

Designing Interactive Systems I

Introduction to the Course

Prof. Dr. Jan Borchers
Media Computing Group
RWTH Aachen University

Winter term 2017/2018

<http://hci.rwth-aachen.de/dis>

Who am I?

- Studied CS at Karlsruhe (& Imperial)
 - Human-Computer Interaction
- PhD CS, TU Darmstadt (& Linz, Ulm)
 - Interaction with multimedia
 - HCI design patterns
- Assistant professor at Stanford & ETH Zurich
 - Interactive rooms
 - Ubicomp user interfaces
- Full professor at RWTH since Oct. 2003
 - Interaction with audio & video
 - Wearable & Tangible UIs, Personal Fabrication, IDEs,...



Our Team



Krishna Subramanian, M. Sc.
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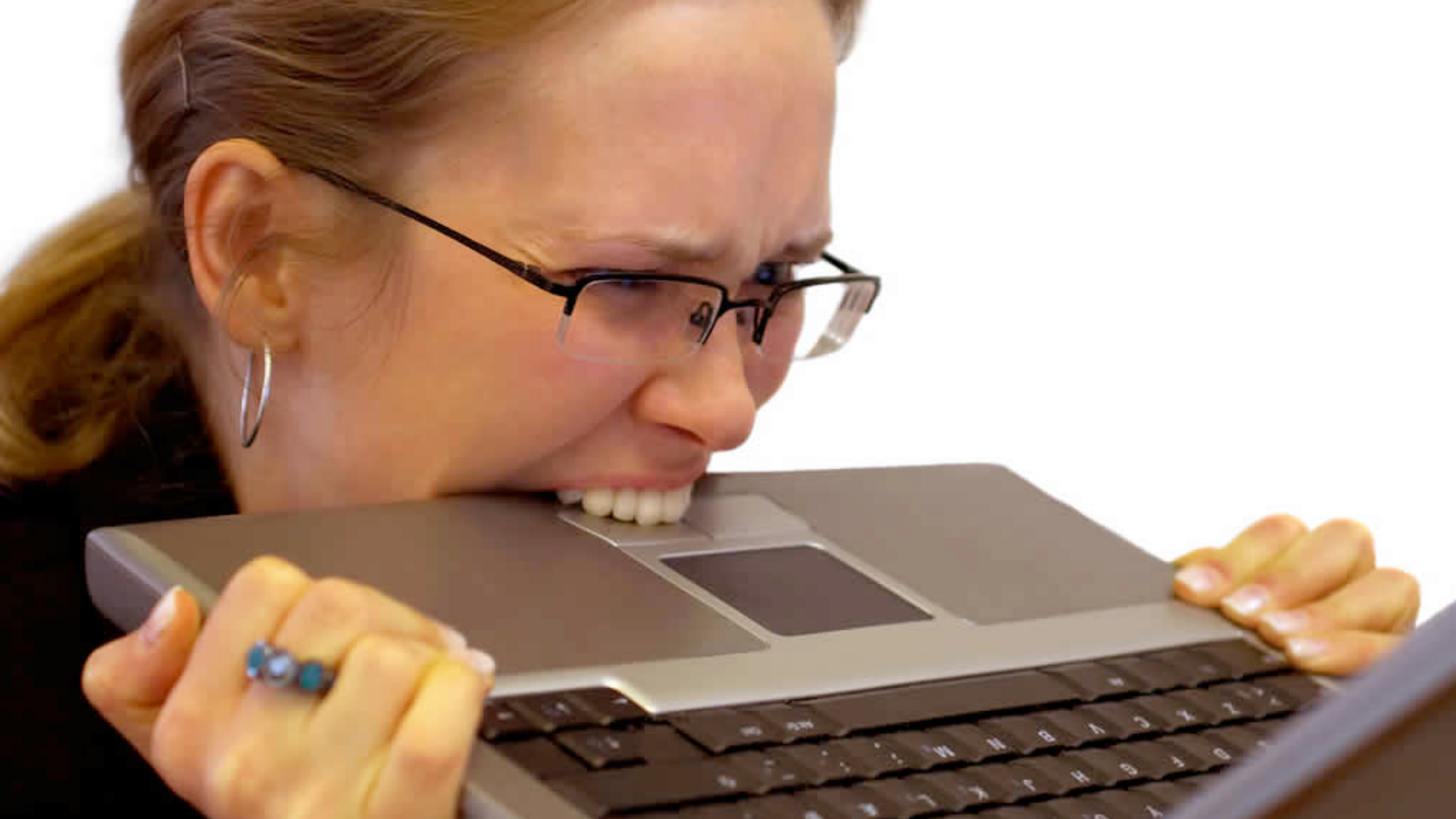
They answer all your questions!

Please add this subject line to your mail: “[**DIS1**]”

Human–Computer Interaction?



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Inv:	Hi Fo Holdings, Ltd.		HIFO		To		YVR	AA	PO#:		
At:	Hi Fo Holdings, Ltd.		HIFO		Deliver By		YYZ	AE	GBL Num:		
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Cont:			Est PAJ:		Del Miles		0	0	MasterID:		
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Fee	\$0.00		Fee Collect						<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>		
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Units	Type	H Description		Stated	ActWt	Dimensions	ChgWt	Rate	Charges		





Emergency Exit

Press on bar
for 3 seconds

Door lock
will release
in 15 seconds

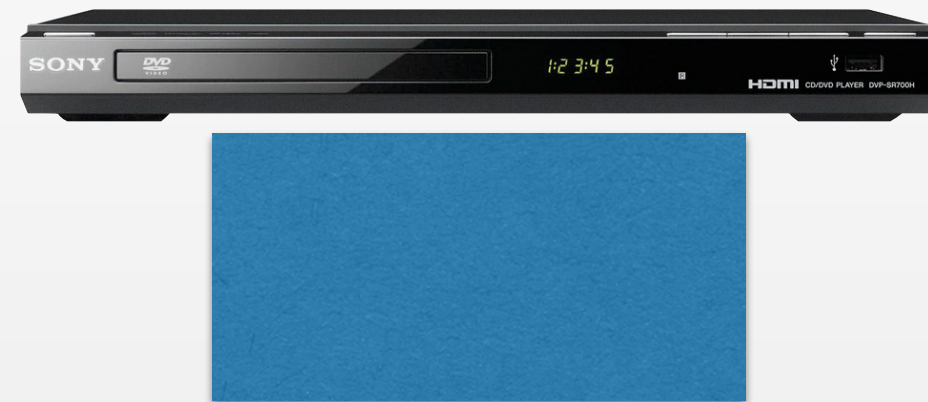
Sortie de secours

Appuyer sur la barre
pendant 3 secondes

Le dispositif
de verrouillage
se déclenchera
dans 15 secondes

WARNING!
SWING CUTTING DEVICE. CUT MUST BE SQUARE
AND EDGE FINISHED FOR PROPER ONLY LIFTING

Usability Sells!



