Indiana University School of Informatics and Computing, IUPUI
Program Review and Assessment Report: 2016–2017

The following degree programs are reviewed in the 2016–2017 academic year:

- Master of Science in Health Informatics
- Master of Science in Human-Computer Interaction
- Master of Science in Library and Information Science
- Master of Science in Media Arts and Science

Schedule

	2013–2014	2014–2015	2015–2016	2016–2017	2017–2018
Health Information Management BS	✓		✓		
Informatics BS	✓	✓			✓
Media Arts and Science BS	✓		✓		
Bioinformatics MS	✓		✓		
Health Informatics MS	✓			✓	
Human-Computer Interaction MS	✓			✓	
Informatics MS (starting fall 2016)					✓
Library and Information Science MS	✓			✓	
Media Arts and Science MS	✓			✓	

Program Review and Assessment Report

Master of Library Science Program

2016–2017

Prepared by the Department of Library and Information Science

I. GENERAL INFORMATION, INSTITUTIONAL DATA

This report focuses on the Master of Library Science (MLS) under the IUPUI School of Informatics and Computing (SoIC). The MLS is currently housed under the Department of Library and Information Science (LIS), which joined SoIC on July 1, 2013.

The department consists of the

- Master of Library Science (MLS), a 100% online graduate (professional) degree program
  - Several MLS dual-degree options, in which 10 or fewer students participate.
  - Undergraduate Minor in Data Studies, approved for fall 2017.
- Faculty:
  - Full-time: 2 tenured associate professors, 2 tenure-track assistant professors, 3 lecturers.
  - Adjuncts: all qualify for graduate teaching by having a master's or higher and significant (2+ years) professional experience in the topics they teach.
- Students (currently, MLS only):
  - Headcount: 218, spring 2017 (159, spring 2015). Geographic: 177 Indiana, 51 domestic nonresident (22%), no international.[1]
  - Students on average take 1–2 courses per term, through summers; approximate time to degree (36 credits plus 3 prerequisite) is 3 years.
  - Persistence/graduation rates: IUPUI Graduate/Professional Student Retention and Graduation. (IUPUI Data Portal)

Cohort start year	Retained Year 2	Retained Year 3	Retained Year 4
Fall 2011	82%	78%	80%
Fall 2012	79%	74%	72%
Fall 2013*	78%	66%	
Fall 2014	84%	78%	
Fall 2015	83%		

*Change to all-online format; merger into SoIC from SLIS.

Cohort start year	Graduated Year 3*	Graduated Year 4	Graduated Year 5
Fall 2011	37%	70%	73%
Fall 2012	27%	67%	72%
Fall 2013	32%	58%	
Fall 2014	31%	*na*	

[1] All other SoIC MS or Ph.D. programs: 286; of 174 domestic, 87% are Indiana, 13% non-Indiana; 40% are international.

**Percent graduated is cumulative.*
Cohorts of 2011 and 2012 are from "SLIS" data; from 2013 on, SoIC/LIS.

II. LEARNING OUTCOMES

Program-Level Student Learning Outcomes

Methods and Outcomes Overview:

Primary method:

ePortfolios. Direct measure, every student, every outcome.

Secondary methods:

Grades
Stakeholder input (advisory board, student survey)
Licensing exam (for the School Librarian specialization)

Student learning outcomes are organized in the following areas:

- Approach professional issues with understanding
- Assist and educate [information] users
- Develop and manage collections of information resources
- Manage and lead libraries and other information organizations
- Represent and organize information resources
- Use research effectively
- Deploy information technologies in effective and innovative ways

https://soic.iupui.edu/lis/master-library-science/learning-outcomes/

Upon completion of the MLS in LIS program, students will be able to	RBT[2]	PGPL[3]
1. Approach professional issues with understanding	3	1, 4
2. Assist and educate [information] users	5	2, 3
3. Develop and manage collections of information resources	5, 6	1, 2
4. Manage and lead libraries and other information organizations	6	1, 2
5. Represent and organize information resources	4, 5	2
6. Use research effectively	3	2, 3
7. Deploy information technologies in effective and innovative ways	5, 6	2, 3

III ASSESSMENT

Primary

Portfolios of student-selected artifacts demonstrating mastery of each of the 7 program outcomes. Requirement instituted for students entering as of fall 2011. Originally designed

[2] RBT: Revised Bloom's taxonomy

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

within the Oncourse ePortfolio matrix system. This system did not include individual scores or individual feedback but did provide program-level information.
Migrated in 2016 to Taskstream system.

For fall 2016 and May 2017 graduates, only "late" artifacts were/are required; in future cohorts, "early" artifacts will be deposited by the end of 18 credits in the program, with advisor feedback.

For each learning outcome and sub-component, students provide a reflection and one to three artifacts that demonstrate mastery. These artifacts are reviewed and scored by a faculty member prior to graduation.

Results from Fall 2016 and Spring 2017 graduates:

Graduation term	Program outcome	Authors Evaluated	Raw Results	Average for Group (%)
Fall 2016	**Use Research Effectively**	20	2.69/3	89.67
Fall 2016	**Approach Issues with Understanding**	20	2.68/3	89.33
Spring 2017	**Use Research Effectively**	31	2.63/3	87.74
Fall 2016	**Represent and Organize Resources**	21	2.62/3	87.3
Spring 2017	**Information Technologies**	32	2.61/3	86.88
Spring 2017	**Represent and Organize Resources**	28	2.60/3	86.55
Fall 2016	**Manage and Lead Info Organizations**	20	2.59/3	86.28
Spring 2017	**Approach Issues with Understanding**	29	2.56/3	85.17
Fall 2016	**Develop Collections**	19	2.54/3	84.8
Fall 2016	**Assist and Educate Users**	19	2.52/3	84.15
Spring 2017	**Assist and Educate Users**	31	2.52/3	84.05
Fall 2016	**Information Technologies**	22	2.48/3	82.58
Spring 2017	**Manage and Lead Info Organizations**	26	2.48/3	82.56
Spring 2017	**Develop Collections**	31	2.41/3	80.36

The average for group is the percent of all possible points. In this schema, "2" constitutes mastery, while "3" is superb demonstration of mastery.
This table is ordered from highest scores to lowest.

The results demonstrate that all graduates have at least a basic level of knowledge and skills related to the program outcomes.

Once the process can incorporate "early" artifacts, faculty will be able to determine where there may be initial gaps in building a base for advanced study, as well as intervening specifically where individual students appear to struggle.

- Use: Curriculum Committee reorganized course prerequisites, advising materials, and conceptual cluster visualizations to help students see linkages and areas within the curriculum; completed spring 2017. Reorganization of course scheduling is in progress.

Secondary, indirect, supporting

- Grades. Indirect. All graduating students have received at least a B– (indicates basic mastery) in all core courses. For electives, grades must be a C or above with an overall GPA of 3.0 (again, indicating basic overall mastery).
  - Use: individual interventions for C, incompletes, and low GPA, according to program and school policies.
- Stakeholder input. Indirect/supporting.
  - Portfolio review, summer 2015: special study of portfolio artifacts with community professionals.
    Report: https://iu.box.com/s/fr2jncbi1mi67vsbreqa8np8ckgrrgst, includes next steps.
  - Advisory Board, at twice-yearly Advisory Board meetings, participants discuss necessary skills for recent graduates.
    - Use: design of special courses, and improvement of content of core courses. Spring 2016: "Advanced Personnel Management." For 2017: greater emphasis on in-field experiences.
  - Students: Indirect/supporting. Periodic surveying of current students. Last conducted in fall of 2016.

Area of specialization or interest	Response Percent	Response Count
Public libraries (mainly children and/or young adult)	22.8%	21
Public libraries (other, general, adult)	30.4%	28
School libraries	10.9%	10
Academic libraries	17.4%	16
Archives	10.9%	10
Special/Other (please specify)	7.6%	7

Survey highlights: 89 respondents (approx. 40% of program headcount).

- The majority rate the core courses highly: 36% "very well" and 51% "well." Most are positive about the selection of courses available (34% "very well" and 47% "well").

Most believe the program prepares them "very well" (33%) or "well" (41%) for their career; 19% are "neutral"[4] (7% rated this poor or very poor).

- Many students are "neutral" in the areas of internships and career services. This may be because they do not need internships (which are not required) and are already in a career pathway that they understand.
    - Use: Currently, detailed open-ended answers are primarily used to schedule courses (ALA accreditation standards: students are able to construct coherent programs of study.) Comments in respect to teaching methods are incorporated into departmental discussions.

- Licensing exams: Pearson School Library Exam.[5] Direct measure, but questionable fit. The pass rate for the state is 59%. Seven students in the IUPUI MLS program have taken the exam and 6 have passed it.
    - Use: refinement of S671 School Media, but primarily advising for students.
    - DLIS faculty do not agree that the Pearson test is an adequate reflection of the core skills and knowledge needed for school librarian success. Instead, the SLM program is designed around the American Association of School Libraries (AASL) guidelines for school library programs, *Empowering Learners* http://www.ala.org/aasl/standards/guidelines
    - Currently, DLIS does not have a certificate or other non-degree option for those who are interested solely in licensure and not the MLS. We are developing this, based on the Indiana Legislature's approval of a test-only route for currently licensed teachers.

		Of which			**Percentages**		
Within Indiana University records	**Total Test Takers**	**Passed 1st attempt**	**Retested and passed**	**Not Yet passed**	**1st attempt pass**	**Passed**	**Not Yet Passed**
No LIS courses	10	3	2	4	33%	56%	44%

[4] This result could be because an accredited degree is required by state law for many public library positions. There is a belief among some that they already possess knowledge and skills, and must simply acquire the degree to advance.

[5] To be a certified school media person in Indiana, persons who already possess a teaching license in Indiana must take a standardized test, the Pearson School Library exam—but are not required to take any coursework. Persons who do not possess a license must take the full MLS, 15 credits of education courses, pass the Pearson School Library exam, and the Pearson PK-12 Pedagogy exam. This requirement was mandated by the state in 2013. Licensing requirements change relatively frequently.

Some LIS courses	2	1	1	0	50%	100%	0%
MLS	13	8	2	3	67%	77%	23%
Indiana pass rate (all attempts)						59%	

Historical Note: At the time the Online MLS degree was approved by IU and the Indiana Commission for Higher Education (ICHE) program assessment was designed to fit within the shared MLS governance structure between Bloomington and Indianapolis. Bloomington withdrew from this shared assessment and governance in the following year.

