



























Mobile Interaction

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Who am I?

- Assistant professor in computer science
- MS/PhD in CS from UC Berkeley
- BA in art-semiotics, computer science from Brown University
- Work in the HCI area
 - tangible user interfaces
 - user interface software tools

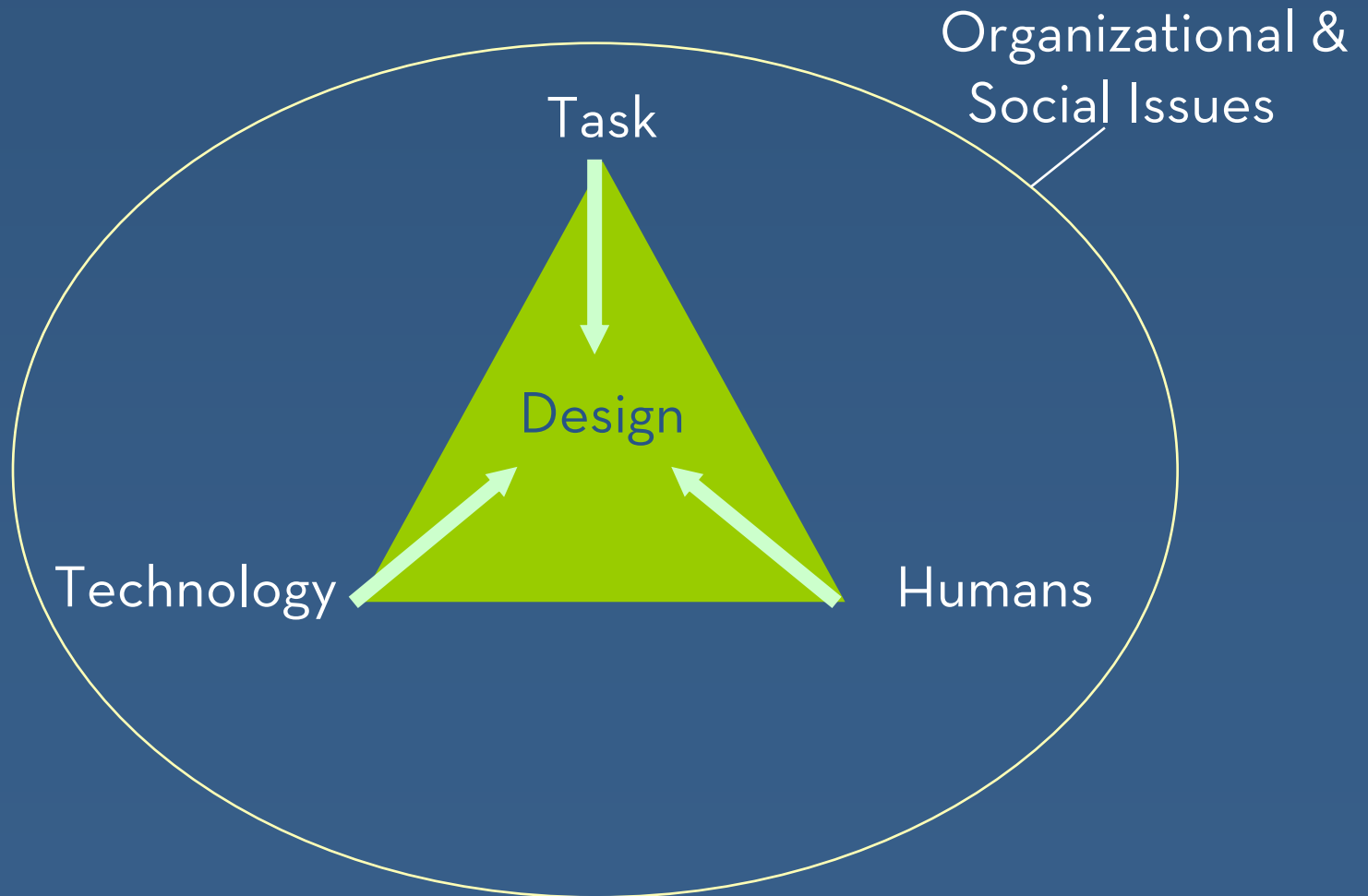
...and you?



Human-Computer Interaction (HCI)

- Human
 - the end-user of a program
 - the others in the organization
- Computer
 - the machine the program runs on
- Interaction
 - the user tells the computer what they want
 - the computer communicates results

What is HCI?



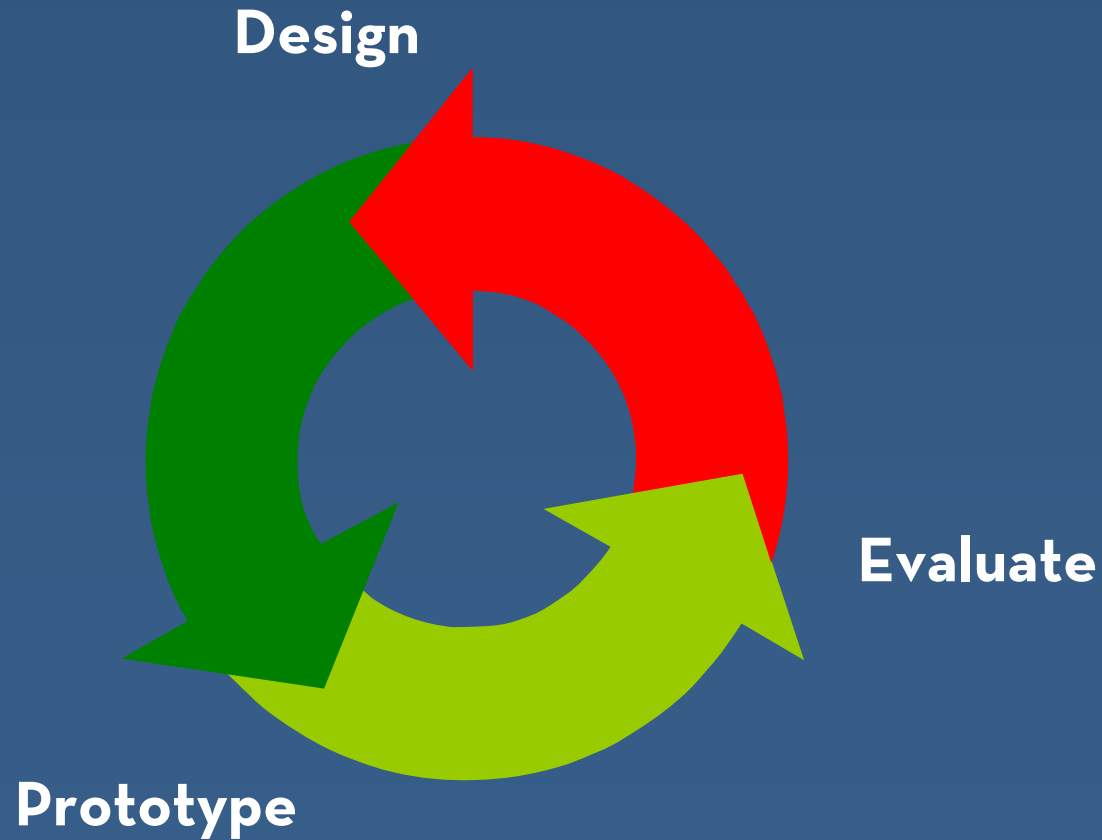
User Interfaces

- Part of software program that allows
 - user to interact with computer
 - user to carry out their task
- HCI = design,
prototyping,
evaluation, &
implementation of
user interfaces (UIs)

