

# **Program Review and Assessment Report**

## **Master of Science in Human-Computer Interaction**

August 2020

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## I. GENERAL INFORMATION, INSTITUTIONAL DATA

This report focuses on the Human-Computer Interaction (HCI) Master of Science Program under the IUPUI School of Informatics and Computing. The M.S. in HCI is currently housed under the Department of Human-Centered Computing (HCC), which was founded on July 1, 2013. It has brought together strong research and education expertise in:

- Accessibility for people with disabilities and older adults
- Patient-centered interfaces in hospitals and clinics
- Youth empowerment technologies for neighborhood health
- Patient-centered technologies for personal and community health
- Technologies to support successful aging
- Global knowledge infrastructures for environmental change research
- Data sharing and reuse in transdisciplinary scientific communities
- Designing for vulnerable, marginalized communities
- Android Science and Developmental Robotics
- Community and Urban Informatics; Digital Civics
- Ubiquitous and Social Computing
- User Experience (UX) Research and Interaction Design
- Information Visualization
- Embodied Interaction
- Participatory Design
- Computer-Supported Cooperative Work (CSCW)

During the 2019-2020 Academic Year, there were a total of 10 faculty for the Human-Computer Interaction (HCI) Master of Science Program, including one Professor, one Associate Professor, six Assistant Professors, and two Professors of Practice, exposing students to wide expertise within HCI including academic and professional practice.

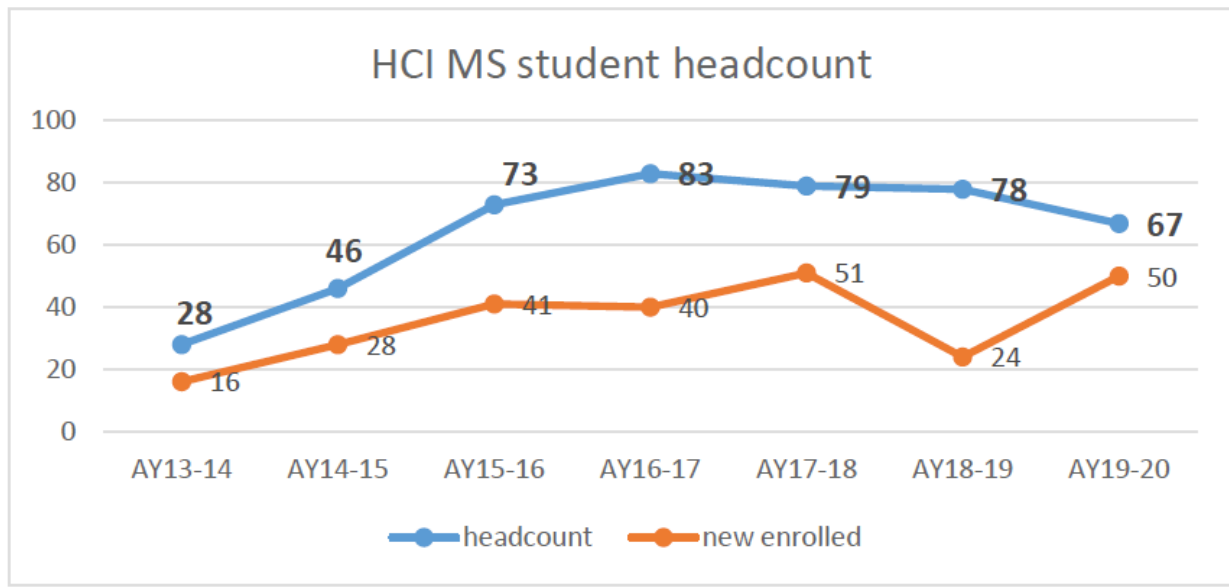
## II. PURPOSES, REPUTATION, ASPIRATIONS:

*Estimate of the program’s national ranking based upon numbers of graduates, subsequent placement of graduates, level of support, or other criteria appropriate to the discipline.*

The M.S. in Human-Computer Interaction is a 36-credit-hour program that integrates interactive computing, user experience (UX), usability, interaction and interface design, and the social sciences in the research, design and development of user-centered and socially acceptable interactive technologies, applications, and information systems.

The program is unique on the IUPUI campus and prepares graduates for in-demand careers in private industry or academia (e.g., admission into HCI-related Ph.D. programs, including IUPUI’s own Ph.D. in Informatics with a human-computer interaction specialization). Upon or before graduation, our HCI students found full-time jobs and internships as user experience researchers and designers at top companies in Indiana, nationally, and internationally, including Yahoo!, Google, Pearson, Apparatus, FormStack, Salesforce, WalmartLabs, Dell, Intel, Demandware, SAP, IU Health, and many others.

As of Spring 2020, there are 67 students currently in the program, which has picked up a very healthy growth trend of approximately 20-40 new students every year (including fall and spring admits), and with cohort of prospective students bound to grow rapidly. However, due to COVID, many of our Fall 2020 students have deferred acceptance to another year.



