



2019 LexisNexis IP Conference, Taipei:

## Multidisciplinary Scientific Analysis in Intellectual Property Disputes

### 知識產權糾紛之跨領域科學分析

黃奎瑞博士 Ray Huang, Ph.D., P.E., CFEI

香港毅博 首席工程師暨總經理 Principal Engineer and Office Director, Exponent Hong Kong

楊含章 Cathy Yang

香港毅博 科學顧問 Scientist, Exponent Hong Kong

# Types of Experts

- The Inventor
- Technical Expert ← Focus of today's talk
  - Consulting Expert
  - Testifying Expert
- Patent Expert
- Damages Expert



# Take Home Message

- Break down the problem
- Enable story telling

# Before You Hire Expert(s)

Ex

# Example

- Food ingredient in a yogurt product.
- Do I need a yogurt expert? Let's break it down:
  - Is the ingredient truly in the yogurt?
  - Do the manufacturing process and supply chain incorporate this ingredient?
  - What was the rationale for using this ingredient?
  - Could this ingredient turn into something else, or is it a product of something else?
  - What is the effect of this ingredient?
- Each objective suggests a different type of expertise and perhaps a different type of expert.
- Perfect team/individual – a toxicologist (team) with a strong chemistry background and extensive quality control and food manufacturing experience in the food product industry.



# General Guideline

- Core Issues vs. Occupation/Disciplines
- Opinions should help legal theory and strategy and be driven on the basis of fact and experience.
- Selection:
  - A professional team that can be focused on scope, schedule, and budget requirements.
  - Able to deliver an objective, scientifically defensible work product.
  - Able to translate complex issues into a compelling presentation to the jury.
- Early involvement
- *Before* engaging the engineer/scientists, break down the core issues that need to be addressed in your case to form and build the team.

# After You Hire Expert(s)

Ex



“Power Factor” Storytelling



# General Guidelines

- Enable story-telling.
- Context and delegation:
  - Technical expert should understand the entire patent and all claims at issue before technical analysis or laboratory testing begins.
  - Delegate all analysis and testing; ideally, each of your experts should understand what role he/she plays in the case.



# Best Practices

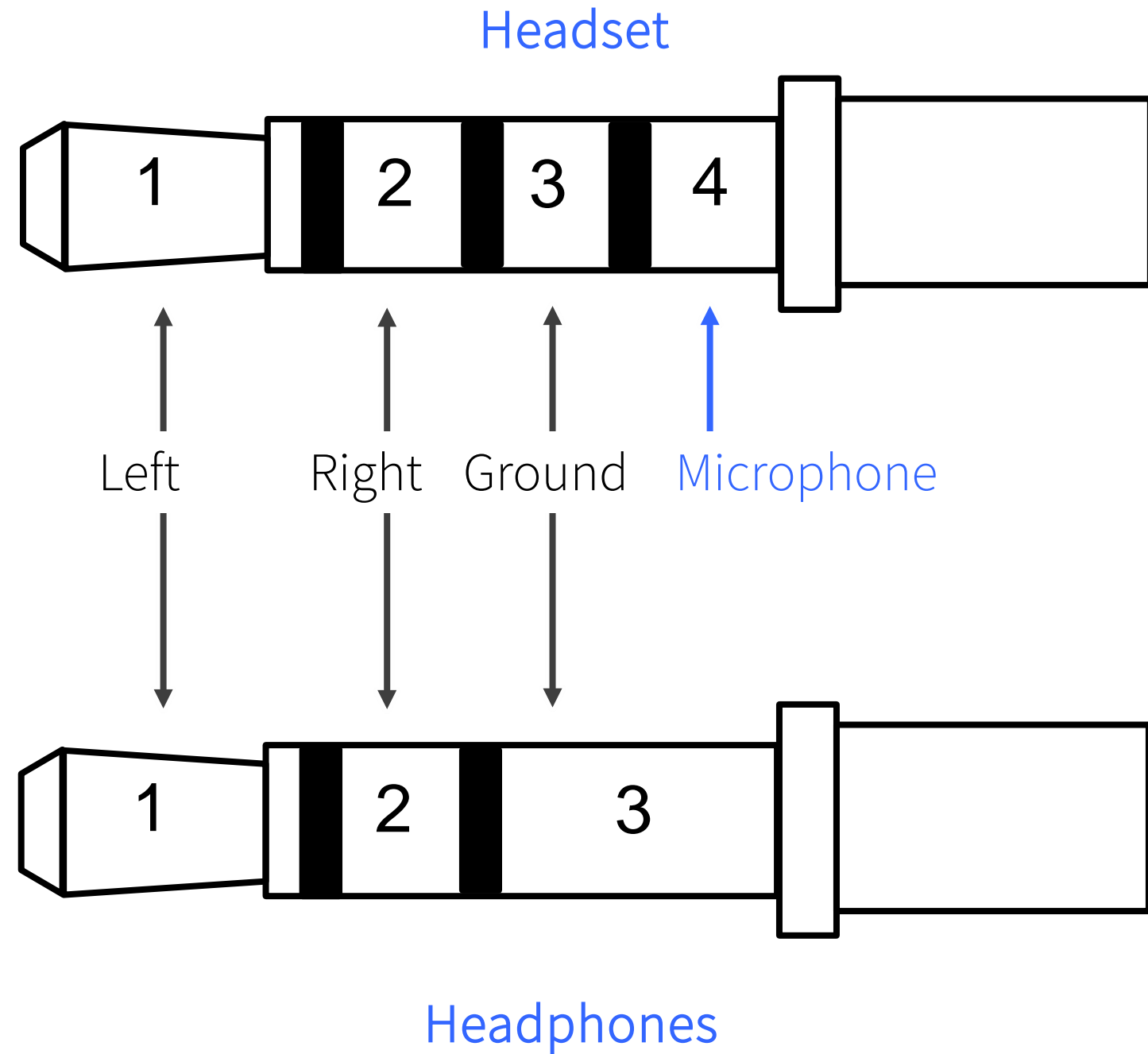
- Foster conviction and objectivity.
  - The expert can say "I did XYZ testing..." or "I did this experiment to prove XYZ", which can be leveraged if opposing expert is subpar.
  - Conversely, do not try to convince the technical expert to opine on something specific that he/she does not necessarily fully support—the lack of conviction will be obvious.
- Avoid micromanaging.
  - Double check and communicate about work product. Ensure there are no last minute substantial additions.
  - Do not write or draft any sections that are not specifically related to legal issues.
    - The expert should be able to say "I wrote this report" and "I wrote this entire report, every single word in it."

