H-566
Experience Design for Ubiquitous Computing

Department of Human-Centered Computing
Indiana University School of Informatics and Computing
IUPUI

Semester: Spring 2017
Section Number: 26709
Thursday, 6pm to 8:40pm, IT 355

Credit Hours: Four credit hours
Course Web Site: http://canvas.iu.edu
Instructor: Francesco Cafaro, Ph.D.
Office Address: IT 579
Email Address: fcafaro@iu.edu

Course Description
An introduction to research topics in ubiquitous and pervasive computing, including sensors, ambient displays, tangibles, middleware, mobility, and location and context awareness. These topics are explored from a user-centered design perspective, focusing on how a situated and embedded model of computing affects requirements gathering, interaction design, prototyping, and evaluation techniques. Students gain expertise with contemporary ubiquitous and pervasive computing technologies and learning to incorporate them into a user-centered research and design process.

Prerequisites
There are no prerequisites for this course.
Contact Information
Francesco Cafaro, Ph.D.
e-mail: fcafaro@iu.edu
Office: IT 579
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Office hours
Thursday 4 to 6,
and by appointment
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Textbook
None. You will read and analyze 50 research papers from recent Ubicomp and HCI top
conferences (see the reading list at the end of the syllabus). They are freely accessible from the
ACM portal: [http://dl.acm.org](http://dl.acm.org) at IUPUI, or at [https://ulib.iupui.edu/databases/acm-digital-library](https://ulib.iupui.edu/databases/acm-digital-library) when you are not at IUPUI.
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Learning Objectives:

<table>
<thead>
<tr>
<th>Upon completion of this course, students will:</th>
<th>PGPLs</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Understand how the vision of ubiquitous computing is articulated and continually reinterpreted by a community of researchers and practitioners</td>
<td>1. K&amp;S 2. CT</td>
<td>Paper Presentations</td>
</tr>
<tr>
<td>2. Understand how traditional HCI methods (e.g., requirements gathering, prototyping, evaluation) need to be adapted to ubiquitous computing contexts</td>
<td>1. K&amp;S 2. CT 4. EB</td>
<td>Group Project</td>
</tr>
<tr>
<td>3. Apply critical reading skills to texts with a diversity of disciplinary approaches, including theoretical texts, design texts, and technical texts</td>
<td>2. CT 1. K&amp;S</td>
<td>Paper Presentations</td>
</tr>
<tr>
<td>4. Apply the design and evaluation methods of ubiquitous computing to the study of a novel or existing ubiquitous computing technology</td>
<td>1. K&amp;S 2. CT 3. EC</td>
<td>Group Project</td>
</tr>
<tr>
<td>5. Analyze a body of research to identify the contributions that have been made and areas in which additional, novel contributions might be made</td>
<td>2. CT 1. K&amp;S 3. EC</td>
<td>Paper Presentations</td>
</tr>
<tr>
<td>6. Evaluate the strengths, weaknesses, and applicability of ubiquitous computing enabling technologies in a variety of contexts</td>
<td>2. CT 1. K&amp;S 3. EC 4. EB</td>
<td>Paper Presentations</td>
</tr>
<tr>
<td>7. Communicate, via both written and oral modalities, about technology and technical information in ways that will be accessible to people from a variety of backgrounds and experiences</td>
<td>3. EC 2. CT 1. K&amp;S</td>
<td>Paper Presentations</td>
</tr>
</tbody>
</table>

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**Course Requirements:**
During this class, you will: participate in the class discussions; present two research papers in groups of two students; work in a group to identify a research problem, conduct a study, and report the results in a paper; submit written critique to two research papers. 
There is not a traditional final exam.

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**SCHEDULE**
All classes will include a combination of research paper presentations (typically, 4 or 5 papers per day) and group work — except for the days of the group project presentations.