Since its inception in 2003, the MS in HCI has graduates approximately 325 students, who went on to secure job positions mainly in the many industry sectors where Human-Computer Interaction play an increasingly major role, in both large and medium-sized organizations.

Our program continues to have great job placement for our graduating students. A concern, that I am sure is shared with many other programs, is that we do not know how COVID-19, and the connected global economic downturn, may impact job placements.

Based on our program's 2019-2020 job placement data (40 students; 22 respondents), our MS in HCI program has 95% job placement rate for graduating/recently graduated students and of those students found employment within the area of their major, with and with an average starting salary of \$84,000.

Based on our program's 2018-2019 job placement data (51 students; 44 respondents), our MS in HCI program has 91% job placement rate for graduating/recently graduated students and of those students found employment within the area of their major, with and with an average starting salary of \$84,000.

Based on our program's 2017-2018 job placement data (28 students; 27 respondents), our MS in HCI program has 92% job placement rate for graduating/recently graduated students with 88% finding fulltime employment within the major and with an average starting salary of \$85,600.

Based on our program's 2016-2017 job placement data (40 students), our HCI MS program has 100% fulltime job placement rate for graduating/recently graduated students in their area of major and with an average starting salary of \$107,776.

Based on our program's 2015-2016 job placement data (26 students), our MS in HCI program had a 100% job placement rate for graduating/recently graduated students, with 100% students finding full time employment in their area of major, and with an average starting salary of \$67,000.

Based on 2013-2014 job sample placement data for the program (n=26), our MS in HCI program has 96% job placement rate for graduating/recently graduated students, with 88% students finding employment in their area of major, and with an average starting salary of \$64,731.

Examples of job positions our students have secured include: user experience (UX) designer, UX engineer, UX research specialist, UX researcher, front end web developer, user interface designer, usability engineer, search quality specialist, interaction designer, product designer, product manager, search quality analyst, senior human factors engineer, User Interface (UI) Designer and Developer, and UI/UX architect.

The program may be completed in two years by a full-time student. Part-time study options are available for domestic students. However, international students and any students funded directly by the School of Informatics and Computing (in the form of an assistantship or fellowship) must complete the program in two years.

Beyond industry, several graduate students have used their time at IUPUI to develop skills necessary to competitive and accepted into top-ranking HCI PhD programs, including University of Michigan, Carnegie Mellon University, University of California-San Diego, Georgia Tech, and Northwestern University.

Our program aspires to be among the top ten in the nation, and among the top five in the Midwest, with competing MS in HCI programs in major universities, including: Carnegie Mellon University, Georgia Tech, University of Michigan, DePaul, and University of Washington. Together with the MS in HCI program in the part of the School on the Bloomington campus, our HCI faculty collectively (Indianapolis and Bloomington) is the second largest body of HCI faculty and students in the Midwest (second to Carnegie Mellon University's HCI Institute).

### III. PROGRAM PROCESSES

#### 1. Program Content

##### ***a. Distinctive characteristics; structure, breadth, and depth of program.***

The program content includes four specific components:

- Six core courses (18 credits) that cover the foundation of Human-Computer Interaction theory and practice of the discipline, by providing students with a selected but comprehensive preparation in:
  - interaction design methods and conceptual tools to be a successful and competitive HCI practitioners (user research and user requirements, user interface and user experience modelling, analysis, design and usability evaluation)
  - theoretical knowledge to understand, interpret and contribute research to complex phenomenon surrounding human-computer interaction (psychology and human factors in computing, social and collaborative computing, ubiquitous computing)
- Two required electives (six credits) to be chosen to round out the student’s educational experiences and prepare them for their future careers. Students must choose either H517 (Visualization Design, Analysis, and Evaluation) or H565 (Collaborative and Social Computing). Students also must choose between H567 (Internet-of-Things Design for Business Innovation), I590 (Experience Design and Evaluation of Accessible Technologies), or N505 (Advanced Issues in Emerging Media Environments). These courses enable students to deepen their UX expertise in targeted ways that prepare them for future employment opportunities by addressing issues.
- Two open elective courses (six credits) to be chosen among the department electives in Human-Centered Computing or in other schools which offers courses that complement the preparation of the HCI core (*e.g.*, visual communication or design thinking courses at the Herron School of Art and Design). A recommended elective is an industry internship for up to 6 credits, which many students pursue.
- Final Capstone Project or Thesis (two sequential courses) (six credits) that enable students to apply in a research or professional practice setting the knowledge learned in the course towards a final HCI project (theoretical, experimental or applied in nature) in collaboration with external industry client, and guided by the academic supervision of an HCI faculty member.