DVD Player (1996)



iPhone (1st Q'07)

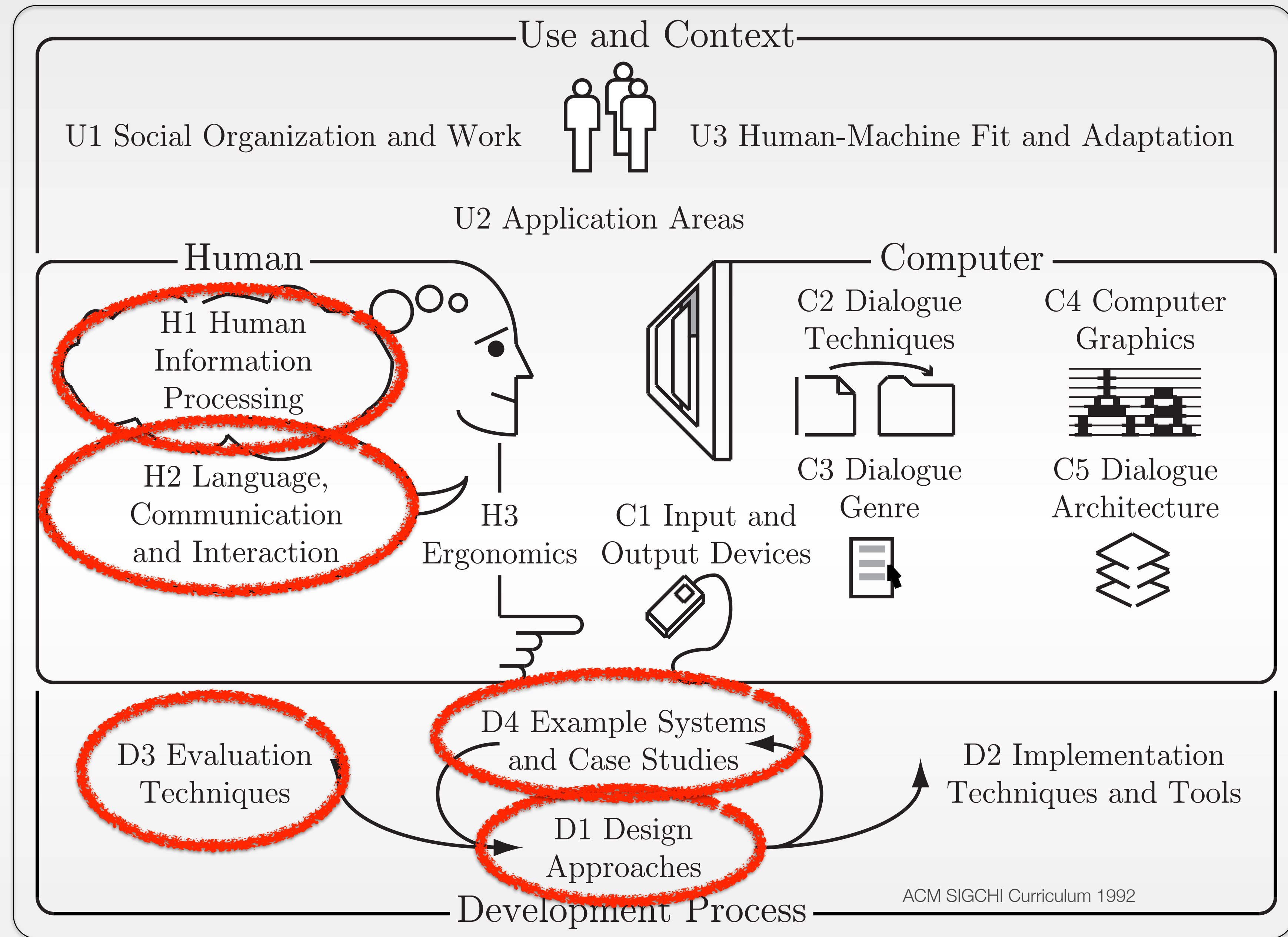


iPad (1st 80d '10)

Source: CNBC



What is HCI?



Class Topics

Cognition

- Performance
- Models of interaction
 - Affordances
 - Mappings
 - Constraints
 - Types of knowledge
 - Errors
- Design principles









History

- History of HCI
- Visions
- Phases of Technology

Design Process

- Iterative design
- User observation
- Ideation
- Prototyping
- User studies and evaluation
- Interaction design notation

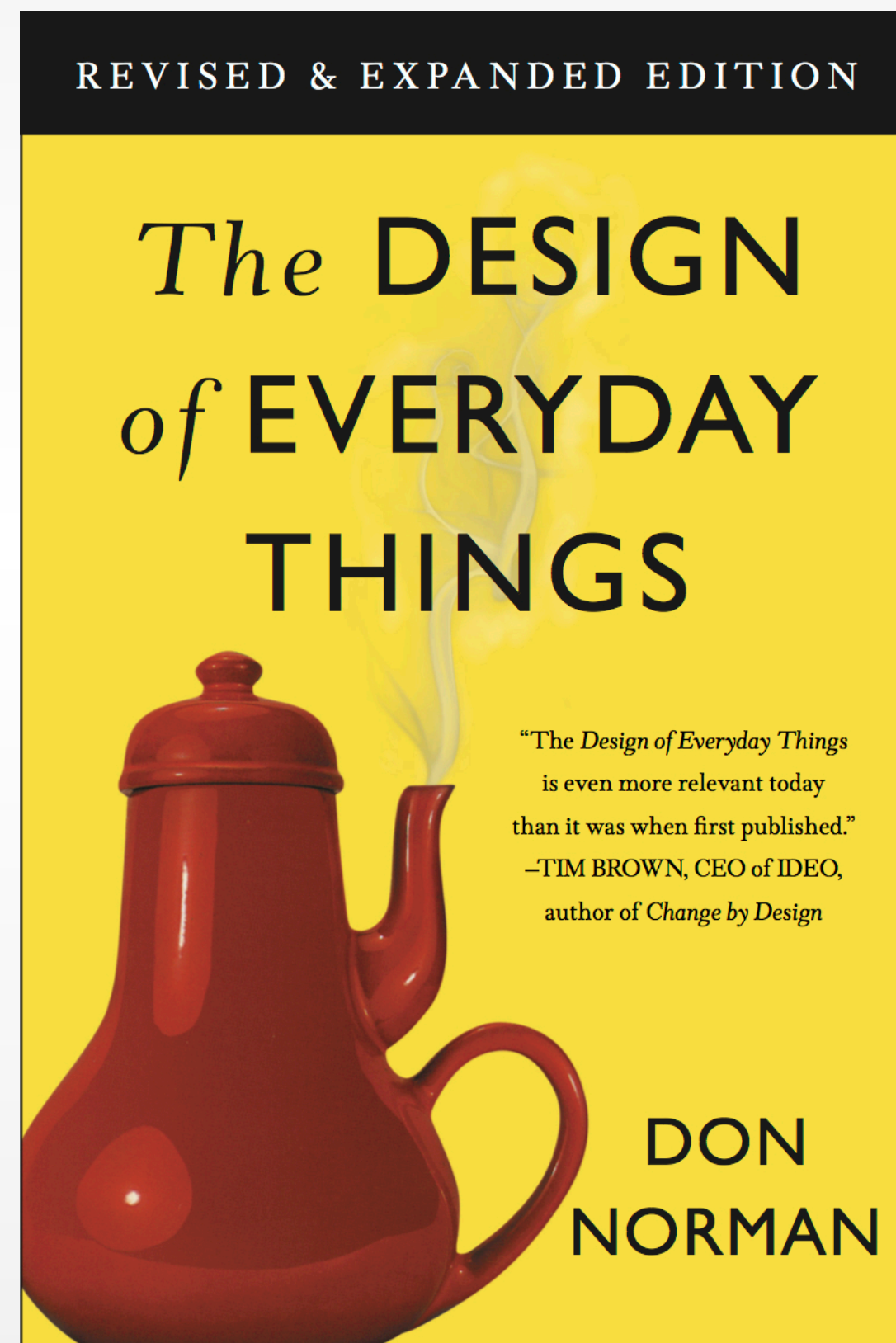


Date	Type	Content for the Studio/Lab	Course Content for the Week (as Video and Slides)
09.10.2017	-	-	 S01 Fitts Law & CMN Model
11.10.2017	Studio	Introduction to the course, logistics, and introduction to S01	↓
16.10.2017	Lab	Discussion of S01, introduction to S02 A01: Fitts' Law out	 S02 Gestalt Laws, Information Content, Visibility, and Affordances
18.10.2017	Studio	Work on A01 in class	↓
23.10.2017	Lab	Discussion of S02, introduction to S03  A01 submission & discussion A02: Gestalt Laws, Affordances, and Signifiers out	 S03 Mappings, Constraints, Seven Stages of Actions
25.10.2017	Studio	Work on A02 in class	↓
30.10.2017	Lab	Discussion of S03, introduction to S04	 S04 Knowledge in the World and Head, Mistakes and Slips.
01.11.2017	-	-	↓
06.11.2017	Lab	In-class exercises  A02 submission & discussion A03: Seven Stages of Action, Mappings, and Constraints out	↓
08.11.2017	Studio	Work on A03 in class	↓
13.11.2017	Lab	Discussion of S04, introduction to S05  A03 submission & discussion	 S05 History I: From Abacus to Macintosh
15.11.2017	Studio	Watch and critique "Objectified" (a design documentary)	↓