<table>
<thead>
<tr>
<th>Date</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thu Jan 19, 2017</td>
<td>FOUNDATIONS AND POSITION PAPERS I (UBICOMP); THE BODY AS AN INTERFACE I; [PROJECT] Individual Presentation of Research Ideas</td>
</tr>
<tr>
<td>Thu Jan 26, 2017</td>
<td>PROXEMICS &amp; LARGE DISPLAYS; [PROJECT] Groups Formation</td>
</tr>
<tr>
<td>Thu Feb 2, 2017</td>
<td>[PROJECT] Initial Research Presentations</td>
</tr>
<tr>
<td>Thu Feb 9, 2017</td>
<td>SMART HOMES; PERSUASIVE TECHNOLOGIES</td>
</tr>
<tr>
<td>Thu Feb 16, 2017</td>
<td>LEARNING</td>
</tr>
<tr>
<td>Thu Feb 23, 2017</td>
<td>NON-TRADITIONAL POPULATIONS; NOVEL INTERFACES</td>
</tr>
<tr>
<td>Thu Mar 2, 2017</td>
<td>[PROJECT] Presentation of User Study Methodology</td>
</tr>
<tr>
<td>Thu Mar 9, 2017</td>
<td>HEALTH</td>
</tr>
<tr>
<td>Thu Mar 16, 2017</td>
<td><del>SPRING BREAK</del></td>
</tr>
<tr>
<td>Thu Mar 23, 2017</td>
<td>FOUNDATIONS AND POSITION PAPERS II (EMBODIED INTERACTION); THE BODY AS AN INTERFACE II</td>
</tr>
<tr>
<td></td>
<td>In-Class Participation 1</td>
</tr>
<tr>
<td>Thu Mar 30, 2017</td>
<td>TANGIBLE INTERACTION</td>
</tr>
<tr>
<td></td>
<td>In-Class Participation 2</td>
</tr>
<tr>
<td>Thu Apr 6, 2017</td>
<td>TRACKING; ELICITATION STUDIES</td>
</tr>
<tr>
<td></td>
<td>In-Class Participation 3</td>
</tr>
<tr>
<td>Thu Apr 13, 2017</td>
<td>ELICITATION STUDIES</td>
</tr>
<tr>
<td></td>
<td>In-Class Participation 4</td>
</tr>
<tr>
<td>Thu Apr 20, 2017</td>
<td>Paper Presentations</td>
</tr>
<tr>
<td>Thu Apr 27, 2017</td>
<td>AUGMENTED REALITY; MUSEUMS</td>
</tr>
<tr>
<td></td>
<td>In-Class Participation 5</td>
</tr>
</tbody>
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**GRADES**
You will be able to collect up to 100 points through the semester. Your points will be converted into a letter grade according to the table below.
Individual Assignments (10 points)

- Individual Presentation of research idea 2 Points
- Final Paper Review 8 Points

Team Paper Presentations (20 points)

- Paper Presentation 1 10 Points
- Paper Presentation 2 10 Points

Group Project (Research Paper) (47 points)

- Initial Research Presentation 5 Points
- First Paper Draft 7 Points
- User Study (Methodology) Presentation 5 Points
- Intermediate Paper Draft 8 Points
- Final Presentation 7 Points
- Final Paper 15 Points

Participation (23 points)

- Attendance 10 Points
- In-Class Participation 1 2 Points
- In-Class Participation 2 2 Points
- In-Class Participation 3 2 Points
- In-Class Participation 4 2 Points
- In-Class Participation 5 2 Points
- Peer Evaluation 1 1 Point
- Peer Evaluation 2 1 Point
- Peer Evaluation 3 1 Point

Grading

Grades will be assigned using the IUPUI grading scale: 
http://registrar.iupui.edu/gradecover.html

You will receive a score for each graded assignment or group work. The sum of all points that you can receive during the semester is 100. In order to compute your final grade, you can
simply add up all the points that you received during the semester, and convert your score to a letter grade using the table below.

