



# MARKET ANALYSIS – PHD IN DIGITAL CULTURE AND COMMUNICATION

Prepared for University of North Carolina at  
Charlotte

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In the following report, Hanover Research presents a market analysis assessing the viability of a PhD in Digital Culture and Communication at the University of North Carolina at Charlotte. This interdisciplinary program would be a collaboration involving numerous academic programs and departments, and would prepare students for academic and nonacademic careers. In addition to evaluating demand for the proposed program, this report also studies the competitive landscape it is likely to face and profiles selected peer programs in depth.

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# PROJECT OVERVIEW

## INTRODUCTION

The University of North Carolina at Charlotte (UNC Charlotte) is considering offering a PhD in Digital Culture and Communication. The University has asked Hanover Research (Hanover) to investigate the likely student and employer demand for the program and provide additional information about likely competitors and program design considerations.

**The proposed program would offer an interdisciplinary array of courses and empower students to customize their program of study to meet their needs and interests.** It would draw from existing faculty expertise in the areas of communications, English, linguistics, technical communication, computing, informatics, and the University Writing Program. The degree program will recruit nationally and target students with Master’s degrees in English, computer science, linguistics, composition/rhetoric, communication studies, and related fields. Admitted students would be expected to possess entry-level computing and programming knowledge, and graduates would be well-positioned to compete for academic employment or research and design roles with corporate and government communications entities. This report addresses three key research questions, listed below, regarding program structure and marketability.

- ✓ What is the anticipated student demand for a PhD in Digital Culture and Communication?
- ✓ What is the current projected demand for program graduates among academic and non-academic employers?
- ✓ To what extent do existing PhD programs in Digital Communication fields embrace the proposed program’s interdisciplinary approach, and how are they structured and resourced?

## REPORT STRUCTURE

The report is divided into four sections, each of which contains two or more subsections and addresses different facets of the research questions stated above.

- **Section I: Competitive Landscape and CIP Code Selection** identifies and profiles preeminent national and international programs resembling the proposed Digital Culture and Communication program. It provides examples of existing programs that overlap with the proposed program’s anticipated Communications and Computer Science specializations, or “tracks.” The profiles outline the program goals and provide information about their key areas of emphasis, target student populations, and graduate career prospects. This section provides insight into how universities classify related degree programs using the National Center for Education Statistics (NCES) Classification of Instructional Program (CIP) codes.

- **Section II: Student Demand Analysis and Program Profiles** uses the most recent five years' worth of federal degree completions data compiled by the NCES to assess trends in student demand for doctoral programs in Digital Culture and Communication.
- **Section III: Employment Demand Analysis** uses federal Bureau of Labor Statistics and North Carolina Department of Commerce data and occupational employment projections, as well as relevant news, industry, and academic publications, to estimate workforce demand for the proposed program. It also provides an analysis of recent academic and nonacademic job postings that are potentially relevant to Communications or Computer Science Track Digital Culture and Communication graduates.
- **Section IV: Selected Peer and Competitor Profiles** examines the student populations, objectives, configurations, and curricula of selected programs identified in the Section I environmental scan. The profiled institutions were selected to highlight the variety of program options available, and the range of potential competitors the proposed program is likely to face.

## KEY FINDINGS

- **US and UK universities offer a variety of interdisciplinary research-based doctoral programs and center-based concentrations in fields relating to Digital Culture and Communication, and classify their programs in a variety of ways.** The proposed program overlaps with freestanding PhD programs in communications, information studies, and computer science fields such as the PhD in Modern Culture and Media at Brown University and the Human-Computer Interaction (HCI) program at Carnegie Mellon University. Additionally, several universities including Stanford University, Pennsylvania State University, and University of Maryland operate HCI or Information Sciences centers that allow PhD students from traditional fields (e.g. computer science, communication) to pursue interdisciplinary concentrations in Digital Culture and Communication fields.
- **NCES degree conferrals data suggest that national demand for Digital Culture and Communication doctoral programs is rising faster than demand for doctoral-level education as a whole, and that the computer science track is growing more quickly than the larger communications subfield.** Within the southeastern United States, demand for degrees in both tracks is increasing more quickly than demand for doctoral degrees in all fields. Degree completions in relevant fields have been more variable among the four institutions within 150 miles of UNC Charlotte that offer doctoral education in relevant fields. However, the overall trend among local competitors indicates rising demand.

- **Digital Culture and Communication PhD graduates with expertise in humanities and computer science fields should experience strong employment demand through the early to mid-2020s, with the best opportunities reserved for computer science graduates.** Nationwide, in North Carolina, and in the North Carolina Southwest Region Prosperity Zone,<sup>1</sup> the group of occupations related to the proposed degree program are projected to grow more quickly than the workforce as a whole. Opportunities in North Carolina and in the Southwest Region Prosperity Zone are expected to be particularly strong. Hanover’s analysis of the Media and Communications Workers and Computer and Mathematical Occupations occupational clusters indicates that growth in computer and technology careers will outpace growth in media and communications fields across all three geographies.
- **While employment prospects for graduates are likely to be good overall, many nonacademic positions prioritize relevant experience over advanced academic credentials, and program alumni are likely to compete with graduates from traditional fields.** None of the BLS occupations tracked in Hanover’s analysis, including postsecondary faculty, require a PhD of more than 50 percent of their workers. In many relevant fields, less than one in ten workers holds a PhD. Program graduates seeking academic or private sector employment would likely have to compete against graduates from traditional disciplines like Communication, English, or Computer Science. In such cases, the competitive advantage conferred by a PhD—as opposed to a bachelor’s or master’s degree—is not always clear.
- **Academic employment prospects in communications- and computer science-related fields have been improving.** Data from the National Communication Association suggest that demand for communication PhDs in academia has more than doubled since 2009, and the number of position advertisements has surpassed the number of degrees conferred since 2012. Data from the Computing Research Association suggests that the average number of teaching and research faculty within computer sciences departments across the United States increased from 40.7 to 44.3 between 2006 and 2017, and is projected to increase by 14.6 percent within two years.
- **The proposed program is likely to compete against a variety of freestanding PhD programs in humanities and computing fields, as well as interdisciplinary center-based offerings where students are affiliated with traditional PhD programs and academic departments.** This range of competitors reflects the interdisciplinary nature of the Digital Culture and Communication field, as well as its vibrancy. As shown in the profiles, the most common methods of organizing this type of program include affiliating it with a communications/media department or computer science/informatics department, or making the field a concentration attached to an interdisciplinary center and available to a wide range of students as a “minor” field. Regardless of configuration, competitor programs often offer funding packages—usually in the form of graduate assistantships—to their students.

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<sup>1</sup> Comprised of Anson, Cabarrus, Cleveland, Gaston, Iredell, Lincoln, Mecklenburg, Rowan, Stanly, and Union Counties.

## SECTION I: COMPETITIVE LANDSCAPE AND CIP CODE SELECTION

This section provides a general overview of the types of programs against which the proposed Digital Culture and Communication PhD is likely to compete, as well as the ways in which those programs' host institutions classify them relative to related disciplines. This section aims to demonstrate the different ways in which competing programs are organized and marketed, and to study the ways in which peer programs report their degree conferrals to the National Center for Education Statistics (NCES). The NCES Integrated Postsecondary Education Data System (IPEDS) uses a taxonomic system of codes known as Classification of Instructional Program (CIP) codes to track degrees conferred by detailed program type, and its data will be the basis of the student demand analysis in Section II. **In general, the discussion of programs in this section highlights the wide range of NCES reporting practices, as well as the variety of freestanding and center-based interdisciplinary programs that could potentially compete against the proposed program.**

Because the proposed program is intended to be highly interdisciplinary, the task of isolating appropriate CIP codes for analysis is complex, and illustrates the range of different ways institutions define these programs. With this complexity in mind, Hanover has conducted an extensive analysis of similar programs and their likely CIP code usage as of the 2015 IPEDS data year. This section identifies and summarizes the attributes of prominent national competitor programs and provides an overview of their likely CIP code usage and degree completions reporting practices. The CIP codes identified herein will inform the completions trends analysis in Section II. Meanwhile, the overview of programs immediately below provides insight into the diversity of related degree offerings.

Identifying appropriate programs for inclusion and determining relevant CIP codes for the proposed degree program is particularly complicated in light of the fact that UNC Charlotte has stated that the PhD will have two concentrations: a communications track and a more technical computer science track. No single CIP code clearly represents academic programs that emphasize both disciplines in equal measure. As such, Hanover has opted to study aggregated completions in two tracks of CIP codes related to the proposed program. These include a Communications Track cluster and a Computer Science Track cluster.

### COMMUNICATIONS TRACK POTENTIAL PEER PROGRAMS AND CIP CODES

In order to identify the most relevant Communications Track cluster codes, Hanover analyzed the IPEDS reporting practices of universities that offer similar programs. To this end, we conducted a search for programs using "Digital Culture and Communication PhD" as the operative term. We then evaluated each program identified through the search to ensure that it overlaps significantly with the proposed program at UNC Charlotte and also included potential competitors identified by UNC Charlotte. Finally, we examined each university's doctoral degree IPEDS reporting practices and sought to pinpoint the most likely CIP code for reporting completions in the program. The list of peer programs is provided in Figure 1.1.

