

CTHCI



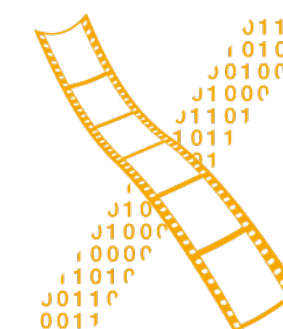
Current Topics in Human–Computer Interaction

Organization • Research Contribution Types

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

Summer Semester '26

<https://hci.rwth-aachen.de/cthci>



RWTHAACHEN
UNIVERSITY

Team

Lecturer



Prof. Dr. Jan Borchers

Teaching Assistant



Kristina Hörrmann

Current Topics in HCI Lectures



Paul Preuschoff



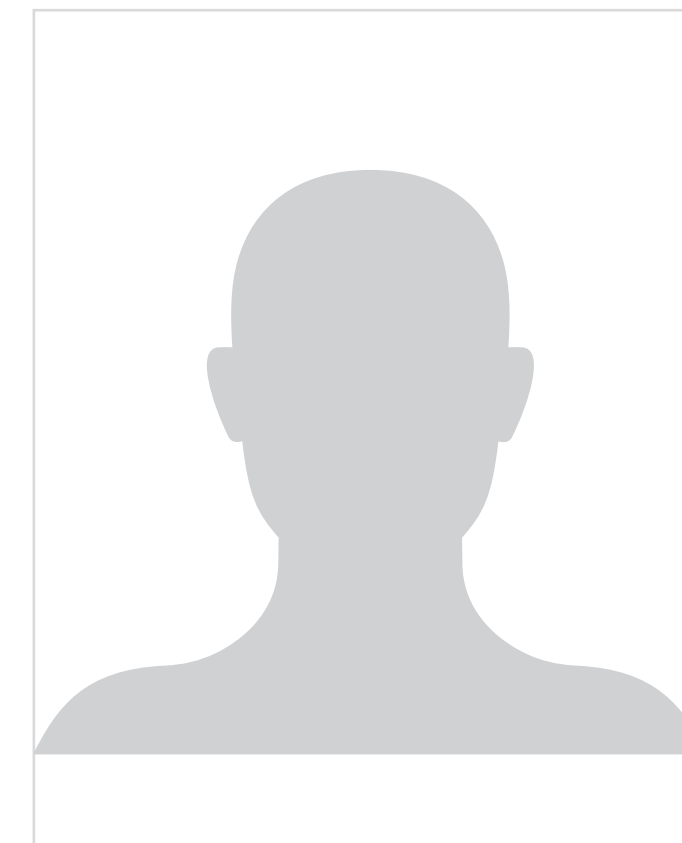
Lea Schirp



René Schäfer

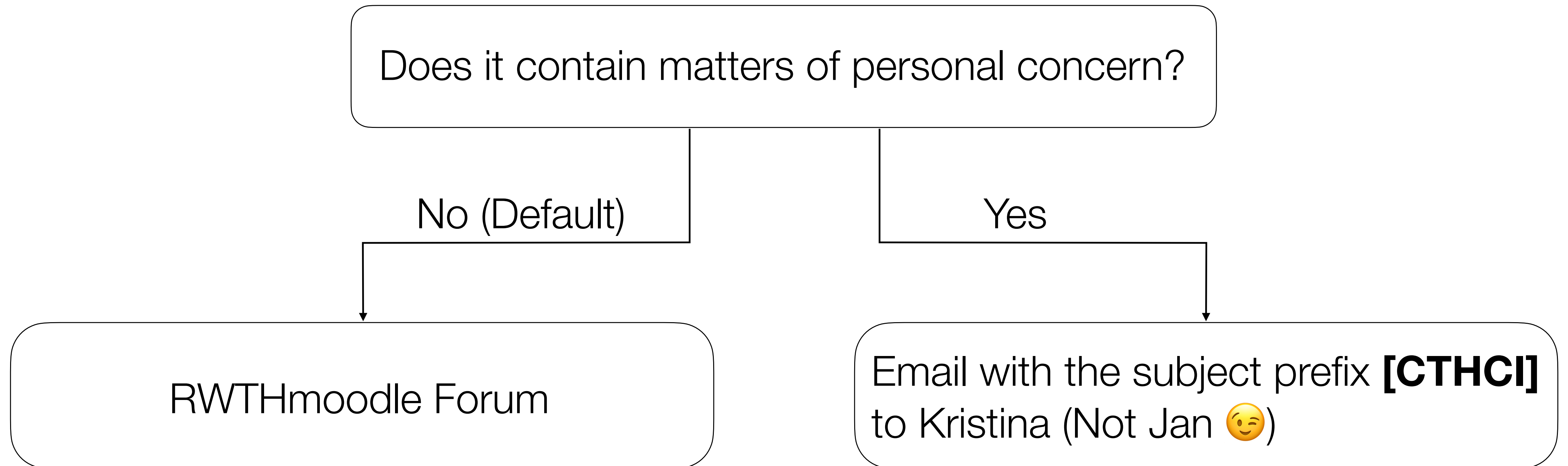


Sarah Sahabi



And others

The Question Flow Chart :)



Alternatively: A quick chat with us after the lecture ☕

Goals

- Our most advanced class, with a clear focus and audience
- Understand (and practice!) **how scientific research in HCI is conducted**
 - **Empirical** research is quite unique to HCI in your CS education
- Practice how to **retrieve** and **evaluate** information from research literature
 - Prepare for your **thesis** and future (research) work
- Learn about **current HCI research** from **conference papers and journal articles**
- **Meet our PhD students** and learn about our research areas, to find a favorite topic and advisor for your thesis

Who Are You?