##### ***b. How has the department curriculum responded to new directions in the discipline?***

HCI industry and research continues to evolve and adapt as new computing technologies are introduced, adopted, and used. Our program keeps the curriculum up to date with new technologies and directions in the discipline so our students can fully achieve the Program-Level Student Learning Outcomes. Thus, the curriculum has evolved over the last decade to keep the pace with the fast changing HCI industry and research areas, and to meet the increasingly sophisticated needs and expectations of the students. Specifically, key milestones that characterized the positive growth and evolution of the curriculum include the following:

- 2021: In the Spring 2021, Prof. Dombrowski will be teaching a graduate course on HCI Design Ethics. In recent years, there have been numerous calls made by industry to contend with ethical issues related to human-centered computing technologies. This course will begin to address these calls by having students: 1) recognize key ethical dilemmas related to computing and society; 2) articulate ethical dilemmas by applying ethical frameworks to the design of computing systems; 3) evaluate those designs; and 4) develop ways of having effective ethical workplace conversations.
- 2018: We changed some of our required courses. Specifically, with student feedback, we removed the course INFO I501 Introduction to Informatics. The course was deemed too basic for advanced students who held CS degrees or prior engineering experiences; conversely, the course was not supportive enough for students with non-STEM, CS, or engineering backgrounds. By removing this course, it allows students to pursue other courses to expand their portfolios and deepen their UX-related knowledge.
- 2018: We added a requirement for an Open Elective Graduate Course. These courses help us keep our curriculum relevant to current and very likely future business needs. These courses represent the ongoing evolution of how computing technologies are designed, current trends in human-centered computing, and areas that are likely to be key for human-centered computing industries. Students can choose from three key classes:
  - [INFO-H 567 IoT Interface Design for Business Innovation](#)
  - [INFO-I 590 Experience Design and Evaluation of Access Technologies](#)
  - [NEWM-N 505 Advanced Issues in Emerging Media Environments](#)
- 2016-2017: Introduction of new core course INFO H517 Visualization Design, Analysis, and Evaluation, that addresses the critical HCI area of interactive visualization, and addresses important program-level learning outcomes (Assess the purpose, benefits, and limitations of visualization as a human-centered data analysis methodology; Conceptualize and design effective visualizations for a variety of data types and analytical tasks; Implement interactive visualizations using modern web-based frameworks; Evaluate visualizations using perceptual principles and established design guidelines; Conduct independent research on a range of theoretical and applied topics in visualization and visual analytics).
- 2017: Initiation of a faculty task force on service design for the Internet of Things (IoT), led by Lou Lenzi, Professor of Practice and world-renowned design leader, who joined the department in 2016. This initiative will build on the theoretical and methodological foundations of the program to offer students industry-centered learning experiences on HCI strategic design as tied to business strategies in the growing area of the Internet of Things. An elective course on Human-Machine Interface Design Strategies for IoT ecosystems is scheduled for fall 2017.
- 2009-2010: integration of the two-semester Capstone Project class in the curriculum, to replace the informal yet non-sustainable structure that was before, by which students had to shop around for individual project or thesis advising. With the significant growth of the program, the “final project” class was introduced to provide to students a much more structured scaffolding of their final project effort, with an instructor on record for the capstone class every semester. This positive change led to increased student retention, higher on-time graduation rates and more efficient workload for the research-active faculty (who could focus on individual mentoring of PhD students).
- 2015: Thanks to the new advisory board of the department, industry partners were systematically including to serve as “clients” for student capstone project. Each capstone team is

matched (based on preference and skillset) to an industry client to orient the application of the learned HCI skills towards a real-world problem space and project.

- 2008- present: the program increasingly added online sections to its in-class courses. Currently 80% of the in-class sections are also offered online to increase flexibility in matching the student scheduling needs and commitments. **In Spring 2020, a proposal for a new fully online track for the MS program has been submitted for approval and has been approved by the IU Office of Online Education. The proposal is now going through the campus approval processes.**
- 2003-present: The content of the courses has been refreshed and updated every year thanks to the inclusion in the faculty body of seasoned user experience (UX) professionals from the local industry, who serve as Adjunct faculty for key courses in the program. This is a key addition to the program that offers students an essential industry perspective into the discipline, and helps make our graduates job-ready.
- Since 2008, Internships were explicitly included in the curriculum and highly-recommended to the students in search of electives that could give them more industry experience.

### *c. Recent revisions/improvements to courses*

- Improved of alignments of skills between core courses and Final Project Capstone courses. Instructors of core courses and capstone instructor have discussed how to better cover in the core courses important skills necessary for a successful capstone outcome
- Ongoing improvement of capstone course organization and skills based on feedback received from external clients students worked with during their capstone project.
- Embedded industry expert panels and alumni panels in introductory first-semester H541 course