**Figure 1.1: Overview of Potential Communications Competitor Programs and their Likely CIP Codes**

INSTITUTION	PROGRAM TITLE	DESCRIPTION	MOST LIKELY CIP CODE	2015 CONFERRALS
American University	PhD in Communication	This program “offers an interdisciplinary course of study solidly rooted in contemporary communications knowledge, theory, research methods, and principles, while drawing from the diverse intellectual resources across the graduate curricula at American University.” It includes courses in the humanities and social sciences, and requires students to design “an individualized program of electives.” <sup>2</sup>	Mass Communication/ Media Studies	2
Brown University	PhD in Modern Culture and Media	The PhD program is designed to prepare graduates for academic positions and focuses on “the theory, history, and critical analysis of one or more media, in ways that encompass diverse cultural contexts and historical periods.” Students’ plans of study are individualized. <sup>3</sup>	Mass Communication/ Media Studies	2
Clemson University*	PhD in Rhetoric, Communication, and Information Design	Clemson’s program “offers a cross-cultural, transdisciplinary curriculum” with a focus on rhetoric and communication. Graduates “take positions, for the most part, in departments of English and Communication Studies, as well as departments of New Media” at other universities. <sup>4</sup>	Speech Communication and Rhetoric	3
Georgia Institute of Technology*	PhD in Digital Media	The program “provides both the theoretical and the practical foundation for careers as digital media researchers in academia and industry.” It stands at the “convergence of the methodologies of several traditional disciplines” and requires students to complete nine credits in a department outside of the School of Literature, Communication, and Culture, such as Computer Science. <sup>5</sup>	Digital Communication and Media/ Multimedia	4
Howard University	PhD in Communication, Culture, and Media Studies <sup>6</sup>	Designed to train “scholars and academic leaders,” this program emphasizes “interdisciplinary scholarship of communication with a particular emphasis in multicultural and mediated communication.” Its three areas of emphasis include Strategic Communication, Communication Technology and Policy, and Media Studies. <sup>7</sup>	Speech Communication and Rhetoric	12

<sup>2</sup> “More About the PhD in Communication – School of Communication.” American University. <http://www.american.edu/soc/communication-studies/read-more-about-communication-phd.cfm>

<sup>3</sup> “Graduate Program – Modern Culture and Media.” Brown University. <https://www.brown.edu/academics/modern-culture-and-media/graduate-program>

<sup>4</sup> “Welcome – Rhetoric, Communication, and Information Design.” Clemson University. <https://rcid.sites.clemson.edu/>

<sup>5</sup> “PhD in Digital Media – School of Literature, Media, and Communication.” Georgia Institute of Technology. <http://dm.lmc.gatech.edu/program/phd-program/>

<sup>6</sup> This program appears to have recently been consolidated with a Mass Communication and Media Studies program. See: “Graduate Programs.” Howard University. <http://www.gs.howard.edu/graduateprograms.html>

<sup>7</sup> “Graduate Program in Communication, Culture, and Media Studies.” Howard University. <http://www.gs.howard.edu/graduateprograms/communicationcultureAndMediaStudies.html>

INSTITUTION	PROGRAM TITLE	DESCRIPTION	MOST LIKELY CIP CODE	2015 CONFERRALS
New York University	PhD in Media, Culture, and Communication	The program focuses on “five research areas” including: Global and transcultural studies, Technology and society, Visual culture and sound studies, Media institutions and politics, and Critical theories of media and communication. <sup>8</sup>	Communication and Media Studies, Other	10
North Carolina State University*	PhD in Communication, Rhetoric, and Digital Media	This program “prepares...students to analyze the social, cultural, rhetorical, philosophical, and political dimensions of information technologies, new communication media, and digital texts and to actively engage digital media through research, criticism, production, and practice.” Students work with affiliated faculty in other departments. The program places graduates in academia, government, and industry. <sup>9</sup>	Multi-/Interdisciplinary Studies, Other <sup>10</sup>	5
Stanford University	Theory and Research PhD – Journalism, Media, and Culture	Stanford’s program “prepares students to conduct original research on communication processes, their origins, and their psychological, political and cultural effects.” The program’s “three areas of special strength” are Media Psychology, Political Communication, and Journalism, Media, and Culture. Its core curriculum includes courses in “quantitative and qualitative methods, statistics, and mass communication theory.” Interdepartmental collaborations are encouraged. <sup>11</sup> This program is affiliated with Stanford’s interdisciplinary Human-Computer Interaction research group, alluded to in Figure 1.4. <sup>12</sup>	Communication and Media Studies, Other	3
University of Illinois at Chicago	PhD in Communication	This doctoral program emphasizes communication and technology, though students develop individualized courses of study. Established interdepartmental concentrations include Electronic Security and Privacy, Gender and Women's Studies, Survey Research Methodology, and Latin American and Latino Studies. <sup>13</sup>	Communication, General	2

Source: Institutional websites

\* Denotes institutions explicitly identified by UNC Charlotte as potential competitors

<sup>8</sup> “Doctor of Philosophy – Department of Media, Culture, and Communication.” New York University. <http://steinhardt.nyu.edu/mcc/doctoral/>

<sup>9</sup> “About CRDM.” North Carolina State University. <https://crdm.chass.ncsu.edu/about/index.php>

<sup>10</sup> The university reported no Communications PhD conferrals in 2015, but does list alumni from prior years. It is possible that the program reports its conferrals using a nonspecific Multi/Interdisciplinary Studies code. See:

[1] “North Carolina State University at Raleigh.” National Center for Education Statistics College Navigator.

<http://nces.ed.gov/collegenavigator/?q=north+carolina+state&s=all&id=199193#programs>

[2] “Alumni – Communication, Rhetoric, and Digital Media.” North Carolina State University.

<https://crdm.chass.ncsu.edu/people/students/?group=alumni>

<sup>11</sup> “Theory and Research PhD – Department of Communication.” Stanford University.

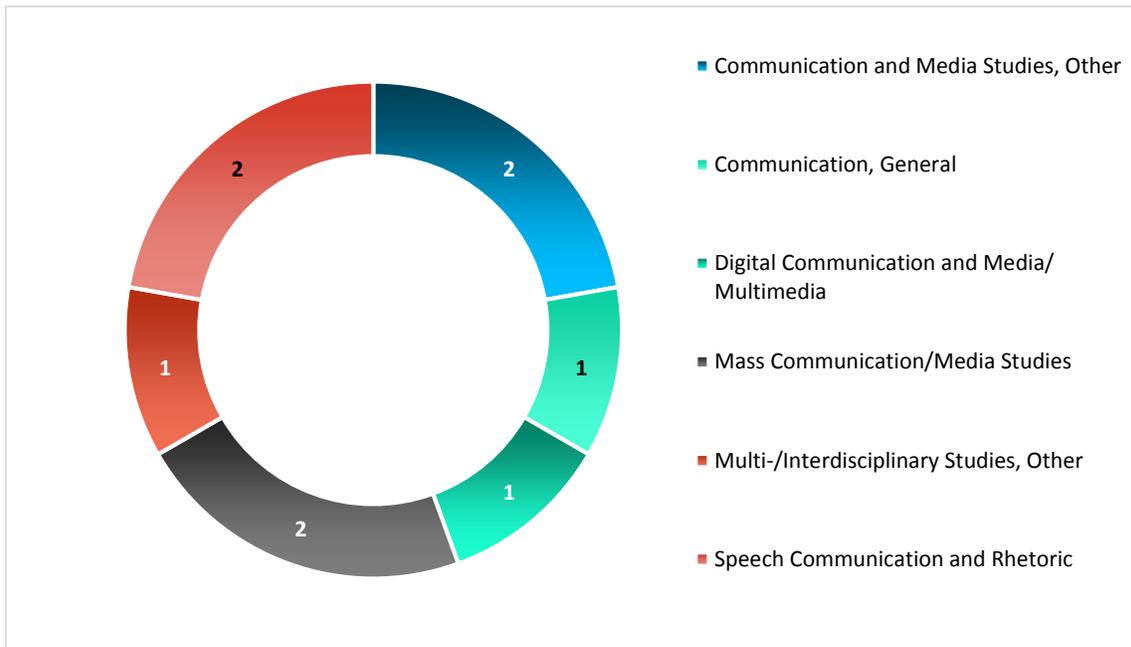
<https://comm.stanford.edu/phd/>

<sup>12</sup> “Stanford HCI Group.” Stanford University. <https://hci.stanford.edu/>

<sup>13</sup> “Program Descriptions – Graduate, Department of Communication.” University of Illinois at Chicago.

<https://comm.uic.edu/comm/graduate>

**Figure 1.2: CIP Codes Most Likely Used by Communications Competitor Programs in 2015**



Source: Hanover cross-reference of institutional program offerings and 2015 CIP code usage

Figure 1.2 above analyzes the CIP codes that each of the institutions in Figure 1.1 most likely used to report Digital Culture and Communication-related doctoral completions for the 2015 IPEDS data year. As indicated, **no single CIP code appears to be substantially more prevalent than other, related codes.** Since institutions report their completions independently, there is no way to verify that these codes and the completions reported under them represent the programs in question. Nevertheless, Hanover’s analysis of each institution’s doctoral programs and doctoral-level completions data for 2015 indicates that there are few likely alternatives to the degree program-CIP code pairings shown above.

**Based on the peer program CIP code definitions provided by the NCES, Section II will analyze completions trends in the CIP codes listed in Figure 1.3.** The list excludes the “Multi-/Interdisciplinary Studies, Other” CIP code used by North Carolina State University, since that code could also be used to label programs completely unrelated to the Digital Culture and Communication degree. Two additional codes that do not appear to be used by potential peer programs were also added to the list due to the fact that the NCES lists them as related codes for two of the codes that were used by similar programs. These codes are “Rhetoric and Composition” and “Digital Arts.” They are related to the “Speech Communication and Rhetoric” and “Digital Communication and Media/Multimedia” codes, respectively.

