



IUPUI

SCHOOL OF INFORMATICS AND COMPUTING
Department of Human-Centered Computing



HCC Strategic Plan 2020-2025

Developed by the HCC Faculty in Fall 2019

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1. Our Human-Centered Computing Department: A Vision for Excellence

“The best way to predict the future is to invent it.”

— Alan C. Kay

By serving the mission of IUPUI and the IU School of Informatics and Computing, we envision becoming a thriving Department of Human-centered Computing that exhibits the following traits:

1. A department with a national and international **premiere research reputation** in human-centered design, computing and media applications that is selected as a department of choice by students and faculty from around the world.
2. A department that attracts, motivates and nurtures **excellent faculty** of international caliber who pursue innovative, forward-looking, and impactful research agendas in human-centered computing with a specific focus on areas of high-societal impact.
3. A department where, at any given time, each tenure-track faculty has at least one **externally-funded grant**, and all research students are fully supported by faculty on external grants.
4. A department that, by leveraging its **urban location**, offers innovative, excellent and **industry-ready educational programs** that embed both local and national industrial partnerships—with the advantage of better aligning programs to market needs, increasing student hiring, and fostering academic-industrial partnerships.
5. A department with large, diverse, and competitive **undergraduate programs** that embrace innovation in online and blended learning to meet the changing needs of the students.
6. A department with competitive, rigorous **graduate programs** that educate tomorrow’s intellectual and industrial leaders in understanding, designing, and creating next-generation human-centered computing systems and in investigating their societal applications and implications.
7. A department where top companies in human-centered computing come regularly to **hire our best students**. Students graduate in a timely fashion and land their dream jobs.
8. A department that continually scans opportunities to **build new programs** in human-centered computing with high market demand and research potential.
9. A department where every faculty achieves the **standard of excellence** required for timely advancement in rank.
10. A department that is a great place to work and fosters an inclusive and collaborative climate; builds a strong **sense of community among faculty and students**; values the characteristics of each individual; encourages, promotes, and celebrates excellence; contributes to advancing diversity in the computing; and serve the wider community in Indiana and beyond.

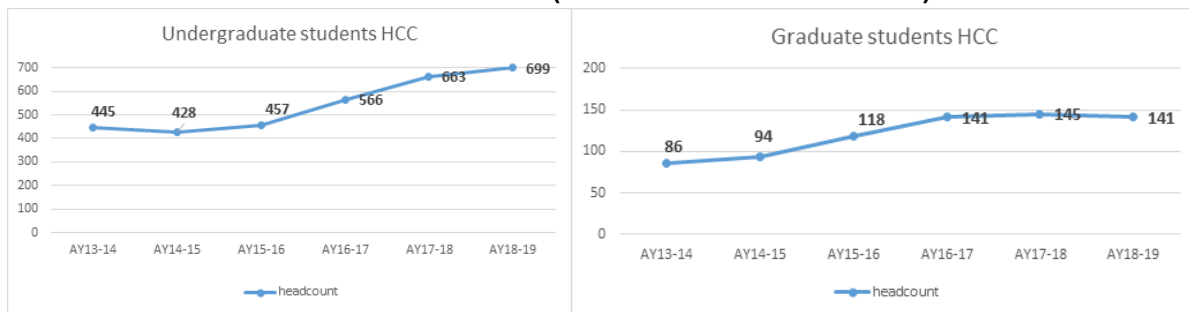
2. Department Overview

The Department of Human-Centered Computing (HCC) was founded on July 1, 2013 within the new configuration of the Indiana University School of Informatics and Computing at IUPUI. As the largest department in the IUPUI portion of the School, HCC is home to a dynamic and interdisciplinary community of faculty and students who bring together strong research and education expertise in broad areas of informatics, emerging media and human-computer interaction and data science to advance interdisciplinary research and teaching at the forefront of human-centered computing innovation.