# Case Studies

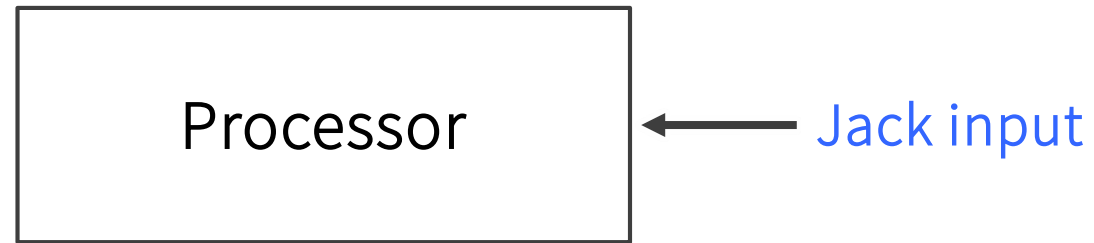
Ex

# Case Study | Patent Infringement Analysis for an ITC Investigation

# Microphone Detection in Mobile Devices

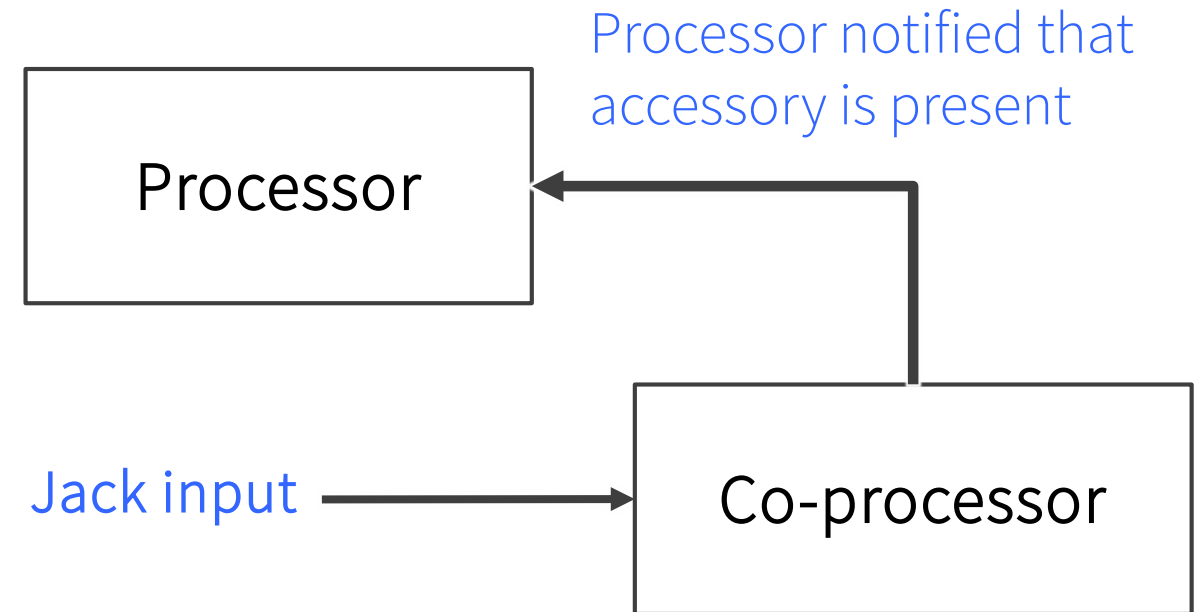


# Different Ways of Detection



## Traditional polling mechanism

Processor samples jack characteristics at a predefined interval and uses them to determine whether microphone is present.



## Interrupts and co-processors

Processor's "assistant" does the work, which notifies processor when a microphone is present.

# Different Ways of Detection



## Traditional polling mechanism

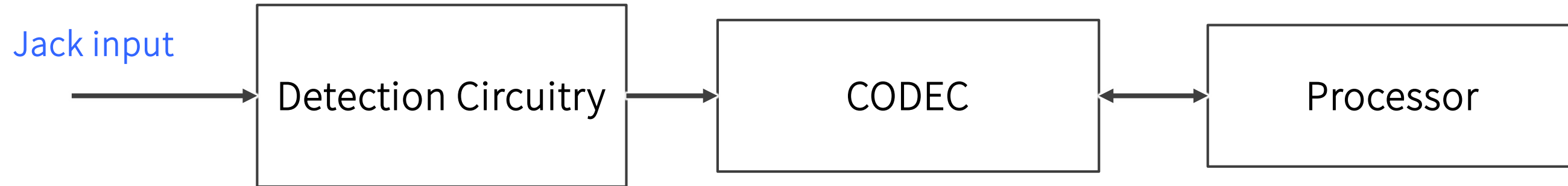
Processor samples jack characteristics at a predefined interval and uses them to determine whether microphone is present.



## Interrupts and co-processors

Processor's "assistant" does the work, which notifies processor when a microphone is present.

# Patent - Dedicated Circuitry for Microphone Detection

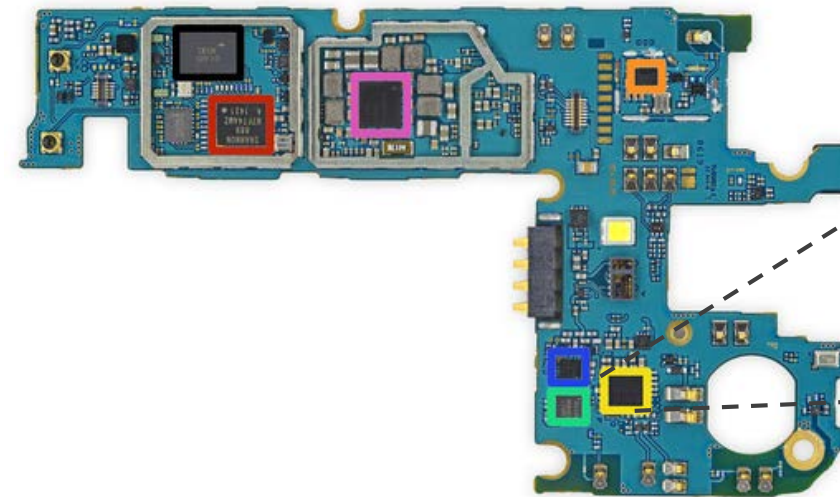


- 1 Measure electrical properties of the jack.
- 2 The CODEC chip uses electrical measurements to determine whether microphone is present.
- 3 Processor notified that accessory is present and can query whether it is a microphone.

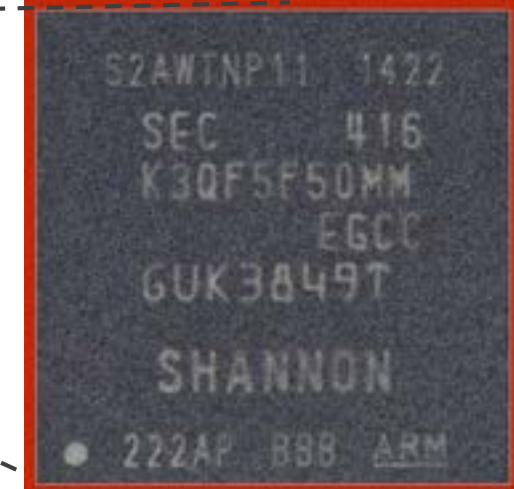
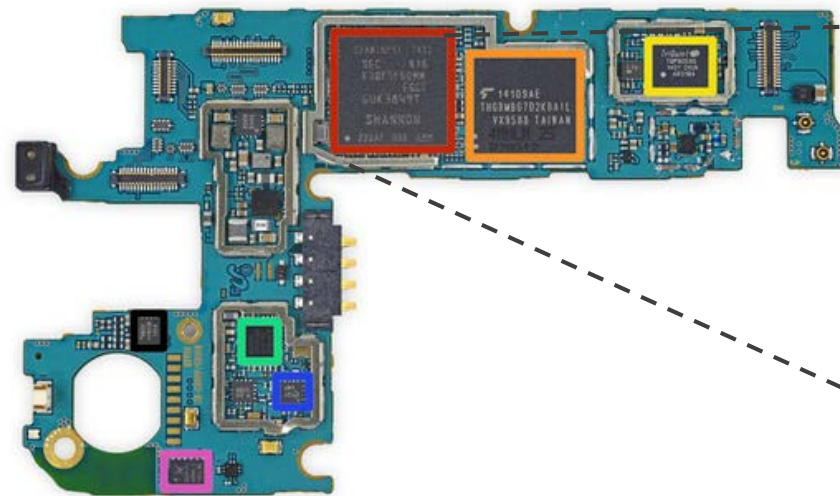
**Key point:** The **determination** is made in the CODEC, not the processor.



# Determine whether certain devices infringe the patent.



CODEC



Processor

Images from iFixit ([www.ifixit.com](http://www.ifixit.com))

The hardware components are present, but is the determination actually being made within the CODEC or the processor?

# Source Code was Examined



Source Code  
(40,000 files)



```
make arch=arm defconfig_file_name
...
make arch=arm > build_out.txt
grep -o -E "[a-zA-Z0-9_-]+\.[ch]" /
    build_out.txt > build_out_clean.txt
```



Source Code  
(1,300 files)

- 1 Code caters to a number of models.  
(not all files are relevant)
- 2 We wrote customized scripts to filter out unwanted files based on the phone model of interest.
- 3 Examined remaining files and cross-referenced them to the phone's **diagnostics message outputs**\*