In Fall 2016, Dr. Miller taught a new HCI-focused version of I-575 “Informatics Research Design.” The overall course objectives and learning outcomes remain the same - to provide student with a broad overview of the fundamental research methods in HCI and related areas, introducing students to various types of research approaches and designs. As HCI continues to absorb and integrate a broad range of research methods, the next generation of HCI scholars will need to be prepared to both implement a wide variety of methods and understand the *methodology* from which they originate. With this goal in mind, Dr. Miller revised I575 with a focus on “Ways of Knowing” in HCI. Each week, students learn about a research design approach in Informatics, with a focus on those used in HCI and related fields. For each approach, the course covers the types of questions the approach enables, the research methods and data gathered by those who use the approach in their own research, and examine successful examples of the research design approach in action. The structure and content are inspired by CU Boulder’s “Human Computer Interaction: Survey & Synthesis,” taught by Leysia Palen ( <https://cmci.colorado.edu/~palen/courses/5919/F14/> ) and Georgia Tech’s “Introduction to Human-Centered Computing” taught by Amy Bruckman ( <http://www.cc.gatech.edu/~asb/teaching/6451/fall2011/> ) but with more of an explicit focus on research methods.

Students submit an online reading reflection for each week’s topic. In parallel, students ‘road-test’ one or more of the research techniques discussed in class through the development of a 10-15 page (~7-10,000 word) research proposal, which they present to the class and turn in as their final deliverable. Every two weeks students receive feedback on their in-progress proposal, either from the instructor or through peer review.



***d. Curricular philosophy: What is the philosophy that has driven the establishment of the core, elective, and minor (i.e., minors offered for students in other departments) curricula?***

The basic principle behind the core is rooted in the fundamental definition of the field of Human-Computer Interaction as indicated in the ACM HCI Curriculum: *“Human-computer interaction is a discipline concerned with the design, evaluation, and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them.”*

We strive to offer a comprehensive yet deep preparation that touches the fundamental methodological and theoretical areas of the field, with an emphasis on the professional knowledge needed to succeed in the industry and selected research and application areas connected to the strengths of our research faculty.

***e. Course evaluation***

In 2017, the program adopted the BLUE student evaluation system, which enables faculty to gather student feedback on the course through custom questions designed by the instructor.

**2. Student Support**

***a. How and when are research advisors selected for graduate students?***

For course advising, the advising to the students operates at two levels:

1. *Graduate Program Advising and Orientation*: the graduate program coordinator engages with students to orient them from admission to graduation to fulfill the necessary verifications and requirements to maintain academic standing, including grade requirements, full-time/part-time status, support for international students and liaison with the Office of International Affairs (OIA), degree and course transfers, credit transfers, and leave of absences.
2. *Plan of Study Advising*: from the time of admission, the Department Chair and assistant provide general guidance to the students on the pre-defined program plan of study, organization of the course load for each semester, selection of the electives and suggestions to contact specific faculty for specific interests or projects.

For research advising, the following process is followed:

- Upon admission, faculty review the self-reported technical and research skillset and the personal statement that students have submitted in their application package
- Based on this information, by the beginning of the first semester, faculty express to the assistant to the Chair their preference for engaging students in research projects based on the current faculty research agenda, the student’s interest and skillset
- Faculty and students are matched, with the opportunity to re-assess performance and fit anytime during the semester (and certainly every semester).

***b. Description of how graduate students are advised for placement***

Students are encouraged to do internships that better prepare them for a professional career. Human Computer Interaction Graduate students are able to take advantage of experiential learning opportunities as elective credits throughout their program for up to six credit hours. The student is required to work a minimum of 45 hours per credit hour. It is in these internship environments where they are able integrate

knowledge and theory learned in the classroom with practical application and skills development in a professional setting under the supervision of a mentoring supervisor and course instructor.

For each Internship, the student will turn in weekly journal entries and a written report describing the activities in which the intern was involved in while working at the organization. In previous semesters, students have interned at a number of organizations both in and outside of the state of Indiana (including Roche, Google, Prysm, Procter & Gamble) and have held various positions such as UX Designers, UX Researchers, Product Owners, as well as, Project Managers.

*c. Description of processes to help graduate students learn to teach*

Admitted master students are vetted and selected to serve as Research or Teaching Assistants based on the interests of the students, their self-report skillset and the needs of the department. Routinely, since the first semester of admission, every full-time MS student is assigned a teaching or research assistantship (funded by the department) to assist faculty in MAS undergraduate courses and a faculty mentor (the course instructor) who directly supervises their work. Most MAS MS students are assigned a Teaching Assistantship of 5, 10, or 20 hours per week mainly based on the number of undergraduate students in the courses and the skillset of the teaching assistant. Specific attention is paid every semester to monitor the teaching performance of the teaching assistant by engaging faculty in assigning to students increasingly challenging teaching roles (from grading, to class supervision, preparation and logistics, to student interaction, tutoring, coaching and lecturing) and providing feedback to the student and to the Chair. Students are encouraged to take advantage of the Center for Research and Learning on campus to hone their communication and teaching skills.

*d. Description of how students are selected to be teaching assistants*

*See above.*

### 3. COVID19 – Review of Course Delivery

In October 2020, a student survey was administered to students regarding Hybrid Courses in the School of Informatics and Computing, Human-Centered Computing (HCC) Department. “The purpose of the survey was designed to gauge the plans and concerns of HCC students regarding their hybrid learning experience in place due to COVID-19 as they look ahead to taking courses in the Spring 2021 semester.”

