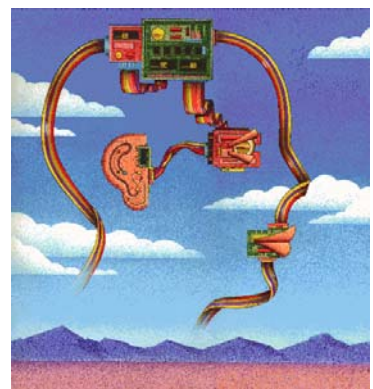


# Tablet PC in the classroom: useful tool or a high tech gadget?

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# OUTLINE

- TECHNOLOGY
- USE IN CLASS (now)
  - A student perspective
  - A teacher perspective
- USE IN LAB (future)
  - Microfabrication Lab (520/530/580.495)  
<http://www.ece.jhu.edu/faculty/andreou/495/>
- FINAL THOUGHTS

# TECHNOLOGY

Making the Most of Windows PAGE 293

# BYTE

FEBRUARY 1991 A MCGRAW-HILL PUBLICATION

## TOMORROW'S Laptops



**15**  
NOTEBOOK  
COMPUTERS

RATED FOR:  
Size and Weight  
Battery Life  
Display Quality  
Data Storage  
Keyboards  
Durability  
Expandability  
PAGE 148

- PEN, VOICE, TOUCH INPUT
- NEW DISPLAYS • NEW CHIPS
- NEW STORAGE DEVICES
- NEW VISIONS

Xerox PARC's Newest GUI:  
The Information Visualizer

IBM's XGA Graphics

The New ARCnet Plus

Queuing Analysis

**PLUS:**  
Excel 3.0  
OS/2 "Lite"  
Adobe Illustrator 3.0  
Stacker  
OOP Libraries  
Sparcstation IPC  
RasterOps 1024MC Colorboard  
Storyboard Live!



Letter to Architect

BUD GOULD  
HARRIS & GOULD  
43 ENCINA AVE.  
PALO ALTO, CA. 94301

DEAR BUD:

After our conversation last thursday, I realized that your idea of widening the skylights and placing them in more of the center of the room is a better way to go. Here are some quick sketches...