**Figure 1.3: CIP Fields for the Communications Track Student Demand Analysis**

CIP CODE	CIP TITLE	DESCRIPTION	EXAMPLE PROGRAM(S)
09.0100	Communication, General	A program that focuses on the comprehensive study of communication, and that spans the study of mass communication/media studies, old and new media technologies, social and political applications, and speech communication and rhetoric. Includes instruction in interpersonal, group, organizational, and intercultural communication; theories of communication; critical thinking, argumentation, and persuasion; written communication; printed, electronic, and digital media; rhetorical tradition and criticism; media, society, and culture; consequences and effects of mass media; media social science and criticism; and quantitative and qualitative methods of inquiry.	<ul style="list-style-type: none"> <li>▪ University of Illinois at Chicago</li> </ul>
09.0101	Speech Communication and Rhetoric	A program that focuses on the scientific, humanistic, and critical study of human communication in a variety of formats, media, and contexts. Includes instruction in the theory and practice of interpersonal, group, organizational, professional, and intercultural communication; speaking and listening; verbal and nonverbal interaction; rhetorical theory and criticism; performance studies; argumentation and persuasion; technologically mediated communication; popular culture; and various contextual applications. Related code: 23.1304 – Rhetoric and Composition	<ul style="list-style-type: none"> <li>▪ Clemson University</li> <li>▪ Howard University</li> </ul>
09.0102	Mass Communication /Media Studies	A program that focuses on the analysis and criticism of media institutions and media texts, how people experience and understand media content, and the roles of media in producing and transforming culture. Includes instruction in communications regulation, law, and policy; media history; media aesthetics, interpretation, and criticism; the social and cultural effects of mass media; cultural studies; the economics of media industries; visual and media literacy; and the psychology and behavioral aspects of media messages, interpretation, and utilization.	<ul style="list-style-type: none"> <li>▪ American University</li> <li>▪ Brown University</li> </ul>
09.0199	Communication and Media Studies, Other	Any instructional program in communication and media studies not listed above.	<ul style="list-style-type: none"> <li>▪ New York University</li> <li>▪ Stanford University</li> </ul>
09.0702	Digital Communication and Media/ Multimedia	A program that focuses on the development, use, critical evaluation, and regulation of new electronic communication technologies using computer applications; and that prepares individuals to function as developers and managers of digital communications media. Includes instruction in computer and telecommunications technologies and processes; design and development of digital communications; marketing and distribution; digital communications regulation, law, and policy; the study of human interaction with, and use of, digital media; and emerging trends and issues. Related code: 50.0102 – Digital Arts	<ul style="list-style-type: none"> <li>▪ Georgia Institute of Technology</li> </ul>

CIP CODE	CIP TITLE	DESCRIPTION	EXAMPLE PROGRAM(S)
23.1304	Rhetoric and Composition	A program that focuses on the humanistic and scientific study of rhetoric, composition, literacy, and language/linguistic theories and their practical and pedagogical applications. Includes instruction in historical and contemporary rhetoric/composition theories; composition and criticism of written, visual, and mixed-media texts; analysis of literacy practices in cultural and cross-cultural contexts; and writing program administration. Related code: 23.1304 – Speech Communication and Rhetoric	<ul style="list-style-type: none"> <li>▪ None</li> </ul>
50.0102*	Digital Arts	A general, undifferentiated program that focuses on the use of computerized digital images as the primary medium of expression in the visual and performing arts, and that may prepare individuals for a wide variety of careers using new media, including graphic design, digital animation, motion graphics, 3D visualization, game and interactive media design, music and sound design, video production, web design, photography, and other fields. Related code: 09.0702 – Digital Communication and Media/Multimedia	<ul style="list-style-type: none"> <li>▪ None</li> </ul>

Source: National Center for Education Statistics<sup>14</sup>

\* Preliminary research indicates that no US institution has conferred a PhD in Digital Arts in the past five data years, so this code is not included in the Section II analysis.

## COMPUTER SCIENCE TRACK POTENTIAL PEER PROGRAMS AND CIP CODES

UNC Charlotte has provided a list of doctoral programs at other institutions that focus on digital communications from a computer science, rather than humanities, perspective. These programs typically report their completions using codes from the Computer and Information Sciences and Support Service (11.xxxx) and Multi/Interdisciplinary Studies (30.xxxx) CIP code families.

In compiling the list of example programs in Figure 1.4, Hanover included the three programs referenced by UNC Charlotte (marked with an asterisk \*) and additional programs identified by the Pennsylvania State University (Penn State) Center for Human-Computer Interaction (HCI) as exemplars of “a national trend toward interdisciplinary degree programs in HCI.”<sup>15</sup> Aside from Penn State, notable programs include offerings by Carnegie Mellon University, Georgia Tech, Stanford University, and the University of Michigan.<sup>16</sup>

<sup>14</sup> “CIP 2010.” National Center for Education Statistics. <http://nces.ed.gov/ipeds/cipcode/default.aspx?y=55>

<sup>15</sup> “Center for Human-Computer Interaction.” Pennsylvania State University. <https://hci.ist.psu.edu/>

<sup>16</sup> Ibid.

**Figure 1.4: Overview of Potential Computer Science Competitor Programs and their Likely CIP Codes**

INSTITUTION	PROGRAM TITLE	DESCRIPTION	MOST LIKELY CIP CODE	2015 CONFERRALS
Carnegie Mellon University*	PhD in Human-Computer Interaction	This small program requires students to select a concentration in one of several subfields. These include social computing, research through design, technical human-computer interaction, learning sciences and learning technologies, and quality of life technology. <sup>17</sup> The program prepares students for academic and industry positions and offers courses “from across the computer sciences, the behavioral sciences, and the field of design.” <sup>18</sup>	Information Science/Studies	0
Georgia Institute of Technology	Human-Centered Computing PhD	This program emphasizes “the interdisciplinary science of designing computational artifacts that better support human endeavors” by uniting HCI, social computing, and cognition, learning, and creativity. <sup>19</sup>	Information Science/Studies	6
Indiana University Bloomington*	PhD in Informatics, Human-Computer Interaction Track	This program recruits students from both technical and liberal arts backgrounds. Students conduct design-focused interdisciplinary research in fields such as interaction design, new media, dynamic visualizations, computer-mediated communication, learning systems, and design pedagogy, among other possibilities. <sup>20</sup>	Information Science/Studies	15
Iowa State University*	PhD in Human-Computer Interaction	Iowa State University’s PhD in Human-Computer Interaction is “an interdisciplinary degree program that prepares students for careers in business and industry as well as academia.” Students take a mix of required Human-Computer Interaction Courses and “electives from a wide variety of disciplines,” mainly in technical fields. <sup>21</sup>	Human Computer Interaction	8
Pennsylvania State University	PhD in Information Sciences and Technology	The College of Information Sciences and Technology offers “multidisciplinary training” as part of its PhD program. It accepts applicants from “diverse academic backgrounds including computer science, behavioral sciences, cognitive and brain sciences, engineering, environmental sciences, information sciences, law, life sciences, health sciences, management, philosophy, physical sciences, policy, mathematics, statistics, social sciences (sociology, economics).” <sup>22</sup>	Information Science/Studies	12

<sup>17</sup> “Emphasis Areas – PhD in Human-Computer Interaction.” Carnegie Mellon University. <https://www.hcii.cmu.edu/academics/phd-hci/emphasis-areas>

<sup>18</sup> “PhD in HCI.” Carnegie Mellon University. <https://www.hcii.cmu.edu/academics/phd-hci>

<sup>19</sup> “Human-Centered Computing Ph.D. Program.” Georgia Institute of Technology. <http://www.cc.gatech.edu/human-centered-computing-phd-program>

<sup>20</sup> “HCI/d PhD Requirements.” Indiana University Bloomington. <https://www.soic.indiana.edu/graduate/degrees/informatics/hcid/phd-requirements.html>

<sup>21</sup> “PhD Program in Human Computer Interaction.” Iowa State University. <http://www.vrac.iastate.edu/hci/degree-programs/phd/>

<sup>22</sup> “PhD Program.” Pennsylvania State University College of Information Sciences and Technology. <https://ist.psu.edu/education/degree/phd>

INSTITUTION	PROGRAM TITLE	DESCRIPTION	MOST LIKELY CIP CODE	2015 CONFERRALS
Stanford University	Stanford HCI Group	This interdisciplinary unit offers a number of Human-Computer Interaction-related degrees including HCI PhD concentrations in the departments of Communication, Linguistics, and Psychology, as well as Computer Science <sup>23</sup> Like the Communications program summarized in Figure 1.1, the Computer Science program is affiliated with the University’s interdisciplinary HCI Group. <sup>24</sup>	Computer Science	31
University of Maryland	PhD in Human-Computer Interaction	This program “is an interdisciplinary research community” in which students “pursue a degree in a particular department, usually computer science, library science, information management, psychology, or education.” Other units within the University, including the Departments of Aerospace Engineering, Maryland Institute for Technology in the Humanities, College of Journalism, Department of American Studies, and Department of Linguistics are also involved with the HCI doctorate. <sup>25</sup>	Various	N/A
University of Michigan	PhD in Information	This program offers a “unique...combination of social and technical approaches to understand fundamental phenomena of the digital age.” Students “explore and seek to understand the major questions that lie at the intersection of people, information, and technology.” <sup>26</sup>	Information Science/Studies	9

Source: Institutional websites

\* Denotes institutions explicitly identified by UNC Charlotte as potential competitors

Figure 1.5 shows the distribution of likely CIP codes from the seven programs summarized in Figure 1.4. As indicated, most, but not all, of these programs use the Information Science/Studies CIP code. Completions in the Stanford University HCI computer science program summarized in Figure 1.4 appear to be reported under the Computer Science CIP code, which is too general to isolate programs with an interdisciplinary communication or HCI focus area.

