Current Topics in Media Computing and HCI
S01 Research Contributions in HCI Part 1

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

Summer term 2018

http://hci.rwth-aachen.de/cthci
Goals

• Understand **types of research and methods in HCI**

• Practice how to **retrieve** and **evaluate** information from the literature
  ⇒ Preparation for thesis and future (research) work

• Learn about **up-to-date developments** in Human–Computer Interaction and interactive multimedia from new books and **recent conference/journal articles**

• Meeting PhD students at the lab and learning about their research areas to find a favorite topic and **advisor for your thesis**
Topics for 2018

- Research topics
  - Bendable Displays
  - Statistical Tools in HCI
  - Force Input
  - AR Interaction
  - Smart Textiles
  - Touch and Tangibles on Large Interactive Surfaces
  - Personal Fabrication topics

- Research literacy
  - Research contributions and approaches in HCI
  - Experimental research and user study protocol
  - Peer-review process
  - Statistics in HCI research
Flipped Classroom

• More interaction, in-class exercises, face-to-face feedback, and Studio-like work on a research project in class

• Content from frontal lectures made available as video clips organised by topic: Learn at your own pace
  • Some topics will stay frontal lectures

• You can help us make this work through feedback and active participation
Current Topics in Media Computing and HCI

• Audience
  • M.Sc. Computer Science
  • M.Sc. Media Informatics
  • M.Sc. Software Systems Engineering
  • B.Sc. Computer Science (extra credit / carry-over)
  • B.Sc. / M.Sc. Technical Communication (with focus on CS/HCI research)

• Prerequisite: DIS I
  • In our studios, assignments, and exams we assume that you know DIS I
Literature Sources

• Recent conference papers
  • CHI, UIST, ISS, DIS, Ubicomp,…

• Recent journal articles
  • TOCHI,…

• Older seminal papers
Literature Sources

• Recent books
  • Research Methods in HCI (Lazar et al., 2010)
    • Highly recommended reading for more details about evaluation methods—especially if you are considering to do your thesis at our chair!
  • Research Methods for the Behavioral Sciences (Gravetter and Forzano, 2015)
    • Further recommended reading for more details about experimental research methods
Administrative

• Format: 6 ECTS
• Studio: Tuesdays, 10:15–11:45
• Lab: Wednesdays, 14:15–15:45

• In-class exercises
• Working on your group assignments and mini HCI research project
• Face-to-face feedback on assignments and project
• Weekly video and reading assignments (individual)
• Expect to spend around 9h/week in total on this class

Active attendance in both labs & studios expected!
Final Grade

- 30% midterm May 29th — on labs, studios, videos, and readings (the date might change, check on our landing page)
- 25% assignments and project
- 45% final (July 31st)
Limited Seats

• **30 seats** available
• Register in CAMPUS **today**
• Priority will be given based on:
  • Semester
  • Prior involvement with classes at this chair
  • Handing in the declaration of compliance tomorrow in the lab
• You will know if you’re in tomorrow after the lab
• First assignment in the first lab (tomorrow)
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<td>08.05.2018 S2: Experimental Research + Writing a Protocol</td>
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<td>05.06.2018 S4: Bendable Displays</td>
<td>Simone Voelker and Marcel Lahaye</td>
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<td>12.06.2018 S5: Statistical Tools in HCI + TBA</td>
<td>Krishna Subramanian + Sebastian Hueber</td>
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<td>19.06.2018 S6: Force Input + AR</td>
<td>Chris Corsten + Philipp Wacker</td>
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<td>26.06.2018 S7: Fabrication topics in CHI2018 + Smart Textiles</td>
<td>Paulina Reijsmeijer + Nur Hamdan</td>
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Learning Resources

- Public website with all general info: http://hci.rwth-aachen.de/cthci
  including links to:

  - Learning material (slides, literature, assignments)
  - Labs and flipped classroom recordings on iTunes Podcasts
  - Research papers in the ACM Digital Library
    - Free access from inside RWTH network
CTHCI Team

• Prof. Dr. Jan Borchers
• Nur Hamdan, M.Sc.
  • hamdan@cs.rwth-aachen.de
    (start subject with “[CTHCI]”)"
Usability testing—whether inside a lab facility, using portable equipment, or outside of a lab facility—was rated highest as an effective usability methodology to create greater strategic impact. One reason for this high rating is:

“Usability testing—whether inside a lab facility, using portable equipment, or outside of a lab facility—was rated highest as an effective usability methodology to create greater strategic impact.” [1]

Usability testing has the largest impact on strategic improvement [1].