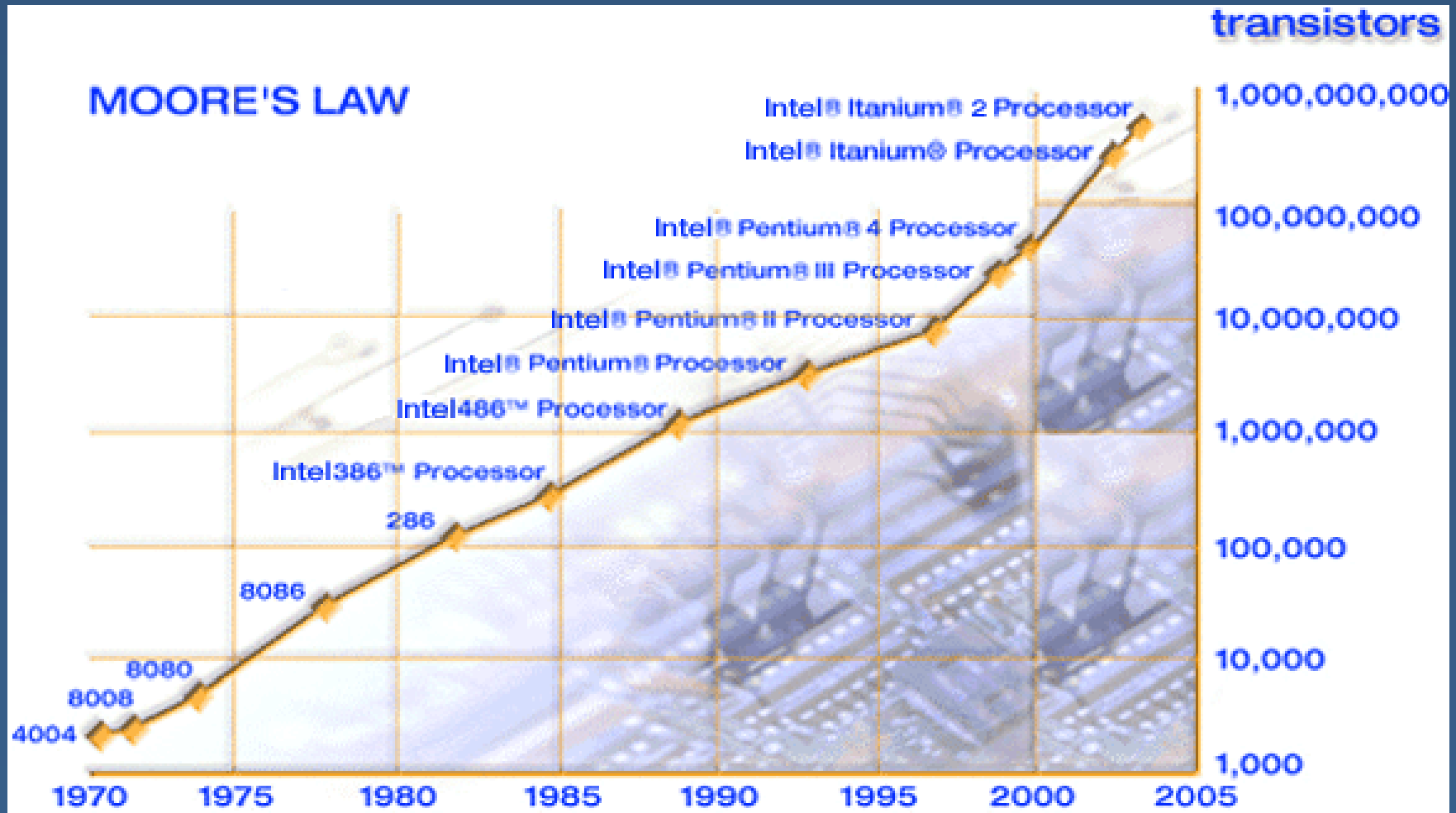
Why Study HCI?

- Major part of work for “real” programs
 - approximately 50% [Myers & Rosson '92]
- Stanford graduates work on “real” software
 - intended for users other than “us”
- Bad UIs cost
 - money (5% ^ satisfaction -> 85% ^ in profits)
 - lives
- User interfaces are hard to get right