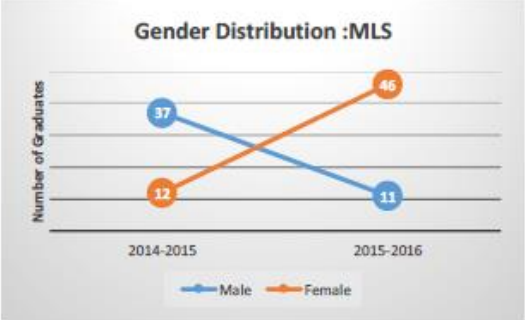
Original proposal assessment design:

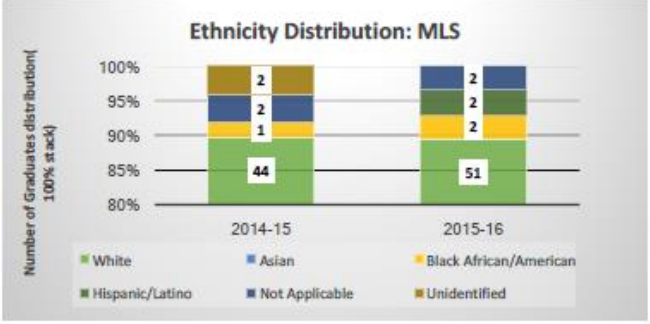
The original schedule of assessments is as follows; highlighted sections were added:

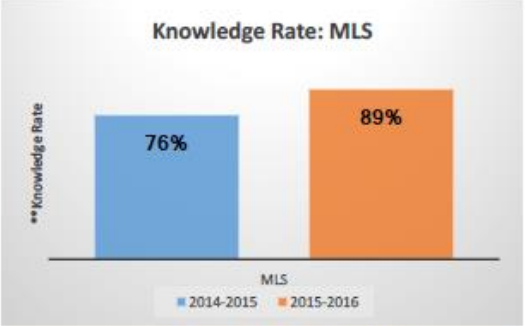
Timing	Instrument	Administration	Review of results
February	Curriculum Survey Continued by LIS-Indy	By Curriculum Steering Committee	April, by CSC and then entire faculty
Fall and Spring Every year one of 5 core areas	Content-specific, pre and post tests BL-only; discontinued	Faculty in core courses	Fall faculty retreat
Biannual	Discussion: Alumni and Advisory Boards Continued by DLIS Advisory Board	Dean and EAD	Built into periodic MLS degree review
Completed each term by graduates	ePortfolio artifacts Continued, see above	EAD, select faculty	Fall faculty retreat
6 months after each graduation	Alumni survey In process. Problems with data and coordination[6].	EAD/staff; summarized by EAD	Fall faculty retreat

[6] A major library science journal, *Library Journal*, conducts a library school alumni / placement survey. Due to communication problems, Indianapolis MLS graduates either were not included or were not separated from Bloomington students in recent years. This will be corrected. Once the Indianapolis program is separately accredited (anticipated in 2019), problems of being included in the Bloomington data will end.

MLS Graduate Program Overview from July 2014 to June 2016







Year	FT in Major	PT in Major	Started Own Company	FT Out of Major
2014-15	73%	5%	3%	19%
2015-16	86%	10%	0%	4%

***Table above shown the Knowledge Rate distribution*

Year	Salary Reported By	Total number of employable students
2014-15	18	49
2015-16	24	51

**Average Salary is based on data as reported by Graduates*

MLS Graduate Program Overview from July 2014 to June 2016

List of Employers- 2014-15

Job Title	Company
Librarian	Hasten Hebrew Academy of Indianapolis, Jasper County Public Library, Lake County Public Library
Reference Librarian	Geneva Public Library District
Project Archivist	Loyola/Notre Dame Library
Information Services Librarian 1	Cumberland County Public Library
Library Specialist	Piedmont Virginia Community College
Metadata Cataloger	Indiana Historical Society
Emerging Technologies Librarian	Carmel Clay Public Library
Head of Youth Services	Monticello-Union Township Public Library, Centerville-Center Twp. Public Library

List of Employers- 2015-16

Job Title	Company
Technical Support Assistant	Indianapolis Marion County Public Library
Librarian	Ivy Tech Community College of Indiana
Digital Services Librarian	Ivy Tech Community College, East Central Region
Adult Services Librarian	Hamilton East Public Library
Technical Support Assistant	Indianapolis Marion County Public Library
Library Associate	Columbia College
Scholarly Communication and Copyright	University of Nevada, Reno
Associate Director	Eckhart Public Library
Director	Poseyville Carnegie Public Library
Director	Waterloo Grant Township Public Library

Other support programs

Advising

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.

Plan of Study Advising: From the time of admission, the Department Chair and student advisor (chosen by the Department Chair) provide general guidance to the students on the plan of study, course load for each semester, selection of electives, and suggestions to contact specific faculty for specific interests or projects. The Department offers an online advising handbook for students and instructors (https://iu.box.com/v/advising-handbook) that contains checklists for each specialization.

Career development

Students are encouraged to do internships that prepare them for a professional career. LIS graduate students can take advantage of experiential learning opportunities as elective credits throughout their program for up to six credit hours. 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.

It is recommended that students who do not already have good, relevant work or volunteer experience do an internship to be competitive in the job market. Internships can occur after 18 credits; students arrange their own though there is an internship database with listings. An internship is not a requirement to get the degree, but experience is an essential part of being a competitive job applicant. There are other for-credit options to have individualized experiences and learning. Check out the 601, 602, 605, 606 Guidelines (pdf: /iu.box.com/v/lis-601-602-605-606-guidelines).

In Fall 2018 it is projected that internships will be a requirement for students who don't have previous are current experience in a library or information organization.

Student organizations

The Association for Library and Information Science Students is an active organization for IUPUI LIS students and alumni to meet regularly, socialize, and discuss topics relevant to the profession.

Center for Teaching and Learning

Effective learning with Canvas is essential in an online program. The Center for Teaching and Learning provides a number of different text-based and multimedia resources to help students get acquainted with Canvas' tools and affordances. Find more at
http://ctl.iupui.edu/Resources/Canvas

News about MLS students, faculty, and alumni

April 24, 2017
Alumna Jennifer Johnson is a 2017 Mover and Shaker

April 19, 2017
Library and Information Science alumnus wins Oberly Award

March 24, 2017
Copeland is co-editor for 'Participatory Heritage'

February 10, 2017
Grant supports four faculty in preserving church's 180-year heritage

January 12, 2017
Alumna to lead new center at Indianapolis Central Library

December 18, 2016
Professor's NEH grant to strengthen rural Utah cultural experience

June 30, 2016
Community hero Shanika Heyward is Library Journal's "Mover and Shaker"

September 21, 2015
Book explores teen novels' portrayals of autism to help libraries choose wisely

April 28, 2015
Over 700 Registered for Inaugural MOOC Hosted by the Library and Information Science Department

January 26, 2015
Librarian Helps Snag $7 Million Federal STEM Grant for Indiana High School

Program Review and Assessment Report

Master of Science in Health Informatics Program

2016–2017

I. GENERAL INFORMATION, INSTITUTIONAL DATA

The Program Review and Assessment Committee (PRAC) report focuses on the Master of Science (MS) in Health Informatics (HI) program, which is hosted at the Department of BioHealth Informatics at the School of Informatics and Computing, IUPUI. Along with the MS, the program also supports five graduate certificate programs on (1) Clinical Informatics; (2) Public Health; (3) Health Information Management and Exchange; (4) Health Information Security; (5) Health Information Systems Architecture. Students in the MS HI program study and do research with faculty on areas such as

- Clinical Informatics – the application of information technology in clinical practices
- Clinical Business Intelligence – the use of information in healthcare organizations to improve revenue, bring efficiencies and support decisions made by administrations and executives.
- Health Information Management – the storage, processing, reporting and management of health information while ensuring confidentiality, privacy, and security.
- Public Health Informatics – the application of information technology for public health

In the 2016–2017 academic year, one new HI tenure-track faculty member joined the BHI Department, increasing students' choice in advisors and research areas in Health Informatics Master of Science Program, especially for those interested in thesis completion.

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 Health Informatics is a 36-credit-hour program that integrates knowledge from informatics, healthcare, health information technology and other disciplines to analyze and protect patient data, increase healthcare efficiencies and produce higher quality patient care.

Our graduates play a critical role in health care organizations by leading the design, development, implementation, management, and integration of electronic health record systems, m-health, and other technologies. These individuals often have a passion for improving health care and making a difference in their community as well as the world. Our graduates work on a wide array of projects in hospitals, doctors' offices, insurance companies, government agencies, and health IT software companies.

There are 83 students currently in the program, which has picked up a very healthy growth trend of approximately 20–25 new students every year (including fall and spring admits); the cohort of prospective students is likely to grow rapidly.

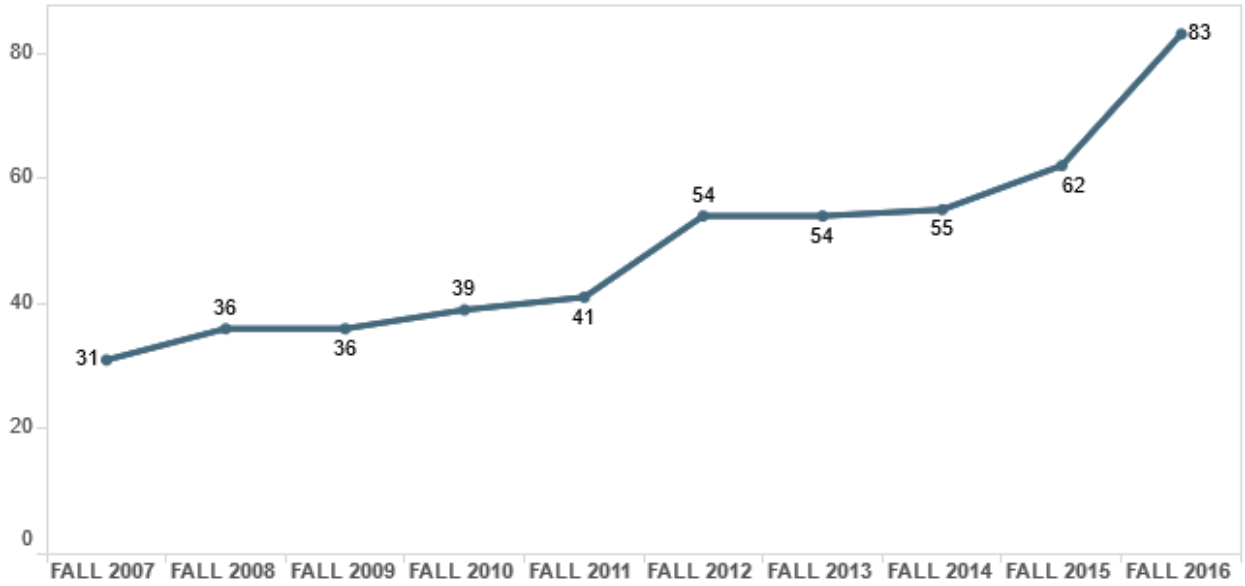


Figure 1: Unduplicated headcount in MS HI program (Source: IRDS IUPUI)

Since enrolling the first student in 2003, the MS in HI has graduated 164 students, who went on to secure job positions mainly in the healthcare industry, which includes hospitals, insurance companies, pharmaceuticals, healthcare marketing and healthcare research centers, in both large and medium-sized organizations. The graduation and retention rates are high, with 86.6% of students enrolled during AY 2014–2015 either continuing in the program or graduating. Furthermore, 85% of the students enrolled in the graduate certificate program choose to pursue the MS degree program upon graduation. Placement in middle to high paying jobs as well as into doctoral-level study programs is consistent: Of the 10 respondents to an 11 month follow up survey regarding post-graduation employment, 9 (90%) were employed in a job within the Health Informatics field at a relevant career experience level. The average declared annual salary of graduates was $72,500. Many students usually get promoted in their existing healthcare organizations, after completion of their MS in Health Informatics degrees. Examples of job positions our students have secured include: health data analyst, clinical informatics RN, health scientist, clinical informatics specialist, clinical informatics coordinator, health security specialist, informatics coordinator, application system analyst, population health analyst, clinical imaging analyst, EHR information system specialist.