- Audience
 - M.Sc. Computer Science / Media Informatics / Software Systems Engineering
 - B.Sc. / M.Sc. Technical Communication / MTIK (with focus on CS/HCI research)
 - B.Sc. / M.Sc. Electrical Engineering, Information Technology, and Computer Engineering
 - M.Sc. Data Science / Computational Social Systems / Simulation Science
 - B.Sc. Computer Science, ...
- Prerequisite: **Designing Interactive Systems (DIS1)** strongly recommended
 - In our labs, assignments, and exams, we assume that you know DIS1

Administrative

- Format: 6 ECTS (but check your individual Examination Regulations / PO)
- Lecture: Tuesdays, 10:30–12:00
- Lab: Wednesdays, 12:30–14:00
- Course language is English (no dictionaries allowed in exam)
- Expect to spend around **9h/week** in total on this class

Limited Seats

- **51 seats** available (groups of 3)
- Register in RWTHonline by the end of **today(!)**
- **Sign the Declaration of Compliance document** and upload it to the Sciebo folder (all on the class website) as a PDF using this naming scheme:

`CTHCI26_DoC_matriculationNumber_lastName.pdf`

(Example: `CTHCI26_DoC_123456_sahabi.pdf`)

Deadline: Today, 21.04.26, 23:59

A script will parse these files, so following the naming scheme improves your chances :)

- Seats will be assigned **before tomorrow's lab**

Course Structure

Part 1: HCI Research Methods

Lectures: Concepts (Tuesday)

- Interactive classes with Prof. Borchers

April 21th – June 23th

Part 2: Current Topics

Lectures: Current Topics in HCI (Tuesday)

- Interactive classes with i10 researchers

June 30th – July 14th

Lab

Practice (Wednesday)

- Assignments
- Solutions
- Discussions

Mini HCI Research Project

Practice Conducting HCI Research (Wednesday)

- Conduct actual HCI research and present your own research project in groups of three

