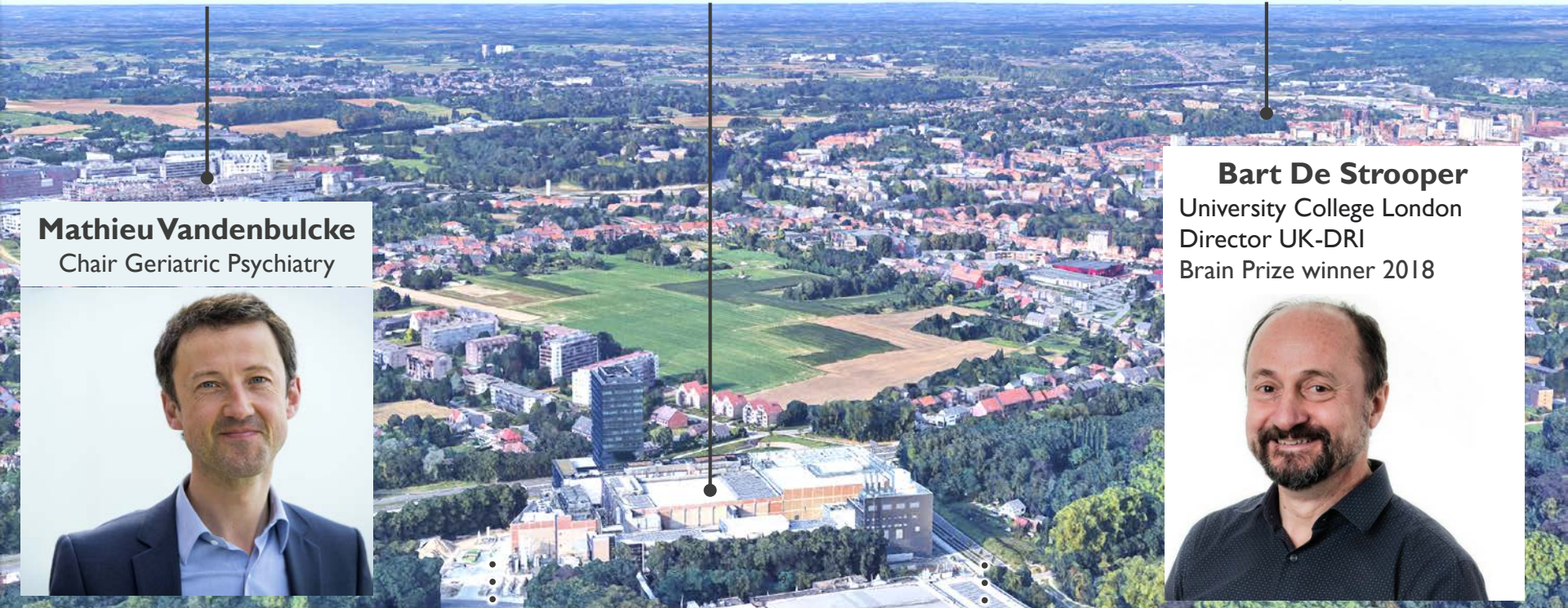
World leader in nano-electronics and digital technologies

KU LEUVEN

World's 5th most innovative university
Reuters 2017

VIB

World 1st patent citations
Times Higher Education 2015



Mathieu Vandenbulcke
Chair Geriatric Psychiatry

Bart De Strooper
University College London
Director UK-DRI
Brain Prize winner 2018


MISSION
lucidity®
decoding dementia