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.

Our program aspires to be among the top ten in the nation, and among the top 5 in the Midwest, with competing MS in HI programs in major universities, including: University of Wisconsin, University of Pennsylvania, Vanderbilt University, University of Illinois, and University of

Washington. We work closely on research opportunities for students in the MS HI program with scientists at the Regenstrief institute, Roudebush VA Medical Center and other health systems in Indianapolis.

III. PROGRAM PROCESSES

1. Program Content

a. Distinctive characteristics of the program; Structure, breadth, and depth of curriculum.

The program content includes three specifics:

- The MS in HI program is divided into two recommended tracks – project track and thesis track, depending on which we have a set of recommended courses, which complete the 36-credit hour requirement.
- An independent study is recommended for students, to cover their specific interests, that might not be covered as part of the course work. This is usually an industry internship, or student-directed research project (INFO-B 551).
- A Final Capstone Project or Thesis (INFO-B 691) enables students to apply in a research or professional practice setting the knowledge learned in the course towards a final HI project (theoretical, experimental or applied in nature) in collaboration with research site, and guided by the academic supervision of an HI faculty member.

Master HI Project Track (36 credit hours total)	Master HI Thesis Track (36 credit hours total)
INFO-I 501 (3 cr.) Introduction to Informatics (classroom and distance)	INFO-I 501 (3 cr.) Introduction to Informatics (classroom and distance)
INFO-B 530 (3 cr.) Foundations of Health Informatics (online)	INFO-B 530 (3 cr.) Foundations of Health Informatics (online)
INFO-B 535 (3 cr.) Clinical Information Systems (online)	INFO-B 535 (3 cr.) Clinical Information Systems (online)
INFO-B 581 (3 cr.) Health Informatics Standards and Terminology (classroom and distance)	INFO-B 581 (3 cr.) Health Informatics Standards and Terminology (classroom and distance)
INFO-B 583 (3 cr.) Security and Privacy Policies (online and classroom)	PBHL-B 551 (3 cr.) Intro to Biostatistics I (classroom) or INFO I590 Statistical Methods in BioInformatics
INFO-B 642 (3 cr.) Clinical Decision Support Systems (online)	INFO-B 642 (3 cr.) Clinical Decision Support Systems (online)
INFO-B 505 (3 cr.) Informatics Project Management (classroom and distance)	INFO-I 575(3 cr.) Informatics Research Design (classroom)
INFO-B 691 (3 cr.) Project in Health Informatics (independent study)	INFO-B 691 (3 cr.) Thesis (independent study)
Elective (3 cr.)	Elective (3 cr.)
Elective (3 cr.)	Elective (3 cr.)
Elective (3 cr.)	Elective (3 cr.)
Elective (3 cr.)	Elective (3 cr.)

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

The Health Informatics curriculum is focused on integrating knowledge from informatics, healthcare, information management, health information technology and other disciplines. Courses form a cohesive and meaningful curriculum focusing on one or more of the stated student learning outcomes including real-world experience through a practicum, project or thesis.

The program uses different teaching methods from classroom and web-based lectures with threaded discussions, experiential problem-based learning, and seminars to independent studies. The teaching method chosen is guided by the learning outcomes and the intended professional competencies of the course.

- Give and grade technical assignments which require execution of queries on large databases using data mining and testing hypothesis approaches.
- Require and grade written assignments (including interactive online posting) evaluating health information and its sources critically and incorporating selected information into his or her knowledge base and value system.
- Require and grade intensive individual and/or group projects demonstrating mastery to effectively use of information technology to accomplish a specific health information technology project (e.g., evaluation of electronic health records, incorporating standards in EHR systems).
- Facilitate and evaluate practica, projects, and/or written assignments requiring critical assessment of implementation of standards and terminologies for documenting health events and exchanging protected health information.
- Assign and grade projects demonstrating that student assures confidentiality of protected patient health information when using health technology systems.
- Require students to propose/justify decision support systems algorithm to support care delivery during class discussions, practica and/or capstone projects, and assign grades based on student assignment performance.
- Assign and evaluate staged projects demonstrating the value of health information technology applications for healthcare.
- Evaluate students' effective communication relating health information systems to clinical practice via graded class discussions, written assignments and class projects.

c. Recent revisions/improvements to courses

Multiple courses have been updated to reflect changes in the evolving field of health informatics, particularly because of recent legislative and technology changes in the field:

- We have completely revised the INFO B581 Health Informatics Standards and Terminology, with feedback from recruiters at the Indiana Health Information Exchange and other healthcare organizations, updates from AMIA and other HI programs. We have added to

the course new standards like FHIR, widely used textbooks, and a lab section to provide hands on training on interoperability tools and technologies.

- We made major revisions to INFO B642 Clinical Decision Support System, with an updated version of the textbook, changes to assignments, and the addition of examples of CDSS implementation.
- We made major revisions to INFO B535 Clinical Information Systems, by adding assignments and hands-on experience with OpenMRS, an electronic medical records system. We also changed the group projects to get students more involved in industry by applying course content to real-world practices.
- Minor revisions were made to in INFO B641 Business of Health Informatics, INFO B582 Health Information Exchange, and B585 Biomedical Data Analytics in response to regulatory changes like MACRA/MIPS, CMS and Medicare/Medicaid changes, Common Rule change, and FDA changes.

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?

Our curriculum is closely aligned to the HI discipline curriculum requirements defined by the CAHIIM accreditation requirements. We have undergone a curricular review for accreditation and that has helped align our program outcomes with the CAHIIM requirements. These cover the following curricular components:

1. Healthcare delivery systems, organization, governance and workflow
2. Health information systems characteristics, strengths and limitations
3. Health information systems assessment methods and tools
4. Quality assessment including total quality management, data quality, and identification of best practices for health information systems
5. Health IT standards
6. Use of healthcare terminologies, vocabularies and classification systems
7. Health information exchanges (HIE)
8. Electronic health records and personal health records
9. Patient rights and associated regulations
10. Privacy and confidentiality of patient health information
11. Information security practices
12. Management of information systems including life cycle analysis, system design, planning methods and tools
13. Evidence-based systems and tools (such as *PubMed*, *UpToDate*)
14. Workflow process re-engineering
15. Human factor engineering, work organization and tools
16. Strategic planning
17. Project planning and management
18. Change management
19. Finance and budgeting and cost-benefit analysis for information systems
20. Assessment of commercial vendor products and software applications
21. Policy development and documentation

22. Personnel management, negotiation, communication skills, business ethics, leadership and governance
23. Systems thinking and theory
24. History of health informatics development and health informatics literature
25. Medical decision-making: principles, design, implementation
26. Development of healthcare terminologies, vocabularies and ontologies
27. Clinical data standards theory and development
28. Clinical data and clinical process modeling (such as UML-Unified Modeling Language, UP-Unified Process)
29. Cognitive support (i.e. clinical decision support)
30. Biomedical simulations
31. Personalized medicine
32. Human-computer interface
33. Principles of health information systems data storage design, including patient-centered
34. Principles of research and clinical literature research
35. Natural language processing
36. Knowledge discovery (such as text and data mining)
37. Principles of computer science
38. Programming language(s) (such as SQL, Python, Java)
39. Software applications – design, development, use
40. Systems testing and evaluation
41. System integration tools
42. Networking principles, methods, design
43. Principles of data representation
44. Electronic data exchange
45. Health Information technology: systems architecture, database design, data warehousing
46. Technical security applications and issues
47. Information technology (IT) system documentation
48. Business continuity and disaster recovery
49. Virtual network applications and storage (such as cloud computing)
50. Epidemiology (public health or clinical)

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 instructors. Since, the course evaluations were received only in Spring 2017, we have not had the opportunity to make changes to the curriculum, but plan to use it moving forward.

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 the 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 to the Chair 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 can 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 clock 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 Lilly, IU Health, Regenstrief Institute etc.).

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

Admitted master degree 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 either the HIM, Bioinformatics or Health informatics program and a faculty research mentor or faculty teaching mentor (the course instructor) who directly supervises their work. Most MS-HI students are assigned a teaching assistantship of 10 hours per week. Specific attention is paid every semester to monitor the teaching performance of the teaching assistant by engaging faculty in assigning to TAs to 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.

IV. LEARNING OUTCOMES

1. Program-Level Student Learning Outcomes

Upon completion of the MS in HI program, students will:	RBT[1]	PGPL[2]
1. Analyze problems: Analyze, understand, abstract, and model a specific biomedical problem in terms of their data, information, and knowledge components.	4	1, 2
2. Produce solutions: Use the analysis to identify and understand the space of possible solutions and generate designs that capture essential aspects of solutions and their components in a healthcare setting.	5, 6	1, 2, 4
3. Implement, evaluate, and refine: Carry out the health informatics solution (including obtaining necessary resources and managing projects), evaluate it, and iteratively improve it.	5, 6	1, 2
4. Innovate: Create new theories, typologies, frameworks, representations, methods, and processes to address biomedical informatics problems	6	2, 4
5. Work collaboratively: Team effectively with partners within and across disciplines and health depts.	3	3
6. Understand the fundamentals of the field in the context of the effective use of biomedical data, information, and knowledge.	2	2
7. For substantive problems related to scientific inquiry, problem solving, and decision making, apply, analyze, evaluate, and create solutions based on biomedical informatics approaches	3, 4, 5, 6	1, 2
8. Apply, analyze, evaluate, and relate biomedical information, concepts, and models spanning molecules to individuals to populations.	3, 4, 5	1, 2
9. Analyze and evaluate complex biomedical informatics problems in terms of data, information, and knowledge	4, 5	2
10. Exhibit sound judgment, ethical behavior, and professionalism in applying biomedical concepts and value-sensitive design to serve stakeholders and society, especially in ethically challenging situations	2–6	4
11. Apply and evaluate methods of inquiry and criteria for selecting and using algorithms, techniques, and methods to solve substantive health informatics problems.	3, 5	2

2. Evidence of Students' Achievement of Program-Level Learning Outcomes

Currently the Principles of Graduate and Professional Learning are used inside the classes for specific projects or exams to prove their capabilities in different areas of expertise.