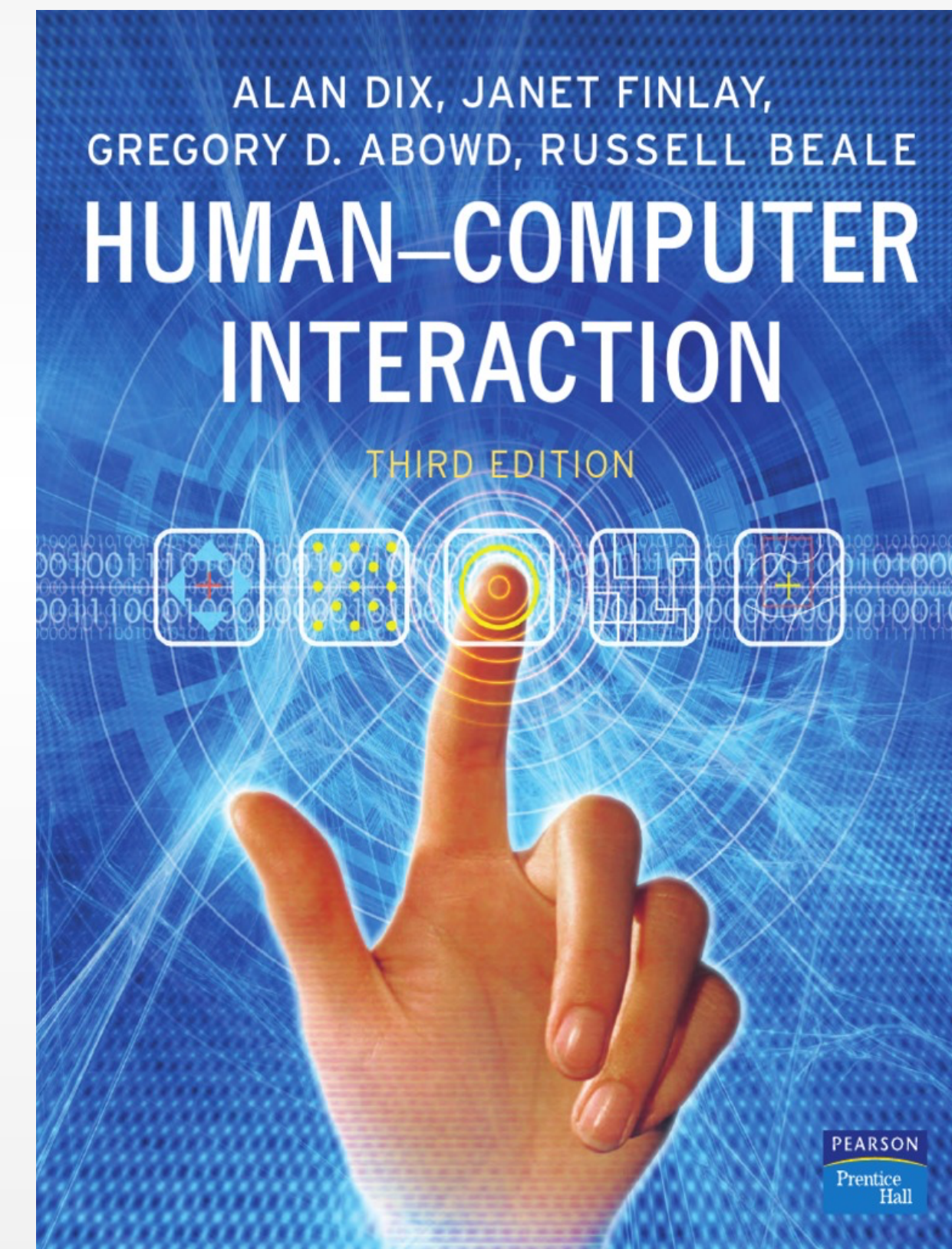
Find the entire schedule on the class landing page: <http://hci.rwth-aachen.de/dis>

Textbooks

Required Read



Recommended Read



What else?

Our Classes



	When?	Type	Credits (ECTS)	Name
★	SS, WS	P	7	The Media Computing Project
	SS	S	4	Post-Desktop User Interfaces
	SS	V/Ü	6	Current Topics in HCI
	WS	V/Ü	6	iOS Application Development
	SS	V/Ü	6	Designing Interactive Systems II
★	WS	V/Ü	6	Designing Interactive Systems I
Only for B.Sc. students				
	WS	PS	4	Human-Computer Interaction
	SS	SW-Pr	7	M3: Multimodal Media Madness



Course: iOS Application Development

- Dates
 - **Lecture:** Tue. 09:15 – 11:45 (Room 2222)
 - **Lab:** Mon. 14:15 – 15:45 (Room 2222; max. 36 students)
- Credits: 6 ECTS
- Lecture (5 weeks) + Seminar (4 weeks) + Project (6 weeks)
 - <http://hci.rwth-aachen.de/iphone>



iOS Application Development: Topics

- Mobile application design principles
- iOS development basics
- Swift 4
- View Controllers & Dialogs
- Input techniques
- Networking
- Multimedia
- Performance tweaking
- tvOS & watchOS
- iPad programming