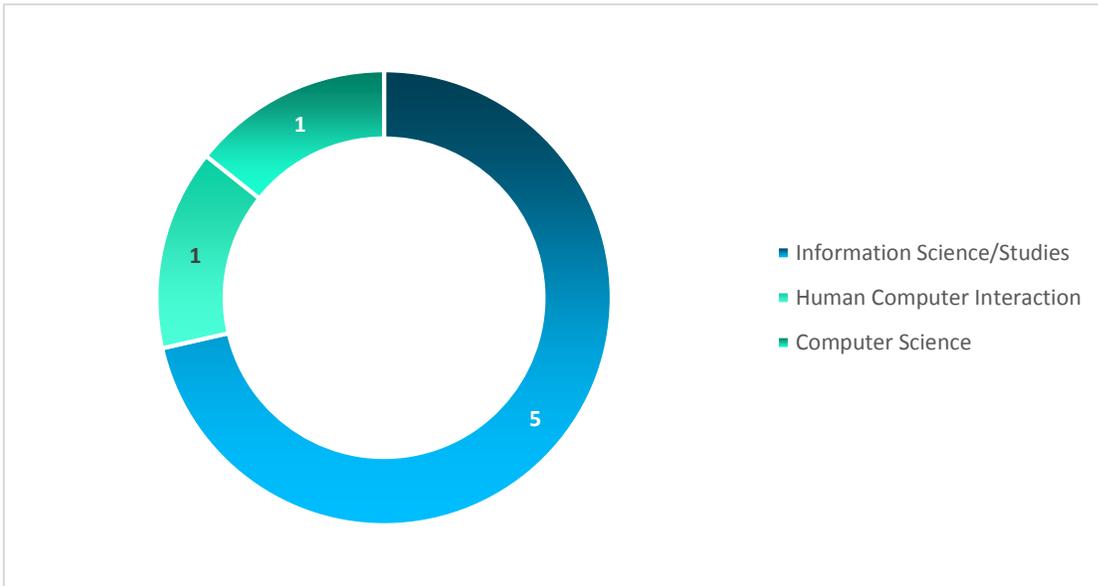
<sup>23</sup> “HCI-Related Degrees at Stanford.” Stanford University HCI Group. <https://hci.stanford.edu/academics/degrees.php>

<sup>24</sup> “Stanford HCI Group.” Stanford University. Op. cit.

<sup>25</sup> “PhD in HCI.” University of Maryland. <http://www.cs.umd.edu/hcil/academics/graduate-studies.shtml>

<sup>26</sup> “PhD in Information – Why Choose Our Program?” University of Michigan. <https://www.si.umich.edu/academics/phd/what-makes-our-doctoral-program-different>

**Figure 1.5: CIP Codes Most Likely Used by Computer Science Competitor Programs in 2015**



Source: Hanover cross-reference of institutional program offerings and 2015 CIP code usage

Figure 1.6 defines the CIP codes that comprise the Computer Science Track cluster of codes throughout this analysis. **While the CIP codes identified in this analysis are the best available matches for the proposed interdisciplinary program’s Computer Science Track, the match is not exact.** Some programs reporting completions under these codes are unlikely to be direct competitors. For instance, Nova Southeastern University reported 24 doctoral completions in 11.0401 Information Science/Studies. However, the University offers PhD programs in computer science, information assurance, and information systems, all of which appear to be predominately technical in nature and unlikely to emphasize communications in the same way as the proposed program.<sup>27</sup>

**In some cases, it is impossible to isolate completions numbers for relevant programs, especially when these programs are administered by interdisciplinary centers that pool the resources of multiple academic departments.** The computer science HCI program at Stanford University is one example, since it appears that computer science students affiliated with the HCI Group are classified under the Stanford Computer Science Department, which uses the undifferentiated 11.0701 Computer Science CIP code. Similarly, the HCI program at University of Maryland involves a number of academic departments across the university, and degree completions appear to be reported at least in part under participating departments, rather than by the program itself.<sup>28</sup> Another example is the Center for Human-Computer Interaction at Pennsylvania State University. The Center is “an interdisciplinary organizational unit for human-computer interaction research, instruction, and outreach” that “seeks to leverage and

<sup>27</sup> See: “NSU Doctoral Program Highlights.” Nova Southeastern University. <http://www.nova.edu/graduate/doctoral.html>

<sup>28</sup> For an overview of recent dissertations, which shows the interdisciplinary nature of the program, see: “PhD Alumni.” University of Maryland Human-Computer Interaction Lab. <http://www.cs.umd.edu/hcil/members/phd-alumni.shtml>

integrate diverse HCI activities throughout the university to facilitate interdisciplinary faculty interaction relating to HCI issues, problems, and opportunities.” It “works with interested departments and colleges to coordinate interdisciplinary Masters and Ph.D. programs in areas incorporating human-computer interaction.”<sup>29</sup>

**Figure 1.6: Proposed CIP Fields for the Computer Science Track Student Demand Analysis**

CIP CODE	CIP TITLE	DESCRIPTION	EXAMPLE PROGRAM(S)
11.0401	Information Science/ Studies	A program that focuses on the theory, organization, and process of information collection, transmission, and utilization in traditional and electronic forms. Includes instruction in information classification and organization; information storage and processing; transmission, transfer, and signaling; communications and networking; systems planning and design; human interfacing and use analysis; database development; information policy analysis; and related aspects of hardware, software, economics, social factors, and capacity. Related Codes: 25.0101 – Library Science/Librarianship, 52.1201 – Management Information Systems, General	<ul style="list-style-type: none"> <li>▪ Carnegie Mellon University</li> <li>▪ Georgia Institute of Technology</li> <li>▪ Indiana University Bloomington</li> <li>▪ Pennsylvania State University</li> <li>▪ University of Michigan</li> </ul>
30.3101	Human Computer Interaction	An interdisciplinary program that focuses on the study of the interaction between people and technology and how that technology impacts society, and combines disciplines within the fields of computing and information science (information systems, software engineering, artificial intelligence and design) and the behavior sciences (cognitive science, cognitive psychology, sociology, organizational psychology, and social psychology). Includes instruction in information technology, cognitive and behavioral sciences, and systems design.	<ul style="list-style-type: none"> <li>▪ Iowa State University</li> </ul>

Source: Source: National Center for Education Statistics<sup>30</sup>

## SELECTED INTERNATIONAL COMPETITOR PROGRAMS

UNC Charlotte has also asked Hanover for information about the international marketplace for similar degree programs, and has expressed interest in three programs offered by United Kingdom (UK) institutions. One of these programs—a Research PhD in Human-Computer Interaction at the University of Nottingham—does not appear to exist. The University offers an MSC in the field,<sup>31</sup> but its Computer Science program does not offer a PhD in Human-Computer Interaction.<sup>32</sup> The remaining two programs, their major attributes and areas of focus, and enrollment estimates are outlined below. **In general, these PhD programs offer**

<sup>29</sup> “Center for Human-Computer Interaction.” Pennsylvania State University. Op. cit.

<sup>30</sup> “CIP 2010.” National Center for Education Statistics. Op. cit.

<sup>31</sup> “Human Computer Interaction MSC.” University of Nottingham.

<https://www.nottingham.ac.uk/pgstudy/courses/computer-science/human-computer-interaction-msc.aspx>

<sup>32</sup> “Research in Computer Science.” University of Nottingham.

<http://www.nottingham.ac.uk/pgstudy/courses/computer-science/research-in-computer-science.aspx>

**an interdisciplinary approach similar to US institutions, and tend to prepare their graduates for positions in private industry.**

**Figure 1.7: Overview of Selected United Kingdom Communications Competitor Programs**

INSTITUTION	PROGRAM TITLE	DESCRIPTION	ENROLLMENT ESTIMATE	GRADUATE EMPLOYMENT FIELDS
Newcastle University	PhD in Computer Science Integrated, Open Lab	Formerly called the Digital Interaction Group, Open Lab is an interaction design and ubiquitous computing research program with 80 participating researchers. Open Lab “focuses on the experience-centred design of digital technology and applied challenges in ubiquitous computing.” It enlists faculty and researchers from computer science, psychology, engineering, social sciences, design, and fine arts fields. <sup>33</sup>	Open Lab is currently recruiting PhD students and offers funding for an entering cohort of 20 students as of 2017. <sup>34</sup>	Not specified
University College London	Interaction Centre PhD	The UCL Interaction Centre (UCLIC) is “a world leading Centre of Excellence in Human-Computer Interaction teaching and research, studying interactions between people and technology, drawing on the best scientific traditions in Computer Science and Human Sciences, and working collaboratively with the research community and industry.” Areas of research include ubiquitous computing, pervasive healthcare, behavioral change, task performance, adaptive interfaces, design practices, affect and emotion, and new interaction techniques. <sup>35</sup> The UCLIC PhD program allows students to register with the departments of Psychology and Language Studies or Computer Science. <sup>36</sup>	The UCLIC boasts 40 interdisciplinary researchers including 9 faculty, 11 postdoctoral researchers, and 21 PhD students. <sup>37</sup>	Graduates often work in usability consultancy, industry design groups, and user experience research within private industry. <sup>38</sup>

Source: Institutional and program websites cited above.

