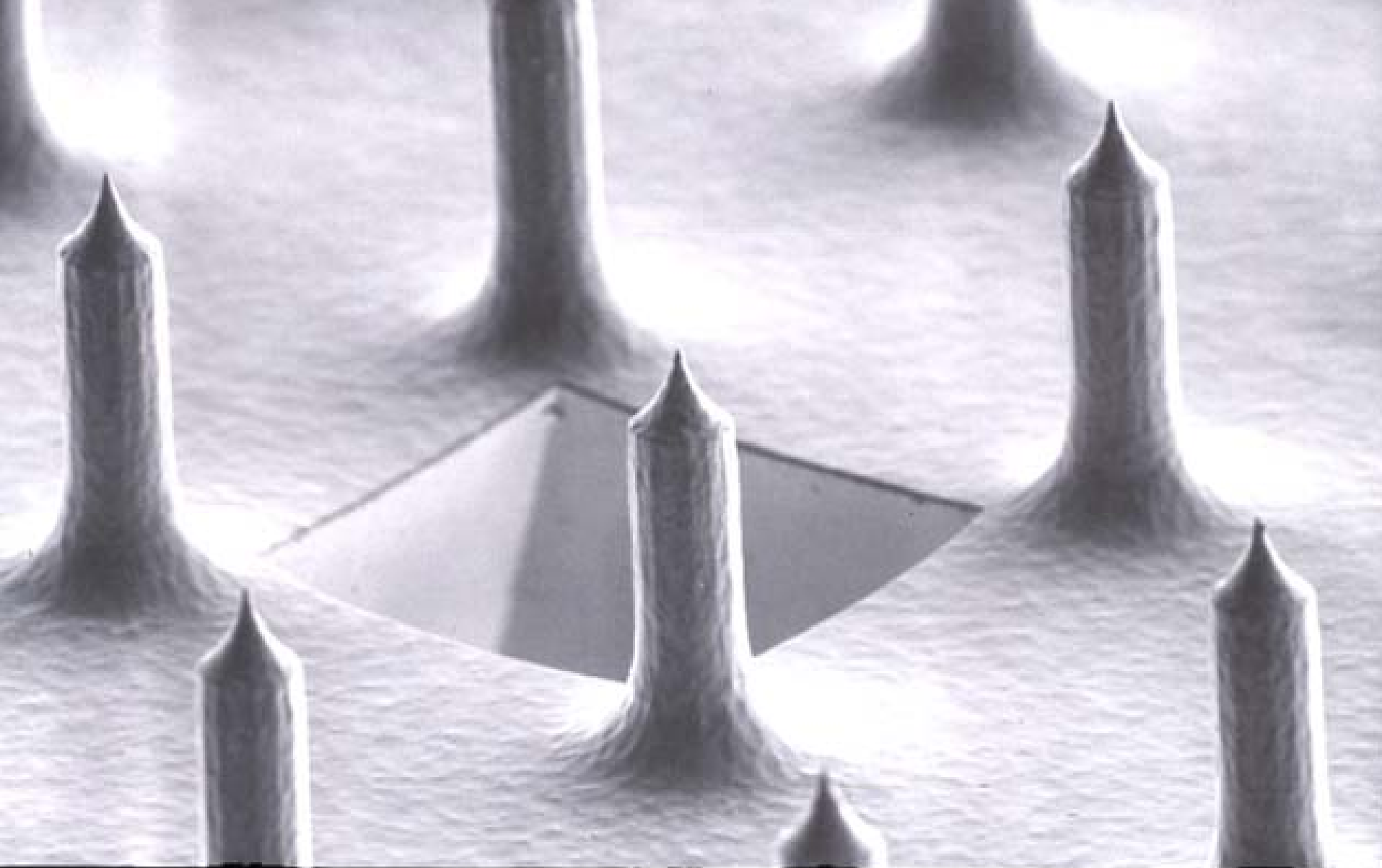


# Nanothoughts About Role of Customer in Guiding Research and Innovation

*Pekka Meriläinen*

- Professor of Innovation in Biomedical Engineering,  
Helsinki University of Technology
- Director, Clinical Research, GE Healthcare Finland