To date, the Department offers the following degree programs:

- **Informatics:** B.S., Minor, 5-year B.S.+M.S.
- **Data Science:** M.S. in Applied Data Science, Ph.D. in Data Science
- **Media Arts and Science:** B.S., M.S., 5-year B.S.+M.S. degrees
- **Human-Computer Interaction:** Udg. Certificate, Grad. Cert., M.S., Ph.D., Ph.D. Minor

Student Headcount (as of end of 2018-2019 AY)



As of Fall 2019, the Department had 840 unique students enrolled (699 in the undergraduate programs and 141 in the graduate programs), a 58% increase since the founding of the Department in Fall 2013. The Department is home to 30 full-time faculty members, including 13 Tenure-Track Faculty, 13 Lecturers, 2 Professors of Practice, and 1 Research Associate. Over 20 part-time, Adjunct Faculty from the professional industry also contribute every semester to course teaching within the Department. HCC faculty conduct forward-looking, innovative research in important areas of human-centered computing that received significant external funding from NSF, NIH, Google, MITRE Corporation, the MacArthur Foundation, as well as a variety of industry and community partners. As of 2019-2020, the HCC Department budget is approximately \$7M.

By building on the department’s successes guided by the prior 2014-2019 strategic plan, this document is the result of a semester-long faculty-driven collaborative process that involved all department’s faculty, advisory board and the School’s administration in outlining future strategic goals and actions that can guide the department in sustaining and fulfilling our aspirational vision of excellence over the next five years.

3. Strategic Areas

We have identified four areas of strategic growth, encompassing our education, research and service mission: (1) undergraduate programs, (2) graduate programs, (3) research, innovation and entrepreneurship, and (4) diversity and civic engagement. Each areas outlines objectives and strategic actions aligned with expected outcomes to achieve in one to five years. Eight out of ten objectives fit into broader goals outlined in the IUPUI Strategic Plan. Here is a brief summary of our objectives followed by the complete plan on the following pages.

Strategic Area 1: Undergraduate Programs

Objectives

- U1. Serve an increasing number of undergraduate students.
- U2. Increase quality of admitted undergraduate students.
- U3. Maximize retention and graduation.

Strategic Area 2: Graduate Programs

Objectives

- G1. Improve national and international standing and visibility of our graduate programs.
- G2. Increase research productivity of graduate students.
- G3. Increase career readiness through industry partnership and career pipelines.

Strategic Area 3: Research, Innovation and Entrepreneurship

Objectives

- R1. Grow innovative and high-impact research by maximizing external grants.
- R2. Facilitate execution of research commercialization cycle, innovation and entrepreneurship.

Strategic Area 4: Diversity, Inclusion and Civic Engagement

Objectives

- D1. Increase civically-engaged research and community outreach.
- D2. Sustain an inclusive and welcoming environment.

4. Undergraduate Programs

Objective

U1. Serve an increasing number of undergraduate students.

Rationale

Attracting, nurturing and serving a vigorous and growing community of talented and successful undergraduate students is a primary educational mission of the HCC Department. By leveraging our premiere urban campus, the connection to the health sciences, as well as industry and community partners in a variety of areas (e.g., digital media, informatics, accessibility, cultural heritage), our undergraduate programs can strengthen “*innovative, distinctive undergraduate curricula and create opportunities for students to engage in high-impact practices*” (Ref. IUPUI Strategic Plan – Goal: Promote Undergraduate Student Learning and Success).

Strategic Actions

- Continue to refine and execute the action items defined in the enrollment management plan to optimize student retention, degree completion and career outcomes.
- Arm recruiters with student success stories in the course of studies and in their careers.
- Continue to support and expand Summer Workshops, Mobile App Competitions for high-school students, Girls Inc. Workshops, and explore opportunities for new exciting competitions (e.g., Bots and AI for all).
- Facilitate credits transfer through Prior Learning Assessment (PLA).
- Better define distinctions and positioning/focus of the available SoIC undergraduate programs (e.g., INFO and ADIS).
- Arm recruiters with a list of “Go-To Experts” for specialty areas available and willing to help talk to parents and prospective students for “aha moments”.
- Work on greater alignment of educational INFO and MAS curricula to careers.
- Optimize Gen Ed Core enrollment and conversion to major.
- Update “*Differentiating Briefs*”: concrete talking points for recruiters, faculty and staff to explain our distinguishing features with respect to competing programs.
- Offer online sections of all or most program core courses.