Project Presentations*

Final Exam

Final Exam

Jul 21st
22nd

Jul 29th

Sep 1st

A01

M1

A03

M2

M3

M4

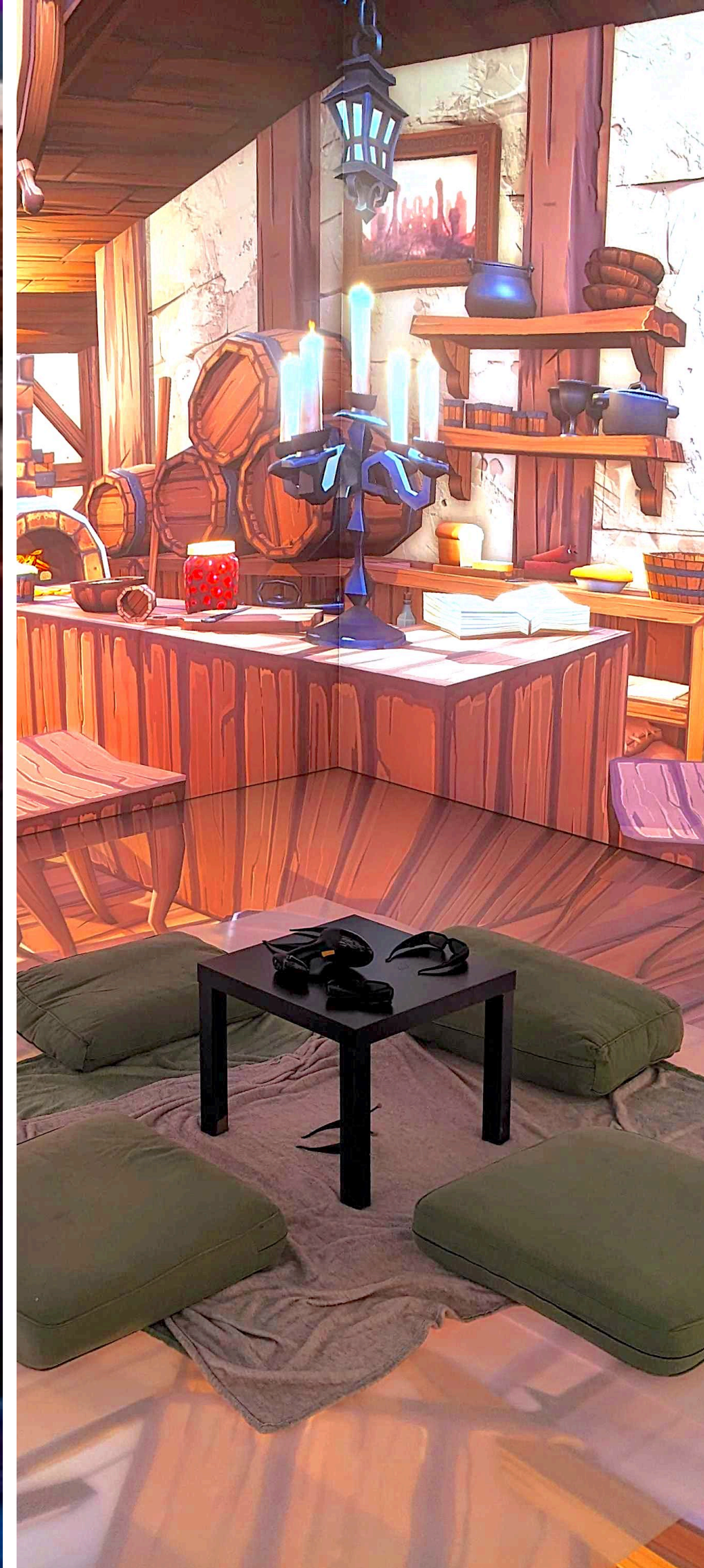
M5

* Mandatory Attendance

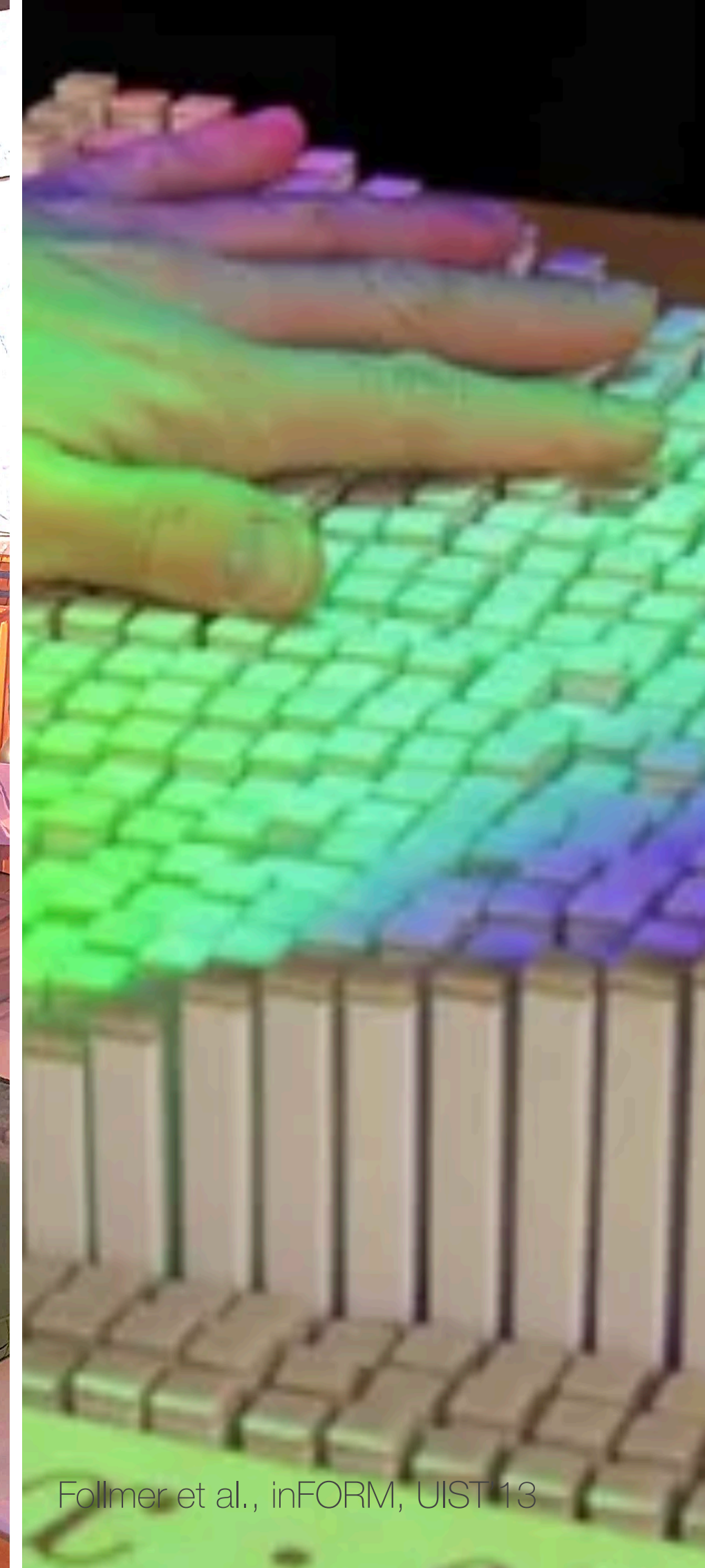




Kristina Hörrmann:
**Brain-Computer
Interfacing**



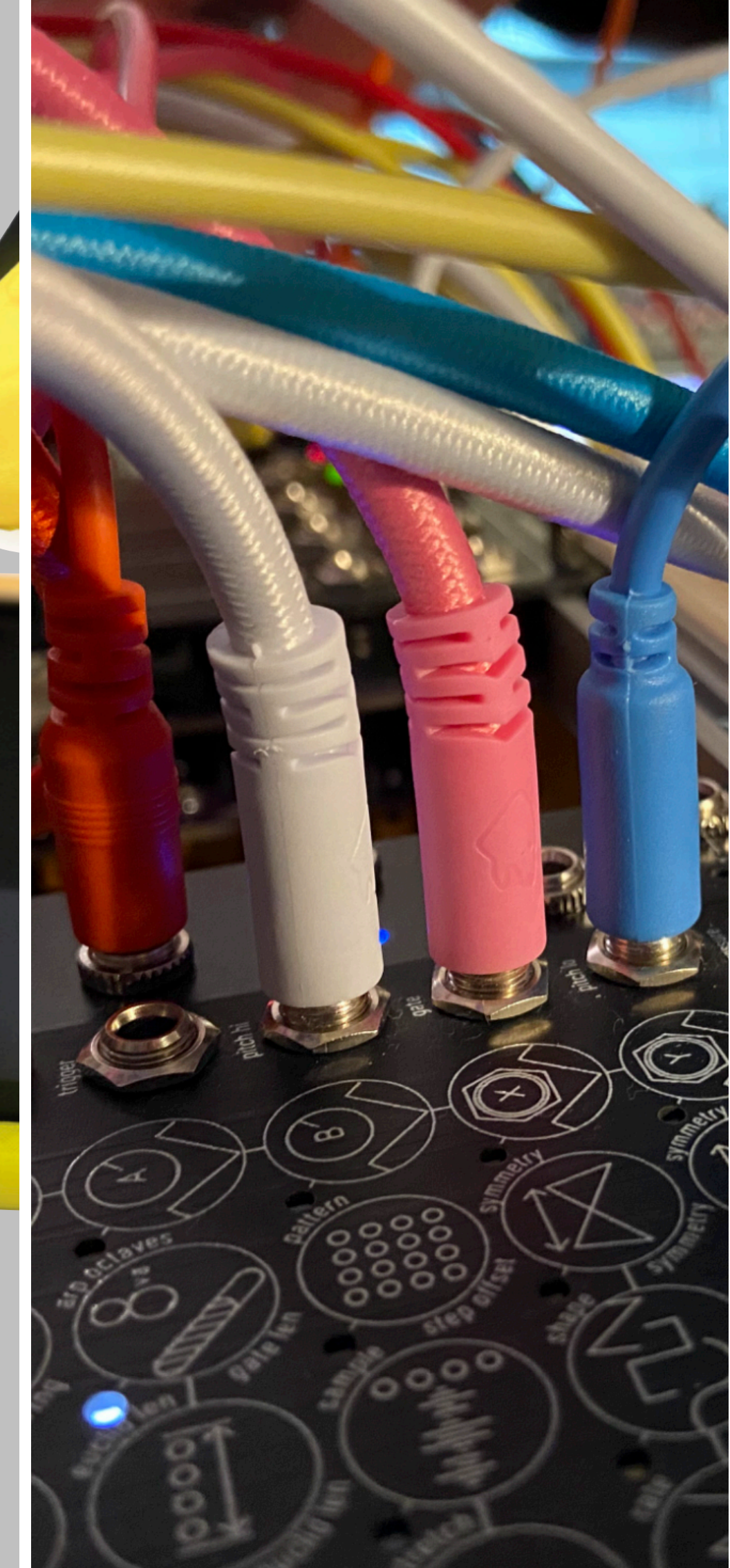
Paul Preuschoff:
**Creativity and
Collaboration**