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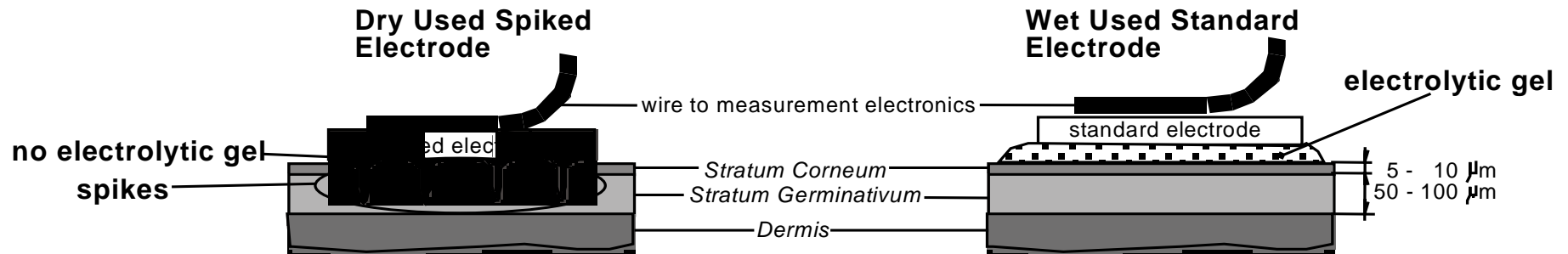
15KV

X230

100µm

WD12

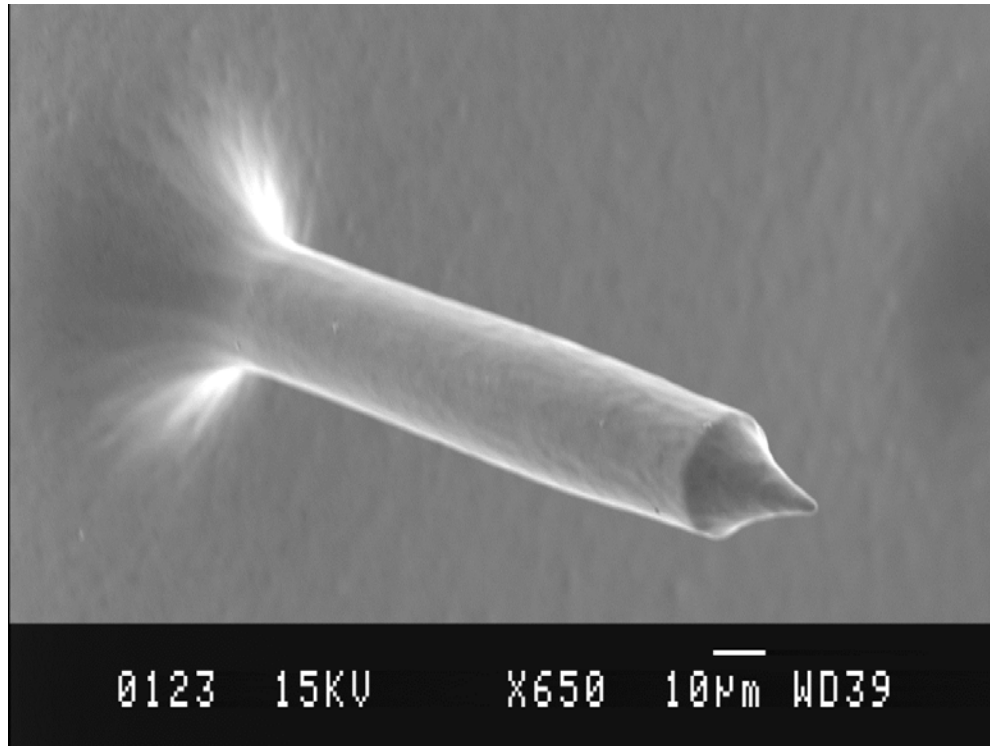
# MEMS spike array electrode



**Developed in collaboration with KTH, Stockholm.  
3-year research project 2000-2002 supported by  
Finnish National Agency of Technology (Tekes)**

**APPLICATION: Disposable EEG-electrodes  
to measure depth of anesthesia**

# NANO CHALLENGE



Uniform and chemically stable coating of the Si spikes with thin Ag-AgCl layers

# Researcher – Customer Landscape

Who should you approach with a great nano idea?