3-5 Year Performance Indicators (Evidence of Success)

- 80+ Informatics BS full-time first-time freshmen per year
- 80+ Media Arts and Science BS full-time first-time freshmen per year
- 80%+ of alumni careers data tracked and reported every year

Objective

U2. Increase quality of admitted undergraduate students.

Rationale

Increased student quality will raise the intellectual rigor of the programs, raise the chances for employability at premiere, high-demanding jobs and graduate programs, inject more and better ideas into the research lines, create a more rewarding and intellectually stimulating environment for faculty, staff and students (**Ref. IUPUI Strategic Plan – Goal: Promote Undergraduate Student Learning and Success**).

Strategic Actions

- Continue to monitor admission standards and adjust as needed based on quality of admitted students and trends in undergraduate enrollment, especially in view of the “SAT optional” initiative at the university level.
- Integrate in the curricula more professional certs/badges; add certificates/minors, explore non-degree 12-15 credit professional certifications for returning students.
- Increase visibility of student work on each floor & digital marketing.
- Expand Study Abroad Programs.
- Increase “Festival Readiness” of Game, 3D, Film & Commercial student work.
- Increase number of Industry-Sponsored Internships (like Infosys).
- Increase number of final projects included in the Capstone and Career Exchange System (from all classes) and presentations targeted to: high schools, advertising, portfolios showcase, career services.
- Continue to support student financial aid and scholarship to attract and retain meritorious students.
- Leverage active NSF grants to secure NSF Research Experience for Undergraduate (REU) Supplements to engage undergraduate students in research.

3-5 Year Performance Indicators (Evidence of Success)

- Increased number of students on the IUPUI “Top 100” list and apply to national/regional awards
- Increased number of undergraduate students involved in research
- Increased quality and depth of undergraduate student portfolios
- Increased quality and depth of undergraduate thesis and capstone projects
- Increased number of undergraduate internships in the major

Objective

U3. Maximize retention and graduation.

Rationale

Students need to find in our department the necessary resources, motivational and inspiring environment to enable them to succeed, thus completing their degree early or on time (maximum 4 years). Timely graduation benefits students, their families and society overall (**Ref. IUPUI Strategic Plan** – Goal: Promote Undergraduate Student Learning and Success). Maximizing retention and graduation success must not compromise on program rigor (no grade inflation).

Strategic Actions

- Continue executing on student retention strategies by growing and supporting implementation of High-Impact Practices, including:
 - Bridge and first-year experience
 - Service learning, project-based, capstone and integrative learning
 - Interventions for specific cohorts of students dropping courses
 - Financial aid and strategic use of scholarships
- Continue to refine and execute the action items defined in the enrollment management plan to optimize student retention, degree completion and career outcomes.
- Continue to identify and make all faculty and program directors aware of specific retention issues, problems and potential causes.
- Continue to mentor adjunct faculty and grow awareness of resources, expectations and best practices for maximizing student learning and retention.
- Promote Help Me Roar IU to make *all* faculty and students aware of resources for students.
- Facilitate time-to-degree completion by creatively offering flexible scheduling options (online, hybrid) and more semester-based offering of core courses, and without compromising quality of courses and engagement with faculty.
- Explore opportunities for more studio-based and lab-based courses for increased retention, mentoring, and quality work.