Follmer et al., inFORM, UIST '13



Weichel et al., ReForm, UIST '15



Lea Schirp:
HCI and Music

Mini HCI Research Project

- Apply the HCI research methods you learned in an actual small project
- You will come up with a research question, analyze related work, design an experimental protocol, conduct a study, analyze the data, and present your findings
- You will work in teams of three students
- We will guide you with a structure of weekly milestones and discussions
- Learn empirical research!



Evaluating Your Mini HCI Research Project

- How well did you apply the concepts from class to your research questions, study, data analysis, and presentation?
- We follow research paper evaluation criteria (covered in class):
Contribution, Benefits, Novelty, Validity, Applicability, Format
- The project will be graded using our standard grading guidelines:
 - 1.0: Exceptional work that clearly went above and beyond the task specification
 - 2.0: Project was completed satisfactorily as per the task specification
 - 3.0: Project was completed, but has some problems
 - 4.0: Little or no effort was put into the project
 - 5.0: Incomplete project

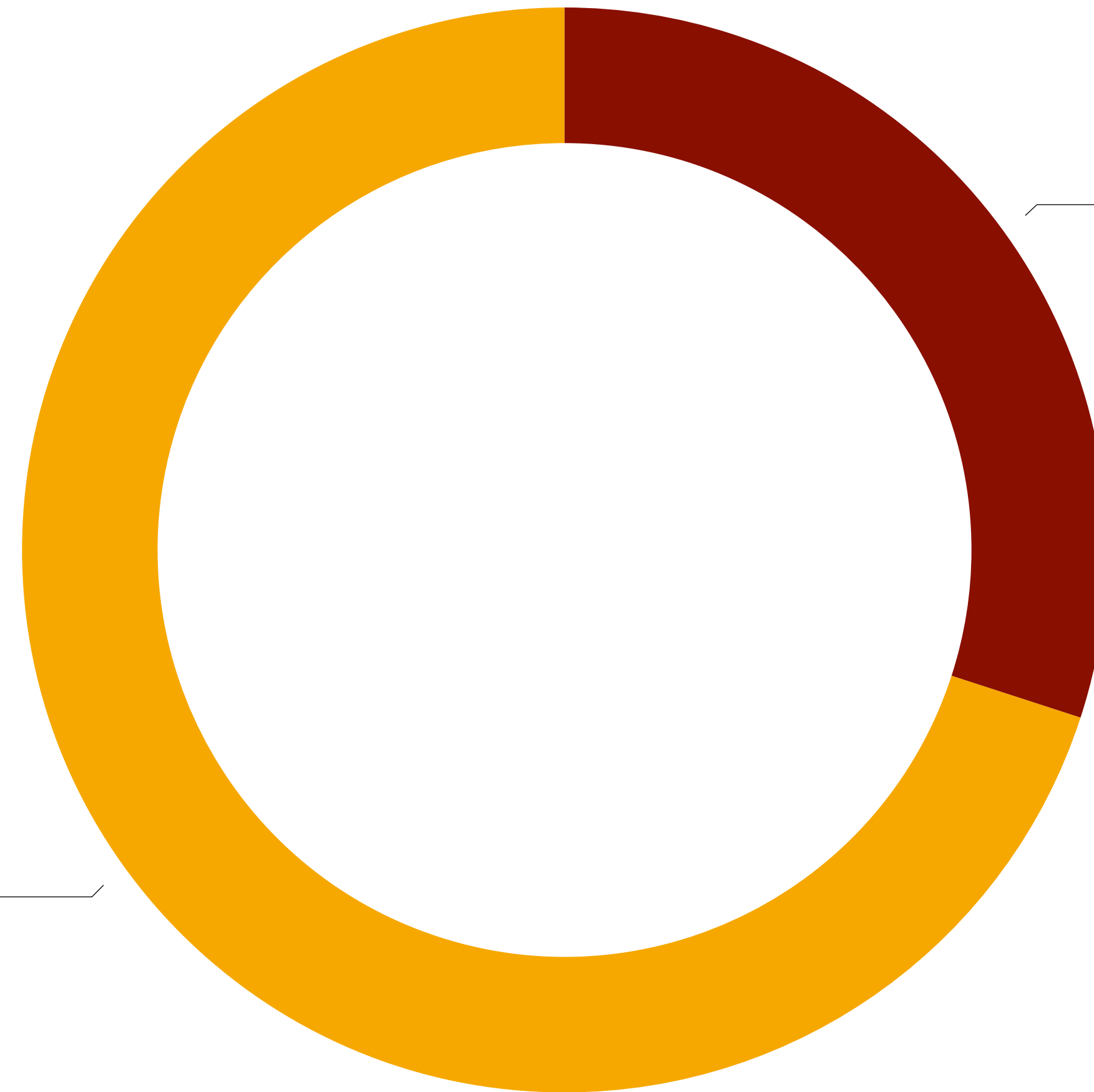


Final Grade Distribution

! You must pass all partial exams to qualify to pass the course

■ **Note:** You can only deregister from the course up to three days before the final project presentations