Academic researchers in universities  
and research institutes

Industry  
R&D

Industry  
Management

Industry  
Marketing

Industry  
Manufacturing

Research labs

End User  
B2B

End User  
Consumer

Business  
angel, VC

# Short course of business for researchers

- Understand what the customer needs
  - Develop what the customer needs
  - Make customer want what is developed
  - Make customer buy what was developed
- Make customer delighted when using the thing
- Make customer recommend the thing to others
- Make customer a partner to develop it further
  - Make customer buy it once again

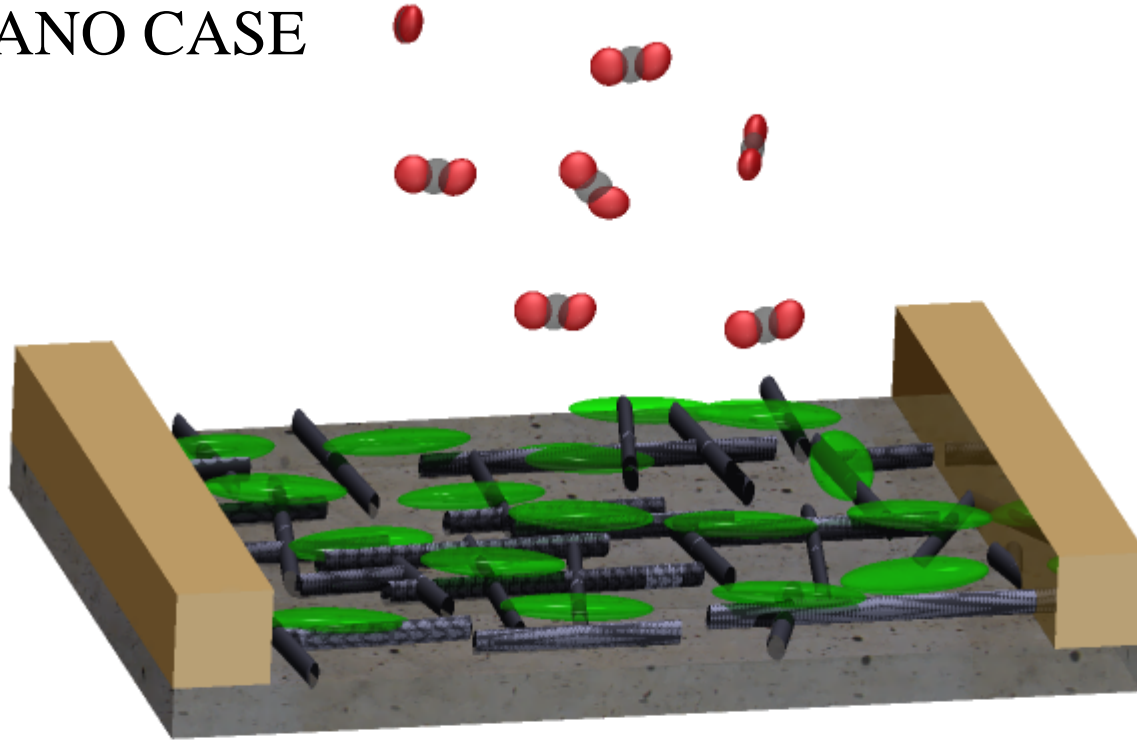
**Nokia to introduce nano coated mobile phone this year!**

**“Nano coating is expensive to manufacture, but enables superior surface properties”**



**”Nokia’s marketing wants fingerprint rejecting mobiles with ultra shining surface”**

## NANO CASE



Carbon nanotube network device coated with polyethylene imine and starch polymer layer for detection of CO<sub>2</sub> gas.

Looks nice, but is too slow for real medical use

Credit: *Alexander Star*, Nanomix, Inc.

# OPPORTUNITY 1



Soda lime ( $\text{Ca}(\text{OH})_2$  &  $\text{KOH}$ ) canister to remove  $\text{CO}_2$  when circulating breathing gas in an anesthesia machine.

Big volume, generates heat and moisture

Develop a nano system to consume  $\text{CO}_2$  and produce  $\text{O}_2$  !  
Synthetic photosynthesis?

## OPPORTUNITY 2

### **PEDESTRIANS FALLING DOWN ON ICY SURFACES**

#### **Statistics in Finland:**

**-1200 hip fractures per year**

**-100 000 visits to doctor**

**-Annual costs 420 mill. EUR**

**-Costs to insurance companies 19 mill. EUR/y**

**-Studded shoes: OK on ice, but dangerous on hard  
indoor surfaces**

**MAKE SMART NANO MATERIAL FOR SOLES**

**Properties of sand on ice and  
of rubber indoors**