The Undergraduate 2nd Major and Minor in HCI

Human Computer Interaction Institute
School of Computer Science
Carnegie Mellon University

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Computer and communication technologies are increasingly integrated with our lives

Finance

Commerce

Healthcare

Transportation
Information

Work

Communication

Play

Education

Interactions Can Be Successful
Interactions Can Also Fail

New Kinds of Capabilities Enable New Kinds of Interactions

Interactions Can Also Fail

Ensure that Interactions are Innovative . . . and Successful

HCII Mission Statement

- Design the most cutting edge technology
- and ensure that humans can, will, want to interact with it
- successfully, efficiently, effectively, with pleasure
- to improve their lives

- To solve the right problems
- with the right tools
- for the right reasons
- in order to develop artifacts, services, and systems that improve people’s lives
CMU…
a Computer Science Legacy

“the study of all phenomena surrounding computing machines”

Alan Newell & Herb Simon
1975 Turing Award Lecture

The HCII Faculty

Computer Scientists
Linguists
Designers
Cognitive Scientists
Literary Scholars
Psychologists
Engineers

Educational programs in HCI for undergraduates

HCI 2nd major
- Formal admissions (Spring) with ~50% admissions rate
- 11 courses, including a final project
- Guaranteed admission to core courses

HCI Minor
- Formal admissions (Spring) with a higher acceptance rate than the HCI 2nd major
- 7 courses
- Guaranteed admission to core courses
The Philosophy of the HCI undergraduate programs

Take excellent students with depth in one discipline relevant to HCI and give them the educational opportunity to “walk in the shoes” of the other disciplines.

- Help the students become effective members of interdisciplinary teams in industry
- Prepare students for leadership in HCI-related industries

On the Philosophy...

- Undergrad education HCI will provide students
  - Basic skills for designing and implementing user-centered software
  - Appreciation of the varied skills necessary to make useful, usable & satisfying interactive products
  - Ability to communication with specialists in other areas
- It will not make software developers into designers or psychologists into programmers.
- It is not a second degree.

Why Study HCI?

- We’re surrounded by computers – therefore, good HCI is about what is happening now!
- If your business is developing interactive software, then good HCI gives you a great competitive edge
- Same for if your business depends on a great web presence
- If your business is an innovator in service design, then HCI is indispensable

Why study HCI?

- Web services and mobile apps are the hottest start-ups in the world and HCI is in the middle of that
- HCI is the central topic in computing – the best way to build up some computer skills and credibility
- HCI is a good path towards being a project manager
- Agile development to understand user needs helps to create innovative products – in HCI and in business
Other reasons for getting an HCI 2nd major / minor

- Interesting problems to work on
- Lots of interaction with stakeholders
- Creative expression
- Working on the parts of computers that everyone sees
- Fame
- Personal interest
- Career security, etc.

Companies Where B/MHCI Alumni Work

- APT
- Accenture
- Adobe
- Amazon
- Amazon.com
- Apple Interactive
- Google
- Adobe
- Affinage
- Bank of America Global Markets Technology
- Boeing
- British Airways
- Capital One
- Cengage Aplia
- Deloitte
- Democratic National Committee
- Deutsche Bank
- Diligent Legacy
- Digg
- Discovery Engine
- Doby
- DropBox
- eBay
- Facebook
- Fandango
- General Electric Co.
- Goldman Sachs
- Google
- Green Hills Software
- IBM
- Intuit
- JPMorgan Chase
- Johnson & Johnson
- Kaiser Permanente
- LearningTree
- Lehman Brothers
- LinkedIn
- Mercedez Benz
- Microsoft
- Mozilla
- New York Times
- Oracle
- OutSystems
- Palantir Technologies
- PNC Bank
- Precor
- PwC
- R/GA
- Ready at Dawn Studios
- Red Hat
- Rosetta Stone
- Round Arch
- RoundArch
- Salesforce.com
- Schematic
- Schoolnet
- Shiny Entertainment
- Speaker Text
- TAG
- Thomson Reuters
- TripAdvisor
- UB Sesar
- University of Michigan
- VMware
- Vanguard
- Vistaprint
- Wizzard Media
- World Evolved Services
- Yahoo!
- Zazzle

Plus ~15% have started their own companies

Careers In HCI

- Undergraduates get good jobs & job offers (AY 2011/2012 data)

<table>
<thead>
<tr>
<th>Degree</th>
<th>Median salary offer</th>
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<tbody>
<tr>
<td>Bachelors, HCI</td>
<td>$79,500</td>
</tr>
<tr>
<td>Computer science</td>
<td>$95,000</td>
</tr>
<tr>
<td>Psychology</td>
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<tr>
<td>Information Systems</td>
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<tr>
<td>Communication Design</td>
<td>$60,000</td>
</tr>
<tr>
<td>Masters, HCI</td>
<td>$85,000</td>
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</tbody>
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Mattress Factory: Interactive Archive of Past Installations
Controls for a Semi-Autonomous Orchard Tractor

Classroom Controls

3D Dentistry

Quote by a student about the capstone project

“I had the chance to use HCI methods and understand the basis for them. We had to constantly test and change things based on the very specific needs of our users. Things that seemed so simple to us were like a foreign language to them. It really helped drive the entire point of HCI home to me.”

HCI Minor

Prerequisites
- Freshman-level programming (51-257 or 15-110 or 15-112 or 15-121 or 15-123)

Core Courses
- Interaction Design Overview (IDO) (05-392)
- Designing Human Centered Systems (DHCS) (05-391)

Electives
- 4 electives (from defined list or approval from Program Director)

Double Counting
- 2 courses with primary major

How can you explore whether HCI is for you?