The survey asked five basic questions:

- 1) Student’s major and level
- 2) What are your concerns about having Hybrid-Distance (HD) classes in the Spring?
- 3) What are your concerns about having Hybrid-Traditional (HY) classes in the Spring?
- 4) My preference for the Spring semester would be taking mostly HD; taking mostly HY; taking only HD; taking only HY; other options.
- 5) Are there ways in which the department can better support your hybrid learning?

312 students completed the survey (39% response rate), distributed across the programs in HCC. 39 graduate students from the HCI program participated in the survey.

**For Hybrid-Distance Classes:**

Most students (n=13; 56%) stated that hybrid-distance classes “worked well, no issues”.

However, some respondents did express concerns:

- Lack of rapport with students and peers, missing class discussion (n=4; 17%)
- Hard to interact online, hard to learn, can’t see other students online (n=3; 13%)
- Concerns about quality of teaching (n=1)
- Concerns about missing homework (n=1)
- Concerns about access to stable internet connection (n=1)

**For Hybrid-Traditional Classes:**

10/22 respondents indicated that hybrid traditional courses worked well.

9/22 respondents indicated that they had safety concerns.

Overall, HCI Graduate students prefer the Hybrid-Distance class format. Faculty will devote additional effort in developing effective classes with attention to positive learning outcomes.

**IV. LEARNING OUTCOMES**

**1. Program-Level Student Learning Outcomes<sup>1</sup>**

Upon completion of the MS in HCI program, students will:

	RBT <sup>2</sup>	PGPL <sup>3</sup>
1. Evaluate and create interfaces by applying HCI theories, terms, principles, and methods including user experience, user-centered, and interaction design theories and practices; interactive product design and development processes and lifecycle; user profiling to interaction design (needs and requirements); system requirements and product assessments; prototype design theory and practice; and product usability evaluations and testing methods	5, 6	1, 2
2. Apply psychological and cognitive principles and theories to human factors and user experience design	3	1
3. Research and develop interactive collaborative systems by applying social computing theories and frameworks	5, 6	1, 2
4. Design novel ubiquitous computing systems by researching and applying relevant HCI and informatics theories and frameworks	6	1, 2
5. Apply principles and theories of quantitative analysis, qualitative analysis, design research, information visualization, and visual analytics	3	1
6. Design effective, usable, and human-centered interactive systems using prototypes and proof of concepts	6	2
7. Critique interaction designs on their usability, human-centeredness, and satisfaction of requirements, evaluate the fitness of requirements, goals, and	5, 6	2, 3

<sup>1</sup> Revised fall 2016

<sup>2</sup> RBT: Revised Bloom’s taxonomy

<sup>3</sup> PGPL: Principles of Graduate and Professional Learning (1. Knowledge and Skills Mastery; 2. Critical Thinking and Good Judgment; 3. Effective Communication; 4. Ethical Behavior)

research methods, make recommendations, and create and defend alternative designs.		
8. Effectively communicate in digital, oral, and written form the processes, ideas, outcomes, and implications of HCI projects	2, 5	3
9. Articulate decisions and reasoning behind decisions made related to interaction design choices, design and research methods	2, 5	3
10. Exhibit sound judgment, ethical behavior, and professionalism in applying HCI concepts and value-sensitive design to serve stakeholders and society, especially in ethically challenging situations	2–6	4
11. Collaborate in teams fairly, effectively, and creatively, applying group decision-making and negotiation skills	2–6	4

**2. Evidence of Students’ Achievement of Program-Level Learning Outcomes**

The Capstone Projects –conducted in partnership with local companies and institutions – represent the culmination of knowledge and abilities for students in the program. Students’ success with their Capstone projects is a direct evidence that students are able to master the eleven program-level learning outcomes when solving real-world problems.

There are three indicators that provide indirect evidence of their mastery of the eleven program-level learning outcomes and of the transferable skills (Revised Bloom’s taxonomy and Principles of Graduate & Professional Learning). First, we have a continued high job placement rate for graduating/recently graduated students, mostly in their area of specialization: the recruitment process at the companies listed below always includes a thorough assessment of the candidate’s technical proficiency and competencies. Second, the student success in the internship program is another indirect evidence of their mastery of the eleven program-level learning outcomes and transferable skills in industrial and corporate environments. Third, recent HCI MS graduates have been accepted to prestigious PhD programs in Human-Computer Interaction (e.g., Carnegie Mellon University, Georgia Tech, Northwestern University, University of California-San Diego, and IUPUI): this is indirect evidence of our graduates’ mastery of the eleven program-level learning outcomes and transferable skills in academic environments.