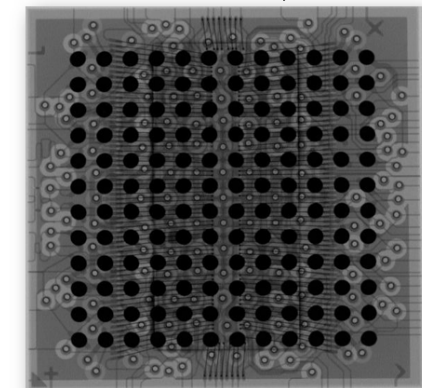
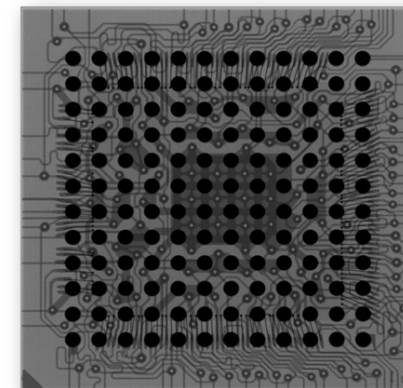
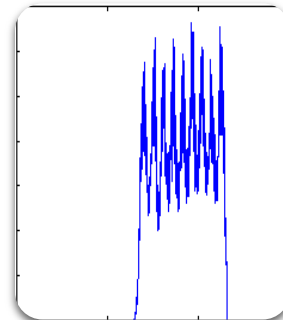
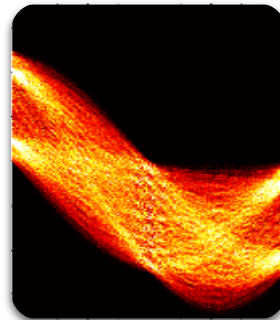
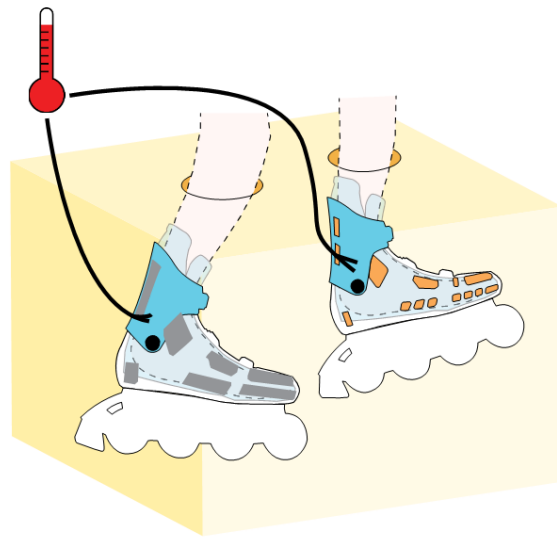
\*Required bypass of restrictions on phones to access diagnostic data (i.e., "jailbreak").

More Case Studies

Ex

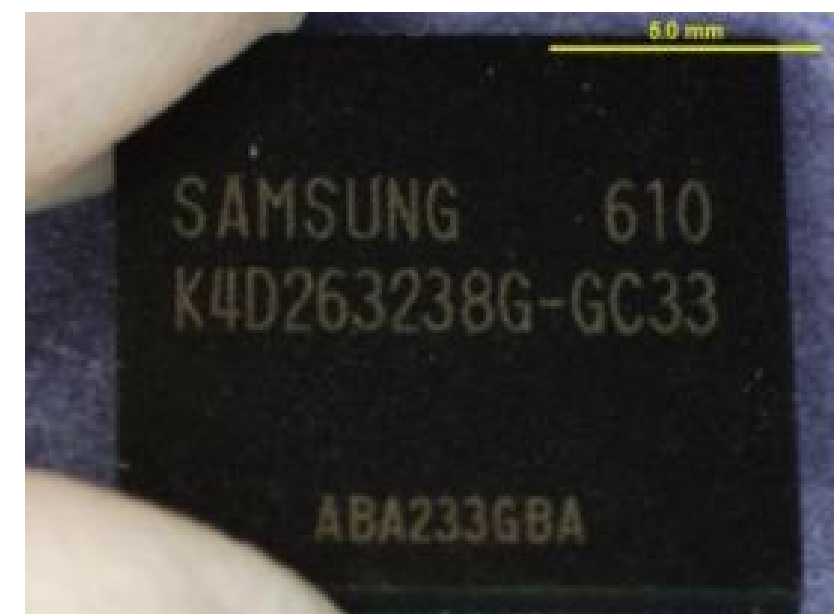
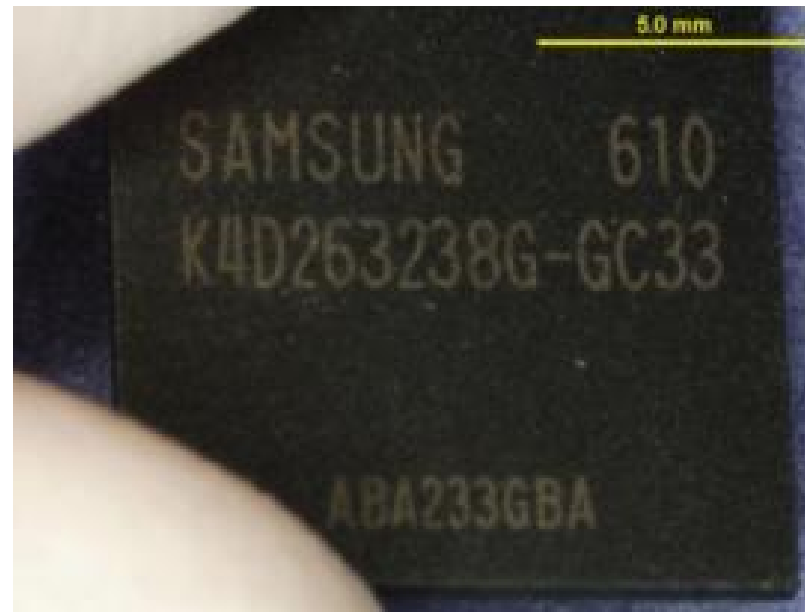
Materials Chemistry, Polymer Physics, Structure and Property Characterization

Biopharmaceutical for Primary Containers, Combination Products, and Medical Devices