- Enroll in one of the core courses
  - Designing Human-Centered Systems is a great course
- Enroll in an elective
- Pick a course you can double count
- Become involved in HCI research (internship or independent study with HCII professor)
Skills: How to build interactive devices
(aka: “gadgets”)
- Add to your toolbox of techniques: Prototyping simple /controller-based electronic devices

Concepts:
What can be done with them from an HCI perspective

Design of Educational Games
05-418/05-818 HCII – Vincent Aleven

The potential of digital games to improve education is enormous. However, it is a significant challenge to create a game that is both fun and educational. In this course, students learn to meet this challenge by combining principles and processes from game design and instructional design.

The Role of Technology in Learning in the 21st Century

Design an educational initiative that uses technology to change the face of education in both the developing and industrialized world.

Interested in finding a better solution to the password problem?

Crowd-Driven Innovation

Steven Dow
Assistant Professor

social media
micro-task crowds

needfinding
storyboarding

brainstorming
making a pitch

Networking
crowdfunding

05-833 Applied Gadgets
Sensors and Activity Recognition in HCI

Join the struggle: build something for the user!
taught by Scott Hudson

05-499A ♦ 05-899A: Interaction Techniques
NSH 1305 – Mon/Wed 1:30pm – 2:50pm, 12-Units, by: Brad Myers

- For B-HCI, Minor in HCI, M-HCI, PhD
- How people interact with computers, smartphones, game consoles, appliances and other technologies
- From historical to future designs
- Students will learn:
  - Articulate design issues regarding interaction techniques
  - Design a new interaction technique
  - Evaluate interaction techniques using the appropriate tests for performance and usability
  - Describe the historical progression of interaction techniques
- Prerequisites: some HCI course

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Crowd-Driven Innovation

5-436 / 5-836 / 8-534 / 8-734
Usable Privacy and Security

Offered Spring 2014
Tuesdays and Thursdays
3:00 – 4:20 pm
Instructor: Lorrie Cranor

- Learn about usability issues related to security and privacy
- Learn how to design for security/privacy AND usability
- Get hands-on experience doing usability studies related to security and privacy
http://cups.cs.cmu.edu/courses/ups.html
Crowd Programming

Build the intelligent interactive systems of your dreams by injecting a little bit of on-demand human intelligence.

- write crowd programs with Amazon Mechanical Turk, oDesk, Facebook…
- apply usability principles to elicit high-quality responses
- use statistical methods to improve the quality of crowd work
- build interactive systems powered by real-time crowd labor

bit.ly/crowdprogramming
Jeffrey P. Bigham
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Mobile Service Innovation

Room 172, 300 S. Craig
T/Th 3:30-4:00 PM
Jim Morris & Steven Dow

- Open to all disciplines
- No Prerequisites
- Team Projects

Topics
- Need-finding, interviewing, analyzing social media
- Divergent thinking, brainstorming
- Synthesis techniques and problem framing
- Storytelling, storyboarding, and video production
- Value proposition, business models
- Prototyping/blueprinting
- Crowdsourcing, web analytics, A-B testing

innovation.cs.cmu.edu

Applied Cognitive Science
05-395 (R. Klatzky)

Virtual Reality
Perceptually Based Decisions
Eyewitness Testimony
Cognitive Tutoring
Learning To Read
Spatial Thinking
Speech recognition and synthesis
Rational vs. Emotional Marketing
Automated Language Understanding
Neural Plasticity and Remediation
Expertise & Sport
Sleep Learning

Personalized Online Learning
05-432 Vincent Aleven

- Learners are different and personalized learning is far more effective than one-size-fits-all approaches. This course covers a number of proven personalization techniques used in advanced learning technologies.

- One of the techniques is the use of cognitive modeling to personalize practice of complex cognitive skills in intelligent tutoring systems. This approach, developed at CMU, may well be the most significant application of cognitive science in education and is commercially successful.

1. E-Learning Design Principles

This course is about e-learning design principles, the evidence and theory behind them, and how to apply these principles to develop effective educational technologies. It is organized around the book “e-Learning and the Science of Instruction: Proven Guidelines for Consumers and Designers of Multimedia Learning” with further readings drawn from cognitive science, educational psychology, and human-computer interaction. You will learn design principles 1) for combining words, audio, and graphics in multimedia instruction, 2) for combining examples, explanations, practice and feedback in online support for learning by doing, and 3) for balancing learner versus system control and supporting student metacognition. You will read about the experiments that support these design principles, see examples of how to design such experiments, and practice applying the principles in educational technology development.
Spring 2012 – iPhone Version 20

The students must develop a system to support an end user client through observing current practice, envisioning how technology insertion will improve the state of the art, deriving requirements, brainstorming solutions, developing an architecture, and assembling technology that realizes the functionality capability to satisfy the requirements.

• Interested in sensors, mobile computing (smartphones, tablets, Glass, ...), and off-the-desktop computing in general?
• Seminar-style course with a project
  – Read, present and discuss the latest in ubiquitous computing
• All students wanted: not just CS
• Domains of health, sustainability, economics, transportation, ICT4D, ...
• Come and help design the future of interactive computing!

Independent Study

• Many students do an independent study to explore a particular area in depth
• Personalized, a negotiation between the student and a professor
  – Often grows out of personal contacts after taking class with an instructor
  – I send out announcements at beginning of semester; also listed on HCII website