HCI4H
Human Computer Interaction for Health

Winter 2017

Instructor: Nadir Weibel
Teaching Assistant: Michael Brevard
Who am I?

• Originally from Southern Switzerland (Ticino)
  • Languages: Italian (native), German, French, English and Spanish (basic)

• BSc. and MSc. in Computer Science and Engineering from ETH Zurich (Switzerland)

• PhD. in Computer Science (2009) from ETH Zurich

• Researcher and Lecturer at UCSD in Computer Science and Cognitive Science since 2009
UCSD

- Research Faculty in CSE
- Human-Centered and Ubiquitous Computing Lab (The Weibel Lab, HCC-Ubicomp)
- Affiliated Faculty with Calit2
  - The Design Lab (http://designlab.ucsd.edu)
  - Center for Wireless and Population Health Systems (http://cwphs.ucsd.edu)
- Research Health Science Specialist at VA San Diego
The Future of Healthcare

https://www.youtube.com/watch?v=-SKJlcHOAyU

Microsoft, 2009
Research

How do we best enable access to health information in the right way, at the right time and for the right user and situation?
Research Aims

To develop technology that supports healthcare professionals and end-user’s fluid interaction with information in hybrid physical/digital information spaces.
Research Questions

- How can we build effective healthcare systems to manage critical information across physical-digital devices?

- What are the consequences of introducing novel interactive information systems in the wild?

- How can we enrich methods to capture multimodal information and evaluate novel interactive systems?
HCI4H
Human-Computer Interaction for Health
HCl4H Goals

• Comprehensively understand ethics, privacy, and research regulations to work in the healthcare field.

• First-person experience of real-world medical settings and what is the role of technology in them

• Comprehensive understanding of fieldwork in healthcare

• Exposure to a variety of methods to collect data in medical environments

• Knowledge to propose technology-centered research in the healthcare setting

• Clear description of a plan to study or address a real-world problem in healthcare through the introduction of interactive technology

• Experience in prototyping technology for health.
Overall Goal

• To develop the skills undertake research at the intersection of computer science, emerging interactive technologies, and healthcare
Weekly Topics

- Week 1: Introduction/Admins + Research Ethics
- Week 2: Access to Healthcare settings + Studying HCI4H
- Week 3: Models, Methods and Theories for HCI4H
- Week 4: Teamwork: Emergency and Trauma Medicine
- Week 5: Operating Rooms and Medical Devices
- Week 6: Health Information Systems and Imaging
- Week 7: Vulnerable Populations
- Week 8: Mobile Health and Studies of Physical Activity
- Week 9: Beyond the Clinic
- Week 10: Final Presentations
Phase A: Exposure to HCI4H

• Introduction of core concepts for working in the healthcare and technology fields
• Introduction to methods
• Site Visits
• Case Studies
• Experiences
Phase 2: Reflection on HCI4H

- Ideas on research project in HCI4H
- Research design and proposal writing
- Discussions and reflections
- Human-centered design and prototyping
The Course: Logistics

Goal 1: Exposure to HCI4H

- Site-Visits (Center for Future Surgery, Simulation Labs, Emergency Department, High-tech clinics, NICU, Radiology, Radiation Oncology, Physical Activity Research Center, WestHealth.)
  Tuesdays 2pm-3.20pm at the different sites

- Class Discussions
  Thursdays 2pm-3.20pm, EBU3B 4140

Goal 2: Research Proposal/Ideas/Prototypes

- Research Discussions and Presentations
  Thursdays 2pm-3.20pm, EBU3B 4140
The Course: Logistics

Web page: http://hci4h.ucsd.edu

Piazza: http://piazza.com/ucsd/winter2017/hci4h

• Register today! (group discussions, peers formation, etc.)
Readings - Books

Fieldwork for Healthcare
Case Studies Investigating Human Factors in Computing Systems

Dominic Furniss
Aisling O’Kane
Rebecca Randell
Svetlena Taneva
Helena Mentis
Ann Blandford

http://www.morganclaypool.com/
doi/pdf/10.2200/S00552ED1V01Y201311ARH005

Fieldwork in Healthcare
Guidance for Investigating Human Factors in Computing Systems