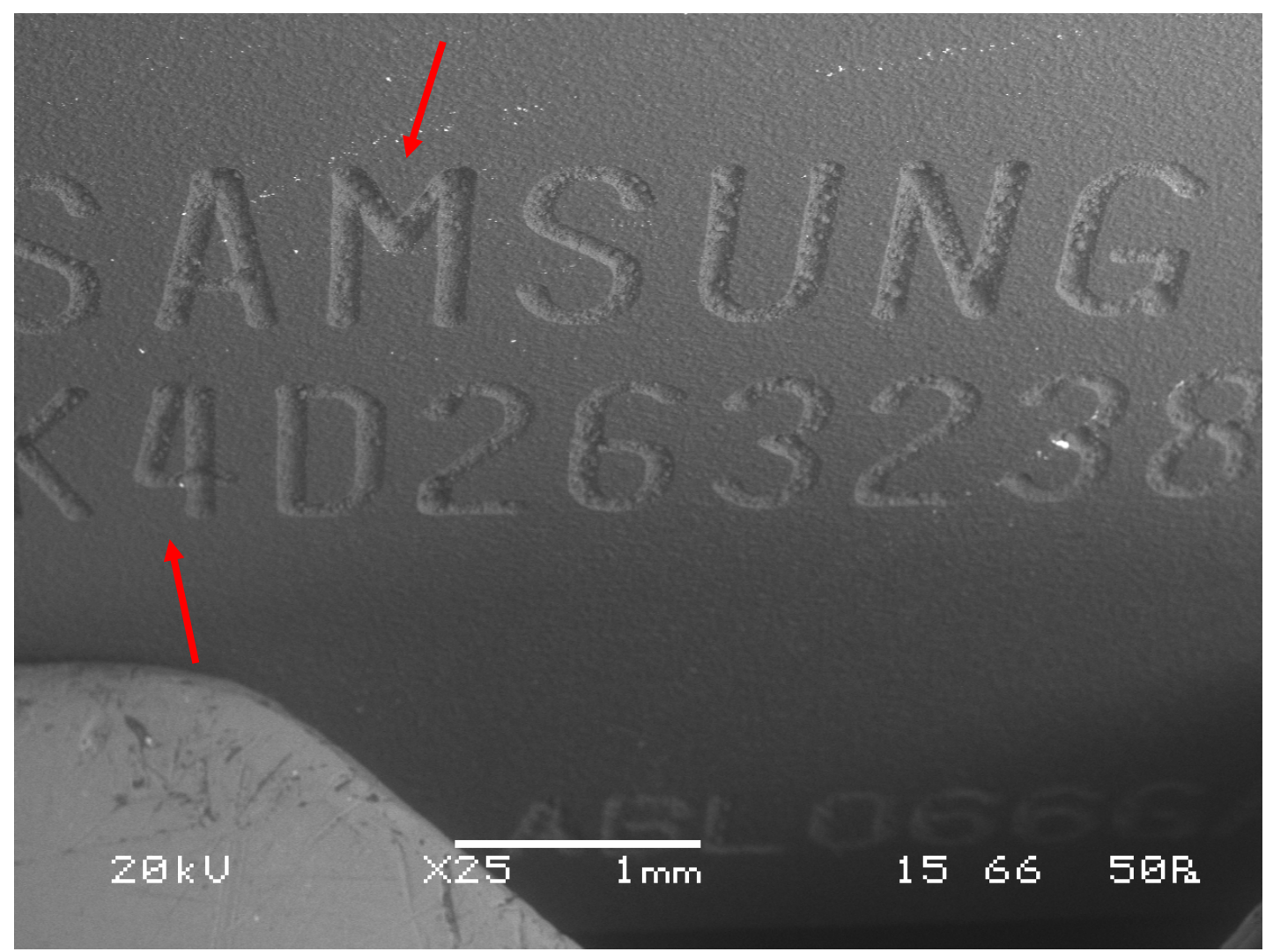


## Case Study | Identification of Counterfeit Memory Chips

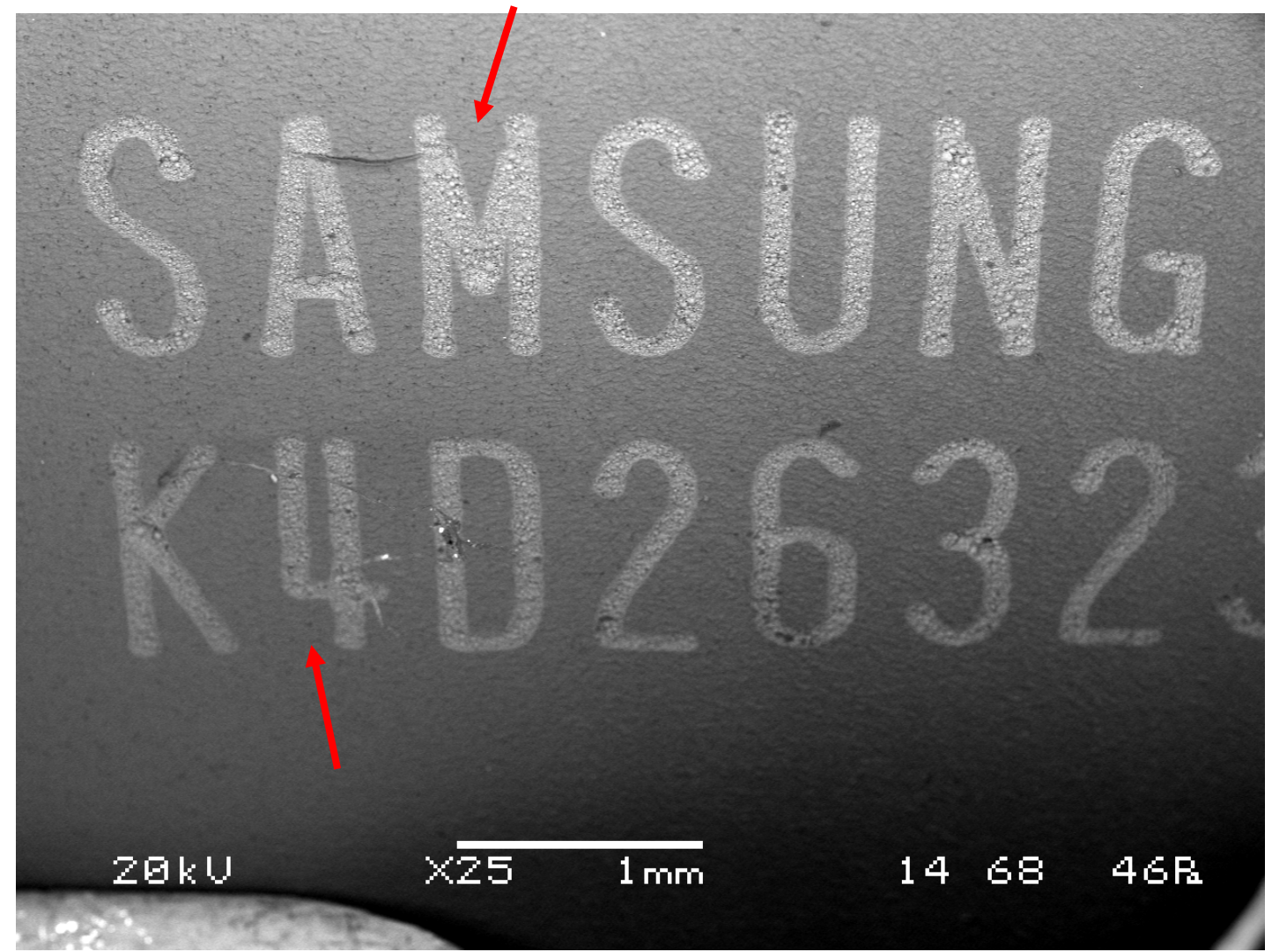
Exponent was asked to identify counterfeit memory chips.



High-resolution microscopy was used to identify differences.