PowerSocket

Smart Outlets

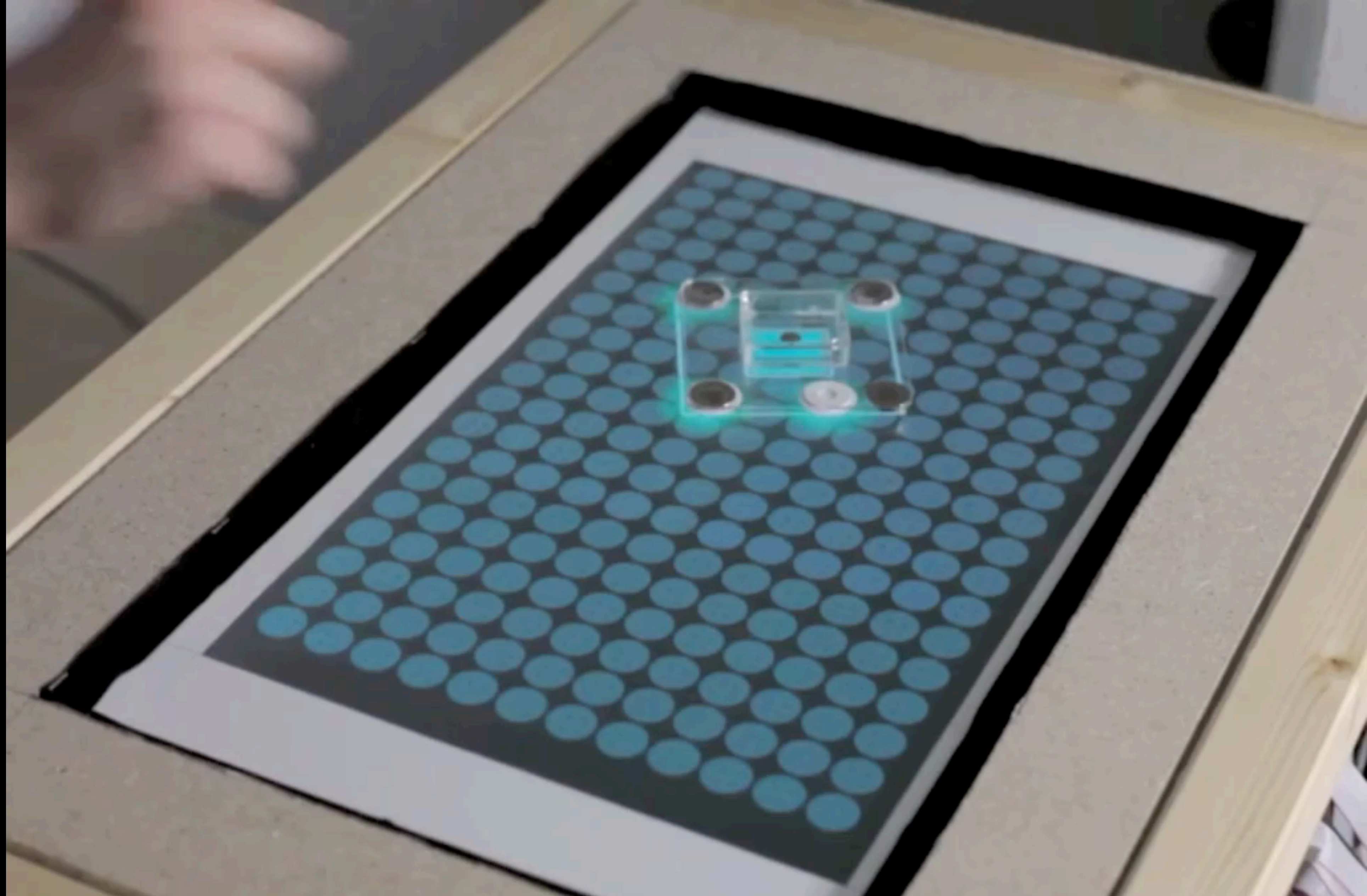


Florian



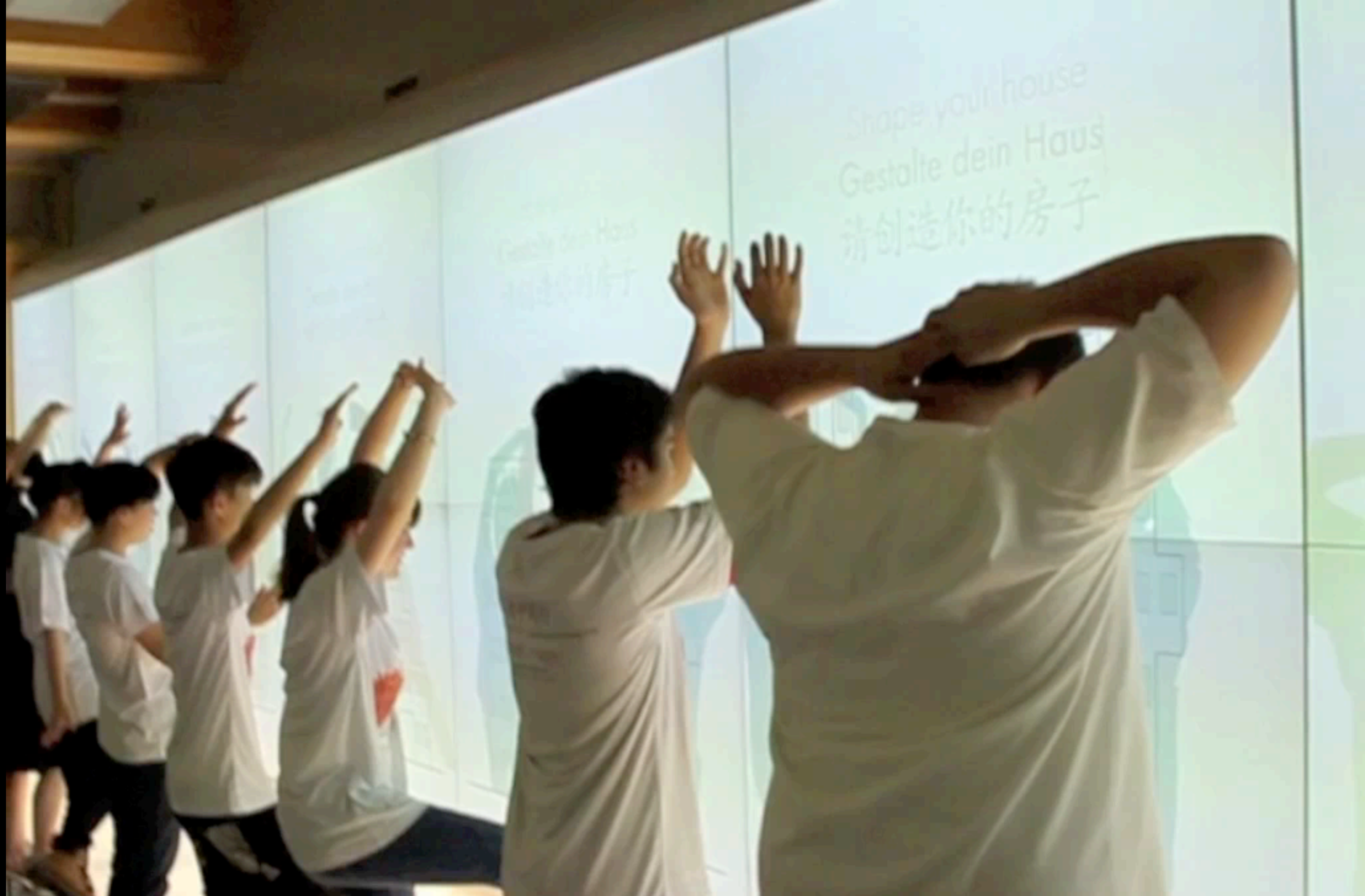
Tabletop Tower Defense

<http://hci.rwth-aachen.de/moellers>



Madgets

<http://hci.rwth-aachen.de/madgets>



Silhouettes at EXPO 2010, Shanghai

<http://hci.rwth-aachen.de/expo>



The vest has a depth camera facing forward to record

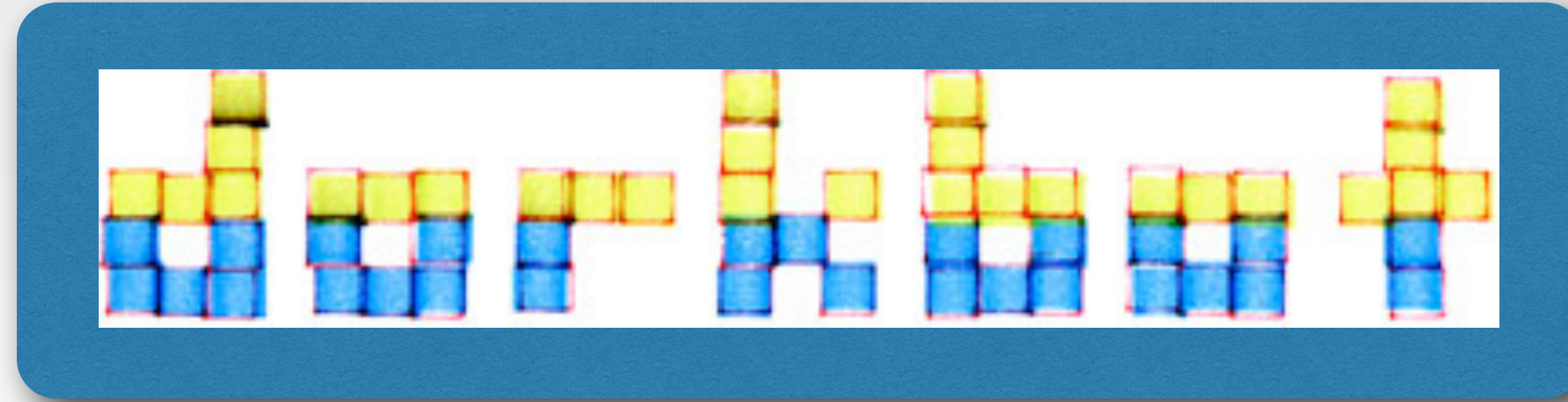


640x480 Depth Image

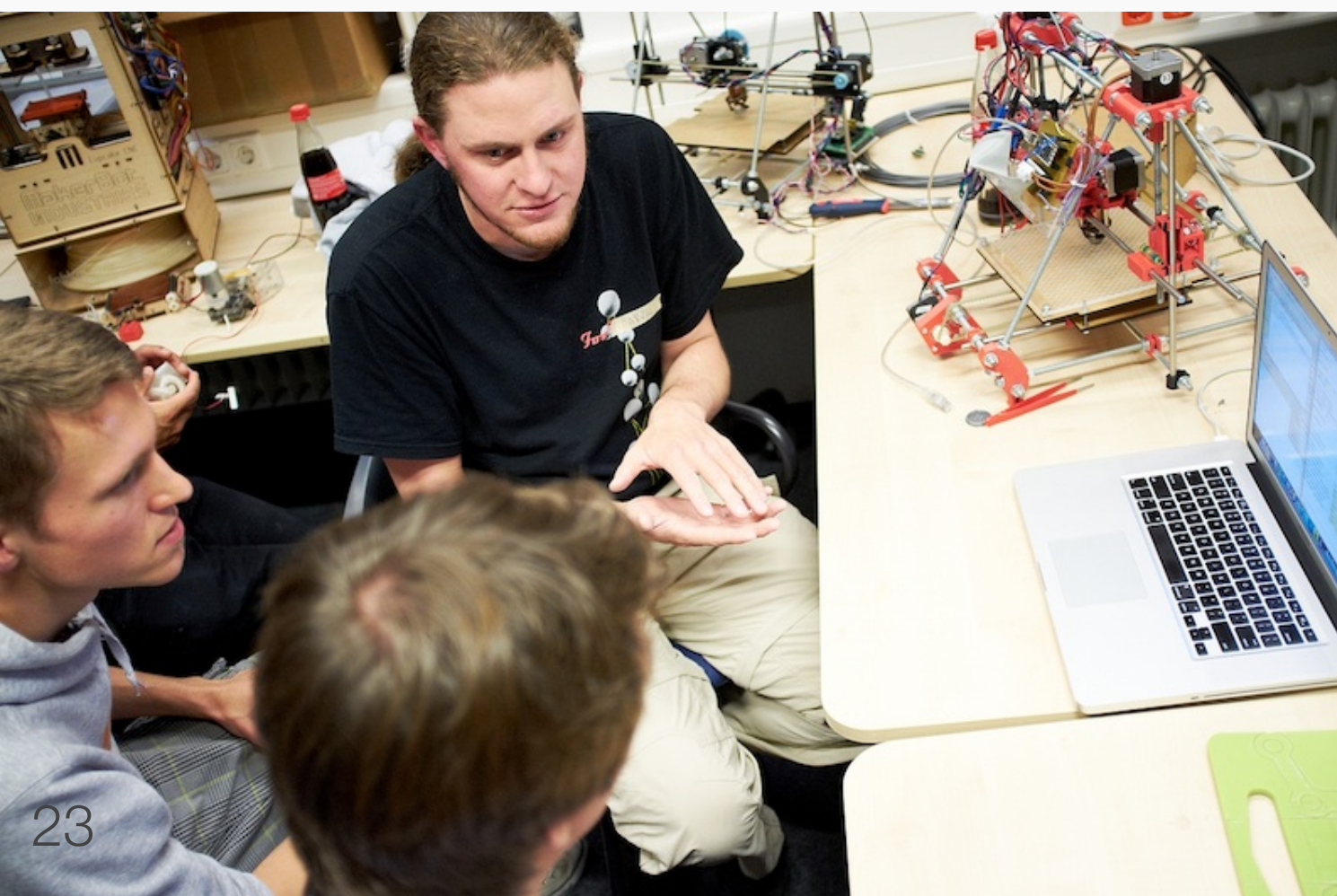


HaptiVest