The Capstone Projects – conducted in partnership with local companies and institutions – represent the culmination of knowledge and abilities for students in the program. Students'

[1] RBT: Revised Bloom's taxonomy

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

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.

Student learning outcomes are assessed by using a core list of assignments and projects, and ensuring that all students have the opportunity to complete one project of each type on the list. Examples of assignments as reflected in the curriculum map include the following:

- Assignments that require execution of queries on large databases using data mining and hypothesis-testing approaches.
- Online discussions and/or written assignments evaluating health information and its sources critically and incorporating selected information into the student's knowledge base and value system.
- Individual and/or group projects demonstrating mastery in the effective use of information technology to accomplish a specific health information technology project (e.g., evaluation of electronic health records, incorporating standards in EHR systems).
- Via practica, projects, and/or written assignments: Performing a critical assessment of the implementation of standards and terminologies for documenting health events and exchanging protected health information.
- Projects demonstrating the assurance of the confidentiality of protected patient health information when using health information systems.
- Via practica, class discussions, and/or capstone projects: Proposing/justifying decision support systems algorithms to support care delivery
- Staged projects demonstrating the value of health information technology applications for healthcare.
- Via class discussions, written assignments, and class projects: Communicating effectively the importance of health information systems to clinical practice

a. Capstone Projects of HI MS students (Spring 2017):

Every semester the program includes client-driven capstone projects in collaborative partnerships with industry to provide increased exposure to students to real-world project challenges.

Title	TEXT MINING OF OPEN SOURCE FDA LABEL DRUG INTERACTIONS
Student Name(s)	ANVESH KANNURI
Project Partner	Regenstrief Center for Computational Biology and Bioinformatics

Title	DETECTION OF SEIZURE MOVEMENTS BY USING A PORTABLE WRIST ACCELEROMETER
Student Name(s)	Preethi Krishnamaneni
Project Partner	Nationwide Children's Hospital, Ohio

Title	INDIVIDUALIZED DOSING OF NIFEDIPINE FOR TOCOLYSIS IN PRETERM LABOR
Student Name(s)	Haritha Atluri
Project Partner	IU School of Medicine, Dr. Sara K Quinney

Title	LITERATURE MINING TO EXPOSE PHARMACOKINETICS OF DRUGS IN PREGNANCY
Student Name(s)	Shilpa Katta
Project Partner	Regenstrief Center for Computational Biology and Bioinformatics

Title	EVALUATION OF IMPLEMENTED TWO-FACTOR AUTHENTICATION ON CONSUMER MEDIATED HEALTH INFORMATION EXCHANGE
Student Name(s)	BHAVANA SRINIVAS
Project Partner	OpenMRS
Title	DATA MINING OBESITY+ DATABASE FOR KNOWLEDGE EXTRACTION
Student Name(s)	Enming Zhang
Project Partner	n/a

Title	PACE Dialogue Intervention Game Playbook
Student Name(s)	Abdulrasaq ajao; Richard Brown; Nakia finLey; India Johnson
Project Partner	Indiana University School of Medicine

Title	Text Mining on Case Reports to Extract DDI Information
Student Name(s)	Rohith Vanam
Project Partner	Regenstrief Center for Computational Biology and Bioinformatics

Title	Navigator for Long-Term Breast Cancer Survivors: Using Forums with Social Tagging Folksonomy
Student Name(s)	Sean McGann
Project Partner	n/a

b. Careers

Salary

Informatics Nurse: According to PayScale, the average salary for an informatics nurse is $66,552 per year, with an average reported salary range of $51,353 to $89,022. The highest paid informatics nurses reside in Houston, according to PayScale data, where the average reported salary is $74,000 per year.

Health Informatics Specialist: According to PayScale, the average salary for a health informatics specialist is $61,050 per year, with an average reported salary of $35,449 to $91,618 per year.

The highest paid health informatics specialists reside in Chicago, according to data from PayScale, where the average reported salary is $84,000 per year.

Clinical Informatics Specialist: According to PayScale, the average salary for a clinical informatics specialist is $68,707 per year, with a reported salary range from $44,541 to $93,373 per year. The highest paid clinical information specialists, according to data from PayScale, reside in Houston and Dallas, with reported average salaries of $90,000 and $72,000 per year, respectively.

Clinical Analyst: According to PayScale, the average salary for a clinical analyst is $63,823 per year, with a reported salary range from $40,928 to $88,186 per year. The highest paid clinical analysts live in New York and Phoenix, according to data from PayScale, where the average reported salaries are $85,000 and $76,000, respectively.

Clinical Informatics Manager: According to PayScale, the average salary for a clinical informatics manager is $92,819 per year, with a reported salary range of $59,008 to $127,876 per year. Those with nursing informatics, project management, and clinical information systems skills reported average salaries of $100,000, $92,000, and $94,000, respectively to each skill.

List of positions

Examples of recent job position titles our students have secured include

- Health data analyst
- Clinical informatics RN
- Health scientist
- Clinical informatics specialist
- Clinical informatics coordinator
- Health security specialist
- Informatics coordinator
- Application system analyst
- Population health analyst
- Clinical imaging analyst
- EHR information system specialist

Additionally, students have been able to secure fully-funded Ph.D. positions at University of Wisconsin.

List of companies

- IU Health
- St. Vincent
- Eli Lilly
- American Health Network
- Epic Systems

- Cerner Systems
- Salesforce

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

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

News about Health Informatics faculty, alumni, and students

April 26, 2017
Professor Holden's research to give patients the power of data

February 22, 2016
Professor Holden wins Applied Ergonomics 2015 Best Paper Award

August 11, 2015
New integrated degrees prepare students for wider range of career opportunities

April 16, 2015
New degree geared toward health, science and technology prepares students for careers of the future

April 8, 2015
Health Informatics' Students Receive HIMSS Indiana Scholarships

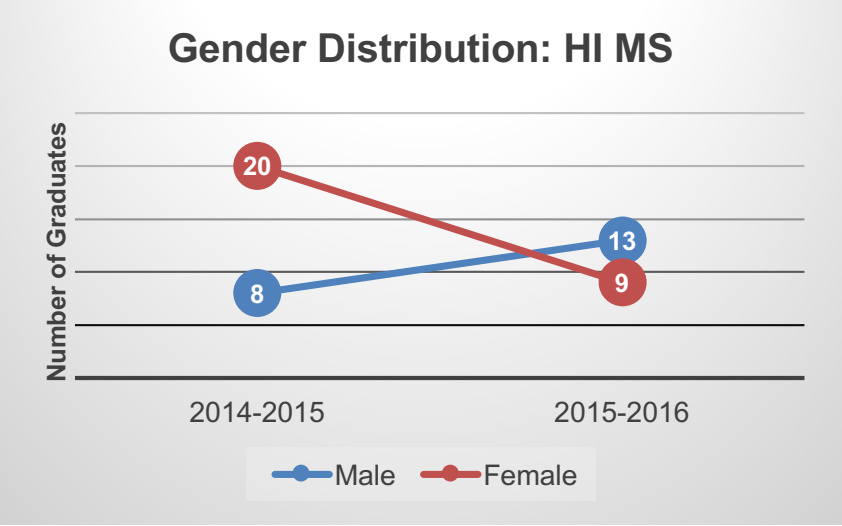
February 12, 2015
Informatics and Computing Assists IU School of Nursing in Big-Data Research About Health and Wellness

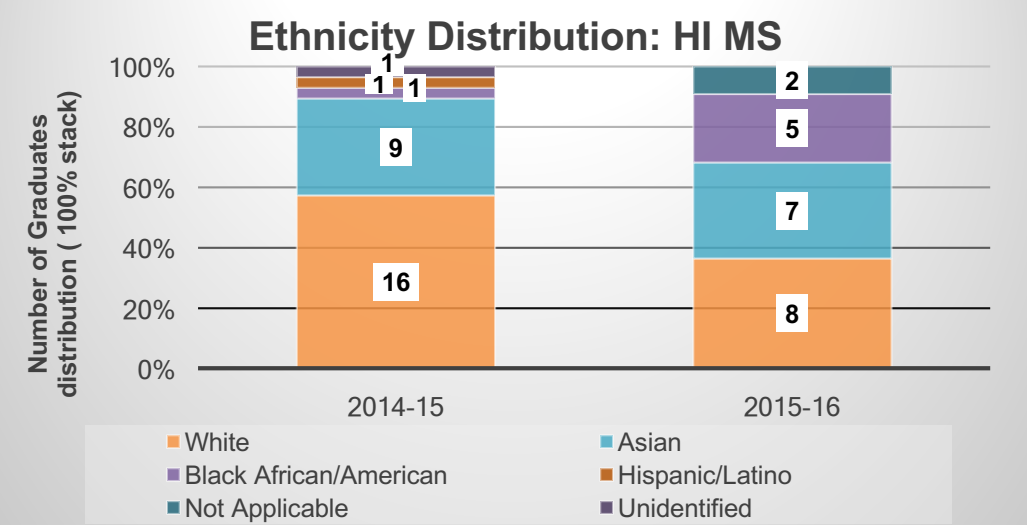
January 29, 2015
Dr. Rich Holden featured in Annals of Emergency Medicine

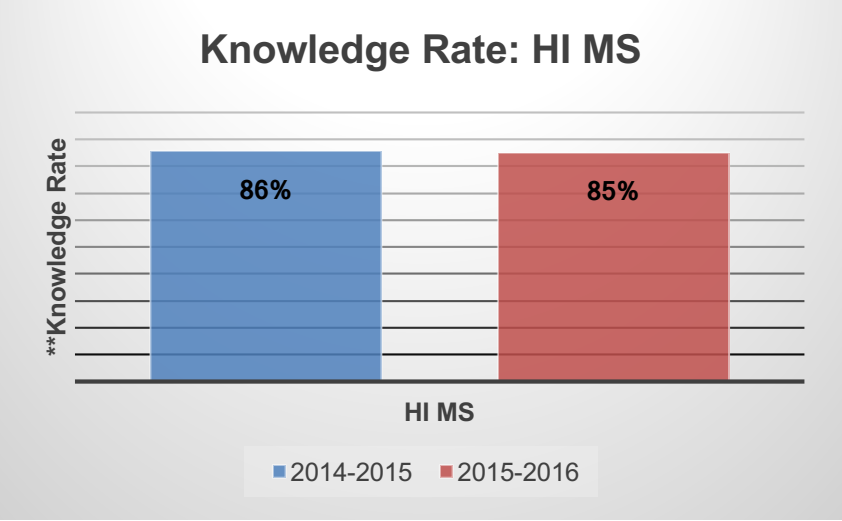
November 24, 2014
Health Informatics faculty and students to participate in Google Code-in