<sup>33</sup> “Open Lab.” Newcastle University. <https://openlab.ncl.ac.uk/>

<sup>34</sup> “Open Lab – PhD Inquiry Form.” Newcastle University. <https://openlab.ncl.ac.uk/phd-enquiry-form/>

<sup>35</sup> “About Us – UCL Interaction Centre.” University College London. <https://ucl.ac.uk/about>

<sup>36</sup> “Study – UCL Interaction Centre.” University College London. <https://ucl.ac.uk/study>

<sup>37</sup> “About Us. – UCL Interaction Centre.” University College London. Op. cit.

<sup>38</sup> “Graduate Destinations – UCL Interaction Centre.” University College London. <https://ucl.ac.uk/study/prospective-taught-courses/graduate-destinations>

## SECTION II: STUDENT DEMAND ANALYSIS

This section analyzes the past five years’ worth of National Center for Education Statistics (NCES) degree completions data to estimate recent demand for degree programs that resemble UNC Charlotte’s proposed doctoral degree Digital Culture and Communication. As noted in Section I, the NCES uses a taxonomic system of numeric codes called the Classification of Instructional Programs (CIP) to classify postsecondary academic programs. Institutions of higher education nationwide submit degree completions data, organized by CIP code, to the NCES’ Integrated Postsecondary Education Data System (IPEDS) for aggregation into the database. Currently, IPEDS houses degree conferral information from more than 7,650 institutions.

### STUDENT DEMAND ANALYSIS METHODOLOGY

While the CIP code selection process is outlined in Section I, there are several additional methodological considerations relating to the NCES completions data. These considerations are outlined below.

### CIP CODES, PROGRAM TRACKS, AND CALCULATED VALUES

As noted in Section I, Hanover’s analysis of student demand is segmented to correspond to the two proposed subfields to be offered as part of the Digital Culture and Communication degree. These proposed tracks emphasize communications and computer science. The CIP codes and titles that represent both of these clusters are listed in Figure 2.1. The two subsections to follow illustrate how these codes were selected and provide an initial look at potential peer and competitor programs in the United States.

**Figure 2.1: Digital Culture and Communication CIP Code Clusters**

COMMUNICATIONS TRACK CIP CODES	COMPUTER SCIENCE TRACK CIP CODES
<ul style="list-style-type: none"> <li>▪ 09.0100, Communication, General</li> <li>▪ 09.0101, Speech Communication and Rhetoric</li> <li>▪ 09.0102, Mass Communication/Media Studies</li> <li>▪ 09.0199, Communication and Media Studies, Other</li> <li>▪ 09.0702, Digital Communication and Media/Multimedia</li> <li>▪ 23.1304, Rhetoric and Composition</li> </ul>	<ul style="list-style-type: none"> <li>▪ 11.0401, Information Science/Studies</li> <li>▪ 30.3101, Human Computer Interaction</li> </ul>

In addition to raw conferrals data—reported as total degree completions through first or second majors—IPEDS completions can be used to calculate other metrics that facilitate a deeper understanding of five-year conferral trends. These include:

- **CAGR**, or Compound Annual Growth Rate, reflects the percentage growth that would occur each year if the same rate of change occurred each year between 2011 and 2015. Thus, it gives an impression of a theoretical, steady growth rate.

- **AAC**, or Annual Average Change, is the average number by which completions rose or fell from year to year. This figure approximates the raw numerical growth (or decline) in the number of graduates over the course of the past five years.
- **STDEV**, or Standard Deviation of Annual Average Change, tracks the overall variability of annual growth. Larger values in this category, especially compared to the total number of degree conferrals, indicate that year-to-year growth or decline is highly variable. Substantial variability in the number of degree conferrals could indicate rapid growth or decline, or that enrollment has been unpredictable from year to year.

Although IPEDS provides the most comprehensive degree conferrals data available, there are some considerations and limitations that should be taken into account when interpreting these data. They include:

- Institutions classify their programs and report their completions data independently. Two institutions offering very similar programs could classify those programs and report degree conferrals under different CIP codes. Conversely, institutions could classify dissimilar programs under the same CIP code. Institutions may also alter how they report CIP codes when classifying a program from one year to the next, such that changes in completions data may not be entirely representative of new or stagnating degree programs.
- It cannot always be assumed that IPEDS completions data for a given CIP code have a one-to-one correspondence with a specific degree program.
- The NCES will not be able to account for new programs (i.e., opened within the past four years, and not previously reporting completions data under CIP 2010 codes). These programs could have admitted students but not yet graduated them. Similarly, IPEDS may include completions data from programs that reported completions during the 2014-15 academic year but have since closed.

## GEOGRAPHIC SEGMENTATIONS

Because UNC Charlotte is seeking to attract students nationwide, but may face more pronounced competition from local and regional institutions, this analysis employs the following geographic segmentations when examining completions trends:

- **A Nationwide** segmentation tracks relevant completions across all institutions in the IPEDS universe.
- **An IPEDS Southeast Region** subgroup tracks completions in relevant CIP codes in the IPEDS Southeast region, which includes Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia.<sup>39</sup>

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<sup>39</sup> Ginder, Scott, et al. "2014-15 Integrated Postsecondary Education Data System (IPEDS) Methodology Report." National Center for Education Statistics. July 2015. p. 4. <http://nces.ed.gov/pubs2015/2015098.pdf>

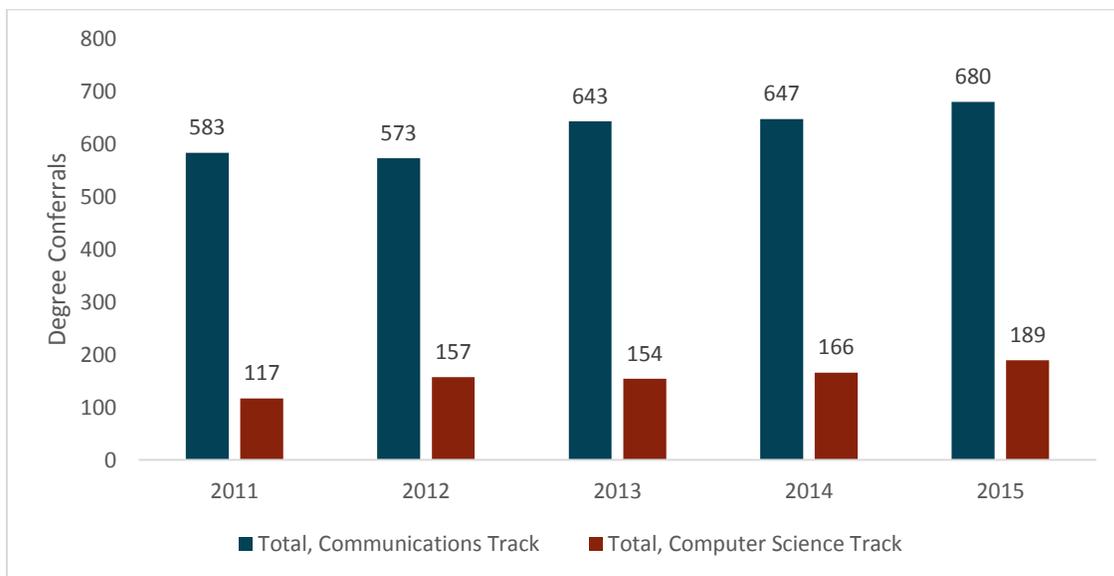
- **A Local Competitor Group** includes institutions located within 150 miles of UNC Charlotte (ZIP code 28223) that reported conferring doctoral degrees in any of the relevant CIP codes in the past five IPEDS data years.<sup>40</sup>

## NATIONAL DEMAND

National conferrals trends among Digital Culture and Communication-related PhD programs have been positive, with steady increases in both the Communications and Computer Science Tracks (Figure 2.2). The Computer Science track is smaller, but its five-year average annual growth rate (12.7 percent) is substantially higher than the 3.9 percent CAGR among communications programs, which mirrors the national average CAGR of 3.5 percent across all research-based PhD programs. Individual CIP codes in each field are listed in order of size, as determined by the total number of degrees conferred between 2011 and 2015 (Figure 2.3).

As shown in Figure 2.3, the CIP codes under which the largest numbers of graduates have been recorded are Speech Communication and Rhetoric, Information Science/Studies, and Mass Communication/Media Studies. While growth in the Human Computer Interaction code has been very strong (CAGR 25.7 percent), the raw numbers of completions are low and highly variable. Moreover, only one university nationwide (Iowa State University) has used this code to report research doctoral completions in the past five years.