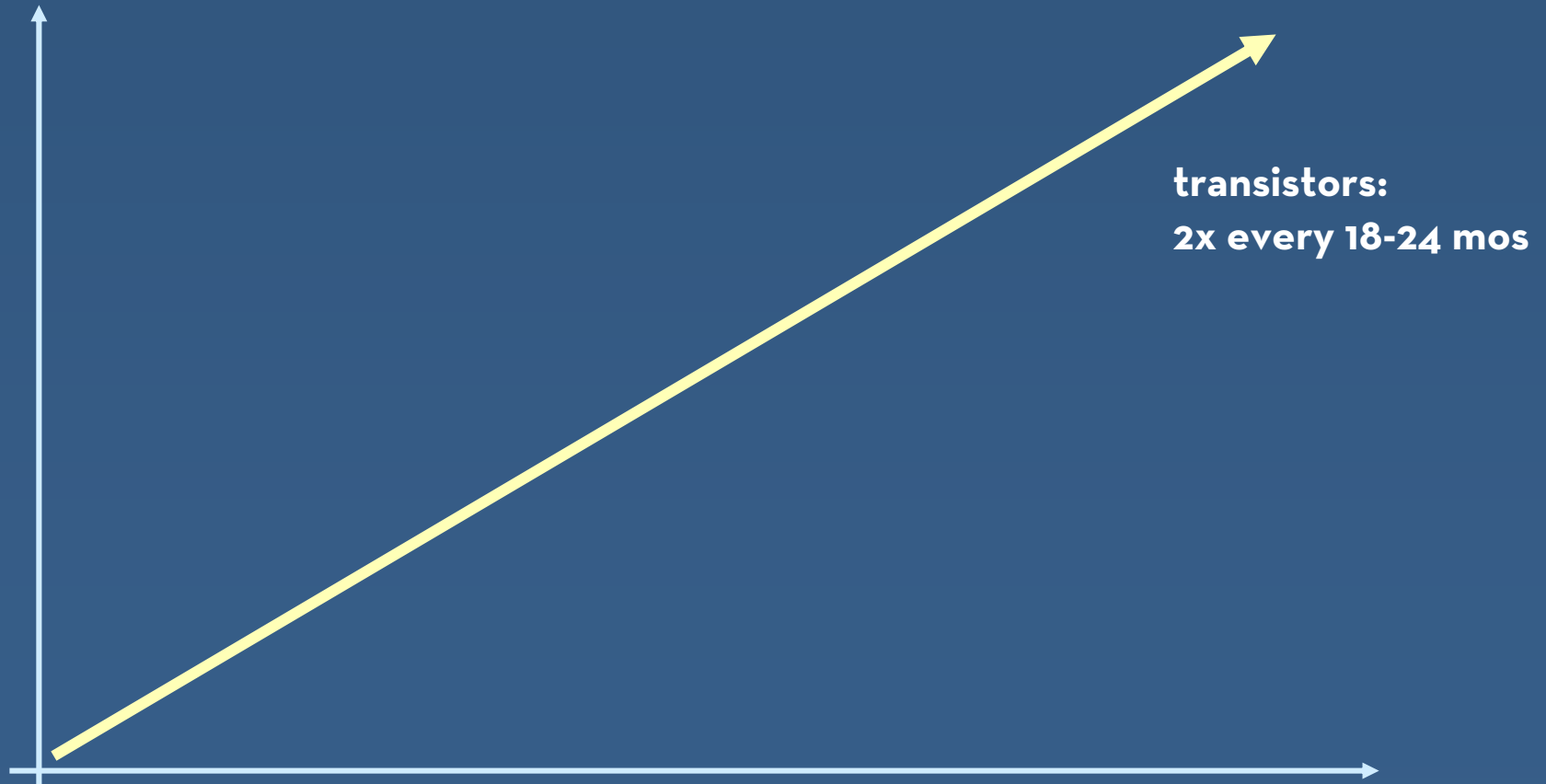
UI Design Cycle



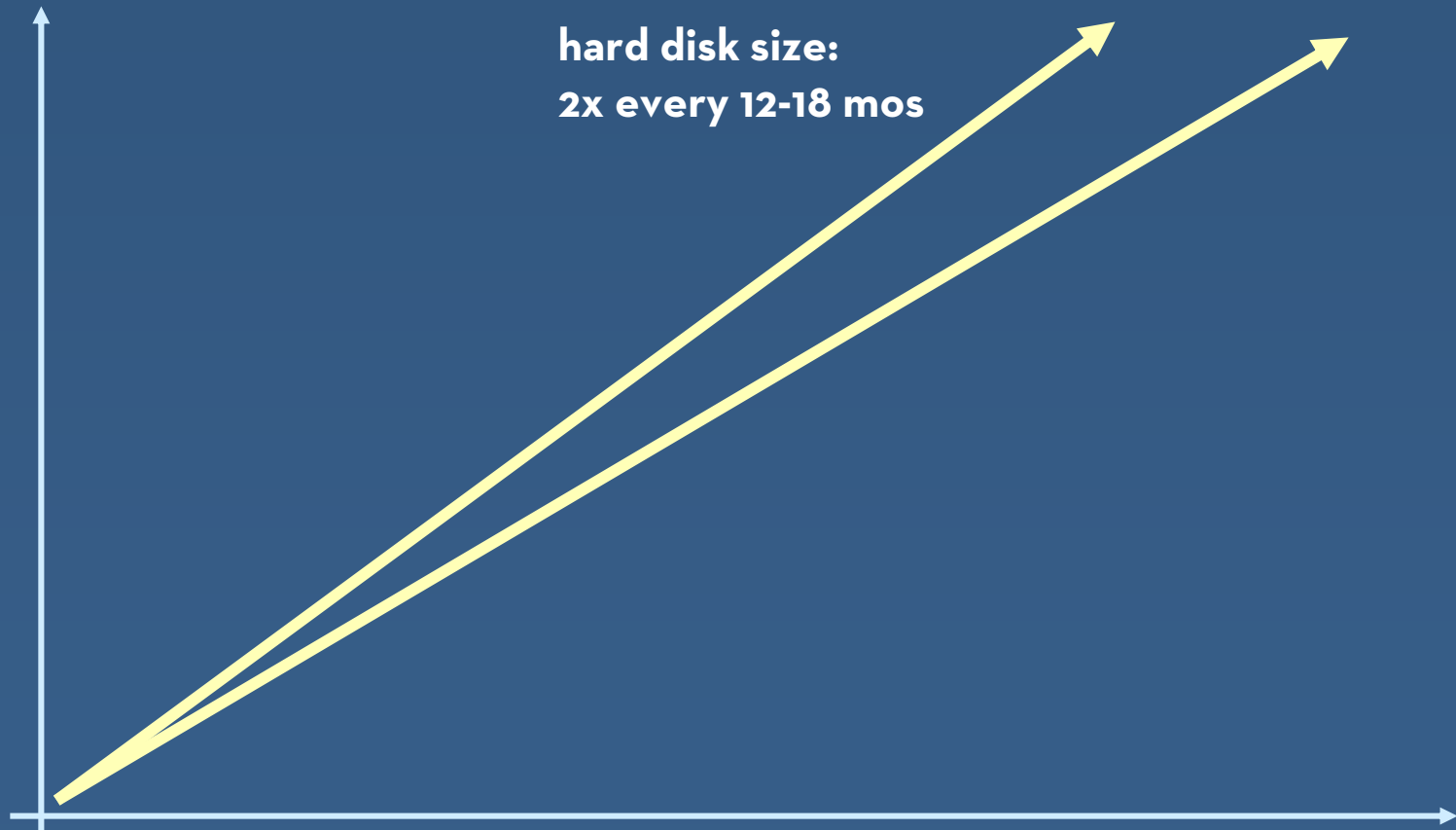
Technology Trends