Final exam
70%

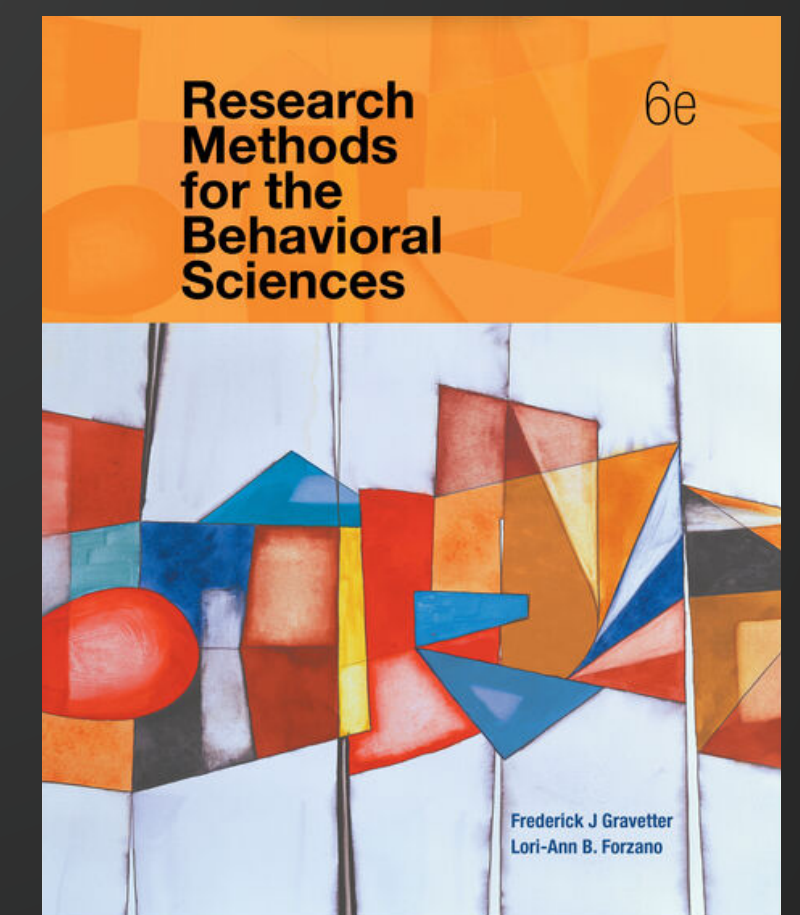
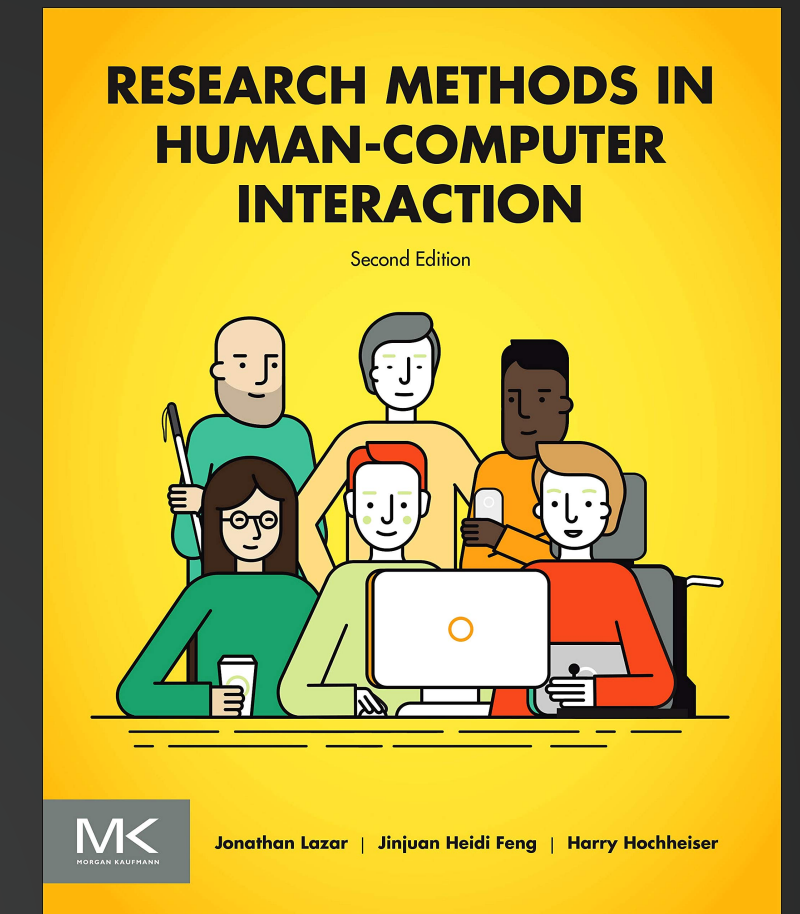