<http://hci.rwth-aachen.de/haptivest>



- People doing strange things with electricity in Aachen
- Monthly — next meeting: Wednesday, **Oct. 18, 18:30** (Room 2222)
- <http://www.dorkbot.de>



CocoaHeads Aachen



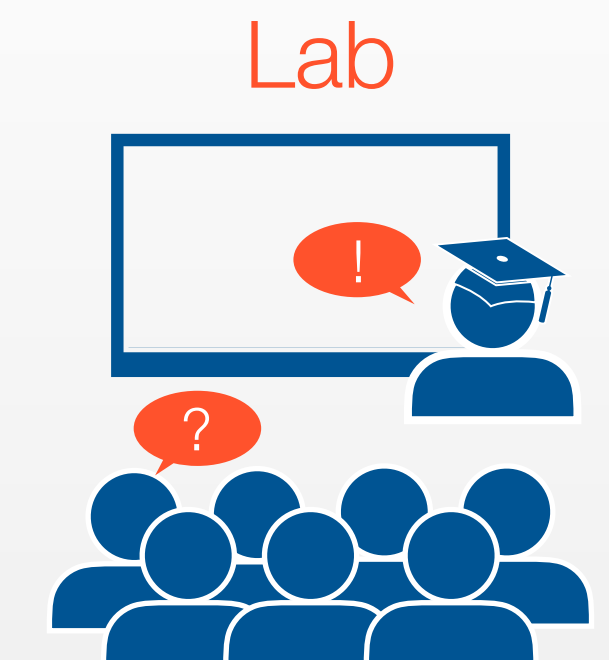
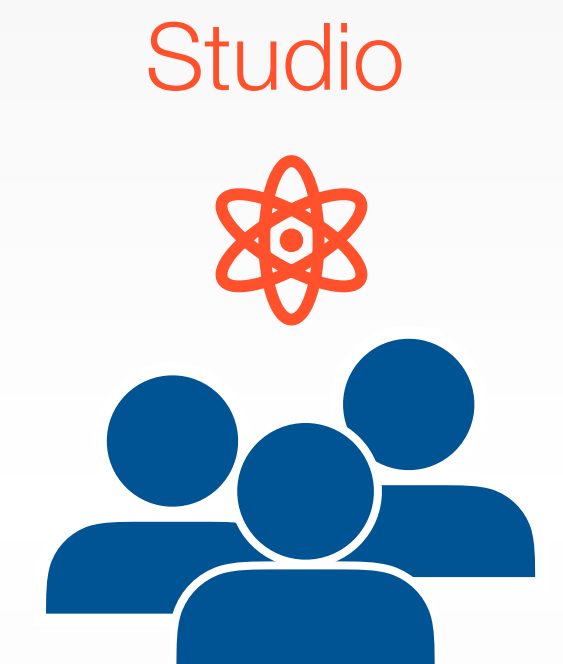
- CocoaHeads: International meet-ups about Apple's Cocoa Framework for macOS and iOS
- Next local meeting: Thursday, **Oct. 26, 19:00** (Room 2222)
- <http://www.cocoaheads.de>