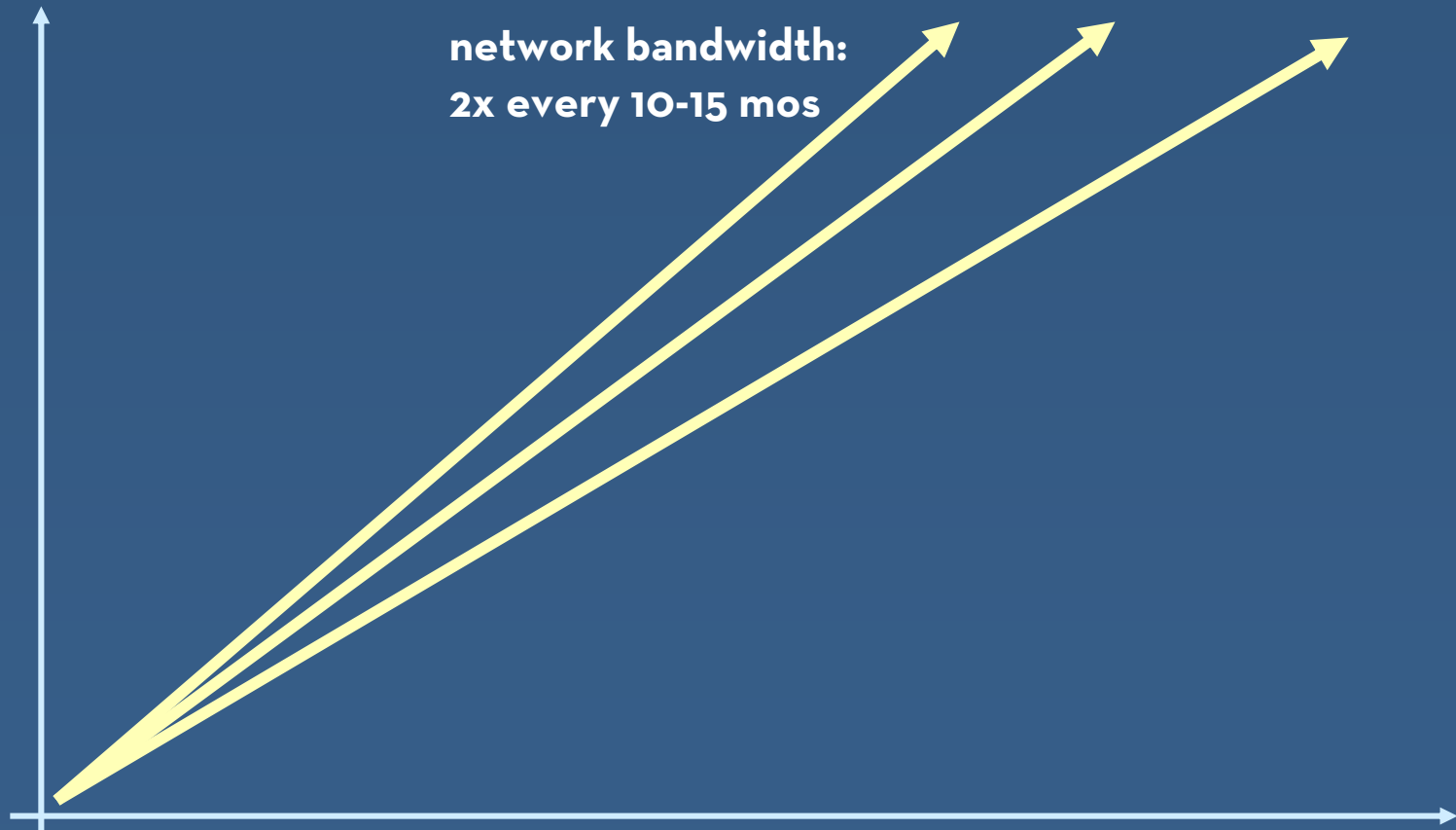
Technology Trends



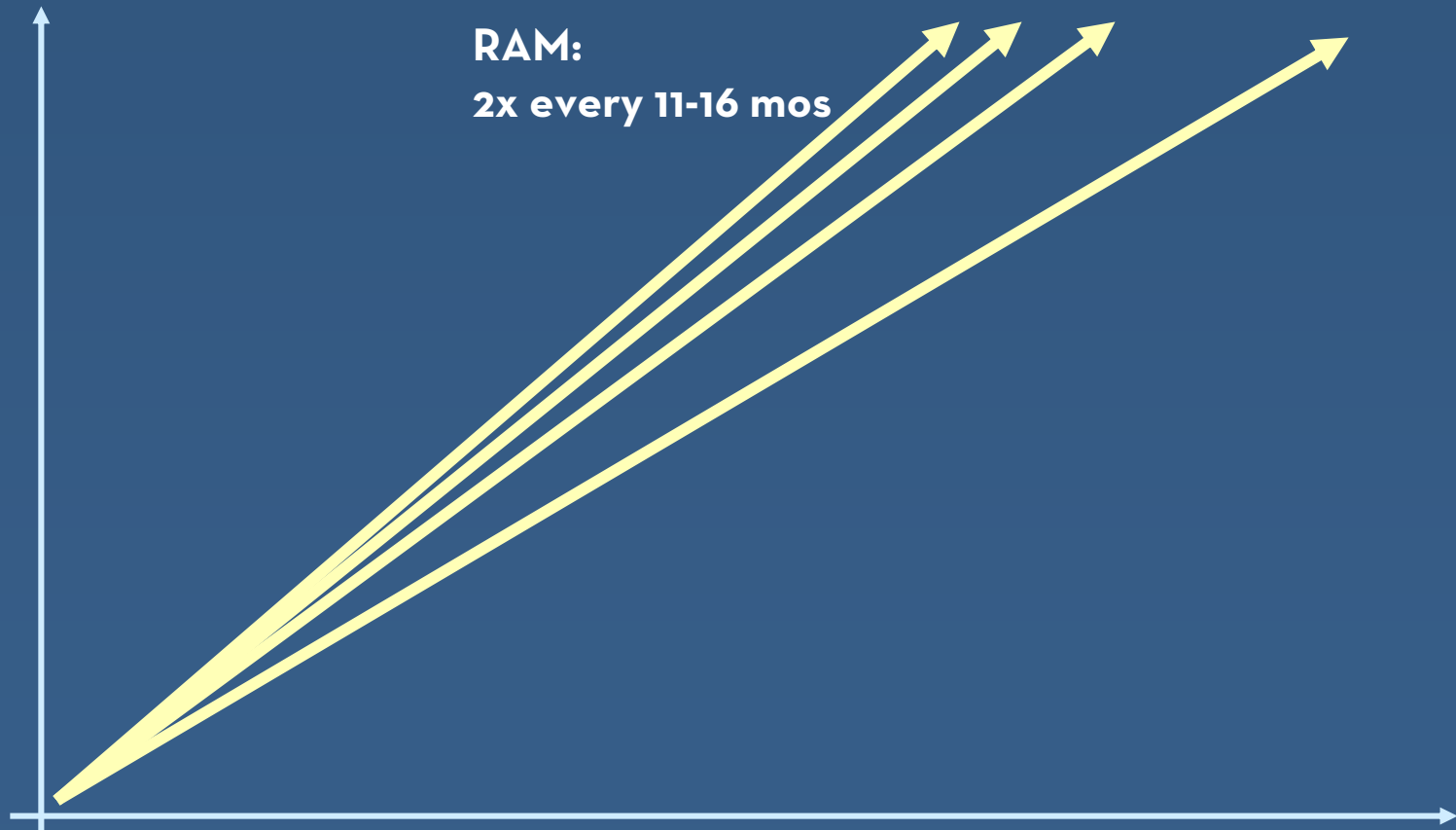
Technology Trends