*a. Capstone Projects of HCI MS students:*

The program includes client-driven capstone projects in collaborative partnerships with industry to provide increased exposure to students to real-world project challenges. Recent examples of capstone projects include:

### **SPRING 2020 – Completed Projects**

- **Title: Improving Management of Capital Projects for a Local Utility**
  - Project Sponsor: Citizens Energy
  - Web Application
  - Two HCI MS Students
- **Title: Jag Study: An Application for Students to Reserve Study Rooms at IUPUI Library**
  - IUPUI Library
  - Web Application
  - Three HCI MS Students
- **Title: Student Companion Application for Haptic Classroom Management System**
  - Project Sponsor: MAX
  - Web Application
  - Three HCI MS Students
- **Title: SPEED+: A Dashboard to Support State Government Spending Decisions**
  - Project Sponsor: State of Indiana (MPH)
  - Web Application
  - Two HCI MS Students
- **Title: Vitally: Fostering Wellbeing through Community-driven Gamification**
  - Project Sponsor: Regenstrief Institute
  - Mobile Application
  - Three HCI MS Students
- **Title: Web-based Solution to Support Online Data Privacy for Salesforce Cloud Users**
  - Project Sponsor: Salesforce
  - Web Application
  - Three HCI MS Students
- **Title: Ecostar: An Application to Support Recycling Engagement for Starbucks Employees**
  - Project Sponsor: Starbucks
  - iPad Application
  - Four HCI MS Students
- **Title: Empowering Undergraduate Student Success**
  - Project Sponsor: Studytable
  - Predictive analysis chatbot mobile application and web application
  - Four HCI MS Students

### **FALL 2019 – Completed Projects**

- **Title: Exploring the History of Fort Benjamin Harrison with Augmented Reality**
  - Sponsored by Schneider Geospatial
  - Three HCI MS students
- **Title: Optimizing Tasks for Coworking Space Members and Staff**
  - Sponsored by GravityDrive
  - Three HCI MS Students
- **Title: Accessible Control Panel for Kiosks at The Children’s Museum**
  - The Children’s Museum
  - Three HCI MS Students

### **SPRING 2019**

1

Title	Mission Control: A Website to Support a Service Offered to Clients
Student Names	Sarah Ake, Taylor Hincks, Makenzie Heard, and Ghaida Khunain
Project Partner	Design on Tap

2

Title	Accessible Museum Experiences for The Children’s Museum of Indianapolis
Student Names	Amber Tansy, Veer Pal, Zoe Pan, and Parth Patel
Project Partner	The Children’s Museum of Indianapolis & Easterseals Crossroads
Type of Project	Responsive Web Application
One-line Description	We designed new website functionality to enhance the experience of museum visitors with sensory sensitivities.

3

Title	Mobile Application to Support Gauge Field Technicians
Student Names	I-Ching Liu, Tzu-Yu Su, and Tabitha Tsai
Project Partner	Gauge Telematics
Type of Project	Mobile Application
One-line Description	We designed a mobile application to support Gauge field technicians as they track Internet of Things devices attached to client assets.

4

Title	CoWork: A Web Application for Coworking Space Management
Student Names	Gauri Patekar, Madhura Mhatre, and Ke Zhuang
Project Partner	GravityDrive
Type of Project	Web application
One-line Description	We designed a web application to support the needs of managers and members of coworking spaces.

5

Title	Lawn Care Customer Access Portal
Student Names	Anmol Khanna, Eric Smith, Krisha Hines, and David Burton
Project Partner	GravityDrive
Type of Project	Mobile application
One-line Description	We designed a mobile solution to be used by customers of lawn care companies.

6

Title	Application to Facilitate Resource Management for Lawn Care Companies
Student Names	Bhavna Ganesh, Swapnil Kosarabe, Hannah Roper, and Aishwarya Sheth
Project Partner	GravityDrive
Type of Project	Mobile application
One-line Description	We designed a mobile application that enhances the ability of lawn care managers to monitor and control their resources.

7

Title	Enhancing Information Retrieval from the Indiana Data Hub
Student Names	Neha Khatri, Rachana Solanki, Huang Fu, and Shuxian Wu
Project Partner	State of Indiana - Management Performance Hub
Type of Project	Web application
One-line Description	We designed new functionality for the Indiana Data Hub to facilitate location and retrieval of information from existing databases.

8

Title	Augmented Reality Application to Support Basketball Spectator Engagement
Student Names	Naomi Khenglawt and Karthik Kiran
Project Partner	MAX
Type of Project	Mobile application with augmented reality features
One-line Description	We designed a mobile application that allows users to play a game that simulates shooting at the basket in a basketball arena.

9

Title	Mobile Interface for Sports Wagering
Student Names	Lawrence Walter, Avinash Mishra, and Niranjan Kshirsagar
Project Partner	MAX
Type of Project	Mobile application
One-line Description	Innovative sports wagering application that utilizes real-time geo-spatial shot data to provide an enhanced in-game fan experience.

10

Title	Picks with Pals: Supporting Friendly Wagering on Events
Student Names	Obaid Ameen, Justin Crouch, and Sarah Rice
Project Partner	Picks with Pals
Type of Project	Mobile application
One-line Description	We designed an application that supports friendly wagering among groups of users on a variety of events that involve a winner.