DIS1: Class Structure

Flipped Classroom

- New format for DIS 1 this year
- At **Home**: Learn from videos with slides at your own pace (**2.5** h/wk), work on group assignments and project (**6** h/wk)
- In **Studio**: Work on group assignments and final project with one-on-one feedback (**1** h/wk)
- In **Lab**: Discuss solutions and new assignments, in-class exercises (**1.5** h/wk)



Credits and Grading

- Group-oriented, project-centered
- **6** ECTS Credits
 - 15% assignments, 25% project
 - 25% midterm: **Nov. 23, 2017, 14:00–16:30** (for 60 minutes)
 - 35% final exam: **Feb. 22, 2018, 08:00–10:30** (for 60 minutes)
- To pass the course,
 - You need to pass the final exam (at least 4.0), **and**
 - Overall, you need an average grade of at least 4.0
- Further details in the lab starting on Monday, **Oct. 16, 2017** at **12:15** in **5053.2a/b**

Registering for this Class

- Limited to **100 seats** (already >135 registrations)
 - Register via Campus Office **by the end of tomorrow (Thursday)**
 - We will announce who's in the next day (Friday)
 - DIS1 mandatory students (e.g., TK) get priority, rest will be randomized
 - B.Sc. students can take this class as elective,
or for their future M.Sc. (then don't register, send us an email!)
- Erasmus students: Email **Paulina** (reijsmeijer@cs.rwth-aachen.de) your TIM user ID

Registering for the Final Exam

- No need to register for the midterm
- No second chance midterm (unless you have a valid reason)
- You can register for just the second chance final exam directly (not recommended)
- Deadline to register: **Friday, Nov. 24 17, 2017, 23:59** (for both final exam dates)
 - If you fail the first final exam, there will be a short period to register for the second chance
 - B.Sc. students: you won't be registered for the second final exam automatically!



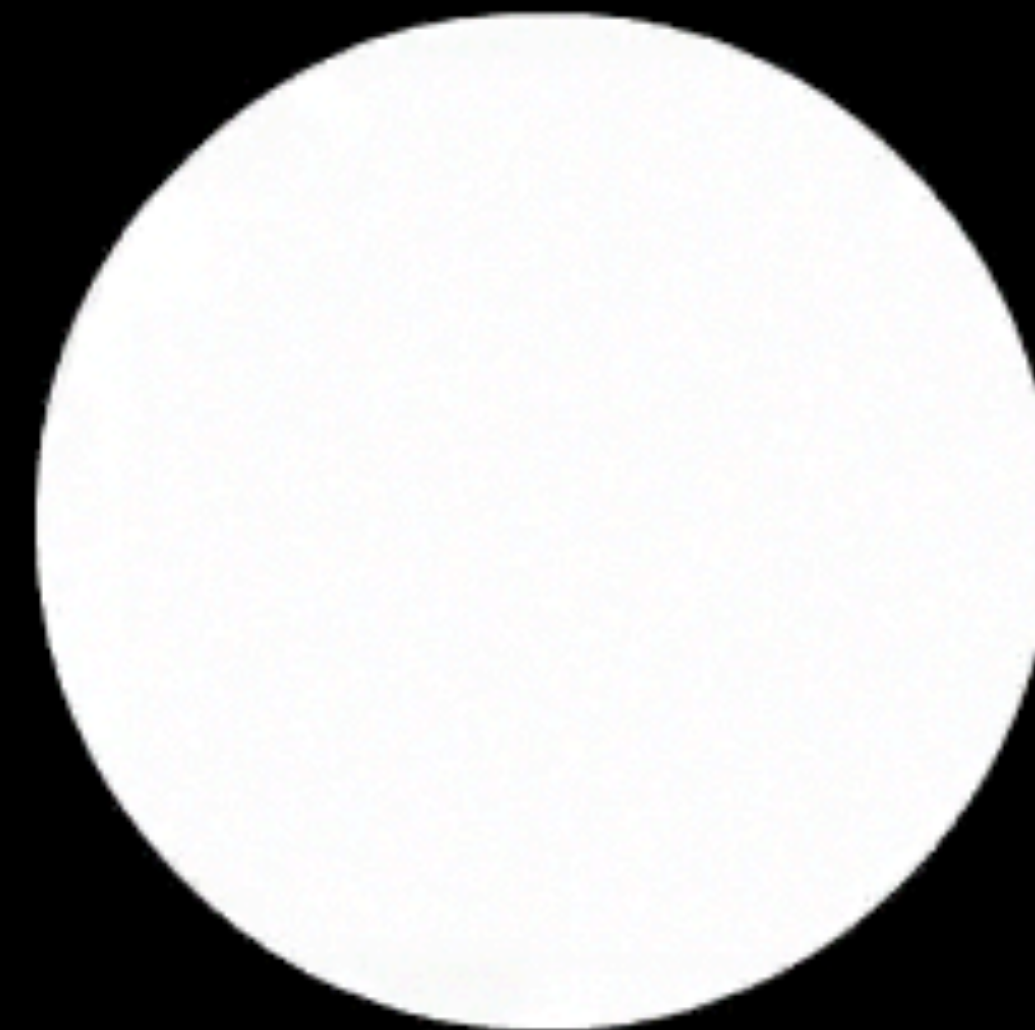
In-Class Experiment 1

- Work in pairs of 2
 - Read the paragraph handed out
 - Have your friend observe your eye movements while you're reading

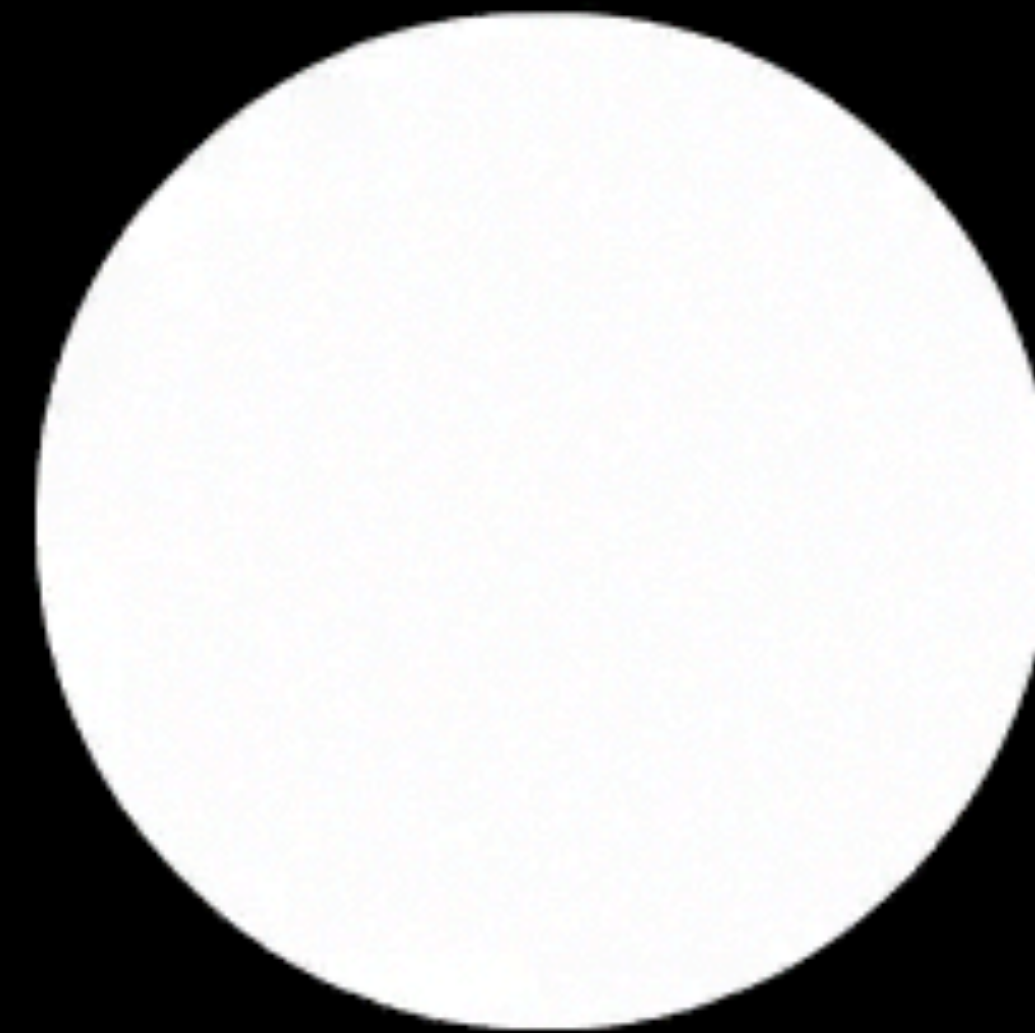
Read the text on the next slide.