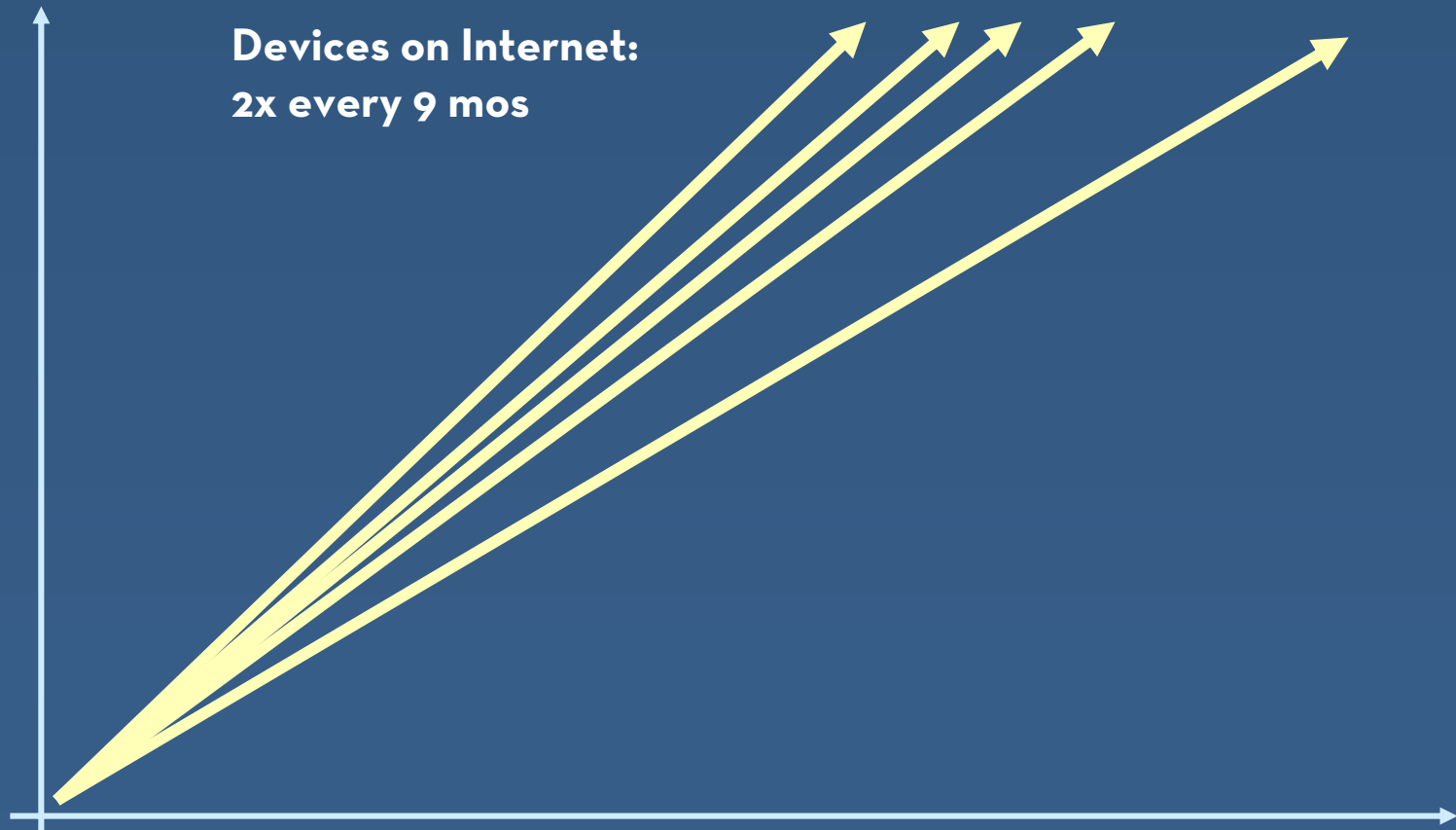
Technology Trends



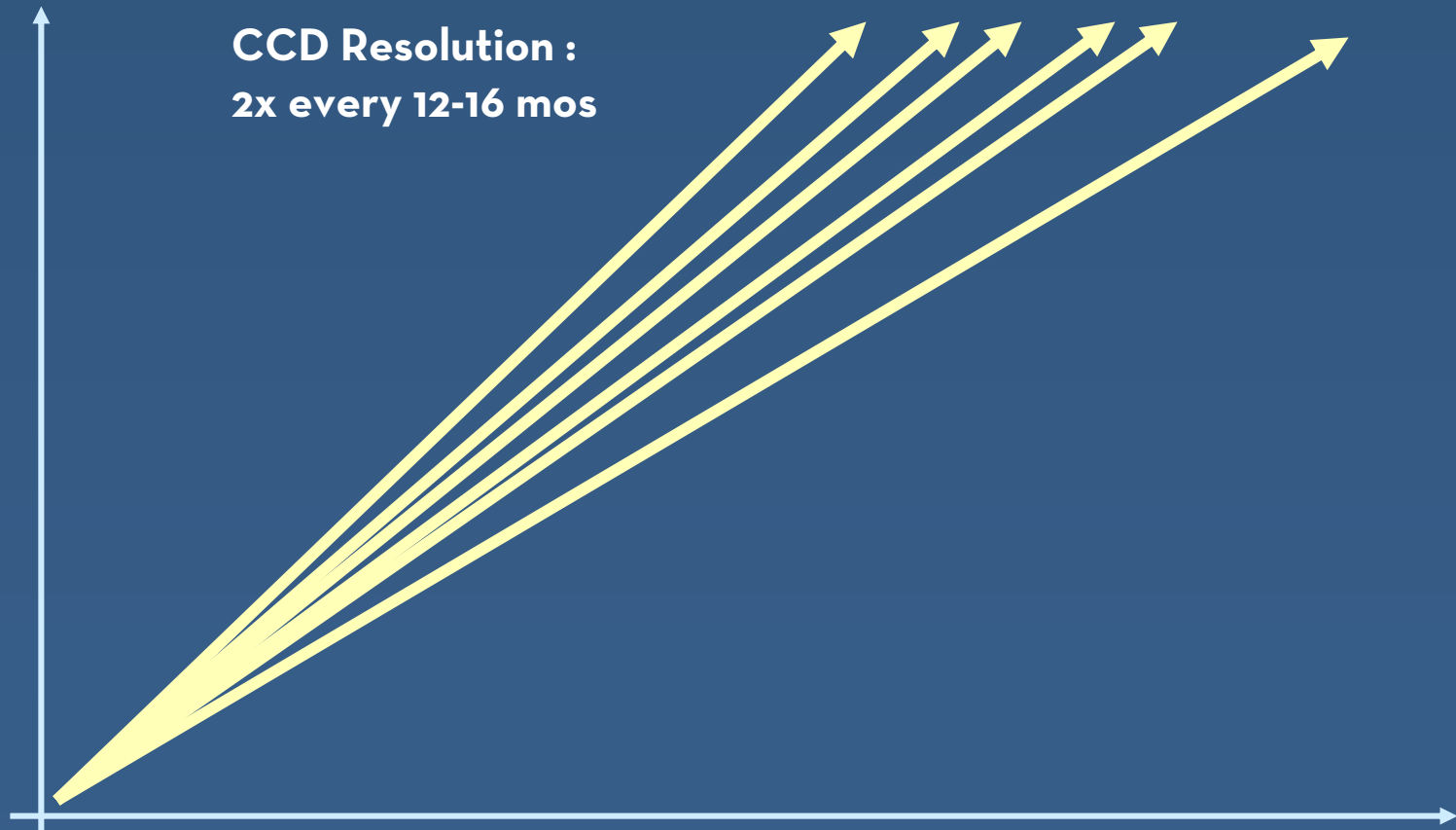
Technology Trends