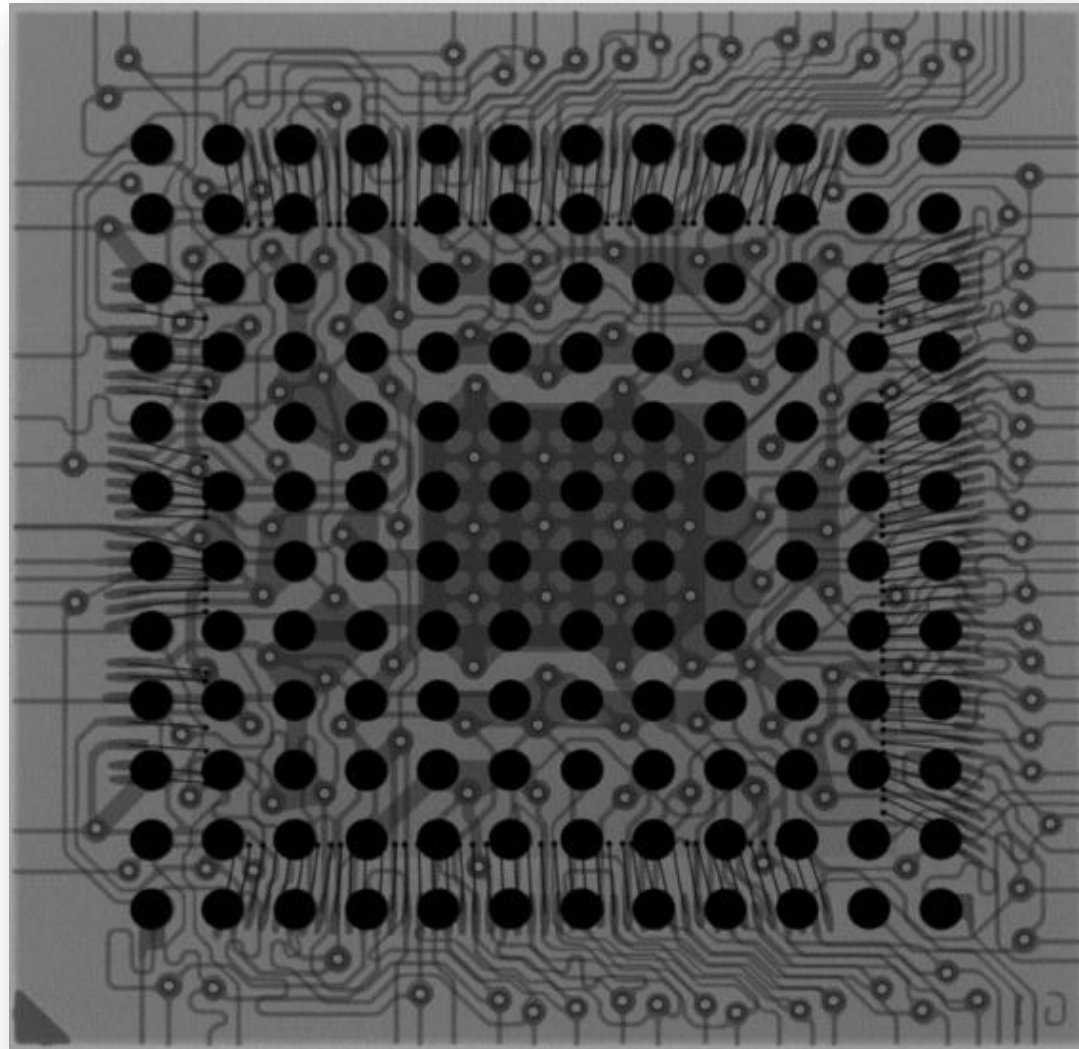
Counterfeit



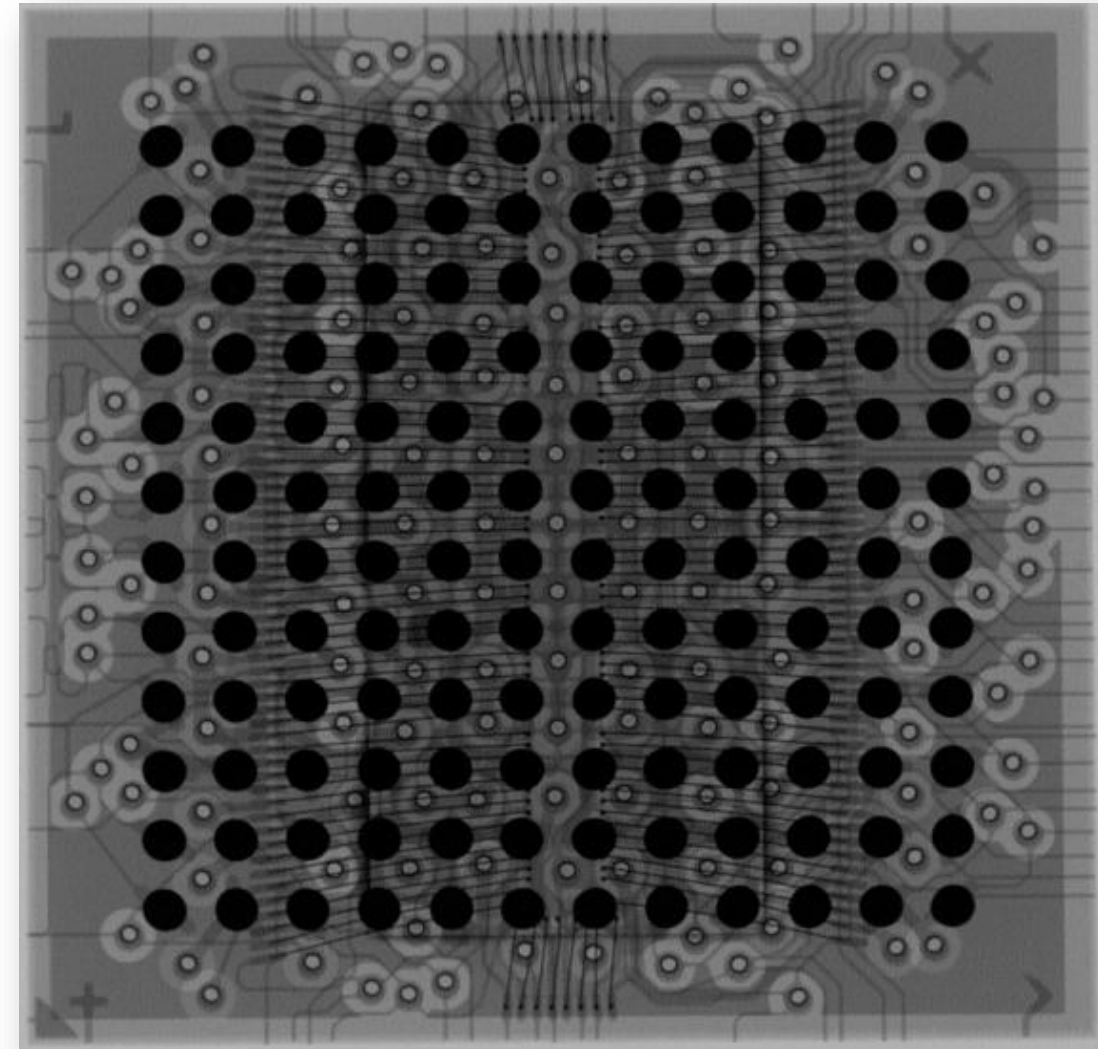
Genuine Sample

X-ray analysis revealed further differences in routing of traces.

Counterfeit



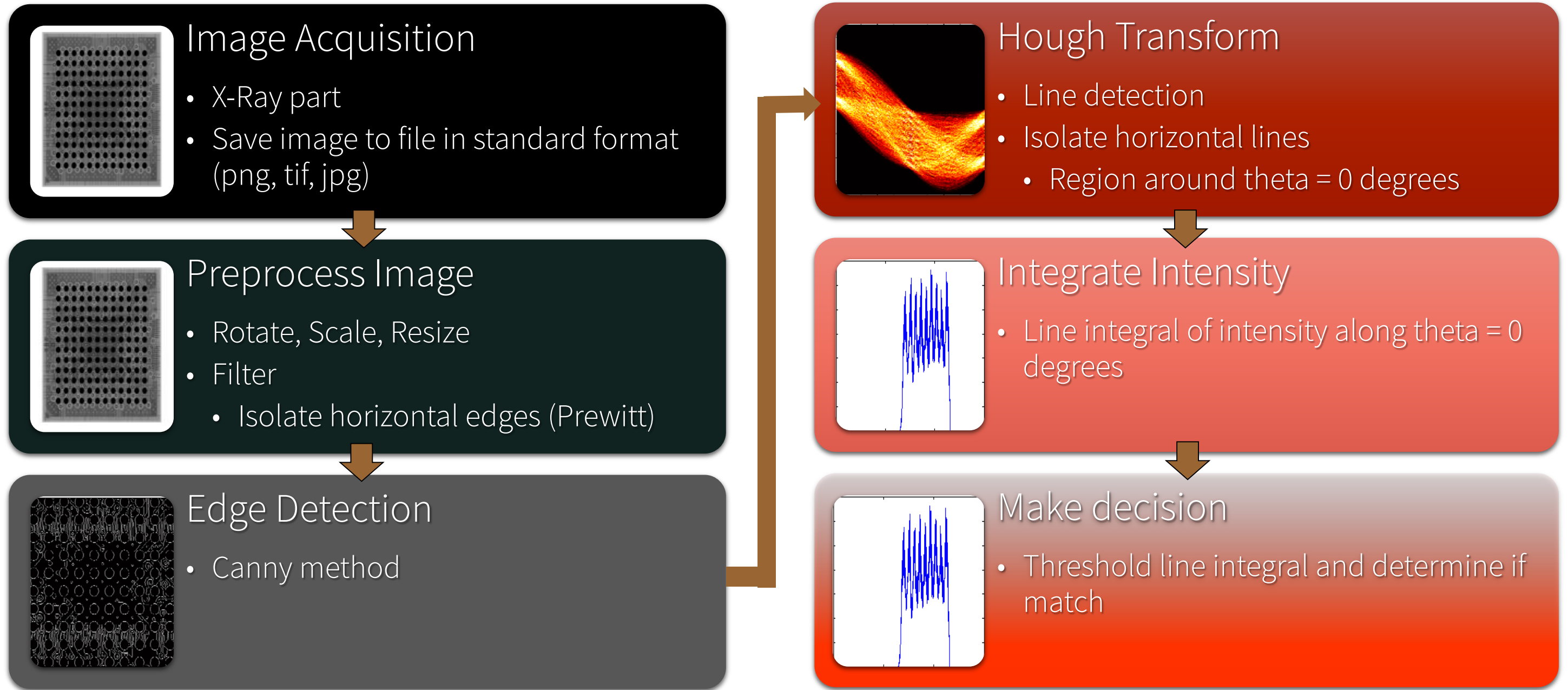
Genuine Sample



We were asked to sort several hundreds of thousand of these...

