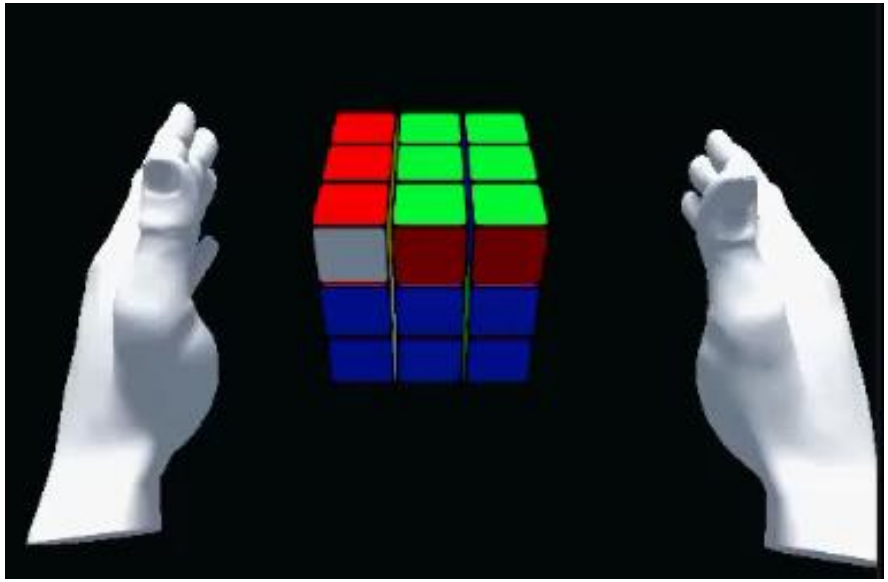
Universidade de Aveiro
Departamento de Electrónica,
Telecomunicações e Informática

Human-Computer Interaction



Beatriz Sousa Santos, 2015/2016

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”

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

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

- "As popular computing has grown, the role of HCI has increased. Most software today is interactive, and code related to the interface is more than half of all code."

- "HCI also has a key role in application design. In a consumer market, a product's success depends on each user's experience with it. Unfortunately, great engineering on the back end will be undone by a poor interface, and a good UI can carry a product in spite of weaknesses inside."

- "Innovation in the product is a nice virtue, but it's an option in terms of marketability. Usability is not."

Canny, J.,The Future of HCI, ACM Queue, Jul.-Aug., 2006, pp.25-32

- "Those of us who deal with user interfaces tend to think primarily in terms of computer programs. But user interface problems in the real world are often worse since the real world is not nearly as malleable as the computer world. An ideal solution, even if we know what it is, might not be practical to implement."

- "The real world is just as much a nuisance to design for as the computer world, and maybe more."

Blinn, J, "User Interface Stories from the Real World", *IEEE Computer Graphics and Applications*, Jan./Feb, 2005, pp.92-93

"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 the year 2020?

- “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”

http://research.microsoft.com/en-us/um/cambridge/projects/hci2020/reading.html

About this course:

Main objectives you should attain:

- 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

- Code:
  - 41549 – 6 ECTS
- Web
  - http://sweet.ua.pt/bss
  - Materials also in moodle.ua.pt
- Responsible:
  - Beatriz Sousa Santos
    - IEETA, gab 1.17
    - bss@ua.pt
  - Paulo Dias
    - IEETA, gab 0.05
    - paulo.dias@ua.pt
  - Joaquim Madeira
    - IEETA, gab 1.11
    - jmadeira@ua.pt

Lectures and Lab classes

Lectures - slides, discussion and paper presentation

Lab classes – design, implementation and evaluation of User Interfaces (UIs) and interactive applications
participation in user studies

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

Participate in user studies and usability tests

Attending lectures and lab classes

- Presence in lectures will help you in several ways.
- Presence in lab classes is mandatory and will be registered formally and you cannot pass if you do not have the minimum required (80%).