<table>
<thead>
<tr>
<th>Letter grade</th>
<th>Score</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>&gt;=99</td>
<td>Professional Level Work; Highly Contributed to the Learning Environment and Autonomously Explored Extra-Curricular Ubicomp Areas</td>
</tr>
<tr>
<td>A</td>
<td>&gt;=93</td>
<td>Professional Level Work</td>
</tr>
<tr>
<td>A-</td>
<td>&gt;=90</td>
<td>Excellent Work</td>
</tr>
<tr>
<td>B+</td>
<td>&gt;=87</td>
<td>Acceptable Work</td>
</tr>
<tr>
<td>B</td>
<td>&gt;=83</td>
<td>Acceptable Work, not at a Professional Level</td>
</tr>
<tr>
<td>B-</td>
<td>&gt;=80</td>
<td>Acceptable Work, below Average</td>
</tr>
<tr>
<td>C+</td>
<td>&gt;=77</td>
<td>Poor Work</td>
</tr>
<tr>
<td>C</td>
<td>&gt;=73</td>
<td>Poor Work, Minimally Acceptable</td>
</tr>
<tr>
<td>C-</td>
<td>&gt;=70</td>
<td>Unacceptable Work</td>
</tr>
<tr>
<td>D+</td>
<td>&gt;=67</td>
<td>Unacceptable Work</td>
</tr>
<tr>
<td>D</td>
<td>&gt;=63</td>
<td>Unacceptable Work</td>
</tr>
<tr>
<td>D-</td>
<td>&gt;=60</td>
<td>Unacceptable Work</td>
</tr>
<tr>
<td>F</td>
<td>&lt;60</td>
<td>Failed</td>
</tr>
</tbody>
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Attendance
H-566 is a seminar class, in which most of the learning will occur through class participation and discussion. For this reason, attendance is mandatory and will directly affect 10 points of your final grade. You will be required to check in at the beginning of each class. Please plan to be on class on time. If you are not in class at 6 pm, you may be considered absent that day.

Your attendance will be graded in the following way:

<table>
<thead>
<tr>
<th>Absences</th>
<th>Letter Grade</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 2</td>
<td>A</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>B</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>C</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>D</td>
<td>1</td>
</tr>
<tr>
<td>6 or more</td>
<td>F</td>
<td>0</td>
</tr>
</tbody>
</table>

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Class Participation
**READ THE RESEARCH PAPERS BEFORE CLASS**! In order to be prepared for class and being able to actively contribute to the discussion, you need to read the research papers that will be presented that week -regardless of whether or not you are leading the discussion that day.
Your class participation will be recorded in five classes through the semester. Your class participation to these classes will affect 10 points of your final grade. You will not be able to successfully participate in those classes if you have not read the papers.

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**Long Medical Absence (more than two days)**

It is your responsibility to promptly notify the instructor promptly if you have compelling medical reasons that prevents you from being in class for more than two days through the semester—so that we can determine additional assignments for the “participation” portion of your grade (23 points).

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**Late Assignments**

Assignments are due at 11:59 pm the day BEFORE class (unless otherwise specified). If you submit an assignment between 1 minute and 24 hours after the deadline, the penalty is 20% of the total score. If you submit more than 24 hours after the submission deadline, the assignment will count 0% towards your final score.

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**Group Work and Peer Evaluation**

Your group project scores will reflect your contribution to the group. It is not enough to be in a group that delivers good work to get a satisfactory grade in the group project: you need to actively contribute to the group, and your personal contribution needs to be clear during the final presentation. It is your responsibility to promptly notify your instructor (within the first two weeks of the group project) of any unexpected circumstances that require you to be assigned to a different group.

We will conduct a peer evaluation three times through the semester. You will be asked to rate the contributions of your groupmates on a scale from 1 (did not contribute at all) to 10 (contributed as expected).

We will conduct a peer evaluation three times through the semester. You will be asked to rate the contributions of your groupmates on a scale from 1 (did not contribute at all) to 10 (contributed as expected).

The first peer evaluation will be with the collected with the initial presentation; it will not affect your score, but you will receive a first feedback from your groupmates.