Afterwards you will be asked a question about the information in the text.

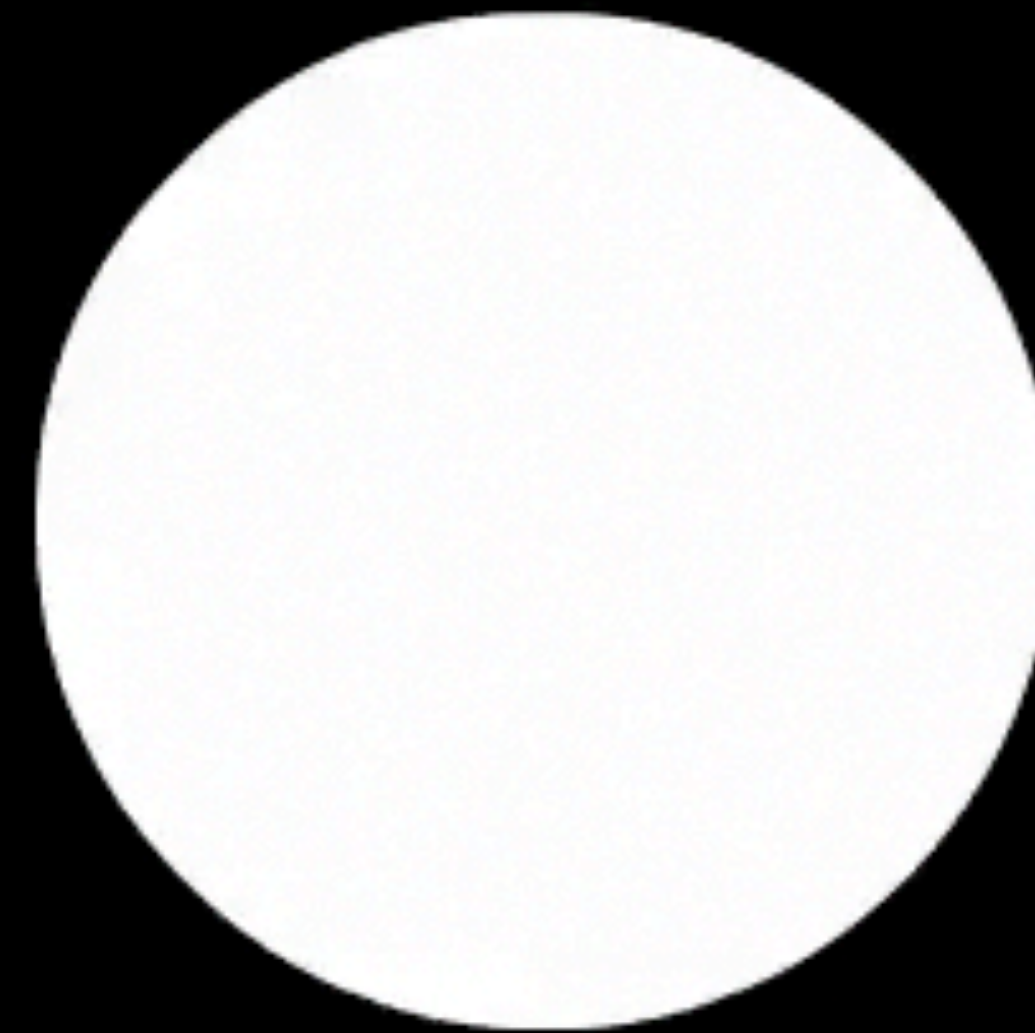
Press the SPACE bar once you have finished reading the text and are ready to answer the question.



Delay: 0ms



Delay: 50ms



Delay: 100ms

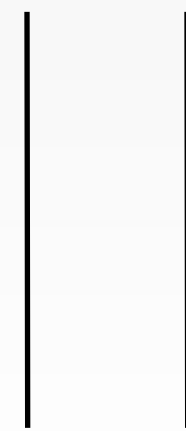
In-Class Experiment 2

- Digit experiment
 - Choose 5 digits secretly from your sheet, then read them to your neighbor.
 - Have her count backwards aloud from 50.
 - Have her answer some other question (like what she had for dinner 3 days ago).
 - Does she still remember the entire 5-digit sequence correctly?
- Switch roles, repeat with 9 digits.
- Finally, switching roles again, read the long sequence of numbers to your neighbor, stopping somewhere suddenly. See how many of the last numbers she can repeat immediately.



In-Class Experiment 3

1cm



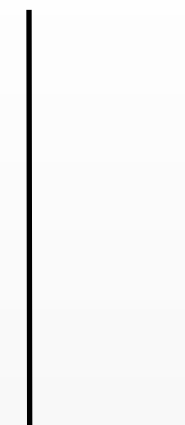
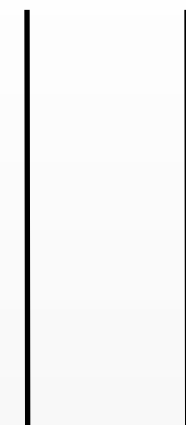
4cm