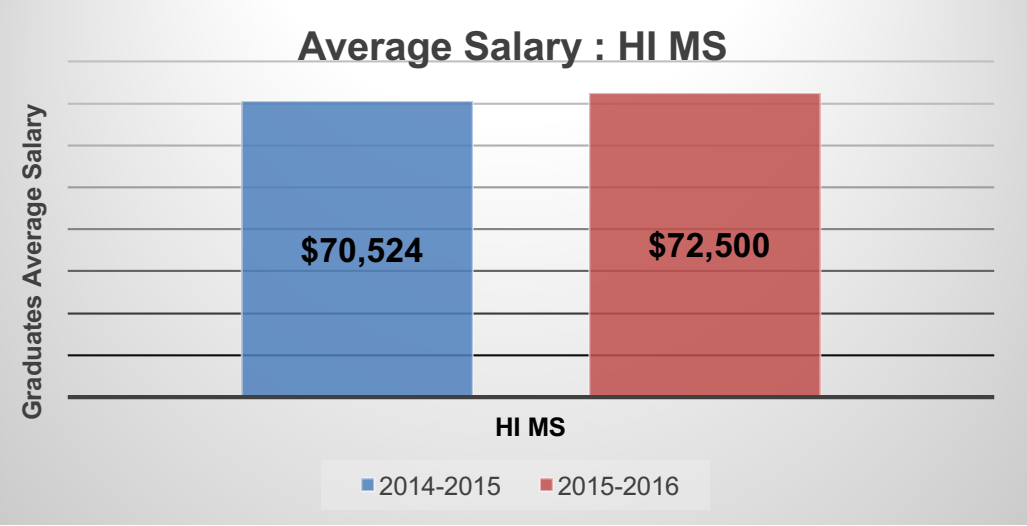
November 7, 2014
Dr. Brad Doebbeling's paper accepted into AMIA 2014

HI MS Graduate Program Overview from July 2014 to June 2016









Year	FT in Major	PT in Major	Started Own Company	FT Out of Major
2014-15	96%			4%
2015-16	82%	6%		12%

***Table above shown the Knowledge Rate distribution*

Year	Salary Reported By	Total number of employable students
2014-15	16	28
2015-16	6	20

**Average Salary is based on data as reported by Graduates*

HI MS Graduate Program Overview from July 2014 to June 2016

List of Employers- 2014-15

Job Title	Company
Cerner Application Support Analyst | Clinical App Specialist | Project Manager/Clinical Analyst | Program Manager	IU Health
Data Analytics Analyst	Henry Ford Health System
Process Validation Engineer | Engineering Manager	Hill-Rom Medical Devices
Analyst	Eskenazi Health
IS Manager-Applications	Hendricks Regional Health
Program Manager	Department of Child Services
Senior User Experience Specialist	The MathWorks

List of Employers- 2015-16

Job Title	Company
Senior Associate Business Analyst	Eli Lilly
IT Project Coordinator | Business Intelligence Developer	Eskenazi Health
Clinical/Business Data Analyst | Clinical Informatics Coordinator | Data Architect	IU Health
Radiologic Technologist	Parkview Health
Manager	Indiana Department of Health
Solution Engineer	Indiana Health Information Exchange
Clinical Data Analyst	Hospital Corporation of America
Systems Engineer 1	Regenstrief Institute
Data Analyst	Managed Health Services

Program Review and Assessment Report

Master of Science in Human–Computer Interaction Program

2016–2017

Prepared by the Human–Computer Interaction Graduate Program

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 2016–2017 Academic Year, four new HCI tenure-track faculty member joined the HCC Department, bolstering student research advising potential in the Human-Computer Interaction (HCI) Master of Science Program, including more support for students interested in thesis completion. There are nine faculty in the program total.

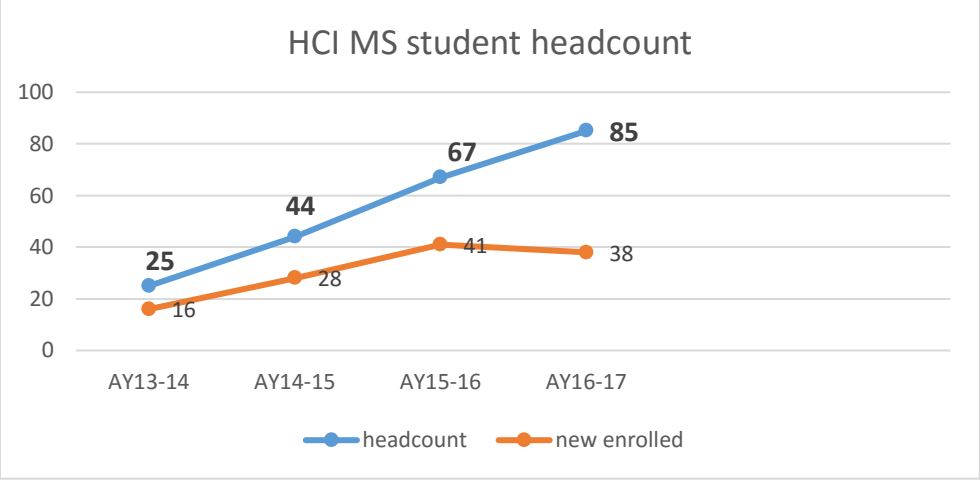
II. PURPOSES, REPUTATION, ASPIRATIONS:

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 prepares graduates for a career in industry or academia, or for admission to the Ph.D. in Informatics program 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 and worldwide, including Yahoo!, Google, Pearson, Apparatus, FormStack, Salesforce, WalmartLabs, Dell, Intel, Demandware, SAP, and many others.

There are 85 students currently in the program, which has picked up a very healthy growth trend of approximately 20–30 new students every year (including fall and spring admits), and with cohort of prospective students bound to grow rapidly. Enrollment has held steady despite a projected drop in international applicants.



Since its inception in 2003, the MS in HCI has graduates approximately 200 students, who went on to secure positions mainly in the many industry sectors where human–computer interaction play an increasingly major role, in both large and medium-sized organizations. Based on the 2015–2016 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 researcher, front-end web developer, user interface designer, usability engineer, and search quality specialist.

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 IU School of Informatics and Computing (in the form of an assistantship or fellowship) must complete the program in two years.

Our program aspires to be among the top 10 in the nation, and among the top 5 in the Midwest, with competing MS in HCI programs in major universities, including Carnegie Mellon University, Georgia Tech, DePaul, and the 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) are probably the second largest body of HCI faculty and students in the US (second to Carnegie Mellon University's HCI Institute).

III. PROGRAM PROCESSES

1. Program Content

a. Distinctive characteristics of the program; Structure, breadth, and depth of curriculum.

The program content includes three specific components:

- Eight core courses that cover the foundation of human–computer interaction theory and practice, 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 elective courses 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 most students pursue.
- Final Capstone Project or Thesis (two sequential courses) 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?

Because of the dynamic and continuously evolving landscape of HCI industry and research, we believe that students can fully achieve the Program-Level Student Learning Outcomes if the program keeps the curriculum up to date with new technologies and directions in the discipline. Thus, the curriculum has evolved over the last decade to keep pace with the rapidly changing HCI industry and research areas to meet the increasingly sophisticated needs and expectations of the students. Specifically, key milestones that characterized the growth and evolution of the curriculum include the following:

- 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 local industry, who serve as adjunct faculty for selected courses. 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.

- 2008–present: Internships were included in the curriculum and recommended to the students in search of electives that could give them industry experience.
- 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.
- 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 students a more structured scaffolding of their final project effort, with an instructor on record for the capstone class every semester. This improvement led to increased student retention, higher on-time graduation rates, and more efficient workloads for the research-active faculty (who could focus on mentoring PhD students).
- 2015: Thanks to the new advisory board of the department, industry partners were systematically invited to serve as "clients" for student capstone projects. 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.
- 2016–2017: Introduction of a 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 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.

c. Recent revisions/improvements to courses

In Fall 2016, Dr. Miller taught a new HCI-focused version of INFO I575 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, and examine examples of the research design approach. 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 focusing 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 (7,000–10,000 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 HCI 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. Previously the program used the school's online evaluation system.

2. Student Support
a. How and when are research advisors selected for graduate students?

Course advising 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 plan of study, course load for each semester, selection of 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 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 reassess 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 prepare them for a professional career. HCI graduate students can 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 turns in weekly journal entries and a report describing work activities. In previous semesters, students have interned at many organizations both in and outside of Indiana (including Roche, Google, Prysm, Procter & Gamble) and have held 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.

IV. LEARNING OUTCOMES

1. Program-Level Student Learning Outcomes[1]

Upon completion of the MS in HCI program, students will	RBT[2]	PGPL[3]
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 research methods, make recommendations, and create and defend alternative designs.	5, 6	2, 3
8. 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

[1] Revised fall 2016

[2] RBT: Revised Bloom's taxonomy

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

2. Evidence of Students' Achievement of Program-Level Learning Outcomes
Currently the Principles of Undergraduate Learning are used in the classes with specific projects or exams in which students prove their capabilities in different areas of expertise.

The Capstone Project—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 can master the 11 program-level learning outcomes when solving real-world problems.

There are three indicators that provide indirect evidence of their mastery of the 11 program-level learning outcomes and of the transferable skills (Revised Bloom's taxonomy and Principles of Graduate and Professional Learning). First, the 96% job placement rate for graduating/recently graduated students, mostly in their area of specialization (88%): 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 measure of their mastery of the 11 program-level learning outcomes and transferable skills in industrial and corporate environments. Third, three of the recent HCI MS graduates (graduate cohort of spring 2017) have been accepted at prestigious PhD program in Human–Computer Interaction (Carnegie Mellon University, Georgia Tech, and Northwestern University): this is indirect evidence of our graduates' mastery of the 11 program-level learning outcomes and transferable skills in academic environments.

a. Capstone Projects of HCI MS students (Fall 2017):
The program includes client-driven capstone projects in collaborative partnerships with industry to provide increased exposure to students to real-world project challenges.