**The second and third peer evaluation will directly impact your score for: (1) intermediate presentation; and, (2) final presentation and final paper.**

Points will be computed in the following way: a basic group score will be assigned to your group submission; the average peer evaluation score $G$ will be computed for your group; if the average score that you received from your groupmates is $y\%$ below $G$, your personal score will
be adjusted by -y%, while if your personal score is +x% above G, your personal score will receive a x% bonus.

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Paper Presentations
You will present two research papers to the class, using the template that will be posted on Canvas. Presentations will be done in pairs, so plan ahead and make sure to coordinate the content and agenda of your presentation with your classmate.

You will be able to select two papers from the reading list during the first day of class. You cannot choose two papers that belong to the same topic.

If you were not in class the first day, it is your responsibility to notify the instructor as soon as possible, and the instructor will assign you two papers.

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UNIVERSITY POLICIES
Campus policies governing IUPUI courses may be found at: http://registrar.iupui.edu/course_policies.html

Administrative Withdrawal
A basic requirement of this course is that you will participate in all class meetings and conscientiously complete all required course activities and/or assignments. **If you miss more than half of the required activities within the first 25% of the course, you may be administratively withdrawn from this course.** Our course meets twice per week; thus if you miss more than four classes in the first four weeks, you may be withdrawn.

Administrative withdrawal may have academic, financial, and financial aid implications. Administrative withdrawal will take place after the full refund period, and if you are administratively withdrawn from the course you will not be eligible for a tuition refund. If you have questions about the administrative withdrawal policy at any point during the semester, please contact the instructor or visit http://registrar.iupui.edu/withdrawal-policy.html (Links to an external site.)

**Important Supplement for IUPUI Syllabi**

IUPUI Policy on Disability Accommodations
Students needing accommodations because of disability will need to register with Adaptive Educational Services and complete the appropriate forms issued by AES before accommodations will be given. The AES office is located in Taylor Hall, UC 100. You can also reach the office by calling 274-3241.

IUPUI Policy on Religious Holidays
IUPUI respects the right of all students to observe their religious holidays and will make reasonable accommodation, upon request, for such observances. Students seeking accommodation for religious observances must submit a request in writing to the course
instructor by the end of the second week of the semester and should use the Request for Course Accommodation Due to Religious Observance Form. More information on the IUPUI Policy on Religious Holidays is available here: http://registrar.iupui.edu/religious.html.

IUPUI Policy on Academic Integrity:
The IU Code of Student Rights, Responsibilities, and Conduct states that students must uphold and maintain academic and professional honesty and integrity; the code defines academic misconduct as any activity that tends to undermine the academic integrity of the institution. Students engaging in academic misconduct may therefore receive penalties from their course instructor and disciplinary action from the university. Policies against academic misconduct apply to all course-, department-, school-, and university-related activities. Academic misconduct may involve human, hard-copy, or electronic resources and includes but is not limited to the following: cheating, fabrication, plagiarism, interference, violation of course rules, and facilitating academic dishonesty. For definitions of these activities, visit http://studentcode.iu.edu/responsibilities/academic-misconduct.html. For information on how faculty and students are expected to handle cases involving academic misconduct, visit http://registrar.iupui.edu/misconduct.html. Additional information about the rights and responsibilities of IU students is available at http://studentcode.iu.edu/.

Title IX - IUPUI Policy on Sexual Misconduct
As your instructor, one of my responsibilities is to help create a safe learning environment on our campus. Title IX and our own Sexual Misconduct policy prohibit sexual misconduct. If you have experienced sexual misconduct, or know someone who has, the University can help. If you are seeking help and would like to speak to someone confidentially, please visit http://stopsexualviolence.iu.edu/help/index.html (Links to an external site.) for contact information.

It is also important that you know that federal regulations and University policy require me to promptly convey any information about potential sexual misconduct known to me to our campus’ Deputy Title IX Coordinator or IU’s Title IX Coordinator. In that event, they will work with a small number of others on campus to ensure that appropriate measures are taken and resources are made available to the student who may have been harmed. Protecting a student’s privacy is of utmost concern, and all involved will only share information with those that need to know to ensure the University can respond and assist.
I encourage you to visit stopsexualviolence.iu.edu (Links to an external site.) to learn more about available resources on campus and in the community.