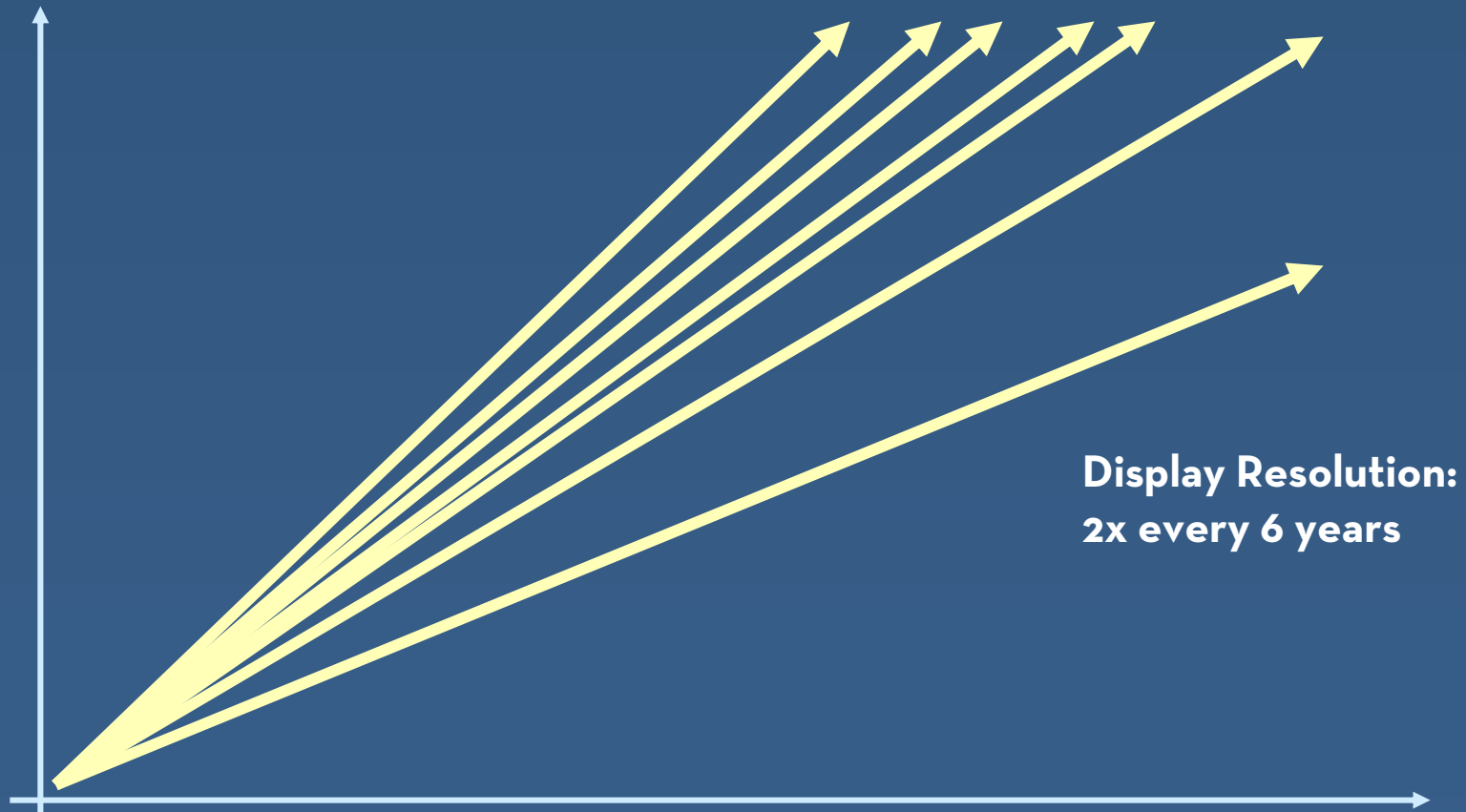
Technology Trends



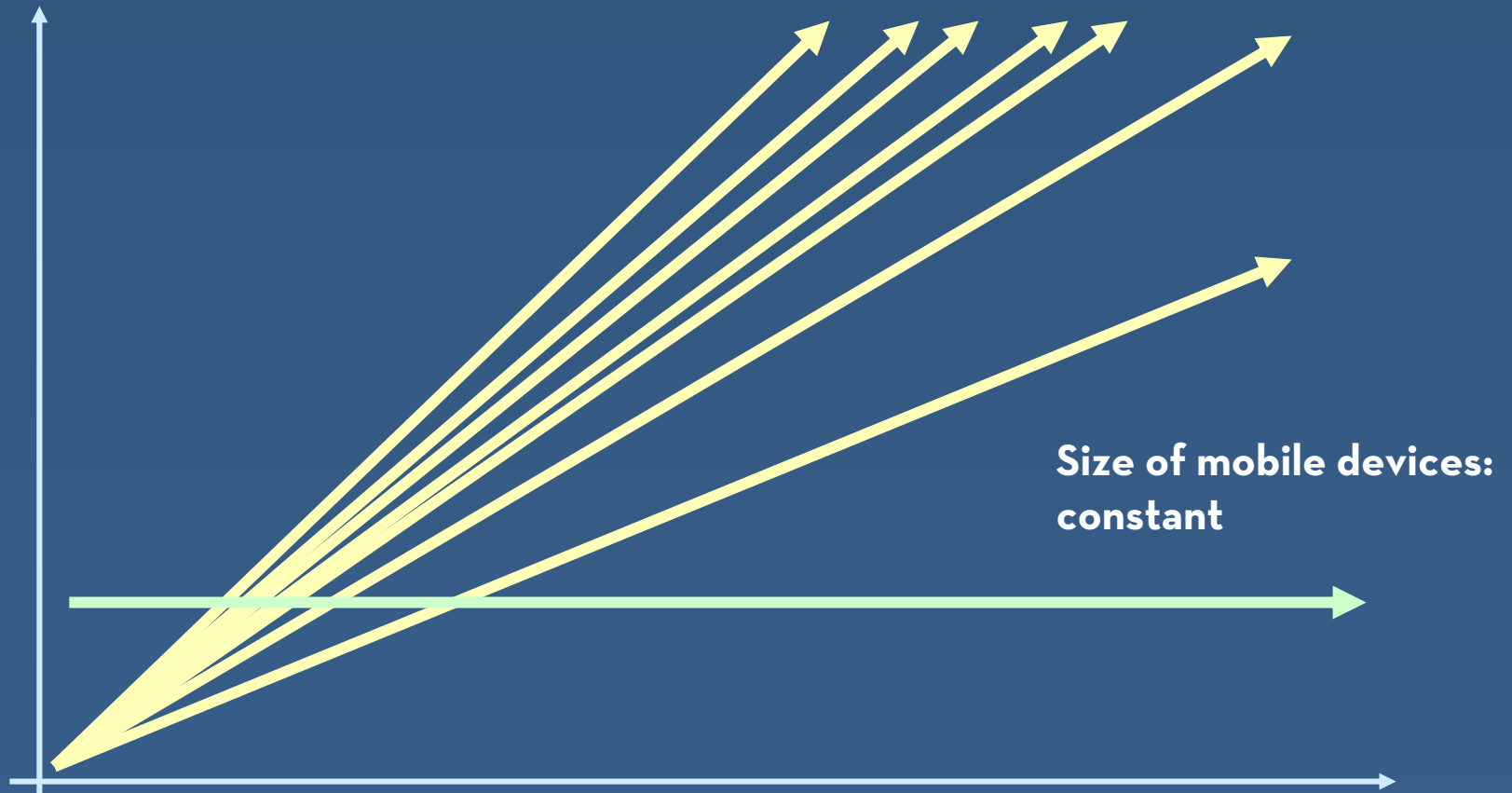
Technology Trends