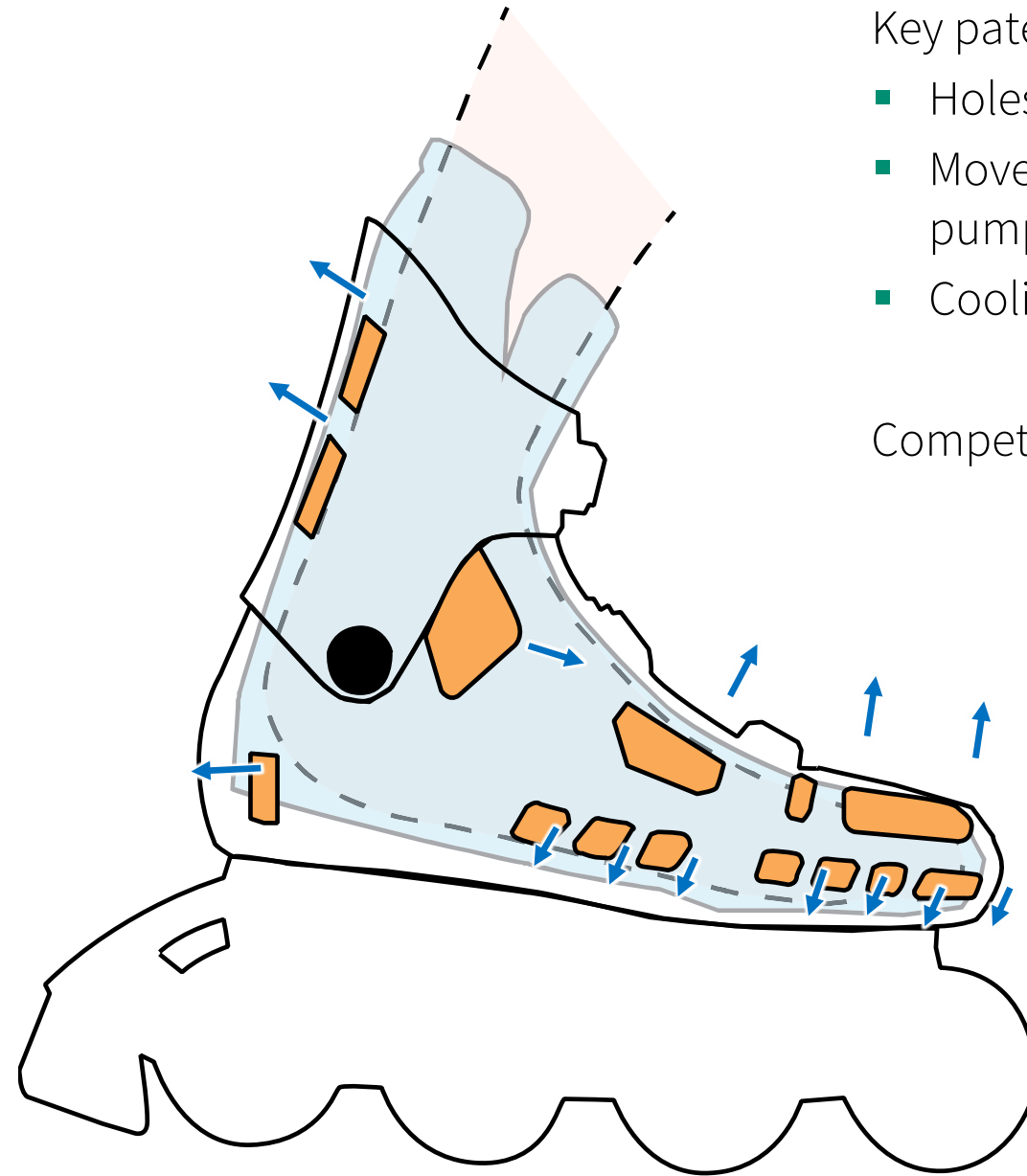
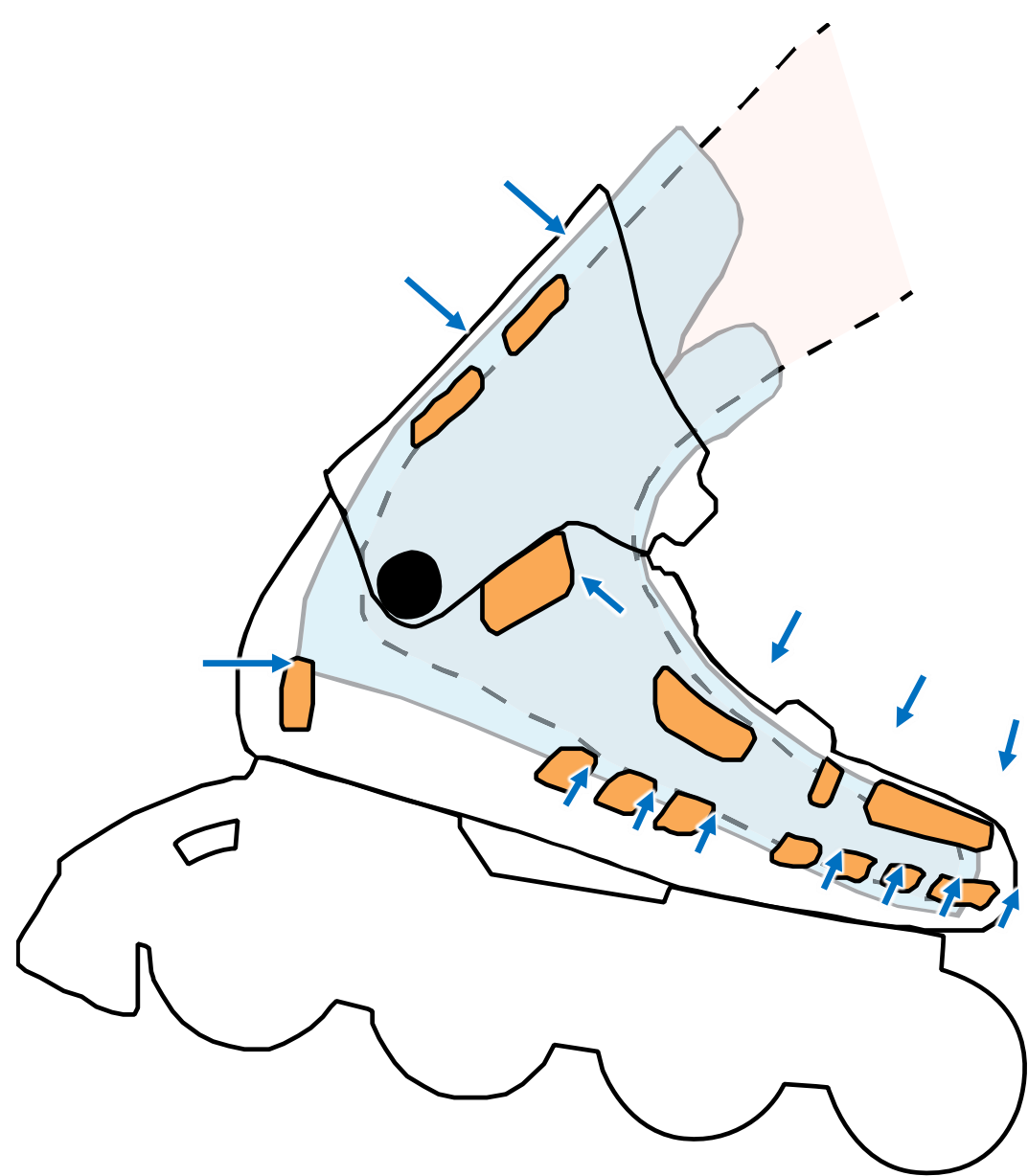


Analysis algorithms were developed to batch process samples.