  [Mondays 13 classes – must attend 11]

  [Tuesdays 15 classes – must attend 12]
- Students that have a full time job must contact responsible faculty members during the two first weeks of the semester

Lectures (subject to minor changes)

(TP1, TP2)

1 (15,16/02/16) - Introduction to the course and to Human-Computer Interaction
List of papers to be presented by the students

2 (22,23/02/16) - Usability Principles and paradigms
Paper presentation guidelines. Presentation of papers

3 (29/02,1/03/16) – The User: Human Information Processing System (HIPS)
Presentation of papers

4 (07,08/03/16) – The User (cont.) Mental models. Conceptual models
Presentation of papers

5 (14,15/03/16) – Dialog styles: a classification. Menus and Direct manipulation
Presentation of papers

W1 (29/03/16) – (only Tuesday) - Workshop on Human-Robot Interaction

6 (4,5/04/16) – Other dialog styles
Presentation of papers

(TP1,TP2)

7 (11,12/04/16) – Screen Layout. Color models and color usage

Presentation of papers

8 (18,19/04/16) – . The Interactive S/W lifecycle. Models for UI design: user models

Presentation of papers

W2 (26/04/16) – (only Tuesday) - Workshop on 3D User Interfaces

9 (02,03/05/16) – Models for UI design: task analysis and dialog notation

Presentation of papers

10 (16,17/05/16) – Models for UI design: task analysis and dialog notation (cont.)

Presentation of papers

11 (23,24/05/16) – Input/output devices

Presentation of papers .

12 (30,31/05/16) – Input/output devices

Presentation of papers

13 (02,03/06/16) –. UI evaluation

Presentation of papers

Lab classes (subject to minor changes)

Monday; Tuesday

1 (15,16/02/16) – Introduction to the Lab classes

2 (22,23/02/16) - Evaluation of UIs using Heuristic Evaluation and Cognitive Walkthrough.
Practical assignment n.1

3 (29/02,1/03/16) – Evaluation of UIs using Observation. Usability testing.

4 (07,08/03/16) – Presentation and discussion of assignment n. 1.
Submission of assignment n.1

5 (14,15/03/16) – UI design and implementation. Introduction to event driven programming - Visual C#

TO1 (29/03/16) – (Tuesday only) UI design and implementation.
Practical assignment n.2
Introduction to event driven programming - Visual C#

Monday; Tuesday

6 (04,05/04/14) – UI design and implementation - Visual C#

7 (11,12/04/16) – UI design and paper prototyping

8 (18,19/04/16) – UI design and implementation- implementation in Visual C#

TO2 (26/04/16) – (Tuesday only)

9 (02,03/05/16) – UI implementation- Introduction to other tools

10 (16,17/05/16) – UI design and implementation- Usability test

11 (23,24/05/16) – UI design and implementation
Submission of assignment n.2

12 (30,31/05/16) – Presentation, demo and discussion of practical assignment n.2

13 (02,03/06/16) – Presentation, demo and discussion of practical assignment n.2 (cont)

Assessment

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

Minimum mark in each part – 7.5/20

- paper presentation (10%) + assignment n. 1 (5%) + assignment n.2 (35%)

- paper to select from a conference -> 15 min presentation
- assignment n. 1: heuristic evaluation -> presentation, demo and discussion
- assignment n. 2: design and implementation of a UI -> presentation, demo discussion and report