11

Title	Round3: Enhancing Peer Feedback in School Courses
Student Names	Steffi Gogoi, Jask Thind, and Yuewei Wang
Project Partner	Round3
Type of Project	Web application
One-line Description	We designed new functionality for a web application that allows students to provide and receive peer feedback for course assignments.

**SPRING 2018**

1

Title	An Application to Enrich Client Relationships
Student Names	Pratik Nalawade, Anagha Varrier, Pushkar Joshi
Project Partner	Design on Tap
Type of Project	Website
One-line Description	A web-based portal to improve client relationships by providing proactive project updates.

2

Title	The INDATA Project: Improving Access to a Disability-Related Media Platform
Student Names	Brennan Wieland, Josh Littlejohn, Greg Oppman
Project Partner	Easterseals Crossroads
Type of Project	Website and mobile application
One-line Description	Design of interfaces to make it easier to find and access media files within a large media platform.

3

Title	Event Ticketing Concierge (ETC): A Ticketing Application for Large Event Facilities
Student Names	Disha Bora, Swapnil Chandra, Joshua Joo, Takshak Parmar
Project Partner	GravityDrive
Type of Project	Mobile application
One-line Description	Design of an interface to facilitate event ticket purchase and support the user experience of the event.

4

Title	Wayfinding at Newfields: An Application to Assist Guests with Exploration of the Museum
Student Names	Matt Brown, Lisha Chen, Dorsh Deans, Kenzo Nawa
Project Partner	Newfields
Type of Project	Mobile application
One-line Description	A novel mobile application to support the guest experience and assist with exploration of an art museum.



5

Title	Talent Assist: Using Artificial Intelligence to Facilitate Job Interviews
Student Names	Sandeep Jagtap, Aziz Khilawala, Arvind Santhanam
Project Partner	IBM
Type of Project	Communication software with artificial intelligence support

6

Title	Use of a Large Touchscreen to Support Collaboration in Healthcare
Student Names	Pruthviraj Narayanaswamy, Mikaylah Gross, Kartik Rao
Project Partner	Prysm
Type of Project	Large touchscreen application and mobile application
One-line Description	Design of an interface to support use of a large touchscreen for online consultations among health care providers.

**FALL 2018**

1

Title	Mobile Application for Managing Lawn Care Crews
Student Names	John Blythe, Dandrew Merriweather, Sagar Salvi and Shawn Tokarcik
Project Partner	GravityDrive
Type of Project	Mobile Application
One-line Description	Mobile application to support managers who coordinate assignments for lawn care crews.

2

Title	Product Academy – An eLearning Application for Product Management
Student Names	Phil Tarnowski
Project Partner	Innovatemap
Type of Project	Web Application
One-line Description	Product Academy is an eLearning application that teaches product management skills to people without a product management background.

3

Title	Voice and Touch-Screen Interfaces for a Smart Home System
Student Names	Spencer K. Edwards, Kara Bougher and Sahithi Muvva
Project Partner	Omni
Type of Project	Mobile Application and Voice Interface
One-line Description	Voice and touch-screen interfaces for a smart home system with machine learning capabilities.

4

Title	Ecotour: A Mobile Application for Educational Field Trips
Student Names	Rahul Jain, Saran Peddinti and Nan Yang
Project Partner	WisdomTools
Type of Project	Mobile application
One-line Description	Mobile application that can increase the learning potential of field trips to wetlands or other parks.

*b. External Engagements with community, state, and national*

The program includes client-driven capstone projects in collaborative partnerships with industry to provide increased exposure to students to real-world project challenges. The course H567 “IoT Interface Design for Business Innovation” has incorporated several collaborative projects undertaken with industry and community partners. Past projects and industry partners have included:

- General Electric, Appliance Division. Project: the connected home and home health.
- Crown Equipment. Project: smart warehouse and material handling equipment telematics.
- Amazon.com. Project: Enhanced Prime Now services.
- IBM Research. Project: connected home and Eldercare/Aging-in-Place.
- Becks Hybrid Seeds. Project: Ground-based robotics and row-crop analytics.
- Rushville, IN. Project: “smart” public services for rural town-centers.
- Shure Corporation. Project: VUI-based IoT services.
- Allegion Security. Project: commercial building secure access.
- Delta Faucet. Project: IoT solutions for residential water fixtures.
- CreateAbility. Project: Home-health monitoring systems
- Gauge Telematics. Project: Wide-area telemetry solutions.
- Rolls Royce. Project: Commercial Technical Training Services
- Global Water Technology. Project: Rural public-utility monitoring service.