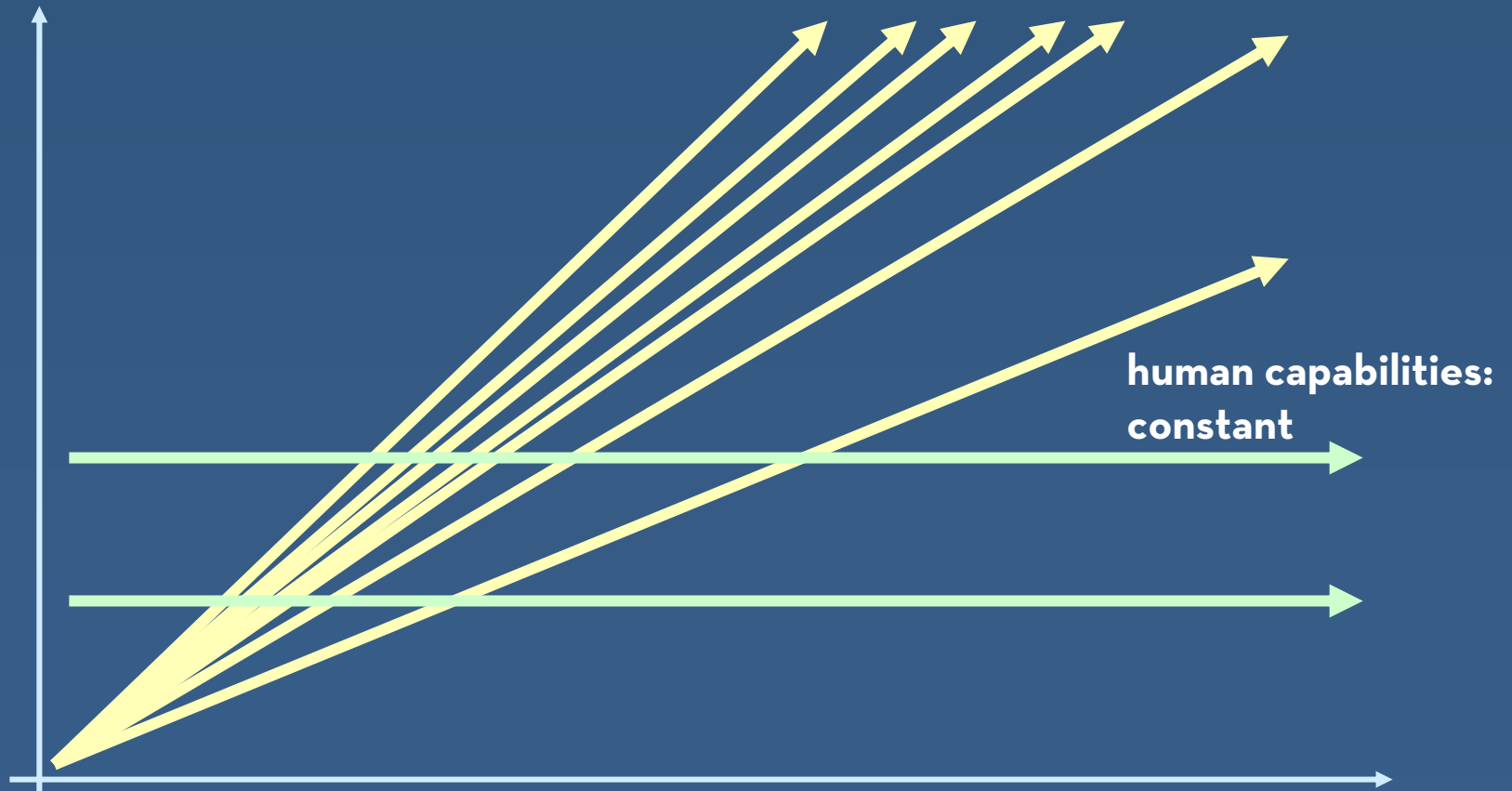
Technology Trends



Technology Trends



Technology Trends



What is mobile?