Project
30%

Literature Sources: Methods

Recent Books

- Research Methods in HCI (Lazar et al., 2nd ed., 2017)
 - Highly **recommended reading** for more details about evaluation methods — especially if you are considering doing your thesis at our chair!
- Research Methods for the Behavioral Sciences (Gravetter and Forzano, 6th ed., 2018)
 - Further **recommended reading** for more details about experimental research methods



Literature Sources: Current Topics

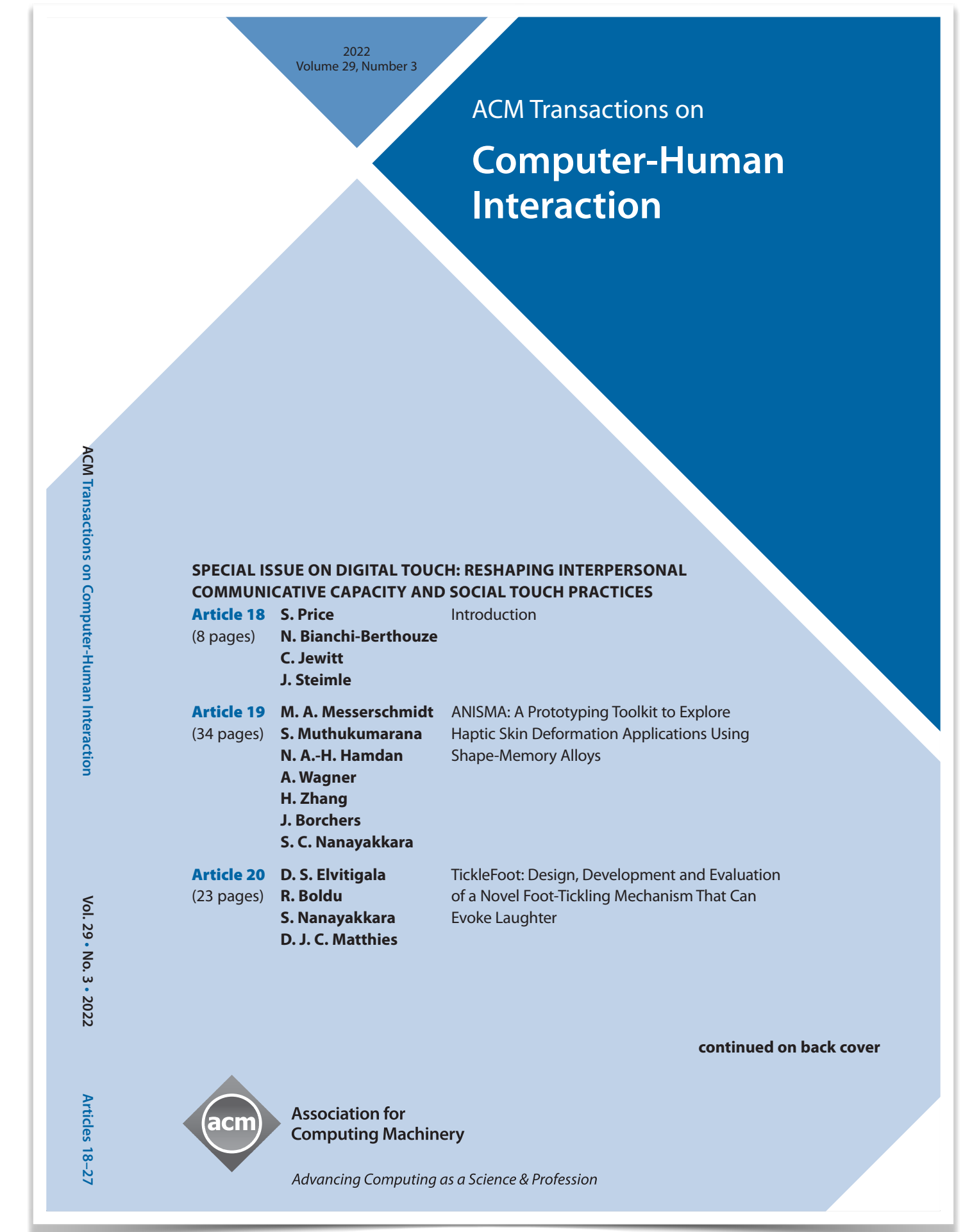
Conferences



ACM ISS 2024



Journals



Citing and Quoting Correctly

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

Original



“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].

1. Stephanie Rosenbaum, Janice Anne Rohn, and Judee Humburg. 2000. A Toolkit For Strategic Usability: Results From Workshops, Panels, and Surveys. In *Proceedings of the 2000 Conference on Human Factors in Computing Systems (CHI '00)*, Apr 1–6, 2000, The Hague, The Netherlands. ACM, New York, NY, USA, pp. 337–344. <https://doi.org/10.1145/332040.332454>.

**Cite and quote
instead of
plagiarizing!**



Consequences of Plagiarism in this Class

- Plagiarism will result in an immediate 5.0 for this class, and may be reported to the university.
- Repeated plagiarism will also ban you from our other classes, and can have severe university consequences, including exmatriculation.