FA19 Semester Projects

- Endress + Hauser. Project: industrial process automation
- Grand Park Sports Campus. Project: sports venue space optimization\*
- Fanimation. Project: Home automation services

\*Project in conjunction with IUPUI Sports Innovation Institute

Each project sponsor participated in the department’s Industry Lecture Series with the exception of Rushville/Smart City. The “Smart City” lecture was presented by former mayor of Indianapolis and current Professor of Practice at Harvard’s Kennedy School of Government, Stephen Goldsmith. Mayor Goldsmith’s talk was followed by a panel discussion moderated by Professor Lenzi. Panelists were:

- Ken Clark, CIO City of Indianapolis
- Darshan Shah, Chief Data Officer, State of Indiana
- Hayleigh Columbo, Government beat reporter, Indianapolis Business Journal
- Stephen Goldsmith, Director of the Innovations in Government Program, Harvard University

A special Industry Lecture Series speaker:

- James Meyer, CEO of Sirius XM Satellite Radio

The Independent Study course SP19-H554 was a semester-long project sponsored by Starbucks Coffee, Seattle WA. The project: Internet Connected Water Filtration System.

All of the above projects (H567 and H554) included design reviews with an on-campus panel of external professionals from regional businesses. These review panels included representatives from the H567 project sponsors along with representatives from:

- High Alpha
- Allegion
- Cummins
- Virtusa
- Catalyst Product Development
- Roche
- Eli Lilly

### *c. Careers*

#### Salary media

**2019-2020 HCI MS:** *Numbers not currently available*

**2018-2019 HCI MS:**

- Salary Range: \$50,000 - \$120,200
- Average Salary: \$84,678
- Median Salary: \$81,000

**2017-2018 HCI MS:**

- Salary Range: \$67,000 - \$122,500
- Average Salary: \$85,600
- Median Salary: \$82,000

**2016-2017 HCI MS:**

- Salary Range: \$74,286 - \$153,656

#### List of full-time positions secured by our HCI MS students upon graduation

Examples of recent job position titles our students secured include:

- User Experience (UX) Researcher
- UX Research Specialist
- UX Designer
- Search Quality Analyst
- User Interface (UI) Designer and Developer
- UX Engineer
- Product Manager
- UI/UX Architect
- Interaction Designer

Additionally, students have been able to secure fully-funded Ph.D. positions at Carnegie Mellon University, Georgia Tech, Northwestern University, University of California-San Diego, and IUPUI.

**Recent Internships (Summer 2020)**

HCI MS	
Position Title	Company
Product Designer	RICS Software
Product Design Intern	Level Up Development
UX Designer	GE Appliances
UX/UI Design Intern	MAQ Software
UX Design Intern	Ingleside Engaged Living
Product Design Intern	FanFood
UX Designer/Developer	Boardable

**Median Hourly Pay: \$20.00**  
Based on median salary reported by 7 HCI MS students

List of companies where our graduates work



*d. Student and faculty testimonials about secured internships, jobs in the major and connection to the industry practice:*

<https://soic.iupui.edu/about/spotlights/reecha-bharali/>

<https://soic.iupui.edu/about/spotlights/ryan-sukale/>

<https://soic.iupui.edu/about/spotlights/mike-wilson/>

*e. External recognition of students, faculty, or graduates including awards or honors and research awards*

***News stories of the achievements of HCI graduate students, including winning national events and other accolades:***

- <https://soic.iupui.edu/news/tech-to-protect-challenge-team/>
- <https://soic.iupui.edu/news/informatics-students-iot-starbucks/>
- <https://soic.iupui.edu/news/hci-phd-alumna-palilonis/>
- <https://soic.iupui.edu/news/iupui-design-sprint/>
- <https://soic.iupui.edu/news/hci-alumni-win-parkview-competition/>
- <https://soic.iupui.edu/news/hci-graduate-interns/>
- <https://soic.iupui.edu/news/hci-students-success-iot/>
- <https://soic.iupui.edu/news/vorm-air-force-grant/>
- Noelle Webster (MS HCI graduate) was recognized by TechPoint as part of the **Tech 25 Class of 2016**, which recognizes Indiana’s Outstanding Tech Builders (<http://techpoint.org/tech-25-winners-2016/>)

***News stories about achievements of our HCI faculty, including grant and paper awards:***

- <https://soic.iupui.edu/news/two-researchers-nsf-career-grants/>
- <https://soic.iupui.edu/news/bolchini-nsf-screenless-grant/>
- <https://soic.iupui.edu/news/brady-bolchini-workplace-access/>
- <https://soic.iupui.edu/news/andrew-miller-cii-caregiving-cancer/>
- <https://soic.iupui.edu/news/hci-professor-idea-juror/>
- <https://soic.iupui.edu/news/cafarro-nsf-eager-grant/>
- <https://soic.iupui.edu/news/reda-nsf-cii-grant/>
- <https://soic.iupui.edu/news/acm-chi-2018/>
- <https://soic.iupui.edu/news/nsf-grant-work-compensation-technology/>
- HCI faculty Professor Miller selected for elite ACM computing academy (<https://soic.iupui.edu/news/andrew-miller-acm-fca/>)