- phones
- datebooks
- wearable
- laptops
- cameras
- iPods
- watches
- ...

Who is mobile?

- college students
- truck drivers
- business people
- airline staff
- hitchhikers
- bike messengers
- activists
- shoppers
- bar-hoppers
- construction workers
- farmers
- fishers
- bus/taxi drivers
- salespeople
- photographers
- real estate agents
- journalists
- parents
- repair people
- doctors
- priests / religious leaders
- beat officers



A Brief History of Wearables

<http://www.media.mit.edu/wearables/lizzy/timeline.html>

1268 (F): Earliest recorded mention of eyeglasses
1665 (F): Robert Hooke calls for augmented senses
1762 (F): John Harrison invents the pocket watch
1907 (F): Aviator Alberto Santos-Dumont commissions the creation of the first wristwatch
1945 (F): Vannevar Bush proposes the idea of a "Memex" in his article "As We May Think" [MIT]
1960 (F): Heilig patents a head-mounted stereophonic television display.
1960 (F): Manfred Clynes coins the word "Cyborg"
1966 (C): Ed Thorp and Claude Shannon reveal their invention of the first wearable computer, used to predict roulette wheels [MIT]
1966 (F): Sutherland creates first computer-based head-mounted display [MIT]
1967 (F): Bell Helicopter experiments with HMDs with input from servo-controlled cameras [Bell Helicopter]
1967 (C): Hubert Upton invents analogue wearable computer with eyeglass-mounted display to aid lipreading [Bell Helicopter]
1968 (F): Douglas Engelbart demonstrates chording keyboard in NLS (oN Line System) [SRI]
1972 (C): Alan Lewis invents a digital camera-case computer to predict roulette wheels [Cal Tech]
1977 (C): CC Collins develops wearable camera-to-tactile vest for the blind [Smith-Kettlewell]
1977 (C): HP releases the HP 01 algebraic calculator watch [Hewlett-Packard]
1978 (C): Eudaemonic Enterprises invents a digital wearable computer in a shoe to predict roulette wheels [Eudaemonic Enterprises]
1979 (F): Sony introduces the Walkman [Sony]
1980 (F): Upton and Goodman file for patent on LED raster display [Textron, Inc]
1981 (C): Steve Mann designs backpack-mounted computer to control photographic equipment
1983 (C): Taft commercializes toe-operated computers based on Z-80's for counting cards
1984 (F): William Gibson writes Neuromancer
1986 (C): Steve Roberts builds Winnebiko II, a recumbent bicycle with on-board computer and chording keyboard
1987 (F): The movie Terminator is released
1989 (F): Private Eye head-mounted display sold by Reflection Technology [Reflection Tech]
1990 (C): Gerald Maguire and John Ioannidis demonstrate the Student Electronic Notebook, with Private Eye and mobile IP [Columbia]
1990 (F): Olivetti develops an active badge system, using infrared signals to communicate a person's location [Olivetti]
1991 (C): Doug Platt debuts his 286-based "Hip-PC" [Select Tech]
1991 (C): CMU team develops VuMan 1 for viewing and browsing blueprint data [CMU]
1991 (F): Mark Weiser proposes idea of Ubiquitous Computing in Scientific American [Xerox PARC]
1993 (C): Thad Starner starts constantly wearing his computer, based on Doug Platt's design [MIT]
1993 (C): BBN finishes the Pathfinder system, a wearable computer with GPS and radiation detection system [BBN]
1993 (F): Thad Starner writes first version of the Remembrance Agent augmented memory software [MIT]
1993 (F): Feiner, MacIntyre, and Seligmann develop the KARMA augmented reality system [Columbia]
1994 (C): Lamming and Flynn develop "Forget-Me-Not" system, a continuous personal recording system [Xerox EuroPARC]
1994 (C): Edgar Matias debuts a "wrist computer" with half-QWERTY keyboard
1994 (F): DARPA starts Smart Modules Program
1994 (F): Steve Mann starts transmitting images from a head-mounted camera to the Web [MIT]
1996 (F): DARPA sponsors "Wearables in 2005" workshop
1996 (F): Boeing hosts wearables conference in Seattle
1997 (F): Creapôle Ecole de Création and Alex Pentland produce Smart Clothes Fashion Show
1997 (F): CMU, MIT, and Georgia Tech co-host the first IEEE International Symposium on Wearables Computers

What makes mobile unique?

- From a systems perspective?
- From an HCI perspective?

What this course will cover

- Cultural Theory
- Social Science
- Wearables
- Design Methods
- Systems/Infrastructure Issues
- Mobile Usability
- ...

How this course fits in

- cs147
- cs247
- cs376
- cs377's

Administrivia

- Course Info

Tuesdays 1:30-4:00, Gates 300

<http://hci.stanford.edu/srk/cs377a-mobile.html>

cs377a-mobile@cs.stanford.edu

- My Info

Office Hours: Fridays 2:00-3:00pm (Gates 384)

<http://hci.stanford.edu/srk>

srk@cs.stanford.edu

Course Structure

- HCI literature
 - conferences papers (CHI, UIST, CSCW, ...)
 - journal articles (TOCHI, HCI, ...)
 - book chapters
 - 3-5 papers/week
- For student-led discussions
 - email balee@cs with list of 3 prefs by Friday
- Must come prepared
 - email cs377a-mobile @cs with 2 criticisms & 2 good points (w/ reasoning, evidence)

Classtime Format

1:30-2:05 I'll present the area

2:15-2:50 Student presents papers

2:50-4:00 Discussion

Grading

55% Projects

15% In-class Lecture

15% Paper Critiques

15% Participation

Projects

- Research quality projects
- Meet with Brian and me about proposals
 - 1 page proposals due Thursday, April 14th
- Mid-term demo/review
- Final report
 - 2-4 page paper in CHI format
 - 10-15 minute presentation in class

Projects

- Working in pairs is encouraged
- A project related to your research (or another course project) is great
 - Let me know if you do this
- Brian and I are happy to offer project suggestions

MultiMobile

- In ~5 years, cell phones will have gigahertz processors and a gigabyte of memory

Input

speech

stylus

physical keypad

tactile controls

computer vision

location



Output

speech

non-speech audio

visual display

haptic feedback

Questions

