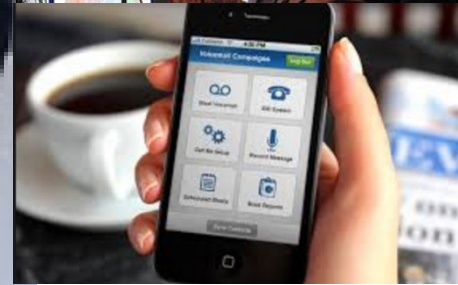




Universidade de Aveiro  
Departamento de Electrónica,  
Telecomunicações e Informática

# Human-Computer Interaction 2020/21



**Beatriz Sousa Santos**

# Outline

- Introduction
- Course Information
- Lectures and lab classes organization
- Lectures and lab classes schedule
- Assessment
- Bibliography

“ the HCI discipline investigates and tackles all issues related to the design and implementation of the interface between humans and computers. “

“It expanded from early graphical user interfaces to include myriad interaction techniques and devices, multi-modal interactions, ..., and a host of emerging ubiquitous, handheld and context-aware interactions”

Carroll, John M., “Human Computer Interaction - brief intro”. In: Soegaard, Mads and Dam, Rikke Friis (eds.). "The Encyclopedia of Human-Computer Interaction, 2nd Ed.". Aarhus, Denmark: The Interaction Design Foundation.

[https://www.interaction-design.org/encyclopedia/human\\_computer\\_interaction\\_hci.html](https://www.interaction-design.org/encyclopedia/human_computer_interaction_hci.html)

# Interaction and Interface

“Roughly speaking, interaction refers to an abstract model by which humans interact with the computing device for a given task, and an interface is a choice of technical realization (hardware or software) of such a given interaction model.”

(Kim, 2015)

“The interface between humans and computers is harder than ever to define, we can interact with computers just by walking through a public space.”

Sellen, A., Rogers, Y., Harper, R., & Rodden, T., “Human Values in the Digital Age”, *Communications of the ACM*, 52(3), March 2009, pp. 58–66



- “What will Human - Computer Interaction (HCI) be like in 20 years?”
- “That question is important because HCI ... has a **pivotal part to play in the 21st**, when computers will become so **pervasive** that how humans interact with them will be a crucial issue for society”



# About this course:

Main objectives you should attain:

- understanding of what is Human-Computer Interaction
- understanding the importance of the User Interface (UI) of an interactive system;
- knowledge of the fundamental concepts, methods and techniques for the:
  - design
  - implementation
  - evaluation of Interactive Computer Systems

# Course information

- Web
  - <http://sweet.ua.pt/bss>
  - More materials in moodle.ua.pt
- Team:
  - Beatriz Sousa Santos
    - bss@ua.pt
  - Paulo Dias
    - Paulo.dias@ua.pt
  - Pedro Almeida
    - pma@ua.pt
  - Fábio Barros
    - fabiodaniel@ua.pt

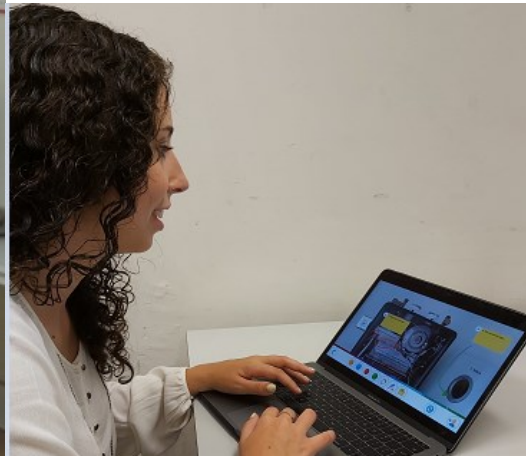


# Lectures and Lab classes

Lectures - slides, discussion and paper presentation

Lab classes – design, implementation and evaluation of User Interfaces (UIs) and interactive systems

- participation in user studies (if possible ...)



You will have the opportunity to:

Learn the fundamentals of this pivotal field

Attend the presentation of cutting edge research

Test and use new interaction and display equipment

Develop for various platforms

Perhaps participate in user studies



## Attending lectures and lab classes

- Attending lectures will help you in several ways.
- Attending face-to-face lab classes is mandatory, will be registered formally and you cannot pass if you do not have the minimum required (80%).
- Working students must contact faculty members during the two first weeks of the semester

## Lab classes (subjected to minor changes)

- Introduction to the Lab classes.
- **Assignment n.1 (evaluate an interactive system) (groups of 3 students)**
- Evaluation of Uis/Interactive systems using analytical methods
- **Presentation and discussion of assignment n. 1.**
- **Assignment n.2 (develop a prototype of an interactive system) (3 students)**
- Human-Centered approach to design and develop interactive systems: requirements analysis; prototyping and evaluation
- Introduction to Android Studio
- Introduction to Web programming
- **Presentation and discussion of assignment n. 2**