1. Title	Therapy Tool for Autism Spectrum Disorder using Oculus Rift VR
Student Name(s)	Scott Hager, Raksha Matada Gopalakrishna
Project Partner	Easter Seals Crossroads

2. Title	Shakti Warriors Administrative Website
Student Name(s)	Mihir Abnave, Onkar Borgaonkar
Project Partner	The H2 Group

3. Title	FLX - make your office life as flexible as you want
Student Name(s)	James Meltzer, Nomaan Ahgharian
Project Partner	n/a

4. Title	Brain-Computer Interface (BCI) and Virtual Reality
Student Name(s)	Jay Dee Johns III
Project Partner	Aleshia Hayes, PhD - College of Engineering, Technology, and Computer Science, IPFW

5. Title	IUPUI Library Research Guide Redesign
Student Name(s)	Kyle Maddox, Wei Xiong, Alex Chambers, Mitchell Cannon
Project Partner	Yoo Young Lee – IUPUI University Library

6. Title	Digital Storytelling Website for Indiana Medical History Museum
Student Name(s)	Abhishek Murali, Alita Pinto
Project Partner	Indiana Medical History Museum

7. Title	Redesigning MISO's Calendar Experience
Student Name(s)	Jasbir Kaur, Matthew O'Haver, Emily Poylio, Dhivya Soundarajan
Project Partner	MISO

8. Title	MISO Market Portal
Student Name(s)	Ethan Harmeyer, Melissa Dryer, Yi Zhang, Cameron Harris, In Kwon Choi
Project Partner	MISO

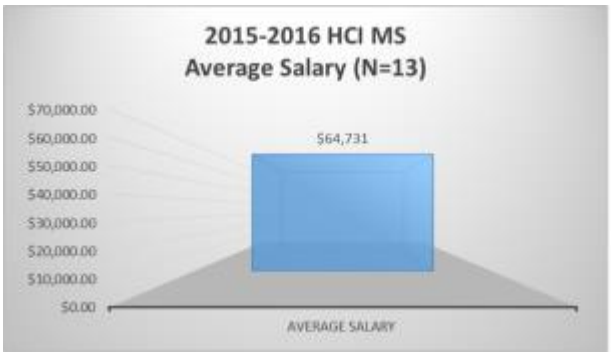
9. Title	Cloud-based Co-Discovery
Student Name(s)	Deepa Prasad, Nitya Reddy Pannala, Vedantha Kartheek TS
Project Partner	Procter & Gamble

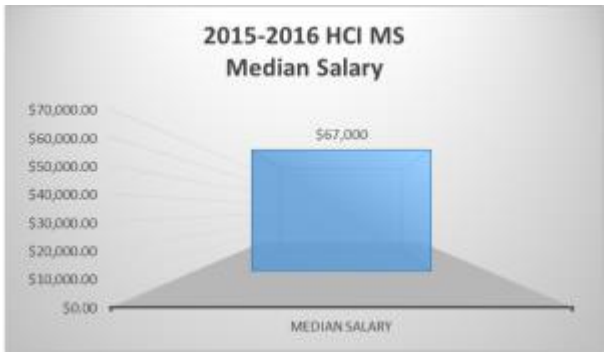
10. Title	PRYSM Stylus-An Interaction Wizard for Large Screens
Student Name(s)	Rehab Tambe, Shanglei Zhang
Project Partner	PRYSM

11. Title	iMoD: Inventory of Moral Distress
Student Name(s)	Neha Singhal, Manali Desai, Prachi Jadhav
Project Partner	Lucia Wocial, PhD, RN, FAAN - Fairbanks Center for Medical Ethics, Indiana University Health

b. Careers

Salary MS in Media Arts and Science





List of positions

Examples of recent job position titles our students secured include

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

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

List of companies

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

- Reecha Bharali
- Ryan Sukale
- Mike Wilson

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

- 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/
- In August 2017, Lynn Dombrowski (PI) and Davide Bolchini (Co-PI) received an NSF grant award of $494,286 to explore the role of HCI in designing novel collaborative and transparent information systems for low-wage workers: https://www.nsf.gov/awardsearch/showAward?AWD_ID=1718121&HistoricalAwards=false
- HCI faculty Professor Miller selected for elite ACM computing academy https://soic.iupui.edu/news/andrew-miller-acm-fca/

News about the HCI faculty, alumni, and students

June 9, 2017
Professor Miller selected for elite ACM computing academy

May 31, 2017
Faculty and students present work at 2017 CHI Conference

May 23, 2017
HCC grad student participating in Google Summer of Code

March 30, 2017
MacDorman explores voice preferences for personal digital assistants

March 24, 2017
School joins prestigious Human-Computer Interaction Consortium

April 25, 2016
Debaleena Chattopadhyay honored as IUPUI Chancellor's Scholar

November 17, 2015
Human-Computer Interaction Ph.D. student interns at Microsoft Research Cambridge to design novel experiences for nearby devices

October 5, 2015
The Human-Centered Computing Department welcomes new faculty

October 1, 2015
Informatics and Computing organizes Indo-US Workshop on Emerging Accessibility Technologies for the Blind and Visually Impaired

September 24, 2015
Informatics and Computing faculty conducting research to develop breathalyzer-type device to detect low blood sugar for diabetes

April 24, 2015
Four Informatics and Computing Students Recognized for Top Honors

September 10, 2014
Dr. Stephen Voida Receives Google Faculty Research Award for Wearable Display Ecologies Project

Program Review and Assessment Report

Master of Science in Media Arts and Science Program

2016–2017

Prepared by the Media Arts and Science Graduate Program

I. GENERAL INFORMATION, INSTITUTIONAL DATA

The 2016–2017 review focuses on the Media Arts and Science (MAS) Graduate Program under the IUPUI School of Informatics and Computing.

The MAS Graduate Program is currently housed under the Department of Human-Centered Computing (HACC), which was founded on July 1, 2013. The MAS Graduate Program was established in 1999 as a stand-alone program in IUPUI. In 2000, when the School of Informatics was established, MAS was integrated into the latter. Since then, MAS has been the largest program in the IUPUI portion of the School. It has brought together strong research and education expertise in instructional technology, healthcare digital media, emerging media, and advanced interdisciplinary research at the forefront of media arts and science.

II. PURPOSES, REPUTATION, AND ASPIRATIONS

1. Reputation

a. Estimate of the program's national ranking based upon number of graduates, subsequent placement of graduates, level of support, or other criteria appropriate to the discipline.

For the 2016–2017 Academic year, the MAS Faculty report that this program has suffered a decline in enrollment and has not been able to rise to a level of regional or national prominence. MAS Faculty acknowledge there are several mitigating factors that prevented this program from moving forward and have begun to address this.

MAS faculty met several times throughout the 2016–2017 academic year in a series of brainstorming and planning sessions. Adjustments in the program are in progress to ensure the program's success. The primary goals are to revise the curriculum, establish an advisory board working with industry leaders to hire new faculty, and promote the program with the purpose of attaining regional (and eventually national) prominence in this field.

The breadth of the MAS graduate program is reflected in the diversity of organizations that hire its graduates (Table 1). Organizations ranging from animation, cloud services, education, entertainment, search engine optimization, video production, media production, and telecommunications are a small representation of the types of organizations that hire MAS graduates with specialized skillsets and talents. Examples of student employment from the MS in MAS program are presented in Table 1.

III. PROGRAM PROCESSES

1. Program Content

a. Distinctive characteristics. The focus of the MAS graduate program is on critical thinking, creativity, and digital storytelling while enhancing contemporary career-building skills. Our program offers education and experience on various integrated media venues in today's convergent society. Students produce dynamic websites, smartphone apps, animation, audio and video productions, interactive education applications, games (play and serious), simulation, 3D technologies, and motion graphics. The program is designed to be flexible, with the opportunity to concentrate on one specialty track or broaden studies in multiple tracks. Specializations include 3D graphics and animation, digital storytelling, game design and development, video production and sound design, web design and development, and user experience design. When a student completes a specialization, it is listed on the diploma as such.

The MAS Graduate Program is undergoing curriculum review. MAS faculty are conducting extensive research in the following areas:

- Types of jobs and employment areas needed for MAS graduates
- Description of skillsets listed in job-related sites
- Working with Career Services in the School of Informatics and Computing to help in placement and increase the quality of service to our MAS graduate students
- Create interdisciplinary bridges and partnerships with other programs in the School of Informatics and Computing

b. Structure, breadth, and depth of program. The Master of Science in Media Arts and Science focuses on applied research and application. It is oriented toward professional practice and relies on a theory-into-practice research base drawn from disciplines that study convergence (media, technology, society) and emergent media technologies. Skills and knowledge embedded in this program include project management, multimedia design, web and mobile computer programming, multimedia authoring language skills, multimedia implementation of audio and video materials, 2D/3D digital graphics (photography, scanning, printing), and the writing and editing of materials for multimedia storyboarding and content that complement the cutting-edge technology and digital media design and production courses.

Once students complete core requirements in the program (Table 2), they select courses from a long list of electives for their area of specialization (Table 3). A specialization gives the opportunity to customize a student's education in those aspects of media and production best suited for their career goals. Students are required to take a 6-credit Master's Thesis/Project course (NEWM N506). This course is a theory-into-practice research media design and development course.

Table 2 – MAS Graduate Core Requirements

MS: 30 Credit Hours		
Program Core	***Electives or MAS Internship***	***Final Project***
N500, N501, N503, N512	*Choose from list of elective courses (see next page) based on disciplinary interest and/or MAS career path*	*N506 - Fall/Spring (3 credit hours each)*
12 Cr. Hr.	*12 Cr. Hr.*	*6 Cr. Hr.*

	FALL	***SPRING***	***SUMMER***
YR 1	• ***N500*** *Principles of Multimedia Technology [M 6pm] Defazio* • ***N503*** *Digital Media Application Design Processes [W 6pm] Defazio* • ***One elective***	• ***N501*** *Foundations of Digital Production [T 6pm] Huang* • ***N512*** *Trends in Media, Info and Comm [R 6pm] Mannheimer* • ***One elective***	***Elective*** *or* ***Internship***
YR 2	• ***N506*** *MAS Masters Final Project/Thesis* • ***One elective***	• ***N506*** *MAS Masters Final Project/Thesis* • ***One elective***	***Elective*** *or* ***Internship***

DEPARTMENT ELECTIVES BY AREA (not exclusive list)**:**
Internship: MAS Internship (N595) [see next page for more detail] (contact: Career Services).
Business and Entrepreneurship: H550 Legal and Business Issues in Informatics, B505 Project Management (contact: Sara Hook).
User Experience, Human-Computer Interaction: I571 Visualization Design, Analysis and Evaluation, H543, H561, H563, H564, H565, H566 (contact: Davide Bolchini).
Research Methods: I575 Introduction to Research (contact: Davide Bolchini).
Game Design and Development: N534 Serious Games and Simulations; 500-level sections of Game Production courses (contact: Mat Powers).
3D Graphics and Animation: 500-level sections of 3D Graphics and Animation courses (contact: Zeb Wood).
Web Design and Development: N504 Advanced Int. App. Design, 500-level sections of Web Design/Dev. courses (contact: Todd Shelton, Travis Faas).
Digital Media and Healthcare: N507 Digital Media for Healthcare (contact: Edgar Huang).
Video Production: 500-level sections of Video Production courses (contact: C. Thomas Lewis).
Engagement in faculty research projects: N553 Independent Study (contact any faculty in the department).

FINAL PROJECT REQUIREMENTS
N506: All students must complete a final project of 6 Cr. Hrs. including N506 (Fall) and N506 (Sp.) of their second year under the supervision of a faculty member. Registration by permission only once a faculty member has agreed to supervise.

1. All students must complete a final project of 6 Cr. Hrs., including N506 (Fall) and N506 (Sp.) of their second year.
2. It is the responsibility of the student to select, contact in advance and engage directly with the individual MAS faculty who is most germane to the student's interest for the final project.
3. Students will work on one final project that extends throughout the two courses (Fall and Spring).
4. Students will receive an official grade at the conclusion of each course/semester.
5. Students are encouraged to propose a project that can be realistically completed by the conclusion of their Spring semester.
6. Incompletes are NOT permitted.
7. The final project may be tied to a real-world application in collaboration with a company or organization that has a problem to solve or an opportunity to explore.