Kitchen

Bathroom

Skylight

Counter

Skylight

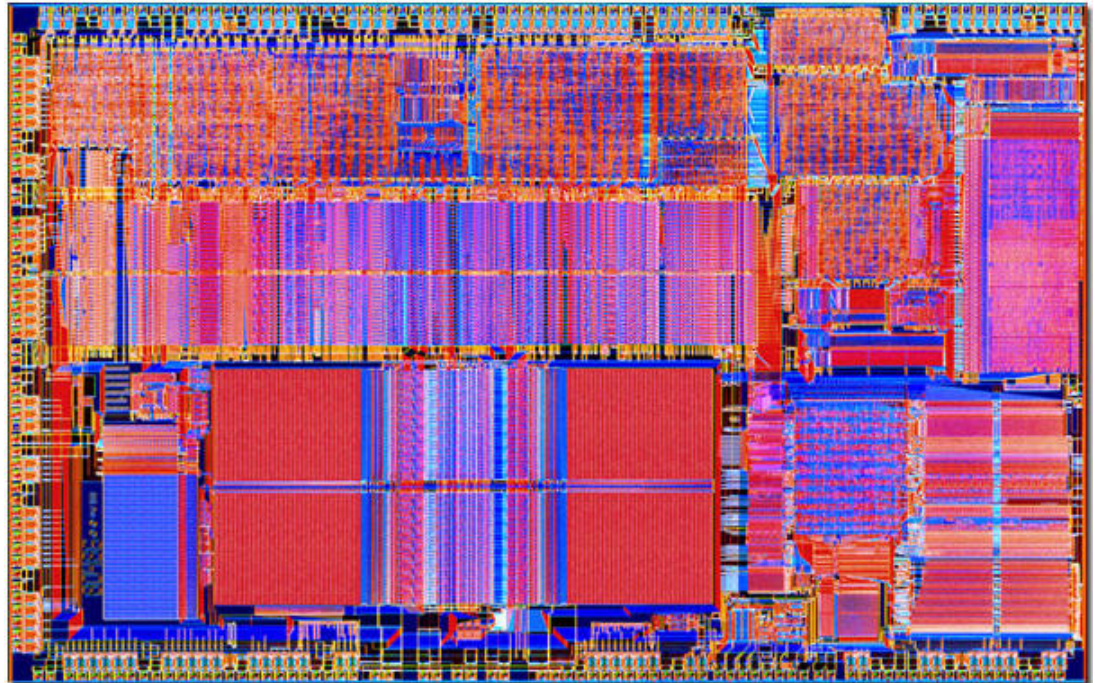
Take a look and let me know what

Help Preferences Tools Skelometry Disk Keyboard Installer In Out

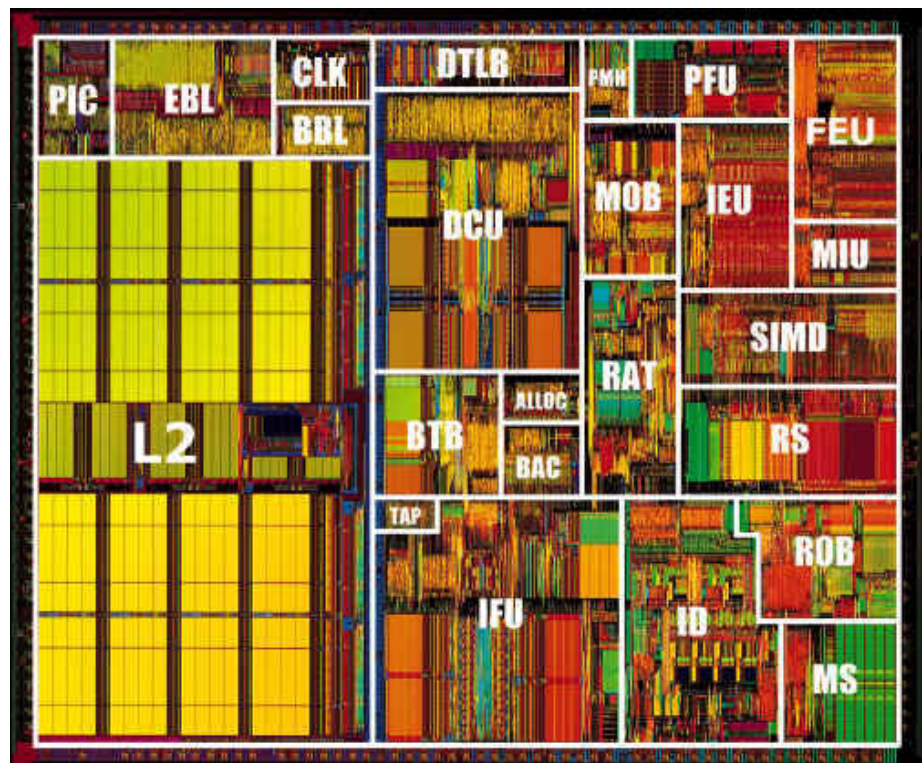


# Why now ... is it processor technology?

486  
16K L1  
FPU  
100 Mhz



PIII  
32K L1  
256K L2  
866 Mhz



## not really!

- Memory (1Gb)
- Software (Tablet PC extensions in XP)
  
- All about wireless
- in your hands
  - 802.11
- in your palm
  - Bluetooth
- at your fingertip
  - Touch-screen !

# USE IN CLASS

- As a student ...

Taking notes; Windows Journal

Good data structure; keep it in journal file format.

Machine can recognize my handwriting better than myself!

- As a teacher ...

Mid-size and large class lecture:

Use it as a scratch pad to organize ideas and lecture material

Use it during lecture delivery by preparing semi-notes.

# Taking notes

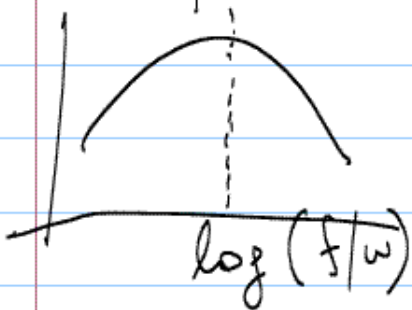
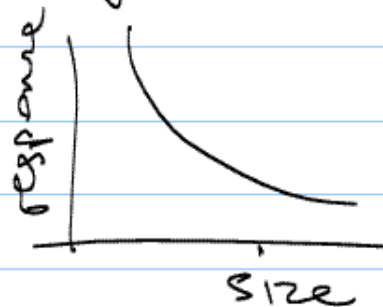
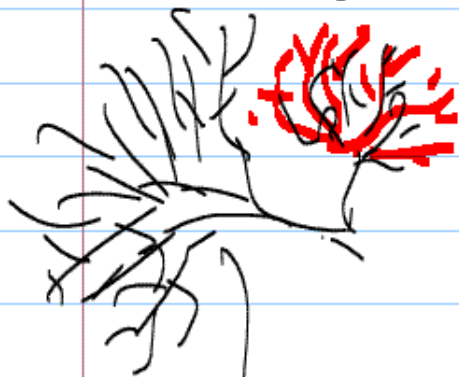
Invariance doesn't hold for linear summation