# Lectures (subject to minor changes)

## Wednesdays

- **1-** Introduction to the course
- **2-** Definition of User Interface (UI), Usability and UX principles and paradigms
- **3-** The user: the Human Information Processing System (HIPS)
- **4-** The user (cont). Mental models and conceptual models
- **5-** Dialog Styles: Menus and direct manipulation
- **6-** Other dialog styles
- **7-** Introduction to User-Centered Design and S/W patterns for UIs
- **8-** Models for UI design
- **9-** Models for UI design (cont)
- **10-** Screen Layout. Color models and color usage
- **11-** Evaluation methods (more detailed study)
- **12-** Input devices
- **13-** Output devices
- **14-** Introduction to 3DUI: Mixed, Virtual and Augmented Reality
- **15-** Paper presentation

Devices that can be  
used in the lab  
classes



# Assessment

**Final Mark -> Exam (50%) + group assignments (50%)**

Minimum mark in each component – 7.5/20

- paper presentation (10%) + assignment n. 1 (10%) + assignment n.2 (30%)
- paper from a conference -> 15 min presentation (groups of 2 students)
- assignment n. 1: **evaluation with analytic methods** -> presentation, demo and discussion (groups of 3 students)
- assignment n. 2: design, implementation and test of a interactive prototype following **User Centered Design** -> presentation, demo, discussion (groups of 3 students)

# Bibliography

- Sharp, H., Preece, J., and Rogers, Y., Interaction Design- beyond Human-Computer Interaction, Wiley, 2019
- Dix, A., J. Finley, G. Abowd, B. Russell, *Human Computer Interaction*, 3rd. ed., Prentice Hall, 2004
- Kim, G. J., Human–Computer Interaction-Fundamentals and Practice, CRC Press, 2015
- Cooper, A. et al., About Face 4: The Essentials of Interaction Design, 4<sup>th</sup> ed., Wiley, 2014
- Shneidermen, B., *Designing the User Interface, Strategies for Effective Human-Computer Interaction*, 6th ed., Addison Wesley, 2016
- Soegaard, M. and, Rikke Friis, D.(eds.). "The Encyclopedia of Human-Computer Interaction, 2nd Ed.". Aarhus, Denmark: The Interaction Design Foundation.  
[https://www.interaction-design.org/encyclopedia/interaction\\_design.html](https://www.interaction-design.org/encyclopedia/interaction_design.html)
- Mitchell, P., *A Step-by-step Guide to Usability Testing*, iUniverse, 2007
- Nielsen, J., *Usability Engineering*, Academic Press, 1993



# Portuguese bibliography

- Manuel J. Fonseca, Pedro Campos, Daniel Gonçalves, *Introdução ao Design de Interfaces*, FCA, 2012

# Paper presentation assignment (groups of two students)

- Wednesday 9h-11h – 33 paper presentations
- Wednesday 13h -15h - 33 paper presentations

This year you may read and present papers from one of these conferences



ACM/IEEE International Conference on Human-Robot Interaction

<http://humanrobotinteraction.org/2020/>



<https://mobilehci.acm.org/2020/>



<http://ieeevr.org/2020/>

- Volunteers to present a paper next week?



Note that:

- Volunteers have absolute priority in selecting the paper
- And will have this assignment done (10% of final mark) soon in the semester !

## Until March 18

Each group of two students should:

- select paper (with  $\geq 8$  pages) from the conference proceedings (HRI2020, MobileCHI2020 IEEEVR2020, ISMAR2020)
- indicate the preferred paper via a form and select the date via doodle
- wait for approval of the paper and date (posted on Moodle)
- read the paper presentation guidelines (available at the course web page)
- prepare a 15 min presentation (~15 slides)
- submit the slides to [bss@ua.pt](mailto:bss@ua.pt) before the lecture at the defined date

“ the HCI discipline investigates and tackles all issues related to the design and implementation of the interface between humans and computers. “

Some Present and Future trends:

Gesture interfaces

Large public displays

Virtual and augmented reality

Brain-computer interfaces

Human-Robot interfaces

Natural Conversational Speech Interfaces

Affective States and Human-Computer Interactions

...

P Montuschi, P., Sanna, A., Lamberti, L, and Paravati, G., "Human-Computer Interaction: Present and Future Trends," *Computing Now*, vol. 7, no. 9, September 2014

<http://www.computer.org/web/computingnow/archive/september2014>

- For the next week:
  - Select the presentation dates you prefer via doodle
  - And the papers you prefer via google form
  - Think about two interactive systems/applications to evaluate

Good luck with your work !