8.

c. Interdisciplinary program offerings

The MAS graduate degree is currently a 30-credit program. Faculty are determined to raise this to a 36-credit hour program that would be consistent with the Bioinformatics, Health Informatics, Masters of Library Science, and Human-Computer Interaction programs in the School.

The HCC Department has a 4+1 option with the M.S. in Media Arts and Science in which students apply the latest research and principles of technology to create innovative and interactive media technology. Leading to the 4+1 option in MAS, this program also has an 18-credit Studio Art and Technology minor offered jointly with the IU Herron School of Art and Design that combines courses from Media Arts and Science, Fine Arts, and Visual Communication Design. SoIC students are introduced to and become proficient with a wide variety of skills related to drawing techniques, design thinking, artistic and visual forms, and visual communication design.

d. How has the department curriculum responded to new directions in the discipline?

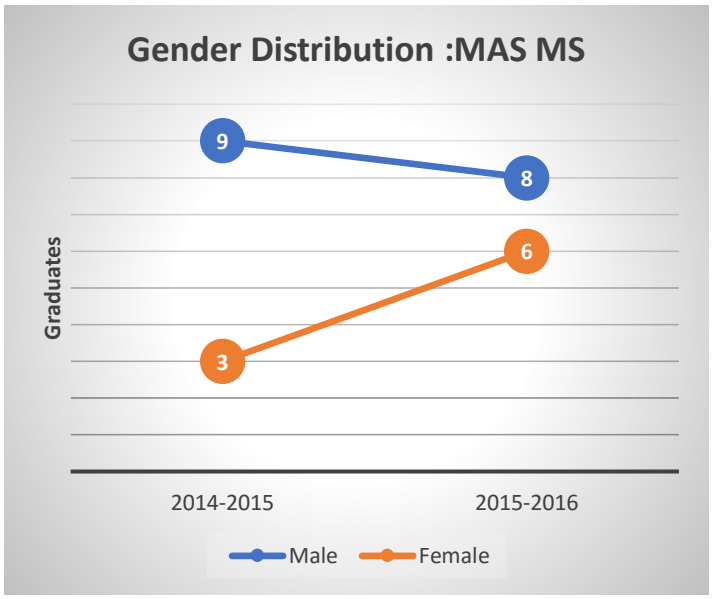
The 2015–2016 PRAC Report reported that many students graduating with an M.S. in Media Arts and Science "lacked clear progressions through courses that built on each other to competencies required for specific job positions."

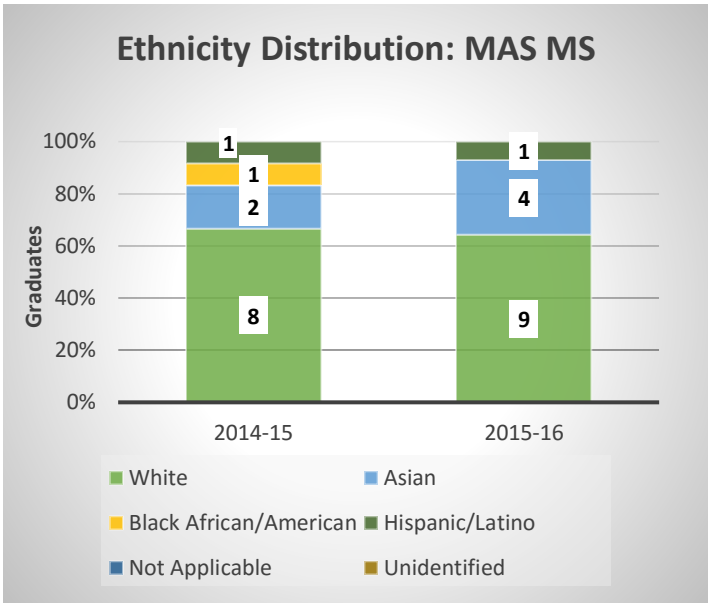
For the 2015–2016 and 2016–2017 academic years, a concerted effort was made to report data on Media Arts and Science students who graduated with an M.S. degree. With the assistance of Career Services, the Graduate Program Coordinator and the SoIC Recorder, this information is listed in Figure 1. A brief list of employers extending from 2014–2016 appears in Figure 2. A secondary list of employers of MAS Graduate Students appears in Table 3.

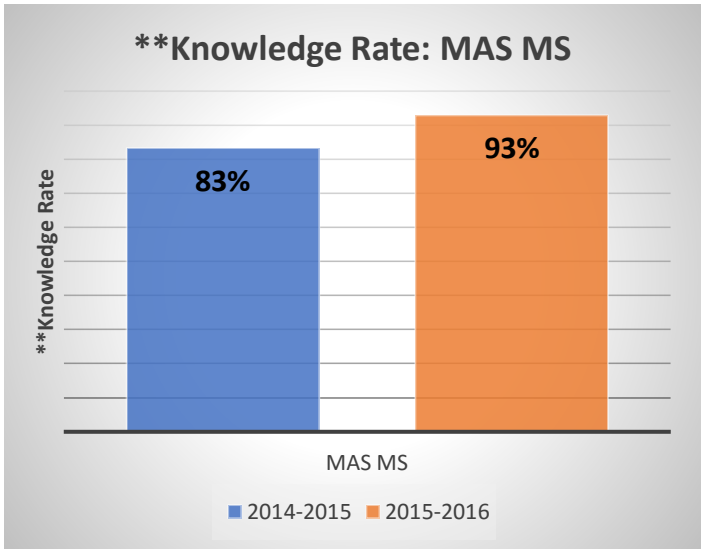
e. Curricular philosophy

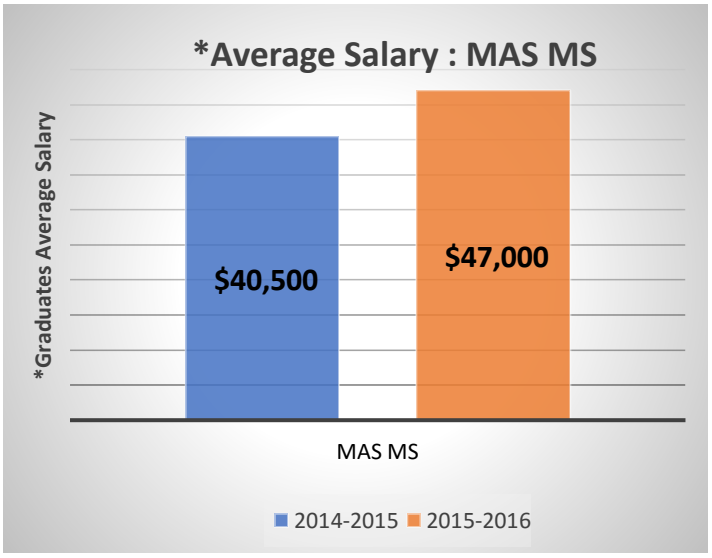
Curricular demands are constantly changing due to fast-paced advances in media and technology. The philosophy has shifted from encouraging students to focus solely on their digital media skillsets, adopt an awareness, and appreciate of critical thinking, design, research and development to advance their skillsets in their major. The design of majors that support career aspirations has been a major emphasis of the Indiana State government and the Indiana Commission for Higher Education. Given that media arts and science encompasses fields that are firmly rooted in media and technology, it is generally expected that students could (and should) be employed in their major upon graduation. The response to the change in philosophy extends beyond the redesign of the curriculum and the establishment of areas of specializations in the program. Engagement with industrial partners with respect to student internships, capstones, and project and portfolio critiques has increased.

MAS MS Graduate Program Overview from July 2014 to June 2016









Year	FT in Major	PT in Major	Started Own Company	FT Out of Major
2014–15	50%	10%	0%	40%
2015–16	85%	8%	0%	7%

Figure 1. MAS MS Graduate Program Overview from July 2014 to June 2016

List of Employers 2014–2015	
Job Title	**Company**
UI/UX Designer	Interactive Intelligence
Client Services Representative	The Capital Group
Graphic Designer/Brand Manager	Sharp SBS
Game Advisor	GameStop
Seasonal Sales Associate	Toys R Us
Information Technology Specialist	MSD of Wayne Township
Motion Graphic Artist/Adjunct Faculty	Civiwiki.org/The Art Institutes
President	Creative Media Arts Inc.
Video Producer	IUPUI

List of Employers 2015–2016	
Job Title	**Company**
Integration Consultant/Developer	Kronos
Sr software developer	Local stake
Freelance Arts	Cateena Crative
Board Member and Web Developer	One Net Coalition
Online Tech Coordinator	Ivy Tech
3D Lab Coordinator	Indiana University @ IUPUI
Motion Graphics Designer	Freelance
User Experience Researcher	Prysm Inc.
Graphic Designer	Hurco
Graphic Artist	M.Y. Products

Figure 2. MAS List of Employers from 2014–2016

IV. MASTER OF MEDIA ARTS AND SCIENCE LEARNING OUTCOMES

A. Succinctly state what students should know and be able to do

Graduates of the Media Arts and Science Graduate Program will demonstrate expertise in the following core competencies essential to success as an informatics, computing, and information technology professional specializing in interactive media and emergent media technology fields:

1. Evaluate and create media-rich digital applications by researching and applying effective multimedia design, and management and development techniques using text, graphics, web and mobile technologies, two-dimensional and three-dimensional modelling and animation, sound, and video; concept development, prototyping techniques, storyboarding and proof of concepts, multimedia production pipelines, testing and evaluation.
2. Apply media design, psychological and cognitive principles and theories to the development of digital games for a variety of domains, including entertainment, health and well-being, medical sciences, education and business.
3. Research and develop omnichannel, interactive media strategies, including digital content and social media architectures, to enhance the communication potential of institutions, business and organizations.
4. Design and use novel forms and applications of media technologies, including those possible through the use of advanced digital video production techniques and 3D printing.
5. Apply principles and theories of quantitative analysis, qualitative analysis, design

research, information visualization, and visual analytics.

6. Design effective, usable, and human-centered media-rich applications using prototypes and proof of concepts.
7. Effectively communicate in digital, oral, and written form the processes, ideas, outcomes, and implications of MAS projects.
8. Articulate decisions and reasoning behind decisions made related to digital media design and production choices.
9. 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.
10. Collaborate in teams fairly, effectively, and creatively, applying group decision-making and negotiation skills.