3-5 Year Performance Indicators (Evidence of Success)

- 90% of faculty teaching undergraduate students use the Student Engagement Roster
- Addressed DWF issues periodically analyzed and reported
- Increased use of student mentoring and tutoring opportunities
- 80%+ 4-year graduation rate
- 85%+ Freshman-Sophomore retention rate
- 90%+ Junior-Senior retention rate

5. Graduate Programs

Objective

G1. Improve national and international standing and visibility of our graduate programs.

Rationale

Successful and selective graduate programs are the signature of a premiere research department. “The state and nation also need growing numbers of professionals with doctoral preparation to innovate, develop new knowledge, and translate research into practice” (**Ref. IUPUI Strategic Plan** – Goal: Increase Capacity of Graduate Education). This is especially true in STEM disciplines and Human-Centered Computing in particular.

Strategic Actions

- Recruit more local HCI professionals to our M.S. programs. Engage with Meet Ups/Creative Mornings/Indiana UxPA/Indiana 5G initiatives.
- Continue to forge or maintain connection to local and regional community.
- Explore professional tracks/specialization to “round out” students skillsets.
- Continue to balance professional and research preparation; align courses to the needs of the Professional Practice Courses and needs of research-driven students intending to pursue a doctoral program.
- Reflections or Design/Innovation Practice (Course).
- MAS MS Program Make Sustainable in 1-3 years.
- Use COMET Lab participation to engage students in community outreach, grant funded research, and professional practice.
- Increase and sustain number of high-profile and high-visibility industry-driven graduate projects and graduate capstones.
- Expand 4 + 1 program. Encourage more undergrads to consider our graduate programs.
- Encourage top MS students to consider the PhD program.

3-5 Year Performance Indicators (Evidence of Success)

- 30+ matriculated MAS MS students per year (including 5–year students)
- 40+ matriculated HCI MS students per year (including 5–year students)
- 40+ matriculated ADS MS students per year (including 5–year students)

Objective

G2. Increase research productivity of graduate students.

Rationale

Research is important for MS students oriented to professional careers and fundamental to PhD students. A high standard of research productivity of graduate students (peer-reviewed publications and involvement grants) can boost the quality of the research enterprise and reputation of the entire department, increasing the quality, reach and impact of their faculty mentors' research. Research-active graduate students (both MS and PhD) will be better prepared to land top jobs in industry and academia.

Strategic Actions

- Increase research publications of graduate students.
- Increase graduate students engagement in funded research projects, and national IT competitions.
- Improve academic writing skills of graduate students. Engage all PhD students in research grant writing and paper writing with faculty.
- Attract top-caliber PhD students by leveraging the increased research stature of the department nation-wide and success in external funding.
- Leverage new Innovation Hall and future IT Lab spaces for increasing student research productivity in collaboration with faculty.
- Increase student participation in campus research events, poster presentations and competition early on.
- Promote more entrepreneurship & top industry internships.
- Increase structured guidance and rigor of MS thesis.
- Continue to support MS travel student funding for presenting peer-reviewed research papers at conferences.

3-5 Year Performance Indicators (Evidence of Success)

- 15+ student co-authored peer-reviewed publications per year in HCC.
- Higher involvement of PhD students in external grant writing.
- Increased culture of “cascade mentoring” where students mentor one another in research.

Objective

G3. Increase career readiness through industry partnership and career pipelines.

Rationale

Long-term connections to industry (both in central Indiana and nationwide) increases the reputation of our graduate programs, serves recruiting efforts, helps our students get hired and improves the relevance of our educational offer.

Strategic Actions

- Share (Alumni) Students “Success Stores” to show exemplars and build confidence.
- Encourage networking among employed alumni and job-seeking graduates.
- Maintain database and data about alumni students in industry.
- Continue to engage in local business community to understand needs, leverage faculty networking, and advisory board.
- Advocate for “Industry Relations” Staff Position Role for the School – Fortune VGG, High-Alpha investors, Mid-Cap, Small-Cap. Raise awareness of our programs.
- Understand Industry Needs – Anticipate needs/Emerging Areas of future career growth/demands.
- Robust participation in the jobs recommendation process for students.