**Figure 2.2: Summary of National Completions by Track, 2011-2015**



Source: IPEDS

<sup>40</sup> Distances are based on the NCES College Navigator Tool. See: “College Navigator.” National Center for Education Statistics. <http://nces.ed.gov/collegenavigator/default.aspx>

**Figure 2.3: Detailed National Completions Trends by Track, 2011-2015**

CIP CODE	2011	2012	2013	2014	2015	CAGR	AAC	STDEV
Speech Communication and Rhetoric	267	241	258	244	267	0.0%	0	21
Mass Communication/Media Studies	126	116	130	141	160	6.2%	9	11
Rhetoric and Composition	93	91	115	116	103	2.6%	3	13
Communication, General	33	70	66	60	70	20.7%	9	17
Communication and Media Studies, Other	44	44	47	59	52	4.3%	2	7
Digital Communication and Media/Multimedia	20	11	27	27	28	8.8%	2	9
<b>Total, Communications Track</b>	<b>583</b>	<b>573</b>	<b>643</b>	<b>647</b>	<b>680</b>	<b>3.9%</b>	<b>24</b>	<b>31</b>
Information Science/Studies	113	148	149	159	179	12.2%	17	13
Human Computer Interaction	4	9	5	7	10	25.7%	2	3
<b>Total, Computer Science Track</b>	<b>117</b>	<b>157</b>	<b>154</b>	<b>166</b>	<b>189</b>	<b>12.7%</b>	<b>18</b>	<b>16</b>
<b>Grand Total, Both Tracks</b>	<b>700</b>	<b>730</b>	<b>797</b>	<b>813</b>	<b>869</b>	<b>5.6%</b>	<b>42</b>	<b>20</b>
<b>All Research Doctoral Degrees</b>	<b>60,151</b>	<b>62,657</b>	<b>65,496</b>	<b>67,944</b>	<b>69,008</b>	<b>3.5%</b>	<b>2,214</b>	<b>681</b>

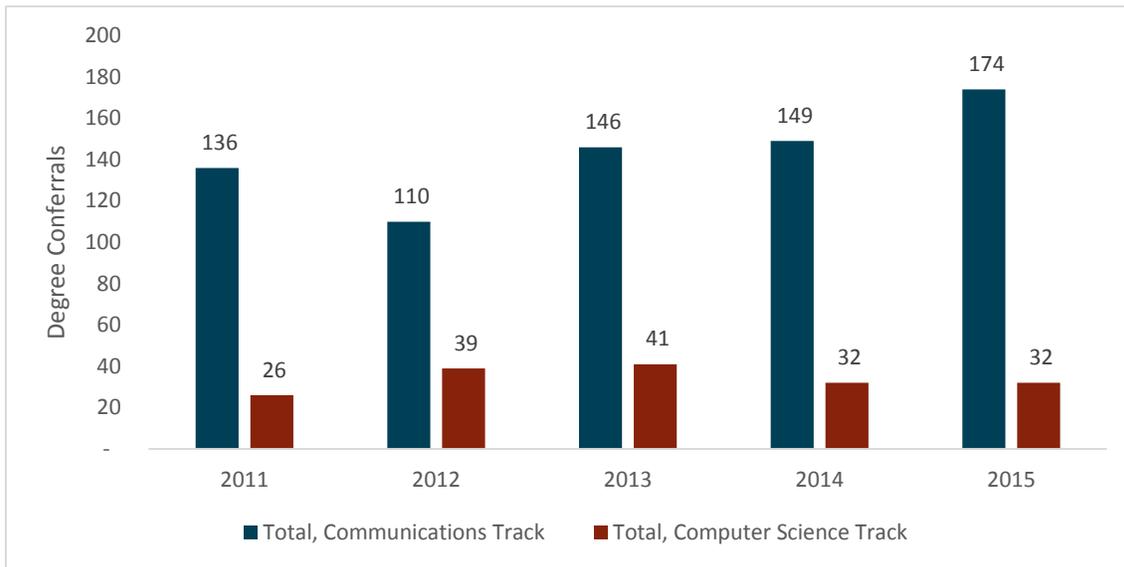
Source: IPEDS

### SOUTHEAST REGIONAL DEMAND

At the regional level, the number of Communications Track conferrals has risen more quickly than it has nationwide, while growth in the number of Computer Science Track doctorates has lagged behind the national average (see Figure 2.4). Among institutions in the IPEDS Southeast Region, the Communications Track doctoral conferrals CAGR is 6.4 percent, meaning doctoral conferrals in the field have increased more quickly in the region than they have nationwide (CAGR 3.9 percent). The opposite is true for the Computer Science Track codes, which have a CAGR of 5.3 percent and have therefore grown less than half as quickly as national doctoral conferrals in the subfield (CAGR 12.7).

Mass Communication/Media Studies, Speech Communication and Rhetoric, and Information Science/Studies have been the first, second, and third largest fields for Digital Culture and Communication doctoral completions. The overall number of doctoral degrees conferred in the Southeast Region has risen at the same rate as doctoral degree completions nationwide (CAGR 3.5 percent). **As at the national level, conferrals growth in Digital Culture and Communication-related CIP codes (in both tracks) has been more robust than for doctoral degrees as a whole (CAGR 6.2 percent).**

**Figure 2.4: Summary of Regional Completions by Track, 2011-2015**



Source: IPEDS

**Figure 2.5: Detailed Regional Completions Trends by Track, 2011-2015**

CIP CODE	2011	2012	2013	2014	2015	CAGR	AAC	STDEV
Mass Communication/Media Studies	60	52	65	60	66	2.4%	2	8
Speech Communication and Rhetoric	52	36	49	52	69	7.3%	4	13
Rhetoric and Composition	14	12	20	17	23	13.2%	2	5
Communication and Media Studies, Other	6	10	7	19	12	18.9%	2	7
Digital Communication and Media/Multimedia	4	--	5	1	4	--	--	--
<b>Total, Communications Track</b>	<b>136</b>	<b>110</b>	<b>146</b>	<b>149</b>	<b>174</b>	<b>6.4%</b>	<b>10</b>	<b>24</b>
Information Science/Studies	26	39	41	32	32	5.3%	2	8
<b>Total, Computer Science Track</b>	<b>26</b>	<b>39</b>	<b>41</b>	<b>32</b>	<b>32</b>	<b>5.3%</b>	<b>2</b>	<b>8</b>
<b>Grand Total, Both Tracks</b>	<b>162</b>	<b>149</b>	<b>187</b>	<b>181</b>	<b>206</b>	<b>6.2%</b>	<b>11</b>	<b>21</b>
<b>All Research Doctoral Degrees</b>	<b>13,114</b>	<b>13,364</b>	<b>13,901</b>	<b>14,696</b>	<b>15,046</b>	<b>3.5%</b>	<b>483</b>	<b>208</b>

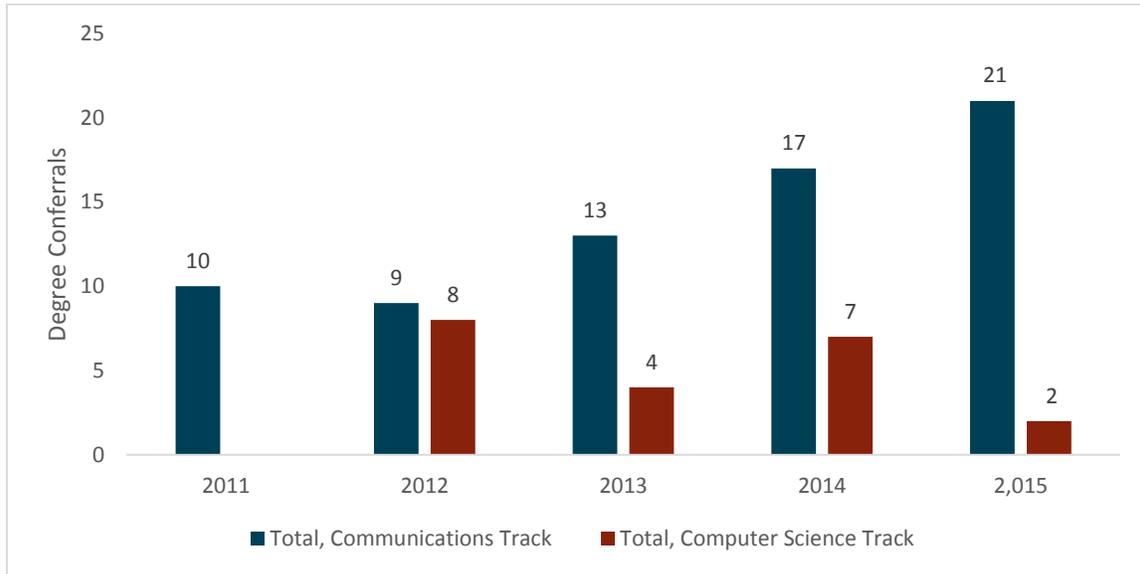
Source: IPEDS

## DEMAND WITHIN 150 MILES OF UNC CHARLOTTE

Only four institutions within 150 miles of UNC Charlotte have conferred Digital Culture and Communication-related research doctorates in the past five IPEDS data years. As at the national and regional levels, Communications Track degrees have been more numerous than Computer Science Track PhDs. **Completions totals in all CIP codes (shown in bold in Figure 2.7) are low and highly variable, but programs appear to be growing.** No institution has conferred more than nine doctoral degrees per year in any Digital Culture and Communication-related CIP code in the past five data years. Completions totals for individual institutions, itemized by CIP code, are presented in the plain text rows of Figure 2.7. Note that the analysis excludes the PhD in Communications, Rhetoric, and Digital Media offered by

North Carolina State University due to the fact that it is classified using the Multi/Interdisciplinary Studies, Other CIP Code, (see Figure 1.1) which is excluded from the Section II analysis.