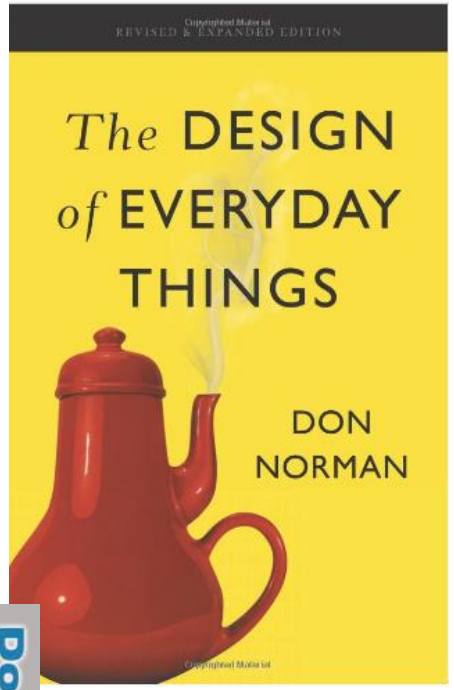
Main bibliography

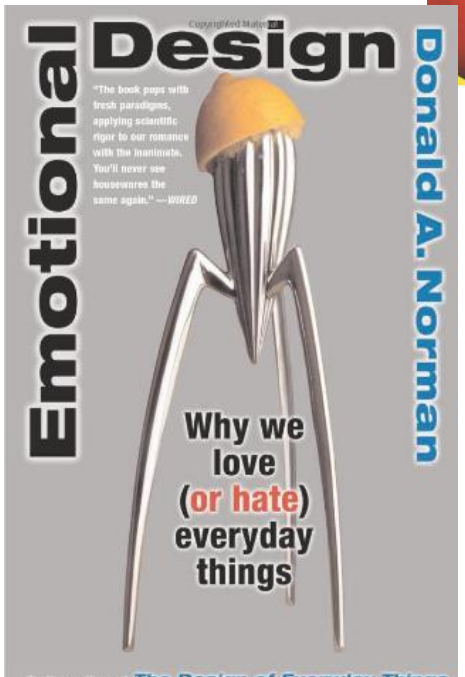
- **Dix, A., J. Finley, G. Abowd, B. Russell, *Human Computer Interaction*, 3rd. ed., Prentice Hall, 2004**
- **Mayhew, D., *The Usability Engineering Lifecycle*, Morgan Kaufmann, 1999**
- Soegaard, M. and, Rikke Friis, D.(eds.). "The Encyclopedia of Human-Computer Interaction, 2nd Ed.". Aarhus, Denmark: The Interaction Design Foundation. https://www.interaction-design.org/encyclopedia/interaction_design.html
- Shneidermen, B., *Designing the User Interface, Strategies for Effective Human-Computer Interaction*, 3rd ed., Addison Wesley, 1998
- Preece, J., Y. Rogers, H. Sharp, D. Benyon, S. Holland, T. Carey, *Human Computer Interaction*, Addison Wesley, 1994
- **Mitchell, P., *A Step-by-step Guide to Usability Testing*, iUniverse, 2007**
- Nielsen, J., *Usability Engineering*, Academic Press, 1993
- Newman, W., M. Lamming, *Interactive System Design*, Addison Wesley, 1995

Interesting books

- Donald Norman, The design of everyday things, Basic Books, Revised Edition, 2013

- Donald Norman, Emotional Design: Why We Love (or Hate) Everyday Things, Basic Books, 2010





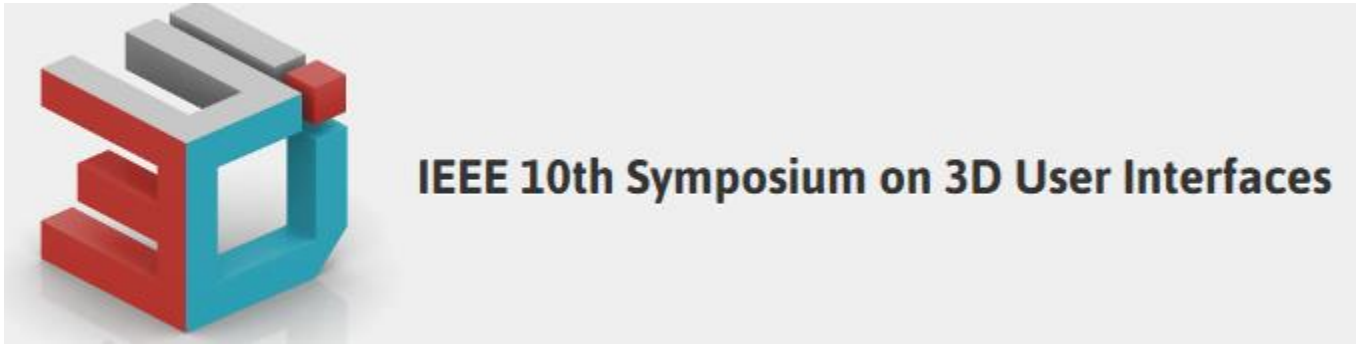
Reading and presenting a conference paper

Monday and Tuesday lectures: CHI 2015

Conference on Human Factors in Computing Systems

Tuesday Workshops:

- **HRI**
- **3DUI 2015**



Paper presentation assignment (groups of two students)

- Monday lectures - 24 paper presentations (papers from CHI 2015)
- Tuesday lectures – 24 paper presentations (papers from CHI 2015)
- Tuesday Workshops:

  March 29 – Human-Robot Interaction – 6 paper presentations
  (papers from HRI or specific sessions of CHI2015)

  April 26 – 3D User Interfaces – 6 paper presentations
  (papers from 3DUI 2015 or specific sessions of CHI2015)

- 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 February 23:

Each group (two students) should:

- select paper (with >=8 pages) from the conference proceedings
  (CHI2015, HRI or 3DUI 2015 according the date selected)

- indicate the preferred paper via a form and select the date via doodle

- wait for approval of 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 before the lecture at the defined date

Paper and date selection

- Paper selection – through the form:

https://docs.google.com/forms/d/1nOfJT8ato0XqSWoVDKJgwSdDgZZQ-2pDmgqtfnRdO_8/viewform

- Date selection – through the following doodles

Monday lectures: http://doodle.com/poll/8g28vidvmwrg9t2y

Tuesday lectures: http://doodle.com/poll/66ap9rvpeevcpr2m

Tuesday workshops: http://doodle.com/poll/ty3e8x6vpzntggf

Monday and Tuesday lectures:

Select a paper from the Proceedings: http://dl.acm.org/citation.cfm?id=2702123

CHI 2015
Conference on Human Factors in Computing Systems

Conference site:
https://chi2015.acm.org/

Videos of keynote speakers:

https://chi2015.acm.org/program/keynotes/

NOTE: there is a file in Moodle with a list of recommended sessions

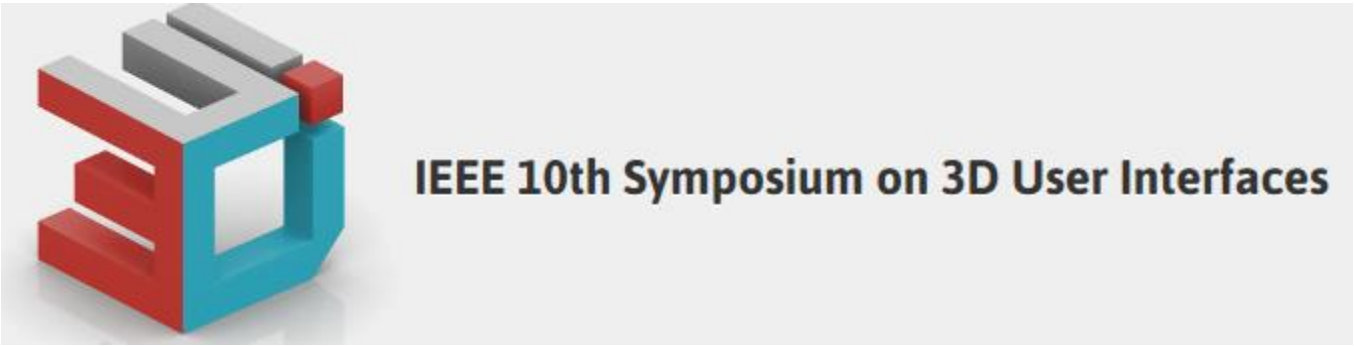
Tuesday Workshop on Human-Robot Interaction:

HRI14
Human-Robot Interaction @ Bielefeld University

March 03–06
9th ACM/IEEE International Conference on Human-Robot Interaction

Select a paper from the list of past contributions (>=8pages):
http://humanrobotinteraction.org/2016/authors/full-papers/themes-for-submissions/

Tuesday Workshop on 3D User Interfaces:



Select a paper (>= 8pages) from 3DUI 2015 proceedings:
http://ieeexplore.ieee.org/xpl/mostRecentIssue.jsp?punumber=7114633

Example: Selecting a paper from CHI 2015

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Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems

General Chairs: Bo Begole — Huawei, USA
Jinwoo Kim — Yonsei University, Korea
Program Chairs: Kori Inkpen — Microsoft Research, USA
Woontack Woo — KAIST, Korea

2015 Proceeding

1- To access the Conference proceedings follow the link:

http://dl.acm.org/citation.cfm?id=2702123

and select the Table of Contents tab

Abstract | Source Materials | Authors | References | Cited By | Index Terms | Publication | Reviews | Comments | Table of Contents

Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems

Table of Contents

previous proceeding | no next proceeding

SESSION: **Non-Rigid Interaction Surfaces**

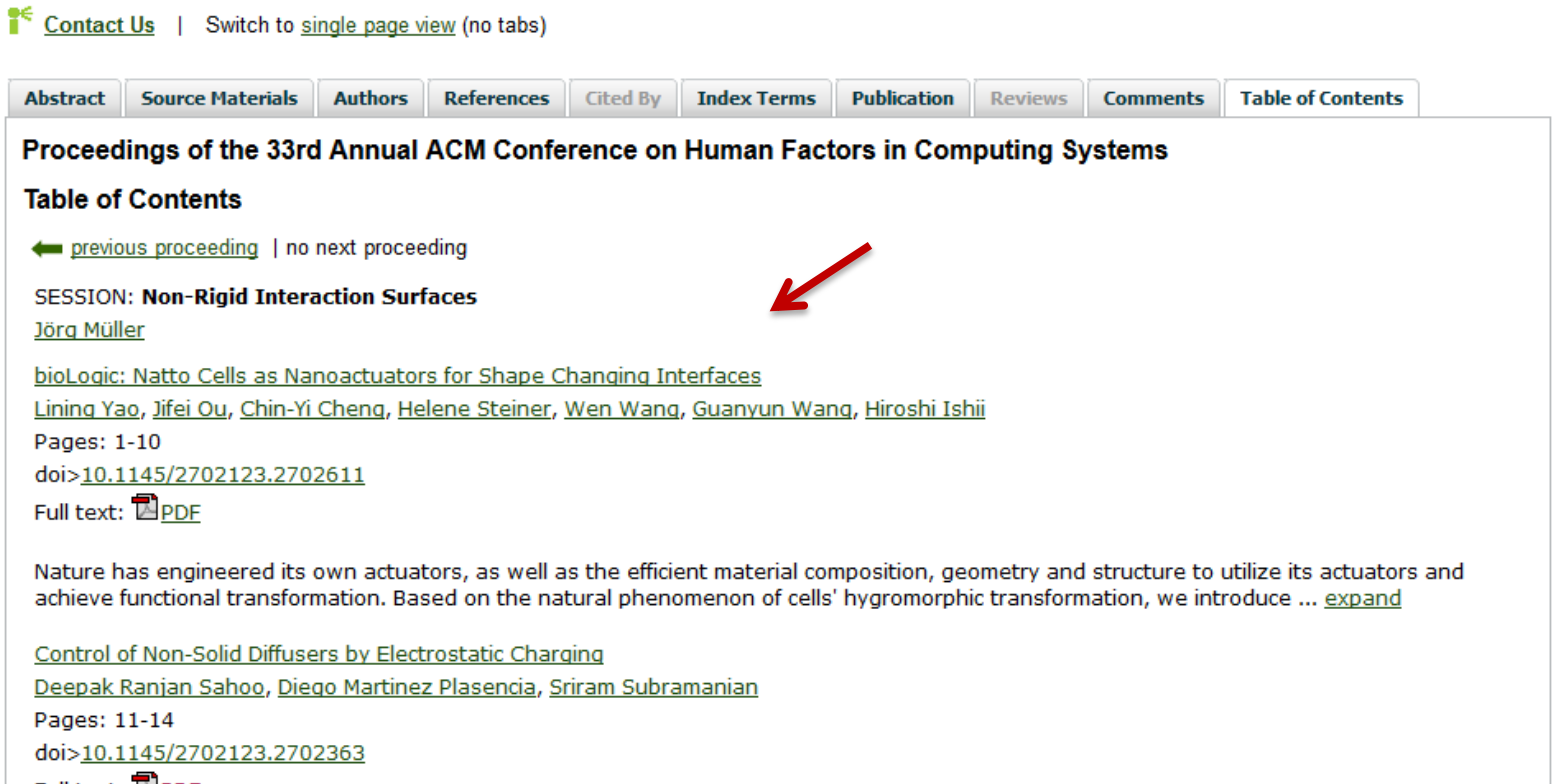
Jörg Müller

2- Browse the proposed Sessions (a list is available in Moodle)

and select a few papers that you might like to read

3- Read the abstracts

For example: if you select the first paper of the first session



Follow the link and read the abstract

Abstract | Source Materials | Authors | References | Cited By | Index Terms | Publication | Reviews | Comments | Table of Contents