Dominic Furniss
Rebecca Randell
Aisling Ann O’Kane
Svetlena Taneva
Helena Mentis
Ann Blandford

http://www.morganclaypool.com/
doi/pdf/10.2200/S00606ED1V02Y201410ARH007
Readings - Books


http://link.springer.com/978-3-319-17272-9

• All chapters are part of there 3 books and are available for free as a PDF while on UCSD campus (or VPN) through the class page URLs.
## Readings

2) Fieldwork for Healthcare - Case studies: Ch 5, "Finding Balance: Matters of Ethics, Consent, and Emotional Work When Studying Handover in Hospitals"  
3) Fieldwork for Healthcare - Guidance: Ch 1, "Ethics, Governance, and Patient and Public Involvement in Healthcare" |
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2) Fieldwork for Healthcare - Case studies: Ch 6, "Fieldwork and Challenges of Access"  
3) Fieldwork for Healthcare - Guidance, Ch 2: "Readying the Researcher for Fieldwork in Healthcare" |
| W3 | Models, Methods and Theories for HCI4H | 1) Cognitive Informatics for Biomedicine: HCI in Healthcare, Ch 6, "Computational Ethnography: Automated and Unobtrusive Means for Collecting Data In Situ for Human–Computer Interaction Evaluation"  
2) Fieldwork for Healthcare - Guidance, Ch 4, "Practicalities of Data Collection in Healthcare Fieldwork Studies"  
| W4 | Teamwork: Emergency and Trauma Medicine | 1) Cognitive Informatics for Biomedicine: HCI in Healthcare, Ch 10 "Design for Supporting Healthcare Teams"  
2) Fieldwork for Healthcare - Case studies: Ch 2, "Understanding Trauma Resuscitation: Experiences from the Field and Lessons Learned"  
3) Fieldwork for Healthcare - Guidance: Ch 3, "Establishing and Maintaining Relationships in Healthcare Fields" |
| W5 | Operating Rooms and Medical Devices | 1) Cognitive Informatics for Biomedicine: HCI in Healthcare: Ch 8, "Human Computer Interaction in Medical Devices"  
2) Fieldwork for Healthcare - Case studies: Ch 1, "Confessions from the Operating Suite: Negotiating Capture, Resistance, Errors, and Identity"  
3) Fieldwork for Healthcare - Case studies: Ch 11, "Studying Patients’ Interactions with Home Haemodialysis Technology: The Ideal and The Practical" |
2) Fieldwork for Healthcare - Case studies: Ch 7, “Building Relationships: HCI Researchers at a Gastro Surgical Department”  
3) Cognitive Informatics for Biomedicine: HCI in Healthcare: Ch 5, "Evaluation of Health Information Technology: Methods, Frameworks and Challenges" |
| W7 | Vulnerable Populations | 1) Fieldwork for Healthcare - Case studies: Ch 3, "HCI Observations on an Oncology Ward: A Fieldworker’s Experience"  
2) Fieldwork for Healthcare - Case studies: Ch 9, "Designing Technology for Extremely Vulnerable Adults: The Important Role of Staff in Design and Ethics"  
3) Fieldwork for Healthcare - Guidance: Ch 6, "Impact of Fieldwork in Healthcare: Understanding Impact on Researchers, Research, Practice, and Beyond" |
| W8 | Mobile Health and Studies of Physical Activity | 1) Fieldwork for Healthcare - Case studies: Ch 8, "Deploying Healthcare Technology 'in the wild': Experiences from Deploying a Mobile Health Technology for Bipolar Disorder Treatment"  
2) Cognitive Informatics for Biomedicine: HCI in Healthcare: Ch 13, "Designing and Deploying Mobile Health Interventions"  
3) Cognitive Informatics for Biomedicine: HCI in Healthcare, Ch 14, "Visual Analytics: Leveraging Cognitive Principles to Accelerate Biomedical Discoveries" |
| W9 | Beyond the Clinic | 1) Fieldwork for Healthcare - Case studies: Ch 12, "Experiences in HCl, Healthcare, and Development: Lessons from the PartoPen Project in Kenya"  
2) Fieldwork for Healthcare - Case studies: Ch 10, "The Challenges of Interviewing Older People in Their Own Homes: Reflections and Suggestions from the Field"  
3) Cognitive Informatics for Biomedicine: HCI in Healthcare, Ch 12 "The Role of Human Computer Interaction in Consumer Health Applications: Current State, Challenges and the Future" |
Assignments