**Figure 2.6: Summary of Local Completions by Track, 2011-2015**



Source: IPEDS

**Figure 2.7: Detailed Local Completions Trends by Institution, CIP Code, and Track, 2011-2015**

CIP CODE	2011	2012	2013	2014	2015	CAGR	AAC	STDEV
<b>Speech Communication and Rhetoric</b>	4	4	3	9	9	22.5%	1	3
Clemson University	--	--	--	2	3	--	--	--
University of North Carolina at Chapel Hill	4	4	3	7	6	10.7%	1	2
<b>Mass Communication/Media Studies</b>	3	2	3	7	8	27.8%	1	2
University of South Carolina-Columbia	3	2	3	7	8	27.8%	1	2
<b>Rhetoric and Composition</b>	3	3	7	1	4	7.5%	0	4
Virginia Polytechnic Institute and State University	3	3	7	1	4	7.5%	0	4
<b>Information Science/Studies</b>	--	8	4	7	2	--	--	--
University of North Carolina at Chapel Hill	--	8	4	7	2	--	--	--
<b>Total, Communications Track</b>	10	9	13	17	21	20.4%	3	2
<b>Total, Computer Science Track</b>	--	8	4	7	2	--	--	--
<b>Grand Total</b>	10	17	17	24	23	23.1%	3	4

Source: IPEDS

## SECTION III: EMPLOYMENT DEMAND ANALYSIS

This section analyzes Bureau of Labor Statistics (BLS) long-term employment projections data and pertinent secondary literature from journalistic, academic, and trade publications. These sources illuminate current and projected employment demand for doctoral-level Digital Culture and Communication Graduates.

### EMPLOYMENT PROJECTIONS ANALYSIS

The employment projections analysis studies current (2014) and projected (2024) employment in occupations related to six of the seven CIP codes listed in Figure 1.3 and both of the CIP codes tracked in Figure 1.6. Projections data derive from the Bureau of Labor Statistics (BLS) and North Carolina Department of Commerce (NCDOC).

### METHODOLOGY AND SOC CODE SELECTION

Hanover used the following methodology to identify potentially viable fields for doctoral-level graduates in Digital Culture and Communication-related fields:

- Using the NCES’s crosswalk between educational fields and occupations, Hanover cross-referenced CIP codes with BLS Standard Occupational Classification (SOC) codes to identify matches between educational programs and occupations (Figure 3.1).<sup>41</sup>
- Hanover then identified relevant occupations in which workers are likely to need or benefit from a doctoral degree in communications-related fields. This analysis was based on the BLS’s reported education levels for workers in each occupation as of 2014. Workforce education data are based on the 2012-2013 American Community Survey (ACS) published by the US Census Bureau (Figure 3.3).<sup>42</sup>

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<sup>41</sup> “CIP 2010 to SOC 2010 Crosswalk.” National Center for Education Statistics. Available for download at: <http://nces.ed.gov/ipeds/cipcode/resources.aspx?y=55>

<sup>42</sup> These percentages represent averages for all works in that occupation over the age of 25. Requirements for young workers entering the field may differ from the credentials that were required of workers with many years of experience. To access this data, see: “Educational Attainment for Workers 25 Years and Older by Detailed Occupation.” Bureau of Labor Statistics. December 8, 2015. [http://www.bls.gov/emp/ep\\_table\\_111.htm](http://www.bls.gov/emp/ep_table_111.htm)

**Figure 3.1: CIP to SOC Crosswalk for CIP Codes in Figure 1.3**

CIP 2010 CODE	CIP 2010 TITLE	SOC 2010 CODE	SOC 2010 TITLE
09.0100	Communication, General	25-1122	Communications Teachers, Postsecondary
		27-3011	Radio and Television Announcers
		27-3022	Reporters and Correspondents
		27-3031	Public Relations Specialists
		27-3041	Editors
		27-3043	Writers and Authors
09.0101	Speech Communication and Rhetoric	25-1122	Communications Teachers, Postsecondary
		27-3011	Radio and Television Announcers
		27-3012	Public Address System and Other Announcers
		27-3031	Public Relations Specialists
		27-3043	Writers and Authors
09.0102	Mass Communication/ Media Studies	25-1122	Communications Teachers, Postsecondary
		27-3022	Reporters and Correspondents
		27-3041	Editors
		27-3043	Writers and Authors
09.0199	Communication and Media Studies, Other	NO MATCH	
09.0702	Digital Communication and Media/ Multimedia	11-9199	Managers, All Other
		25-1122	Communications Teachers, Postsecondary
		27-3099	Media and Communication Workers, All Other
23.1304	Rhetoric and Composition	25-1123	English Language and Literature Teachers, Postsecondary
		25-1199	Postsecondary Teachers, All Other
		27-3041	Editors
		27-3043	Writers and Authors

Source: National Center for Education Statistics

**Figure 3.2: CIP to SOC Crosswalk for CIP Codes in Figure 1.6**

CIP 2010 CODE	CIP 2010 TITLE	SOC 2010 CODE	SOC 2010 TITLE
11.0401	Information Science/ Studies	11-3021	Computer and Information Systems Managers
		15-1111	Computer and Information Research Scientists
		15-1133	Software Developers, Systems Software
		15-1199	Computer Occupations, All Other
		25-1021	Computer Science Teachers, Postsecondary
11.0401	Human Computer Interaction	15-1199	Computer Occupations, All Other

Source: National Center for Education Statistics

Figure 3.3 refines the lists of potentially relevant SOC codes in Figure 3.1 and Figure 3.2 based upon Hanover’s analysis of the required education levels for each position, as well as input from UNC Charlotte. It presents the final list of codes related to the Digital Culture and

Communication program. All occupations in which less than 4.0 percent of workers hold a PhD were excluded from the analyses.

In general, it is notable that among the BLS-designated occupations that are potentially relevant to program graduates, only workers in postsecondary teaching positions and Computer and Information Research Scientists commonly possess a doctoral degree. Fewer than one in 20 public relations specialists, miscellaneous social scientists, or editors hold a PhD.

Because the available SOC codes are not an exact match with the competencies and probable professional interests of the proposed program’s graduates, Hanover has also opted to track employment trends for the Media and Communication Workers (SOC 27-3000) family of SOC codes, which includes two of the non-education SOC codes in Figure 3.3 and approximates employment demand for media and communication workers in general. The analysis also tracks the 15-1000 Computer and Mathematical Occupations family of SOC codes to provide a general overview of employment prospects in the field. Totals for these SOC families are presented in blue (27-3000) and red (15-1000) in their respective tables in the analysis below.

**Figure 3.3: Digital Culture and Communication-Related Occupations by Education Level**

SOC CODE	SOC 2010 TITLE	DESCRIPTION	% WITH A DOCTORATE
15-1111	Computer and Information Research Scientists	Conduct research into fundamental computer and information science as theorists, designers, or inventors. Develop solutions to problems in the field of computer hardware and software.	25.9%
15-1133	Software Developers, Systems Software	Research, design, develop, and test operating systems-level software, compilers, and network distribution software for medical, industrial, military, communications, aerospace, business, scientific, and general computing applications. Set operational specifications and formulate and analyze software requirements. May design embedded systems software. Apply principles and techniques of computer science, engineering, and mathematical analysis.	4.0%
19-3099	Social Scientists and Related Workers, Other*	All social scientists and related workers not listed separately.	17.0%
25-1122	Communications Teachers, Postsecondary	Postsecondary teachers instruct students in a wide variety of academic and career and technical subjects beyond the high school level. They also conduct research and publish scholarly papers and books.	43.3%
25-1123	English Language and Literature Teachers, Postsecondary		43.3%
25-1021	Computer Science Teachers, Postsecondary		43.3%

SOC CODE	SOC 2010 TITLE	DESCRIPTION	% WITH A DOCTORATE
27-3031	Public Relations Specialists	Public relations specialists create and maintain a favorable public image for the organization they represent. They design media releases to shape public perception of their organization and to increase awareness of its work and goals.	4.3%
27-3041	Editors	Editors plan, review, and revise content for publication.	4.7%
15-1000	Computer and Mathematical Occupations	This broad code tracks employment prospects in the computer science field more generally.	N/A
27-3000	Media and Communication Workers	This broad code tracks employment prospects in the media and communications fields more generally.	N/A

Source: Bureau of Labor Statistics

Note: At UNC Charlotte’s request, Hanover has added 19-3099 Social Scientists and Related Workers, Other to the list of codes to be considered. This code is not a match in the CIP to SOC crosswalks. Other matching codes from the Figure 3.1 and Figure 3.2 cross references that do not appear in the final SOC code list above are excluded because less than 4.0 percent of workers in those occupations hold a PhD (Computer and Information Systems Managers), because the occupational field is too general to link to the proposed program (e.g. Postsecondary Teachers, All Other), or at UNC Charlotte’s explicit request (e.g. Writers and Authors).

### GEOGRAPHIC SEGMENTATIONS

The BLS projections analysis considers the following geographic segmentations when analyzing long-term employment projections:

- **National employment projections:** Uses national BLS long-term, 2014-2024 occupational employment projections to evaluate national demand for doctoral-level communications professionals.<sup>43</sup>
- **North Carolina employment projections:** Uses NCDOC long-term, 2014-2024 occupational employment projections to evaluate state-level demand.<sup>44</sup>
- **North Carolina Southwest Region Prosperity Zone projections:** Uses NCDOC long-term 2012-2022 occupational employment projections to show anticipated demand in the state’s Southwest Region, which includes Anson, Cabarrus, Cleveland, Gaston, Iredell, Lincoln, Mecklenburg, Rowan, Stanly, and Union Counties.<sup>45</sup>

<sup>43</sup> See: “Economic and Employment Projections.” Bureau of Labor Statistics. December 8, 2015. <http://www.bls.gov/news.release/ecopro.toc.htm>

<sup>44</sup> See: “Occupational Projections.” North Carolina Department of Commerce. <http://www.nccommerce.com/lead/data-tools/occupations/projections/statewide>

<sup>45</sup> Note that the regional employment projections exclude both postsecondary teacher SOC codes. “Southwest Region.” North Carolina Department of Commerce. <http://www.nccommerce.com/lead/data-tools/occupations/projections/prosperity-zones/southwest-region>

## NATIONAL EMPLOYMENT PROJECTIONS

Figure 3.4 provides the 2014 employment estimate, 2024 projected employment, numeric and percent change, and the projected average number of annual openings for each Digital Culture and Communication SOC code. Codes are ranked from largest to smallest by the projected number of average annual openings. The greatest number of openings by far is projected for systems software developers, followed by public relations specialists and editors. With the exception of public relations specialists, (10-year percent change of 6.2 percent), editors (-5.3 percent) and miscellaneous social scientists (-2.0 percent), all of the occupations related to the proposed degree are expected to grow more quickly than the workforce as a whole (6.5 percent) through 2024.