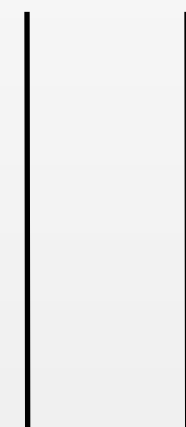
Same for 0.5cm and 2cm wide strips

Tap for 10s, count taps afterwards

8cm

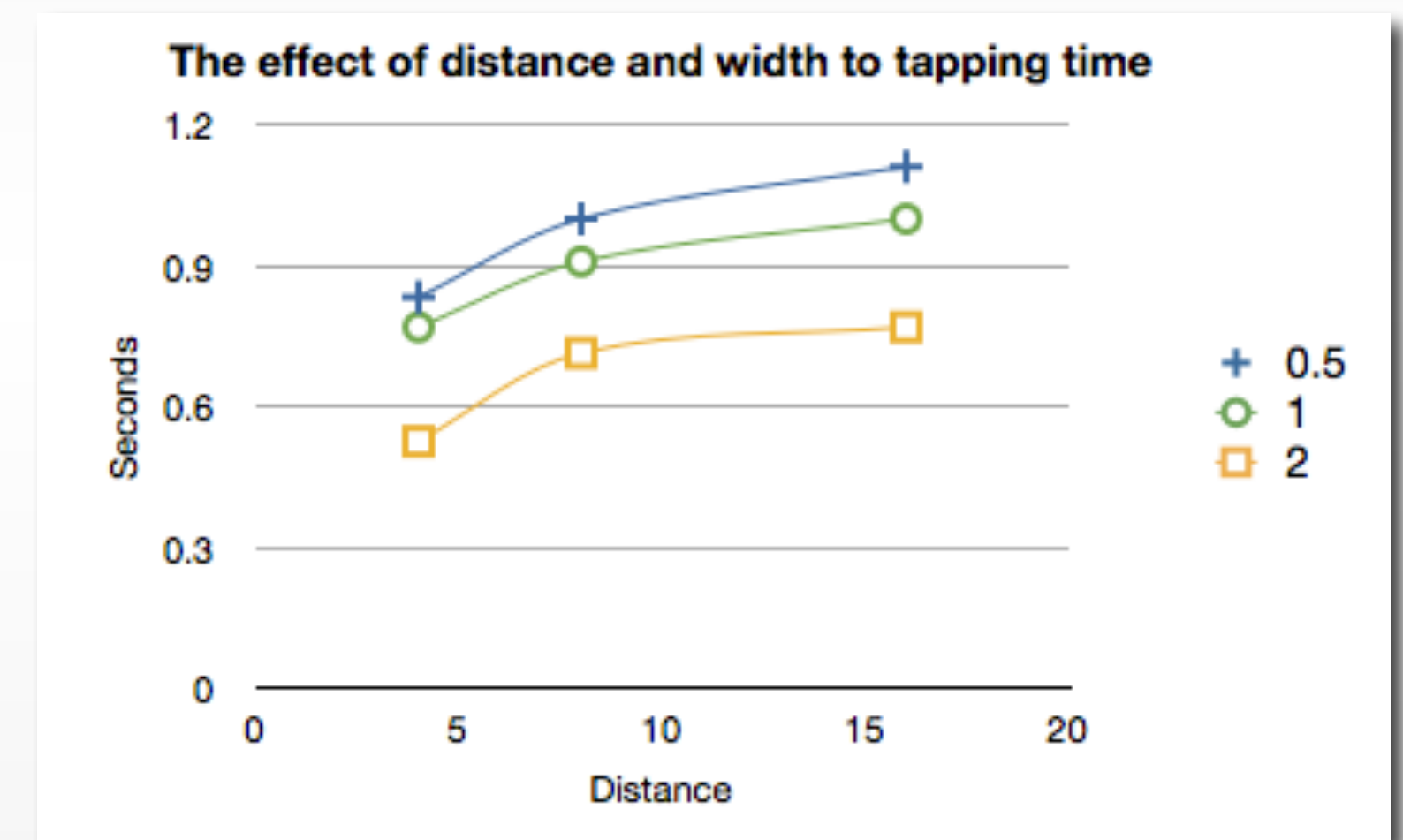


16cm



Tapping Task Results

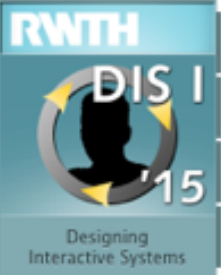
- Doubling the distance adds roughly a constant to execution time
⇒ indicates logarithmic nature
- Doubling the target width (W) gives about same results as halving the distance (D)
⇒ indicates connection of D/W in formula




Summary

- HCI is about people, technology, and design.
- This class is your ticket to our other classes, cool thesis projects, and HiWi jobs.
- You've experienced that mathematical laws seem to govern your perception, memory, and movement—watch the videos for answers!


Class Videos are on iTunes U & L2P




DIS I
'15
Designing Interactive Systems
RWTH Aachen U...




CTHCI
'15
Current Topics in Media Computing &
RWTH Aachen U...




KL II
'15
Konstruktionslehre II – SS 2015
RWTH Aachen U...




MG I
'15
Maschinengestaltung I – SS 2015
RWTH Aachen U...




DIS II
'15
Designing Interactive Systems
RWTH Aachen U...




KL I
'15
Konstruktionslehre I – WS 2014/15
RWTH Aachen U...




iOS Dev
'14
iPhone Application Programming WS
RWTH Aachen U...




DIS I
'14
Designing Interactive Systems
RWTH Aachen U...




CTHCI
'14
Current Topics in Media Computing &
RWTH Aachen U...




DIS II
'14
Designing Interactive Systems
RWTH Aachen U...



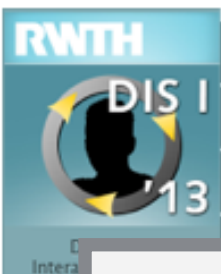
Orthocast
RWTH Aachen U...



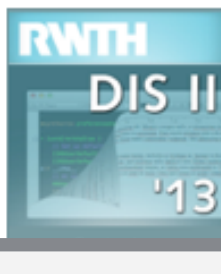
Java
'13
Programmierung für Alle (Java) '13
RWTH Aachen U...



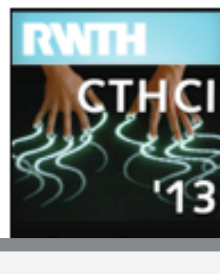
iOS Dev
'13
iPhone Application Programming WS
RWTH Aachen U...



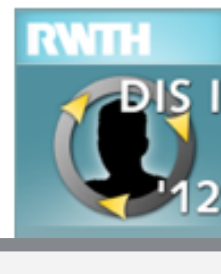
DIS I
'13
Designing Interactive Systems
RWTH Aachen U...



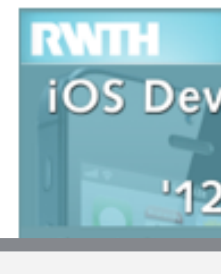
DIS II
'13
Designing Interactive Systems
RWTH Aachen U...



CTHCI
'13
Current Topics in Media Computing &
RWTH Aachen U...



DIS I
'12
Designing Interactive Systems
RWTH Aachen U...



iOS Dev
'12
iPhone Application Programming WS
RWTH Aachen U...

Name	Time	Released	Description	Popularity
1 S12 Notations Part 2	1 hr 31 min			
2 S11 GOMS, Interface Efficiency and Notatio...	1 hr 59 min			
3 S01 Introduction, CMN Model, Fitts's Law	1 hr 51 min		Introduction to the course, C... i	
4 S02 Gestalt Laws, Visibility, Affordances	2 hr 19 min			
5 S03 The Seven Stages of Action, Mappings, ...	1 hr 58 min			
6 S04 Knowledge in the Word and in the head,...	2 hr 16 min			
7 S05 History in HCI Part I	1 hr 31 min			
8 S06 History in HCI Part II	1 hr 38 min			
9 S07 DIA Cycle, Observing Users, Storyboards	2 hr 14 min			
10 S08 Prototyping	1 hr 33 min			
11 S09 Ten Golden Rules of Interface Design	2 hr 16 min			
12 S10 Evaluation with and without Users	2 hr 7 min			
13 Objectified	1 hr 3 min			

Total: 12 Items

Links to iTunes U for both DIS 1 and iOS Application Development are on the class landing pages

Note: For the first week, please access videos and slides via Gigamove (link is on the class landing page)



What to Do Now

- **By end of tomorrow, register** for the **course** on Campus—selection results will be announced this Friday.
- Also check out other classes this week—please deregister if you’re not taking DIS 1
- **Before coming to the Lab on Monday** (Oct. 16, 12:15-13:45, 5053.2a/b):
 - **Watch** videos for the first week on iTunes U (see the class landing page)
 - **Read** Dix’ *Human-Computer Interaction*, ch. “The Human” (pp. 11–59) (see the class landing page)
 - **Buy** Don Norman’s *The Design of Everyday Things* (**required**)
- **Come to next Studio: Wednesday** (Oct. 18, 10:00–11:45, Room 5053.2a/b)