# Case Study | Rollerblade Patent Infringement

# Exponent was asked to demonstrate evaporative cooling of feet.



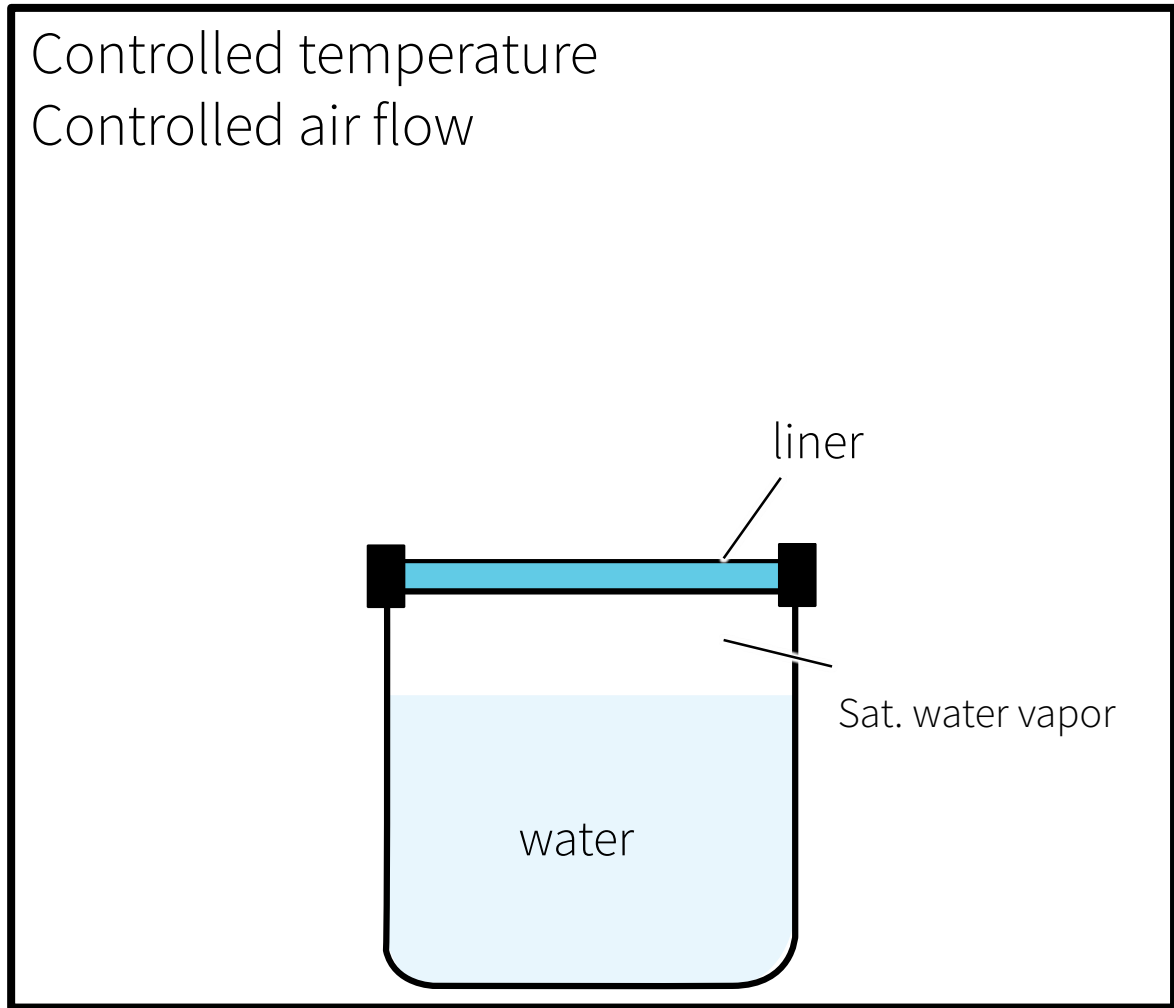
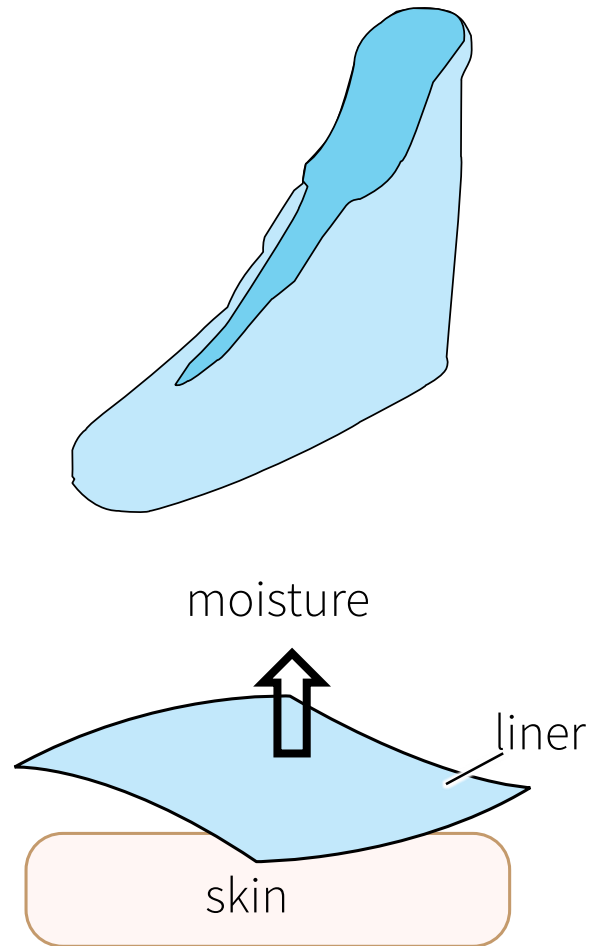
Key patent claims:

- Holes in boots
- Movement of liner allows pumping action → air flow
- Cooling of skater's feet

Competitors' skates had holes.

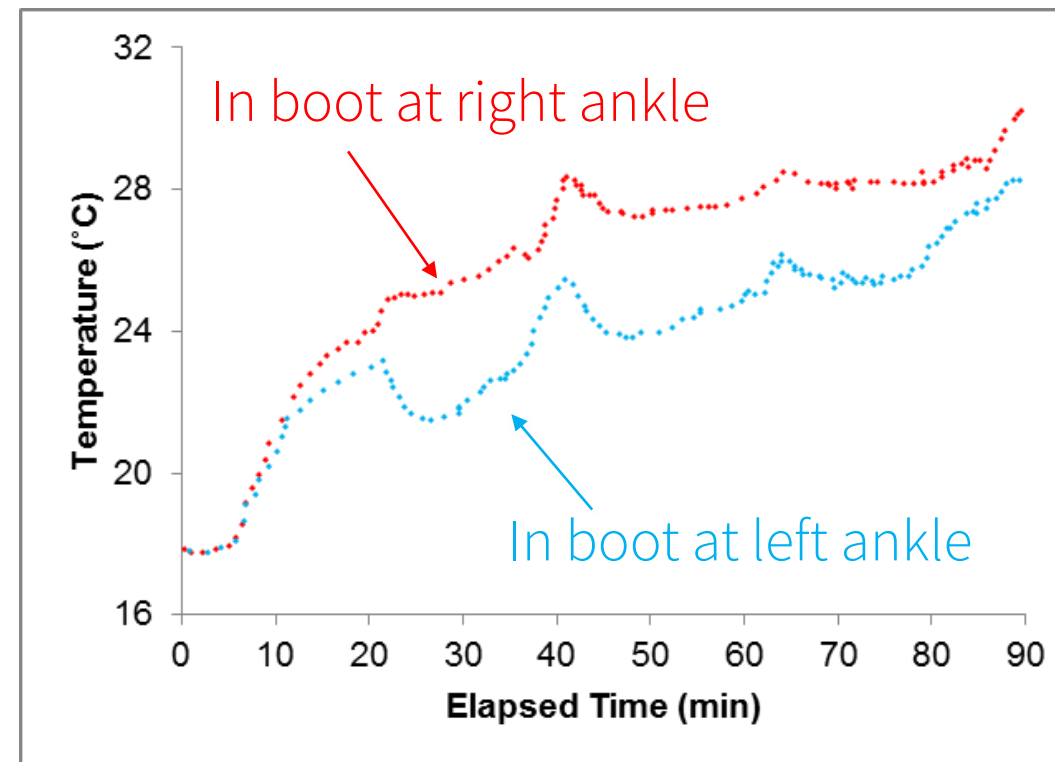
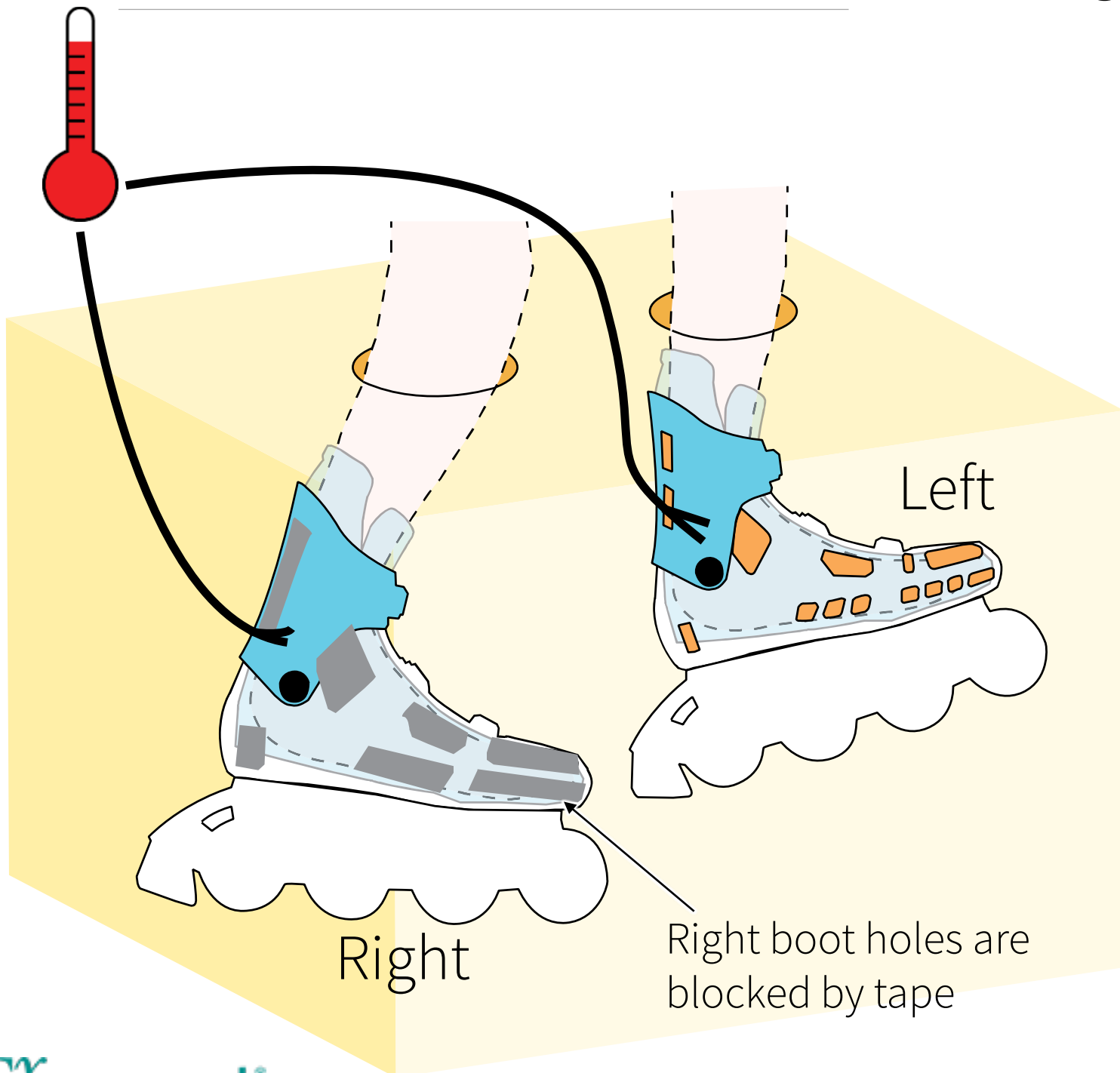
# We demonstrated the moisture-wicking properties of the liner.