- Week 1: CITI Training (see later)
- Week 2-8: Weekly essay (in groups of 2-3, selected by the instructors) on the site visit experience
  - Tailored to a specific point of view (e.g. the patient, the clinician, the researcher)
  - Pointers to the readings
- Week 3-8: Reading’s presentation (1 chapter per student: select the chapter and week ASAP at http://hci4h.youcanbook.me)
- Week 2-10: Iterative work on research design and prototype
  - W2: NSF Smart and Connected Health: Specific Aims
  - W5: Mid-term presentation
Essays and PeerStudio

Overall feedback:

The paper tries to find one good solution to one problem. I feel that this is a good approach because it is better to make one good solution, rather than have many small bad ones. I would love to see in the discussion and conclusion potential negative sides with the solution and how they would think their solution overcomes these negative sides, or how the pros are better than the cons. For example, how can the sender be certain that the receiver has received the message? What do you decide who is receiving the message? (priority queue?) And how long do you wait for a confirmed message response before you send the message to the next person?

Style & Structure

A good essay is well written from start to finish, without spelling, grammar or use of English errors. Good essays should also be well organized, clear and present ideas in a coherent way. Finally, the essay should be objective and address all the issues referred to in the proposed topic, with an in-depth analysis. The information provided in the essay should be sufficient to discuss and understand these issues completely. The essay is free of spelling and grammar errors.

Yes: 2
No: 0

The essay has a proper use of English (sentence structure, vocabulary, punctuations).

Yes: 2
No: 0

The essay has a proper distribution of paragraphs and sections.

Yes: 2
No: 0

The essay is well formatted, organized, and indented.

Yes: 2
No: 0

The essay is within the appropriate length (500 to 1000 words).

Yes: 1
No: 1

The essay is coherent, clear and easy to understand.
Essays and PeerStudio

- Weekly essays
  - Reflect on the site visit and the topic of the week
  - Reference the readings
  - Submit Draft by Friday night
- Draft Reviews and Revision
  - By Sunday night: 2x draft reviews (random assignment of other students’ submissions)
  - By Tuesday night: Revision of the draft based on the reviews
- Final Review
  - By Thursday (before class) 1x final review (random assignment of another student’s submission)
Research Proposal and Prototype

• Your idea for a research project to solve a problem in the healthcare space with interactive technology
• Driven by the experiences in Phase 1
• Pairs of students (team up yourself)
• Iteratively developed over 8 weeks
  • Guidance from the instructors
  • following NSF SCH Rules
• Iterative prototype (more later in week 2)
• Final submission by the end of Week 10
• Final Presentation during Week 10
Evaluation

1. Weekly essay covering specific site visits and assigned topic: 40% (25% the essay, 15% the peer reviews)

2. Readings Presentation and engagement in the discussions: 20% (15% the presentation, 5% the discussion and participation)

3. Final “Vision” Proposal, Prototype, and Presentation: 40% (25% Final proposal, 15% Final presentation)
Communication

• Instructors email address: hci4h@hci.ucsd.edu (start the subject line with the [HCI4H] tag.)

  • Students discussions
  • Instructors discussions
  • The way we will communicate with you,
Web Page

http://hci4h.ucsd.edu/
Assignment 1
CITI/HIPAA Training

https://www.citiprogram.org/
http://irb.ucsd.edu/hipaatutorial/login.html

Start in Class on Thursday
due Thursday 1/19 2pm, before class.
For Thursday

• Register on Piazza and start discussion on groups
• Start looking at Assignment 1 (CITI Training), due Thursday 1/19, 2pm
• Read course website
Readings for Week 1


2. Fieldwork for Healthcare - Case studies: Ch 5, "Finding Balance: Matters of Ethics, Consent, and Emotional Work When Studying Handover in Hospitals"

3. Fieldwork for Healthcare - Guidance: Ch 1, "Ethics, Governance, and Patient and Public Involvement in Healthcare"
Next...

- Next week Tuesday: Site Visits: Center for the Future of Surgery

http://cfs.ucsd.edu/
Thank you!