CHAPTER 1

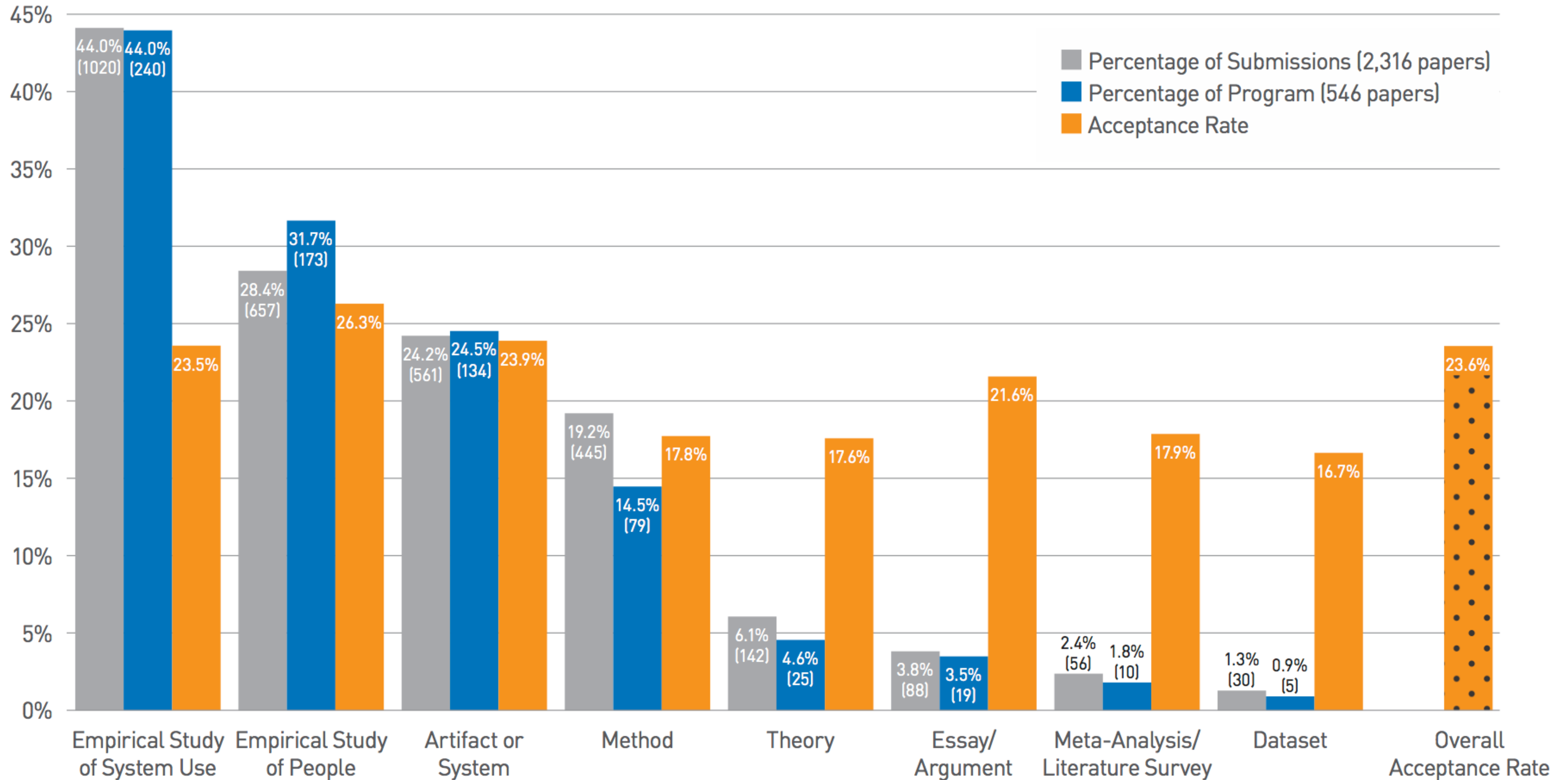
Seven Research Contribution Types in HCI

(Based on: Wobbrock et al., "Research contributions in human-computer interaction", interactions 23(3), 38–44, ACM Press, 2016)

CHI 2016 by Contribution Type

(2,316 submissions, 546 acceptances, 23.6%)

[ibid., page 44]



A hand holding a blue pen pointing at a document with charts and graphs. The document features a bar chart with blue, red, and yellow bars, and a line graph with green and red lines. The background is a light, blurred image of the same document. A yellow geometric shape is in the bottom-left corner.

RESEARCH CONTRIBUTION TYPES

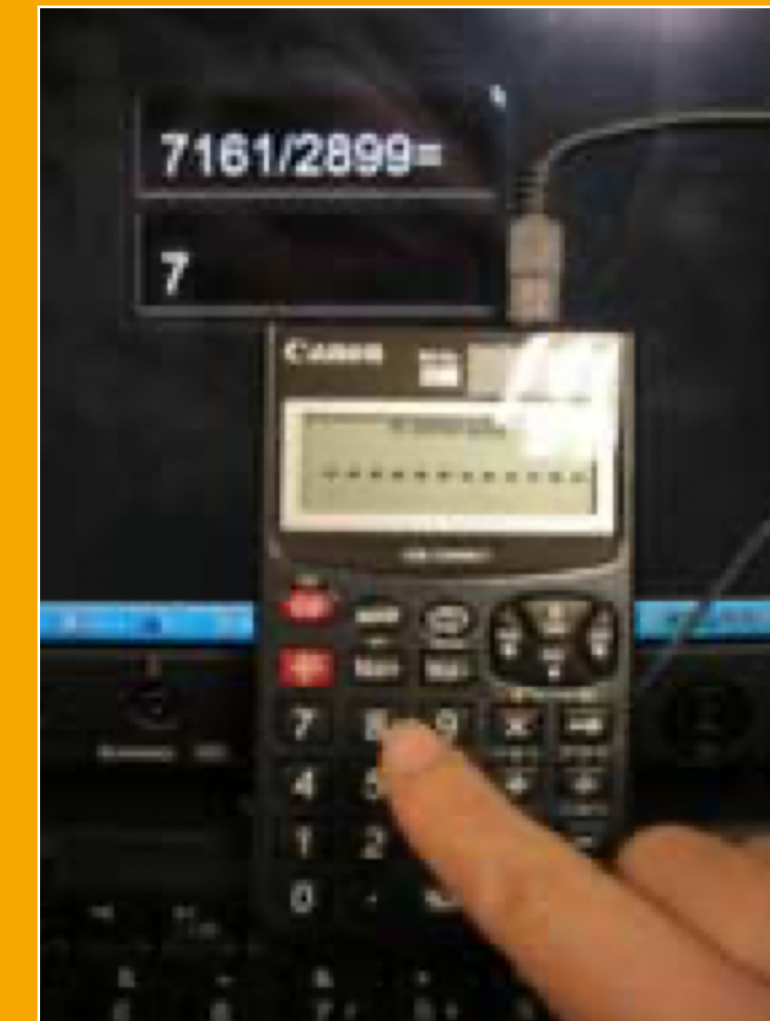
Empirical Contributions

Empirical Contributions

- Based on observation and data gathering
- From experiments, user tests, 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: Soft Buttons