3-5 Year Performance Indicators (Evidence of Success)

- Increased career pipelines, stable partnerships and agreements with companies.
- More faculty labs and students funded by external companies (i.e., sponsored projects).
- Increased career readiness of graduates: 90% job placement of students at MS graduation, with highly competitive salaries.
- Increased numbers of alumni visiting and assisting with career advice and placement.

6. Research, Innovation, Entrepreneurship

Objective

R1. Grow innovative and high-impact research by maximizing external grants.

Rationale

Securing large and competitive external grants has several systemic benefits, including: providing substantial funding to graduate students and faculty to do groundbreaking work; boosting research quality, societal impact, visibility and productivity; enhancing the national ranking and reputation of faculty, Department, School, campus; energizing faculty and students; contributing to build the research infrastructure; paving the way for securing more funding; and amplifying impact and visibility of the students involved (**Ref. IUPUI Strategic Plan – Goal: Accelerate Innovation and Discovery through Research and Creative Activity**).

Strategic Actions

- Continue to mentor tenure-track faculty in securing research funding to achieve the aspirational goal that, at any given time, each tenure-track faculty has at least one externally-funded grant active, and all PhD students are fully supported by faculty on external grants.
- Established PI's faculty to coalesce around new, larger-scale research grant initiatives, capturing the emerging research areas funded by the NSF in human-centered AI, Future of Work, etc.
- Additional Department support for Ph.D. students by leveraging department indirect costs generated by external grants.
- Work towards identifying Clusters/Centers of Research Excellence, also with other units.
- Strategic Hiring when Available in Tenure-Track faculty in Data Science and Media Arts and Science in areas with strong external funding potential.
- Faculty Taskforce for Junior Faculty Fellowship Program (leverage EPIC initiative on department grants to flesh out opportunities) - See also Objective D2.
- Leverage research collaborations with other units (Engineering and Science) through Innovation Hall (the future new building).

3-5 Year Performance Indicators (Evidence of Success)

- One campus-wide research center established with HCC Faculty leading.
- Two external grants secured by HCC Faculty as lead PI over \$1M.
- \$500K+ research expenditure per year (grants, gifts and sponsored projects).
- \$3M total amount submitted per year in research proposals.
- Have multiple welcoming, multi-use, and flexible PhD student spaces for research lab work of faculty and students.
- Increased number of PhD students applying.
- 80% of newly admitted PhD students are fully supported on grants.

Objective

R2. Facilitate execution of research commercialization cycle, innovation and entrepreneurship.

Rationale

A major way to foster this is to engage in and promote research commercialization among faculty and students, develop entrepreneurial skills and provide the resources to make research and innovation have broader societal impact. Our department is uniquely positioned to foster research commercialization because the broad field of human-centered computing values invention as an integral part of the research and discovery process. The major inventions with commercial impacts in our field have been started by graduate students in university labs working with their faculty (**Ref. IUPUI Strategic Plan – Goal: Accelerate Innovation and Discovery through Research and Creative Activity**).

Strategic Actions

- Continue to raise our awareness of industry needs as well as raise their awareness of our programs and abilities, via continuation of industry engagements (Industry Lecture Series), industry partners participating to teaching, and faculty-industry collaborations.
- Look into creative ways to participate in the emerging “co-creation” spaces and new-business incubators (such as IoT Lab, the NIIC - Northern Indiana Innovation Center and Health-IoT Center- and the new 16 Tech, Indiana 5G Zone) emerging around IUPUI and with potential connections to HCC. Consider these incubators as next generation labs that include faculty and students working alongside industry partners.
- With the new restructuring of the university-level IURTC into ICO (Innovation and Commercialization Office), reengage with Technology Manager to showcase individual faculty work.
- Create awareness about IU support and resources for invention disclosure and commercialization.
- Encourage the filing of invention disclosures through recognition and other incentives.
- Leverage teaching by adjuncts and professors of practice who have long-standing industry and solid entrepreneurship experience.
- Increase industry relationships starting with course projects and research collaborations.