- Spatial summation is non-linear.

$$f(t) = g(\dot{\Theta}(t-s)) \exp[-a\Theta(t-s)]$$

angular velocity                      angular size

Biophysical model of multiplication



$$V_m = \log(\dot{\Theta}) - a\Theta$$
$$f(t) : g \cdot \exp(V)$$

Log/Antilog principle!

## Semi-notes

- Lecture material with “missing” parts to be completed by teacher in the class (board or transparency)
  - Keeps students engaged
- Example 1: Completing equations and generalizing.
- Example 2: Annotating pictures and graphs

From: 520/530.487 Introduction to  
Micro Electro-Mechanical Systems MEMS

<http://www.ece.jhu.edu/faculty/andreou/487/>

## Mobility and Electrical Conductivity

an electron in a silicon crystal under an applied electric field  $\mathbf{E}$  has an average velocity  $\mathbf{v}$  yielding the current density  $\mathbf{J}$

$$\mathbf{J}_n = -qn_o \langle \mathbf{v} \rangle$$

$$\frac{\text{Amperes}}{\text{cm}^2} = \frac{\text{Coulomb}}{\text{carrier}} \times \frac{\text{Number of carriers}}{\text{cm}^3} \times \frac{\text{cm}}{\text{s}}$$

define mobility as:

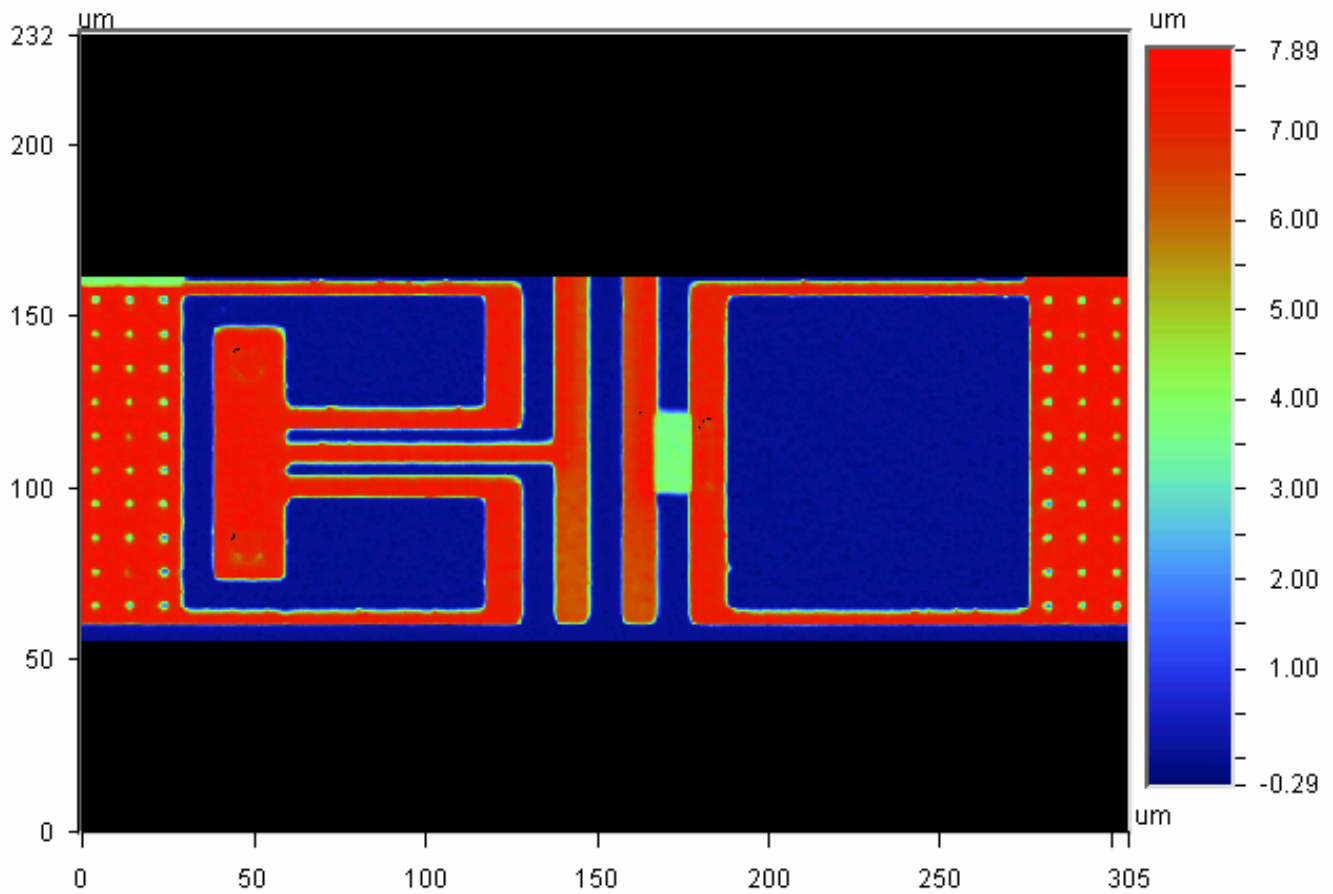
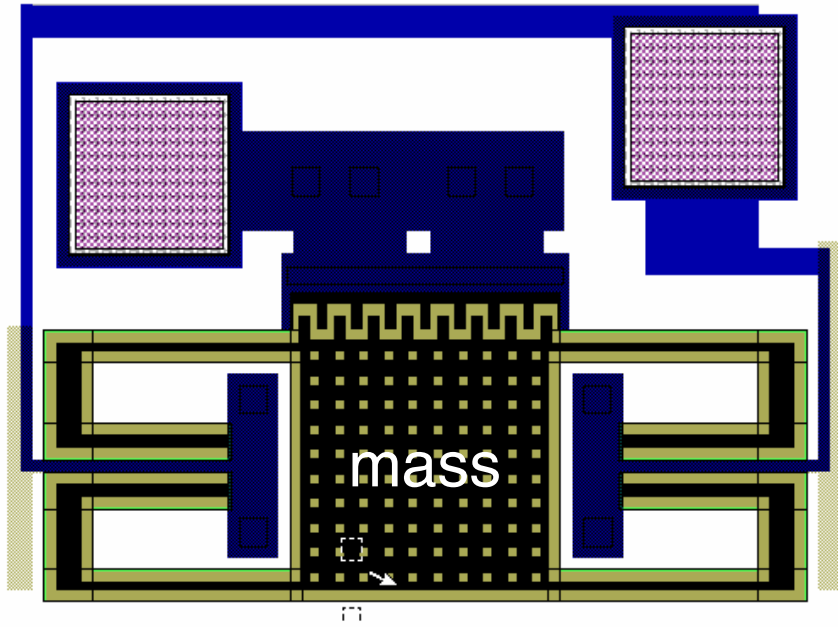
$$\mu_{(\cdot)} \equiv -\frac{\langle \mathbf{v} \rangle}{E} \quad \text{cm}^2 / \text{V} \cdot \text{s}$$

$$\mathbf{J}_n = qn_o \mu_n \mathbf{E}$$

and for both carriers

$$\mathbf{J}_{drift} =$$

# MEMS Structures



## USE IN LAB

- Microfabrication Lab (520/530/580.495)  
A.G. Andreou and J. Wang

<http://www.ece.jhu.edu/faculty/andreou/495/>

- Clean room, **paperless** environment
- Student Tablet PC use:
  - Access to equipment standard operating procedures; requires the development of an online website with necessary information (done!)

<http://www2.ece.jhu.edu/faculty/andreou/WhitakerFacility/uFabKiosk/Index.htm>

- Electronic laboratory note taking

**Need \$\$\$ for 15 tablet PCs!**

# FINAL THOUGHTS

- Technology, hardware and software are mature!
- Now:
  - Electronic note taking
  - Lecturing (semi-notes)
- Future:
  - Laboratory use  
requires infrastructure and \$\$\$
- Depend on wireless connectivity (WiFi) and Bluetooth with GPRS as fallback.
- Synchronize work with desktop every day!

**BACKUP, BACKUP, BACKUP**

Microfabrication Lab course supported by:  
Whitaker Foundation Development grant and by  
Kenan grants from the Whiting School of Engineering

# AT HOME

- Practice handwriting .... K and grades 1-3
- Practice math skills: grades 1-3
- Draw and paint ...