- Lee et al. studied the **efficacy of soft buttons** on touch screens compared to hard buttons (published at CHI '09)
- Measured input accuracy, speed, amount of corrections, and subjective ratings with soft and hard buttons
- Three **empirical experiments** with different independent variables:
 - 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



Hard Button



Soft Button - Stylus



Soft Button - Finger

Example: User Awareness

- Cherek et al. (our lab) studied the **effect on users' awareness** regarding tangible objects on a screen vs. their virtual presentation (published at CHI '18)
- **Empirical experiment**
 - Groups of 2–4 users played a game grabbing their attention
 - Users had to become aware of other players actions occasionally (using virtual vs. tangible objects)
 - Measured the **reaction time**



A hand holding a blue pen is positioned over a document featuring various charts and graphs. The background is a light, blurred image of the document, with a prominent yellow geometric shape on the left side. The text is overlaid on this background.

RESEARCH CONTRIBUTION TYPES

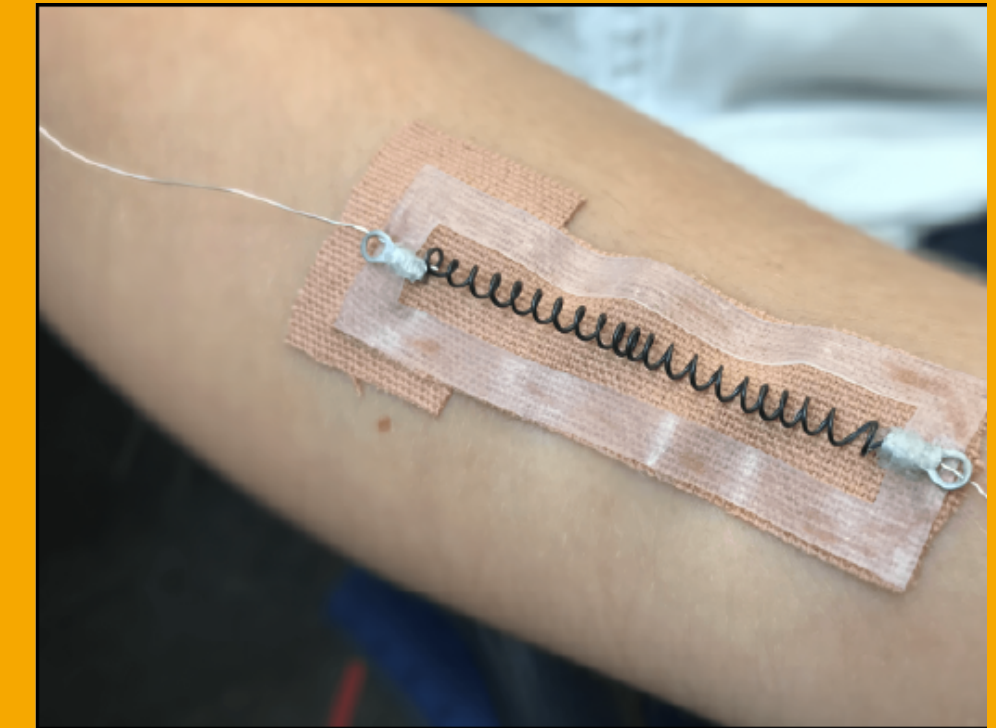
Artifact Contributions

Artifact Contributions

- **Driven by new** systems, architectures, tools, toolkits, techniques & sketches
- **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

Example: Springlets

- We developed **Springlets**: expressive, non-vibrating mechano-tactile interfaces on the skin based on SMAs (published at CHI '19)
- **Artifact contribution**
 - **Thin & flexible tactile interfaces** that are easy to reproduce
- **Empirical evaluation**
 - Study on effectiveness & wearability in stationary and mobile situations



What to Do Now

Today

1. Register for the course on RWTHonline
2. Upload your signed Declaration of Compliance

File Name: CTHCI26_DoC_matriculation
number_last name.pdf
(E.g.: CTHCI26_DoC_123456_sahabi.pdf).

Deadline: Today, 21.04.26, 23:59

3. Look for our decision before tomorrow's lab
4. Also check out our **DIS2** class

At tomorrow's lab, we will introduce you
to literature reviews 🙌

The screenshot shows the RWTHonline course page for CTHCI26. The page includes a navigation bar with 'OUR LAB', 'RESEARCH', 'TEACHING', and 'CONNECT'. A search bar is in the top right. The main content area features a 'Limited Course Seats' section with a red border, containing the following text: 'This course is limited to 39 seats. To register for this course, you must: Register for the course in RWTHonline and upload the signed Declaration of Compliance to this Sciebo folder. Name: matriculation number_last. Deadline: Sunday, April 9, 2024, 23:59:59.' A magnifying glass is positioned over this text. To the right, there is a 'Class Information' section with details for Lecture (Tue, 10:30 - 12:00), Lab (Wed, 12:30 - 14:00), Language (English), and Credits (6). Below that is an 'Exams' section with dates for the 1st Final (Jul 22, 2024) and 2nd Final (Aug 30, 2024). At the bottom, there is a 'Resources' section with links to RWTHonline, RWTHmoodle, and YouTube.