Nature has engineered its own actuators, as well as the efficient material composition, geometry and structure to utilize its actuators and achieve functional transformation. Based on the natural phenomenon of cells' hygromorphic transformation, we introduce the living Bacillus Subtilis natto cell as a humidity sensitive nanoactuator. In this paper, we unfold the process of exploring and comparing cell types that are proper for HCI use, the development of the composite biofilm, the development of the responsive structures, the control setup for actuating biofilms, and a simulation and fabrication platform. Finally, we provide a variety of application designs, with and without computer control to demonstrate the potential of our bio actuators. Through this paper, we intend to enable the use of natto cells and our platform technologies for HCI researchers, designers and bio-hackers. More generally, we try to encourage the research and use of biological responsive materials and interdisciplinary research in HCI.

4- Download the pdf of your preferred paper

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bioLogic: Natto Cells as Nanoactuators for Shape Changing Interfaces

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Authors:

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Hiroshi Ishii	Massachusetts Institute of Technology, Cambridge, MA, USA

2015 Article

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· Citation Count: 1

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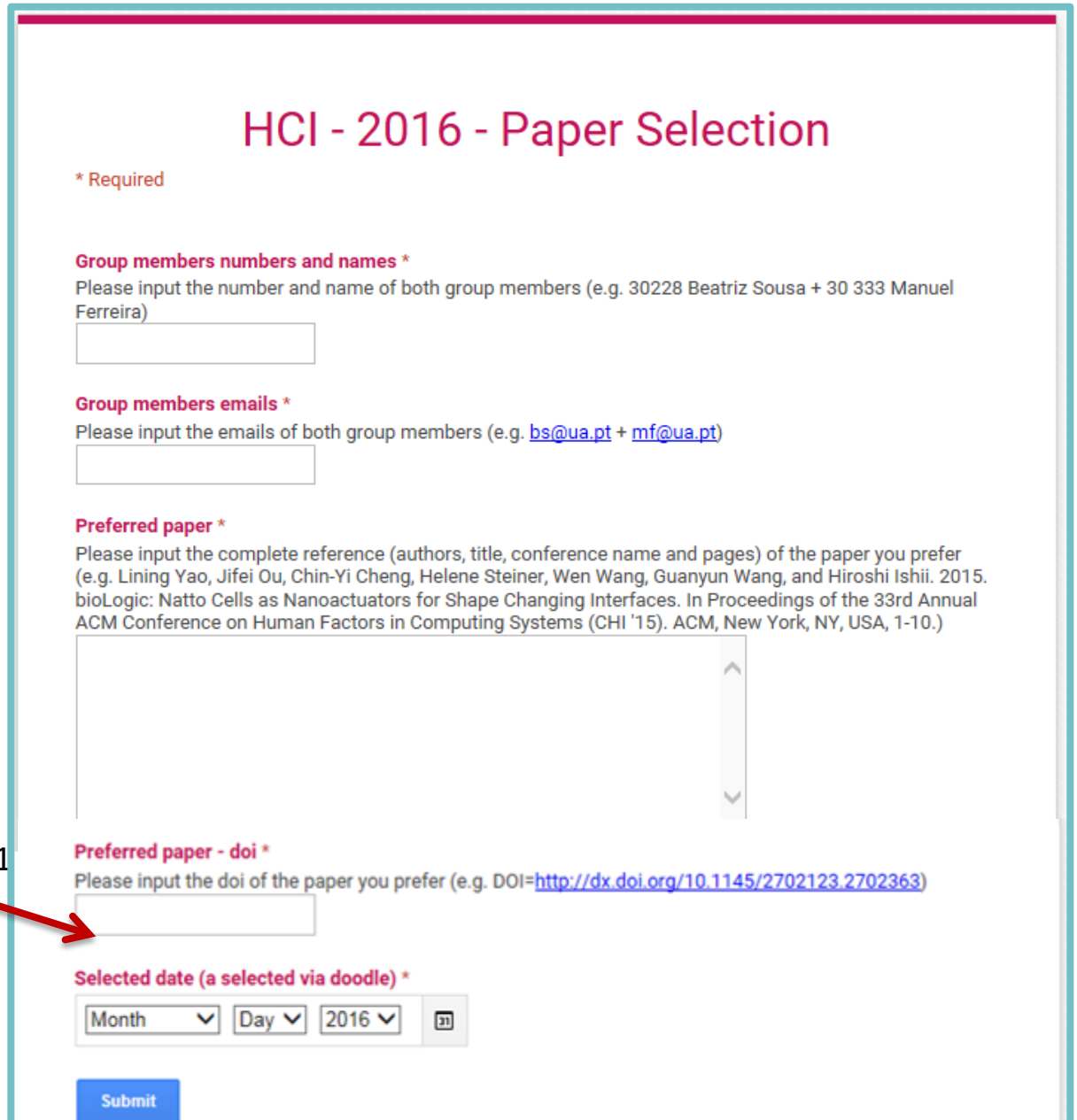
https://docs.google.com/forms/d/1nOfJT8ato0XqSWoVDKJgwSdDgZZQ-2pDmgqtfnRdO_8/viewform