3-5 Year Performance Indicators (evidence of success)

- All HCC Faculty aware of IU support for commercialization and tech transfer (IURTC).
- Opportunities for faculty-student company incubators explored with IURTC and opportunities identified.
- Increased number of invention disclosures with IU Office of Commercialization.

7. Diversity and Civic Engagement

Objective

D1. Increase civically-engaged research and community outreach.

Rationale

A key mission of IUPUI stated in the IUPUI Strategic Plan is to *Contribute to the Well-being of the Citizens of Indianapolis, the State of Indiana, and Beyond*. Diversity of Civic Engagement is fundamental to achieving this, as well as promoting healthy, sustainable and attractive working environments for students and faculty (**Ref. IUPUI Strategic Plan – Goal: Deepen our Commitment to Community Engagement**).

Strategic Actions

- Increase visibility of service learning and community-connected projects happening in the classes and on campus (e.g., civically-engaged design sprints/design challenges).
- Continue to foster student projects and capstones with community partners as external clients, both at the undergraduate and graduate level.
- Foster the development of community/civic engagement projects through collaborations with other community engagement-focused campus entities, such as the SOURCE Center, POLIS Center, etc.
- Continue to collect all community engagement projects that faculty lead in synergy with IUPUI Office of Community Engagement (e.g. the Collaboratory).
- Facilitate faculty research projects with community partners.
- Increase talks and presentations from community partners and organizations to the Brown Bag meetings.

3-5 Year Performance Indicators (Evidence of Success)

- Increased communication and dissemination of service learning courses and civically-engaged research.
- Larger number of student projects linked to community engagement/involved in service learning courses.
- All faculty aware of the opportunities and resources to develop service learning courses.
- Increased number of local communities directly linked to faculty work.
- Increased number of faculty projects with community partners.

Objective:

D2. Sustain an inclusive and welcoming environment.

Rationale

As expressed by Dean Schnabel in the Informatics magazine “Diversity Matters”, diversity is important for three reasons. “*First, it enhances innovation. To design technology for a diverse world, it is crucial to have a workforce that understands that world. Secondly, the current U.S. student body in computing and information technology is overwhelmingly male, and overwhelmingly Caucasian and Asian, and it doesn’t come close to filling the projected workforce needs of the nation. If we don’t include more women and underrepresented minorities, we will not fill our nation’s needs. Third, computing and information technology careers are highly rewarding — both intellectually and financially — something everyone should benefit from*” (Informatics Magazine, Spring 2009, Vol. 6, N.2, p. 4) (Ref. IUPUI Strategic Plan – Goal: Promote an Inclusive Campus Climate).

Strategic Actions

- Expand definition of diversity beyond traditional criteria; widen program opportunities for diverse population including Veterans.
- Continue to make faculty and students aware of growth opportunities and resources, including <https://www.facultydiversity.org/> of which IUPUI is a member.
- Continue to support inclusion-supporting scholarships.
- Improve career pipelines for underrepresented faculty (e.g., Presidential Fellowship at U of Michigan: <http://presidentspostdoc.umich.edu/>), also through external funding of promising Post-Docs from underrepresented institutions.
- Continue to work with Diversity Coordinator and faculty for promoting, encouraging and mentoring Women in Technology and STARS groups; contribute to an open and inclusive School and campus climate for all students and faculty; support, as feasible, Diversity Scholars Research Program (DSRP) campus initiative.
- Support student participation to Grace Hopper and TAPIA, and promote their achievements.

3-5 Year Performance Indicators (Evidence of Success)

- Higher number of underrepresented students in the undergraduate programs.
- Double number of students participating/presenting work at Grace Hopper and TAPIA.
- Increased faculty awareness of diversity opportunities.
- More financial support for inclusive scholarships.