- Key claim: cooling was due to moisture evaporation.
- ASTM method for testing water vapor transmission of materials based on the weight of water in the vessel.
- Water vapor transmission rate (WVTR)



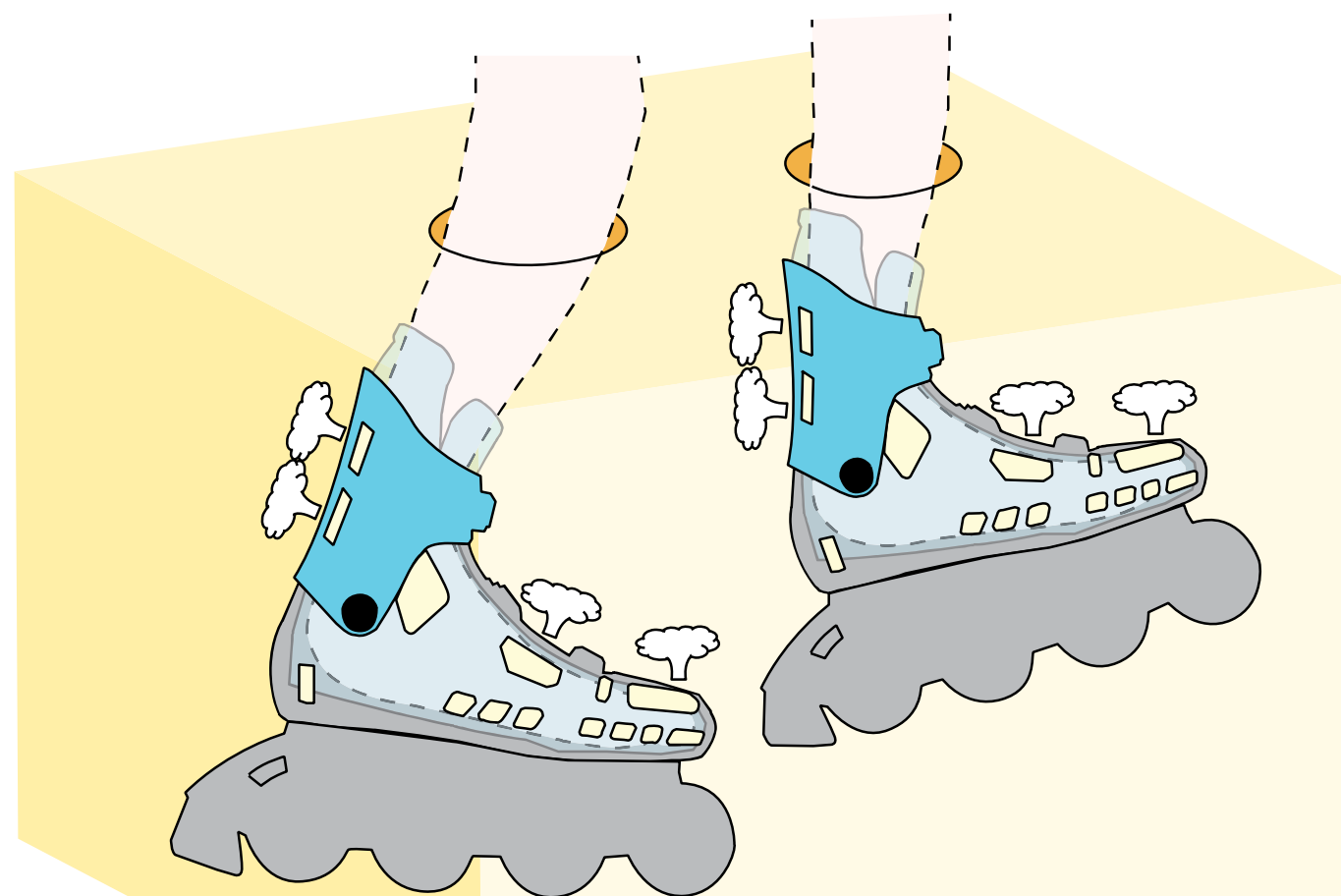
$$WVTR = \frac{G/t}{A}$$

# Real-time Temperature Monitoring

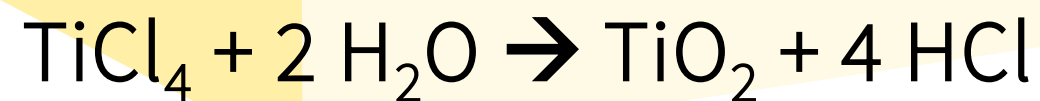


- Volunteers wore boots inside an environmentally controlled chamber.
- Holes on right boot were blocked by tape.
- Thermocouples were installed at the ankles inside the boots for real-time temperature measurement.
- Left boot was consistently lower in temperature.
- Testing was performed on 20 – 30 skater models.

# TiCl<sub>4</sub> allowed flow visualization inside the chamber.



- TiCl<sub>4</sub> was dropped into the holes of the skates.
- Chamber was sealed off from the outside environment.
- The pumping action of skater's feet back and forth created white clouds that went in and out of the holes.



Liquid

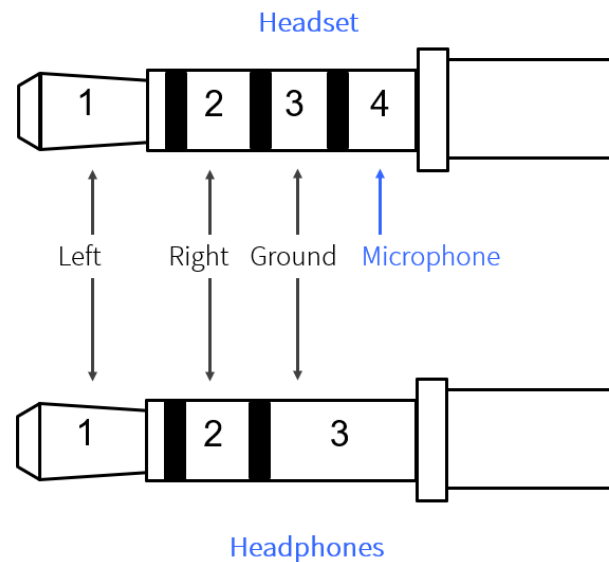
Moisture

Solid

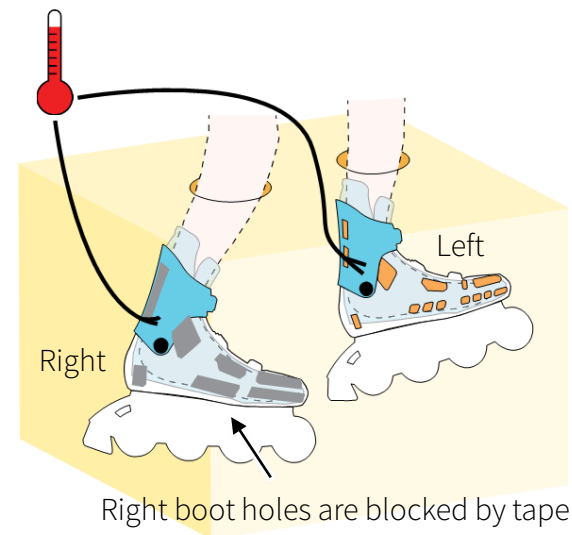
# Multidisciplinary Scientific Analysis in Intellectual Property Disputes

- *Before* engaging the engineer/scientists, break down the core issues that need to be addressed in your case to form and build the team.
- *After* hiring the expert(s), enable “story telling” for both in-house and technical experts with appropriate support and scoping.

## Patent Infringement & Invalidity



## Reverse Engineering



## Technology Identification