V. COURSE EXAMPLE – NEWM N500 PRINCIPLES OF MULTIMEDIA TECHNOLOGY

Core Competencies

The core competencies of this course include the following:

1. Research, analyze and present findings in various hard/soft multimedia technologies
2. Digital media Design and Development—demonstrate effective project management and digital design and development skills
3. Effective team-based communication and collaboration

Teaching and Learning Methods

Teaching and Learning Methods employed in this course are defined as:
Participatory learning and Learn-by-Doing
Project base learning

Principles of Graduate and Professional Learning (PGPL)

Learning outcomes are assessed in the following areas:

1. Knowledge and skills mastery (K&S)
2. Critical thinking and good judgment (CT)
3. Effective communication (EC)
4. Ethical behavior (EB)

Upon completion of this course, the student will	RBT*	PGPL	Assessment
1. Class Participation (individual). The participation grade is based on the evaluation of the students' ability to engage in discussion on important topics presented in class.	Understanding	CT and EC	Understanding, Explanation, Reflective communication
2. Quizzes based on weekly readings (book chapters, papers, reports, online resources)	Remembering	K&S and CT	Quizzes
3. Midterm Team and Final Solo Presentations. This grade is based on the peer and instructor evaluation.	Creating, Evaluating, Analyzing	K&S, CT, and EC	Creating Digital Media Productions
4. Final Project Formal Paper	Creating, Evaluating, Analyzing	K&S, CT, and EC	List, Outline Plan, Questionnaire, Report, Summary
5. Writing Style – with focus on the APA 6 style of writing	Creating, Evaluating, Analyzing	K&S, CT, and EC	Report/Paper

*RBT: Revised Bloom's Taxonomy

Learning Outcomes

The MAS Graduate programs assesses student comprehension and academic completion through collaborative (teamwork) assignments and projects, quizzes and exams, readings, research, critical thinking, reflection-in-action, and formal writing. Students may also elect to participate in community-based projects. Table 4 shows course, instructor and student enrollment.

Table 4. Assessment through Assignments

NEWM-N	585	Lewis	2
NEWM-N	500	Defazio	8
NEWM-N	506	Defazio	5

Student Achievement

For evidence of student achievement of learning outcomes for MAS MS students, the following are excerpts of recent Masters Projects:

- Asa Blevins, *Different Like Me,* Film, 30, VFX.

- Nathan Pike, *Character Sculpting/Modeling Demo Reel,* Video and website
- Ryan C. Sellick, *Digital Media Marketing Campaign for Local Music Group,* Website, Video, Large Scale Graphic.
- Jonathan Sheldon, *The Effectiveness of Serious Gaming: Learning How to Calculate and Predict Slope,* Research project.
- Lindsay Kurbursky, *Accessibility for the Deaf and Hearing Impaired at the Indiana Medical History Museum*
- Amy King, *The Ecosystem Surrounding the Decision Making Process for Purchasing Technology within Libraries*
- Ya Chung Cheng, *Implement Human-Centered Design Methods to Develop a Sharing Economic Application Prototype: "Help2Buy"*
- Rumi Sakuraeda, *Usability Analysis and Redesign Proposal of the OneStart Student Center*

VI. MASTER IN MEDIA ARTS AND SCIENCE MAS – FALL 2016/SPRING 2017 CENSUS AND GRADUATE DATA

Table 5 shows the 2016 Census in the program.
Table 6 shows the number of graduates for August 2016 through May 2017.

Table 5 - MAS – MAS Fall 2016 Census

Total # of Students	21
Female	8
Male	13
International	3
Resident	17
NR – Non-International	1
Saudi Arabia (INT)	2
China (INT)	1

Table 6 – MAS Students Graduate

August 2016	1
December 2016	1
May 2017	3

Unfortunately, the numbers tell the story and current state of the MAS Graduate Program in the School of Informatics and Computing.

The MAS Graduate program aspires to be among the top 10 in the nation and among the top 5 in the Midwest. The MAS graduate program is currently undergoing curriculum review with a special emphasis on Emergent Media Technology. In their five-year strategic plan (currently in development), the MAS Graduate program expects to compete with major universities, including

Carnegie Mellon University, Georgia Tech, University of Dallas, Ball State University, and the University of Washington.

VII. MEDIA ARTS AND SCIENCE STUDENT GROUPS

ACM SIGGRAPH
SIGGRAPH IUPUI Student Chapter is dedicated to furthering the knowledge, excitement, and creativity of its members. Typically, members are interested in graphics, interactive techniques, or computer animation.
Contact: facebook.com/SIGGRAPH

Anime
A group dedicated to spreading and sharing the benefits of anime to other people on Campus. They highlight both subbed and dubbed anime based on preference.
Contact: facebook.com/groups/IUPUIsAnimeClub

Concept Art Society
A place where concept artists can come together and learn art in an inspiring environment.
Contact: facebook.com/ConceptArtSociety

Cosplay Club at IUPUI
The IUPUI Cosplay Club is dedicated to the creation and discussion of costumes and prop making. Members can come to work on their projects, meet others with a passion for cosplay, pick up a few tips, or just hang out.
Contact: facebook.com/groups/iupuicosplay/

F.U.N. (Fandom United Network)
A group of people who like different TV shows, movies, or other forms of media discussing topics centered on the symbolism in media and how they reflect upon the modern cultural mindset.
Contact: facebook.com/fandomunitednetworkIUPUI

Game Developer's Group
This group is for dedicated students who want to advance their skills in game development with hands on exposure to the medium.
Meetings are focused on learning, creating, and critique. Contact: facebook.com/GameDevIUPUI

Gamers' Guild at IUPUI
The Gamers Guild at IUPUI is a place where you can kick back, relax, and enjoy some gaming to take a break from your stressful academic life. No fees, no requirements to attend, just fun.
Contact: facebook.com/GGIUPUI

Informatics Student Government (ISG)
Informatics Student Government (ISG) is the governing organization for student clubs and activities within the School of Informatics and Computing. It is comprised entirely of students.

Contact: www.iupui.edu/~isg/

MacGuffin Media (MacMedia)
MacGuffin Media (MacMedia) is an IUPUI student organization dedicated to providing any and all students with the opportunity to become involved in the various aspects of media, including (but not limited to): Film Production, Audio, 3D, Scriptwriting, etc.

Mobile App Developers at IUPUI (MAD)
The Mobile App Developers organization at IUPUI's primary purpose is to facilitate and promote a community of mobile application developers at IUPUI. Members will gain hands on experience working in the app development pipeline. Facets of development include programming, design, asset creation, and quality assurance testing. No experience is required to join.
Contact: Michael Auer miauer@iupui.edu

Ohmniscient Audio Collective
The Ohmniscient Audio Collective is an audio-based organization that focuses on enhancing and expanding their technical prowess in regards to anything audio related.
Contact: facebook.com/ohmniscientaudiocollective

STARS (Students & Technology in Academia, Research, and Services) The mission of the STARS Alliance is to increase the participation of women, under-represented minorities and people with disabilities in computing disciplines through multi-faceted interventions Contact: facebook.com/groups/IUPUIStars/ Vicki Daugherty vdaugher@iupui.edu

Women in Technology (WiT)
Women in Technology (WiT) is dedicated to improving community by empowering women from all disciplines to utilize technology to make a difference.
Contact: www.iupui.edu/~getwitit

VIII. FINDINGS FROM THE "REPORT OF ACADEMIC PROGRAM REVIEW - SCHOOL OF INFORMATICS AND COMPUTING, IUPUI APRIL 2016"

The School of Informatics and Computing Media Arts and Science Graduate Program went through an Academic Program Review in April 2016. Findings from the Review have been listed below. A few points to note are "The Media Arts program is a particularly current, unique, popular, and successful program in the School" (p. 4).

- "There is potential for research growth in media arts, if a senior tenured faculty member with significant research profile can be brought in to develop scholarship and graduate-level research programs in that area" (p. 1).
- "An increased emphasis on faculty hires at senior levels, including visionary departmental leadership, is needed to ensure that research in the School is shaped

strategically, and to ensure that junior faculty are appropriately mentored for the research expectations in place" (p. 1).

- "There is opportunity to balance the mix of undergraduate and graduate programs, with careful planning for graduate programs, which require tenure-track faculty. The current imbalance in faculty complement in favor of lecturers urgently requires correction" (p. 1).
- "Many lecturers are using innovative methods and technologies in their classrooms, which could be leveraged to contribute to the scholarship of teaching and learning" (p. 2).
- "Greater investment in online education delivery will also be needed as online courses and programs are expanded" (p. 2).
- "Continued annual investment in the Media Arts area will result in continued growth and revenue generation for the School" (p. 2).
- "Multiple faculty appointments, many at senior levels, are needed to bring the School's capacity to critical mass to support teaching, achieve research targets, and to facilitate faculty governance. Currently faculty governance responsibilities are unevenly distributed across the School. The School currently relies on significant numbers of lecturers and adjunct faculty, in violation of the standard campus expectations. This imbalance also compromises the research capacity of the School. The School should consider using cluster hiring" (p. 4).
- "The media arts area could grow to a new level by recruiting a leader with a national research profile. The connection of the media arts program with Human Computer Interaction has potential that is currently underutilized" (p. 5).
- "The faculty workload assignments should consider class sizes and availability of grading assistance" (p. 5).
- "Media Arts students should be offered a basic course in entrepreneurship to develop their business skills, such as understanding of business law and regulations, and accounting. Graduates of this program, and most others, are likely to work as contractors at some point in their careers, and require preparation for that challenge" (p. 5).

News about Media Arts and Science faculty, alumni, and students

April 25, 2017
Senior Cade Jacobs named top undergraduate researcher

January 23, 2017
Mannheimer receives grant for India collaboration with schools for the blind

October 16, 2016
Professor's film to be screened at Heartland Film Festival

September 30, 2016
$237K Navy grant funds 3-D simulation research

September 27, 2016
Professor's YouTube course is a game changer

September 16, 2016
Students digitally document cultural treasures in Paros, Greece

April 13, 2016
Top 10 student's virtual world helps kids with aggression disorders

February 29, 2016
High school educators learn new technologies at Teacher Summit

February 16, 2016
How digital 3-D sculpting is changing the face of prosthetics

February 2, 2016
Award-winning student creating game for kids with diabetes

November 3, 2015
Visual Show "Monsters" Features Media Arts and Science Student Work

October 6, 2015
Students Study Abroad in Paros, Greece – combining service learning, coursework and real-world experience

June 30, 2015
Production class wraps up Return of Aetheria game at PoPCon 2015

June 23, 2015
N485 class presents third installment of Return of Aetheria game series at Indy PopCon 2015

June 22, 2015
Building a Bridge with 3D Printing

May 5, 2015
2015 Spring Capstone Event Features People's Choice Awards

April 27, 2015
Students and faculty team up with IMA to bring exhibit to life

April 6, 2015
Media Arts & Science Students and Faculty Go Behind the Scenes of Pixar During Trip to San Francisco

March 31, 2015
Media Arts and Science Faculty Receives New Frontiers Grant for AMPATH Project

December 16, 2014
Team develops app that offers better way to present patients with information in a global health care setting

December 8, 2014
Media Arts and Science faculty member explores storytelling in e-book

October 14, 2014
Media Arts and Science Student Creates "Shake It Off" Video for Fun and a Cause

October 10, 2014
Alumni Film Accepted Into Heartland Film Festival

August 13, 2014
Collaboration Leads to Cover Feature of Industry Publication

References

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