Education and Title VI
Title VI of the Civil Rights Act of 1964 protects people from discrimination based on race, color or national origin in programs or activities that receive Federal financial assistance.

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RESOURCES FOR STUDENTS

Student Advocate
The Student Advocate Office is located in the Campus Center, Suite 350, and can be contacted by phone at 278-7594 or email at stuadvoc@iupui.edu. For more information, visit the Student Advocate website at http://www.life.iupui.edu/advocate/

Adaptive Educational Services
Students needing accommodations because of physical or learning disabilities should contact Adaptive Educational Services, Taylor Hall (UC), Room 137: http://aes.iupui.edu/

Counseling & Psychological Services
Students who wish to seek counseling or other psychological services should contact the CAPS office by phone at 274-2548 or email at capsindy@iupui.edu. For more information, visit the CAPS website at http://life.iupui.edu/caps/

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READING LIST
(only the name of the first author is included)

FOUNDATIONS AND POSITION PAPERS I (UBICOMP)


THE BODY AS AN INTERFACE I


Chris Harrison. Skinput: appropriating the body as an input surface. http://dl.acm.org/citation.cfm?id=1753394

PROXEMICS & LARGE DISPLAYS


SMART HOMES

Matthew Kay. Lullaby: a capture & access system for understanding the sleep environment. http://dl.acm.org/citation.cfm?id=2370253

William Gaver. Enhancing ubiquitous computing with user interpretation: field testing the home health horoscope. http://dl.acm.org/citation.cfm?id=1240711


PERSUASIVE TECHNOLOGIES

Lane Harrison. Influencing visual judgment through affective priming. http://dl.acm.org/citation.cfm?id=2481410
LEARNING


Francesco Novellis. How real is 'real enough'?: designing artifacts and procedures for embodied simulations of science practices. http://dl.acm.org/citation.cfm?id=1999041


Jennifer A. Rode. From computational thinking to computational making. http://dl.acm.org/citation.cfm?id=2804261


NON-TRADITIONAL POPULATIONS


Divya Ramachandran. Social dynamics of early stage co-design in developing regions. http://dl.acm.org/citation.cfm?id=1240790

NOVEL INTERFACES


Hong Li. WiFinger: talk to your smart devices with finger-grained gesture. http://dl.acm.org/citation.cfm?id=2971738

HEALTH


Rúben Gouveia. Exploring the design space of glanceable feedback for physical activity trackers. http://dl.acm.org/citation.cfm?id=2971754
FOUNDATIONS AND POSITION PAPERS II (EMBODIED INTERACTION)


THE BODY AS AN INTERFACE II

Gabe Cohn. Humantenna: using the body as an antenna for real-time whole-body interaction. http://dl.acm.org/citation.cfm?id=2208330


TANGIBLE INTERACTION


Michael S. Horn. The role of cultural forms in tangible interaction design. http://dl.acm.org/citation.cfm?id=2460643


TRACKING


Xianyi Gao. Elastic pathing: your speed is enough to track you. http://dl.acm.org/citation.cfm?id=2632077

Francesco Cafaro. I see you there!: developing identity-preserving embodied interaction for museum exhibits. http://dl.acm.org/citation.cfm?id=2466252
ELICITATION STUDIES


AUGMENTED REALITY


Lei Xie. Tell me what I see: recognize RFID tagged objects in augmented reality systems http://dl.acm.org/citation.cfm?id=2971661

MUSEUMS


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READING LIST FOR THE INDIVIDUAL PAPER REVIEWS (PICK 2)

AUGMENTED REALITY


TANGIBLE INTERACTION


SUPPORTING VISUALLY IMPAIRED

Yuhang Zhao. CueSee: exploring visual cues for people with low vision to facilitate a visual search task. http://dl.acm.org/citation.cfm?id=2971730

SOUND AND AUDIO

The Instructor reserves the right to make changes to syllabus, course schedule, and reading list, if necessary.