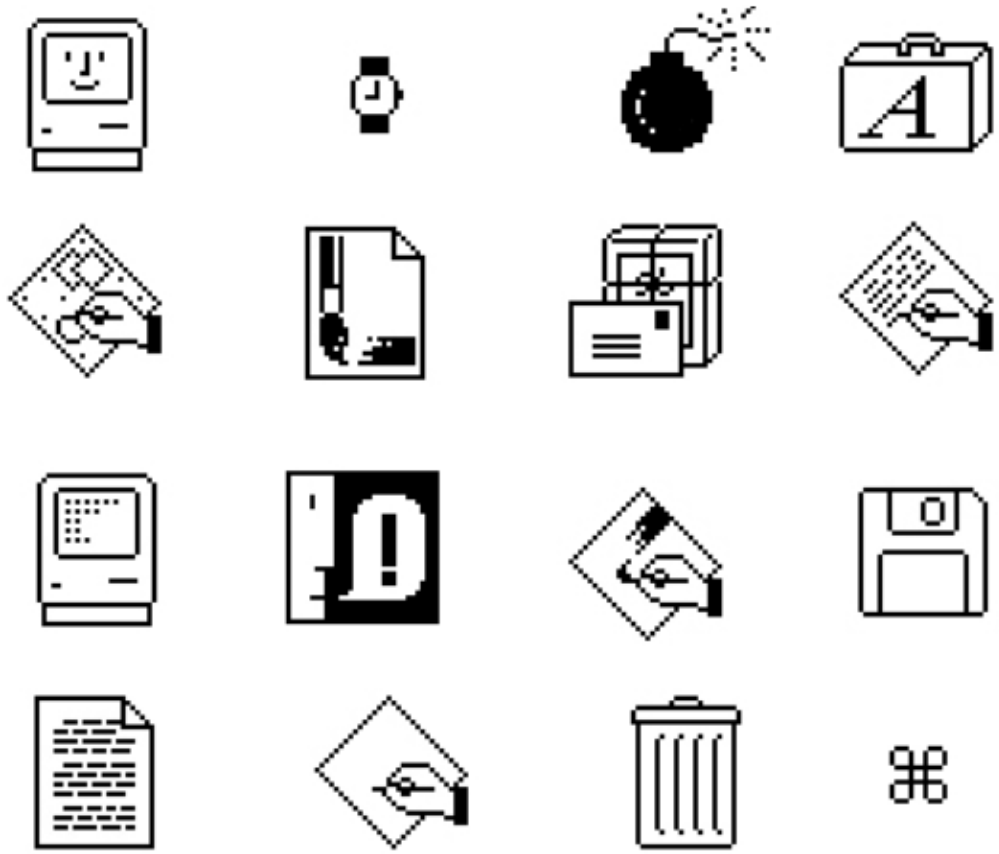
7- Select a date via doodle
(links available in Moodle)

8 – Wait for approval
(a list of approved papers
will be posted in Moodle)

http://dx.doi.org/10.1145/2702123.2702611



The past of HCI



Brad A. Myers. "A Brief History of Human Computer Interaction Technology." *ACM interactions*. Vol. 5, no. 2, March, 1998. pp. 44-54

“ 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 papers you prefer via google form
  - and the presentation dates you prefer via doodle

Good luck with your work !