Cite and quote instead of plagiarizing!
Consequences of Plagiarism in this Class

- Plagiarism will result in an immediate 5.0 for this class.
- Repeated plagiarism will also lead to banning from all other i10 classes.
- Sign the declaration of compliance and hand it in during the lab.
Research Contribution

Types in HCI

Seven Contribution Types

1. Empirical
2. Artifact
3. Methodological
4. Theoretical
5. Database
6. Survey
7. Opinion
Contribution Types from CHI 2016

- Empirical Study of System Use: 42.2% (1026)
- Empirical Study of People: 25.5% (607)
- Artifact or System: 24.2% (594)
- Method: 24.5% (534)
- Theory: 31.7% (733)
- Essay/Argument: 19.2% (445)
- Meta-Analysis/Literature Survey: 14.5% (319)
- Dataset: 17.9% (384)
- Overall Acceptance Rate: 23.6%

(2,316 submissions, 546 acceptances, 23.6%)
1. Empirical Contributions

• Based on observation and data gathering

• From experiments, users test, field observations, interviews, surveys, focus groups, diaries, ethnographies, sensors, log files

• Evaluated based on the importance of findings and the soundness of the methods
Example: Performance of Soft Buttons

• Lee et al., CHI ’09

• Studied the efficacy of soft buttons on touch screens compared to hard buttons

• **Method:** Three empirical experiments:
  
  • OPERATING MODE (finger vs stylus) and FEEDBACK TYPES (acoustic vs haptic)
  
  • ACTIVATION MECHANISM (contact–capacitive vs force activation–resistive)

  • BUTTON SIZE (2 sizes) and ACTIVATION MECHANISM

• Measured input accuracy, speed, amount of corrections, and subjective ratings
2. Artifact Contributions

- Driven by new systems, architectures, tools, toolkits, techniques, sketches, mockups, envisionment
- Enable new exploitations, and suggest new insights and possible futures
- Evaluated based on what they make possible (e.g., toolkits), performance (e.g., techniques), innovation insightfulness (e.g., sketches)
  - Empirical studies can be harmful for some artifacts
- Artifact contributions should negotiate trade-offs and balance priorities
Example: Phidgets

- Greenberg et al., UIST ’01
- Developed a physical toolkit for building physical user interfaces
  - For example, an on-screen dial widget could be implemented physically as a knob
- Goal: a toolkit that allows users to focus on their design, simple to use and extend by average programmers
- **Method:** Observation of undergraduate students developing physical projects in a workshop setting (no formal evaluation metric)
- A description of the resulting projects was provided
What type of contribution?

The Effect of Visual Decoration on the Performance of Continuous Sliders and Visual Analogue Scales

Justin Matejka
Mike Glueck
Tovi Grossman
George Fitzmaurice
What type of contribution?

FlexCase:
Enhancing Mobile Interaction with a Flexible Sensing and Display Cover

Christian Rendl\textsuperscript{1}, David Kim\textsuperscript{2}, Patrick Parzer\textsuperscript{1}, Sean Fanello\textsuperscript{2}, Martin Zirkl\textsuperscript{3}, Gregor Scheipl\textsuperscript{1}, Michael Haller\textsuperscript{1}, Shahram Izadi\textsuperscript{2}
\textsuperscript{1}Media Interaction Lab (Austria) \textsuperscript{2}Microsoft Research (Redmond, WA, USA) \textsuperscript{3}Joanneum Research (Austria)

Music: Janey - Into The City
In-Class Exercise

• From your handouts, read abstracts 1, 2, and 3

• Identify the research contributions
“Such reflection can be challenging in a broad and diverse field, and while we should be wary of constraining our imaginations, we should embrace giving definition to the knowledge we produce. Doing so provides a valuable map for navigating the field of HCI and helps newcomers take their first steps.“

–Wobbrock, 2016
Next

- **In the lab**
  - Continue with exercises on HCI contribution types: Methodological, Theoretical, Database, Survey, Opinion
  - Attend to registration issues on campus and L2P

- **Next week**
  - No studio or lab, we are at CHI 2018 in Quebec, Canada
  - Watch the first video clips on *experimental research* on iTunes Podcasts (link in our wiki)
What You Need To Do Now

• Sign up for this class in CAMPUS by today!

• Required Read: Seven Research Contribution Types in Human-Computer Interaction — Jacob Wobbrock, 2016

• Recommended Read: Framing IxD knowledge — Kristina Höök, 2015

• Come to the lab this Wed, April 18th

Links to learning materials: hci.rwth-aachen.de/cthci