In aggregate, Digital Culture and Communication careers are expected to grow slightly more quickly (8.0 percent) than the 6.5 percent average for all occupations. **However, a comparison of the Media and Communication Workers and Computer and Mathematical Occupations codes indicates that employment prospects for PhD candidates in the Computer Science Track are better than they are for Communications Track students.**

**Figure 3.4: National Occupational Employment Projections, 2014-2024 (in Thousands)**

SOC	OCCUPATION	EMPLOYMENT		CHANGE, 2014-2024		AVERAGE ANNUAL OPENINGS
		2014	2024	NUMBER	PERCENT	
15-1133	Software developers, systems software	395.6	447.0	51.3	13.0%	107.9
27-3031	Public relations specialists	240.7	255.6	14.9	6.2%	43.6
27-3041	Editors	117.2	111.0	-6.2	-5.3%	42.5
25-1123	English language and literature teachers, postsecondary	90.8	100.2	9.4	10.4%	25.5
25-1021	Computer science teachers, postsecondary	43.4	47.2	3.8	8.7%	11.5
25-1122	Communications teachers, postsecondary	36.0	39.5	3.5	9.7%	9.9
15-1111	Computer and information research scientists	25.6	28.3	2.7	10.7%	6.0
19-3099	Social scientists and related workers, all other	35.6	34.9	-0.7	-2.0%	4.2
--	<b>All Digital Culture and Communications SOC Codes</b>	<b>984.9</b>	<b>1,063.7</b>	<b>78.7</b>	<b>8.0%</b>	<b>251.1</b>
27-3000	<b>Media and communication workers</b>	<b>747.9</b>	<b>775.3</b>	<b>27.4</b>	<b>3.7%</b>	<b>198.2</b>
15-0000	<b>Computer and mathematical occupations</b>	<b>4,068.3</b>	<b>4,599.7</b>	<b>531.4</b>	<b>13.1%</b>	<b>1,156.8</b>
--	<b>All Occupations</b>	<b>150,539.9</b>	<b>160,328.8</b>	<b>9,788.9</b>	<b>6.5%</b>	<b>46,506.9</b>

Source: Bureau of Labor Statistics

Note: Numerical data for all occupations shown in thousands.

## NORTH CAROLINA EMPLOYMENT PROJECTIONS

The North Carolina workforce is expected to grow more quickly (12.3 percent) than the national workforce through 2024 (6.5 percent), and aggregated Digital Culture and Communication occupations are expected to mirror the state overall average, with 12.4 percent growth. Systems software developers and public relations specialists are expected to account for the highest numbers of average annual openings, followed by postsecondary-level English language and literature professors and editors. Overall growth for all workers in the Media and Communications occupational family (10.3 percent) is expected to lag slightly behind the state average of 12.3 percent growth across all occupations. Meanwhile, the total number of workers in Computer and Mathematical occupations is forecast to rise by 18.8 percent, though it should be noted that neither of the two codes in this family most closely related to the proposed degree program (Software Developers, Systems Software and Computer and Information Research Scientists) exceed the average for their group.

**Figure 3.5: North Carolina Occupational Employment Projections, 2014-2024**

SOC	OCCUPATION	EMPLOYMENT		CHANGE, 2014-2024		AVERAGE ANNUAL OPENINGS
		2014	2024	NUMBER	PERCENT	
15-1133	Software Developers, Systems Software	10,881	12,724	1,843	16.9%	340
27-3031	Public Relations Specialists	5,253	5,817	564	10.7%	119
25-1123	English Language and Literature Teachers, Postsecondary	2,866	3,237	371	12.9%	88
27-3041	Editors	2,294	2,264	-30	-1.3%	83
25-1021	Computer Science Teachers, Postsecondary	1,477	1,654	177	12.0%	44
25-1122	Communications Teachers, Postsecondary	835	925	90	10.8%	24
19-3099	Social Scientists and Related Workers, All Other	1,281	1,325	44	3.4%	19
15-1111	Computer and Information Research Scientists	315	373	58	18.4%	10
--	<b>All Digital Culture and Communications SOC Codes</b>	<b>25,202</b>	<b>28,319</b>	<b>3,117</b>	<b>12.4%</b>	<b>727</b>
27-3000	<b>Media and Communication Workers</b>	<b>18,393</b>	<b>20,290</b>	<b>1,897</b>	<b>10.3%</b>	<b>604</b>
15-0000	<b>Computer and Mathematical Occupations</b>	<b>116,320</b>	<b>138,188</b>	<b>21,868</b>	<b>18.8%</b>	<b>3,867</b>
--	<b>All Occupations</b>	<b>4,405,557</b>	<b>4,945,712</b>	<b>540,155</b>	<b>12.3%</b>	<b>160,748</b>

Source: North Carolina Department of Commerce

## NORTH CAROLINA SOUTHWEST REGION EMPLOYMENT PROJECTIONS

**Workforce growth in the Southwest Region is expected to be more robust than in the state as a whole, and local prospects for Digital Culture and Communication-related occupations are well above national and state averages for the field.** Taken in aggregate, the SOC codes related to the proposed degree program are expected to grow by 19.5 percent, compared to a projected regional workforce increase of 13.4 percent. Media and Communications Workers (15.4 percent growth) and Computer and Mathematical Occupations (24.0 percent growth) are projected to increase more quickly than average.

**Figure 3.6: Southwest Region Occupational Employment Projections, 2012-2022**

SOC	OCCUPATION	EMPLOYMENT		CHANGE, 2012-2022		AVERAGE ANNUAL OPENINGS
		2012	2022	NUMBER	PERCENT	
15-1133	Software Developers, Systems Software	3,395	4,230	835	24.6	128
27-3031	Public Relations Specialists	1,480	1,712	232	15.7	43
25-1123	English Language and Literature Teachers, Postsecondary	495	596	101	20.4	17
27-3041	Editors	517	493	-24	-4.6	13
25-1021	Computer Science Teachers, Postsecondary	281	340	59	21	10
25-1122	Communications Teachers, Postsecondary	144	174	30	20.8	5
15-1111	Computer and Information Research Scientists	10	12	2	20	0
19-3099	Social Scientists and Related Workers, All Other	24	27	3	12.5	0
--	<b>All Digital Culture and Communications SOC Codes</b>	<b>6,312</b>	<b>7,545</b>	<b>1,233</b>	<b>19.5%</b>	<b>216</b>
<b>27-3000</b>	<b>Media and Communication Workers*</b>	<b>4,702</b>	<b>5,425</b>	<b>723</b>	<b>15.4%</b>	<b>171</b>
<b>15-0000</b>	<b>Computer and Mathematical Occupations*</b>	<b>30,460</b>	<b>37,775</b>	<b>7,315</b>	<b>24.0%</b>	<b>1,216</b>
--	<b>All Occupations*</b>	<b>1,047,535</b>	<b>1,187,786</b>	<b>140,251</b>	<b>13.4%</b>	<b>39,481</b>

Source: North Carolina Department of Commerce

\*Values for these fields are calculated based on aggregated data from individual codes.

## ADDITIONAL EMPLOYMENT DEMAND SOURCES

In this subsection, Hanover examines several industry, academic, and journalistic sources in order to provide further insight into employment for doctoral-level communications graduates. Hanover also analyzes relevant academic and non-academic job postings in order to gather additional information on the potential labor market demand. After evaluating potential sources of information and position advertisements from a variety of relevant professional organizations, Hanover opted to focus on positions advertised by the Modern Language Association as a proxy for academic employment prospects and postings on Indeed.com to approximate private sector

demand for graduates with Digital Culture and Communication competencies. In order to streamline the analysis, Hanover has opted not to include research or job postings from all potentially relevant forums or professional bodies at this time. The Modern Language Association, National Communication Association, and Indeed.com were selected as the most broadly representative sources for academic and nonacademic employment opportunities, respectively.

## EMPLOYMENT OUTLOOK: ACADEMIA

### HUMANITIES

The Modern Language Association's (MLA) most current "Report on the MLA Job Information List" notes that the number of jobs advertised on the organization's most recent 2014-2015 Job Information List decreased for the third year in a row.<sup>46</sup> The most recent English edition listed 1,051 jobs, a decrease of 31 jobs from the prior year, suggesting a potential lack of relevant future jobs in academia.<sup>47</sup>

However, a 2015 report on academic job listings published by the National Communication Association (NCA) suggests that **within the realm of communications more specifically, academic employment opportunities remain strong, and that demand now exceeds the number of PhDs produced.** While the MLA data derives from its analysis of the MLA Job Information List, the NCA's reflect an analysis of the National Science Foundation's Survey of Earned Doctorates.<sup>48</sup> Results of the NCA's annual examination of the job market indicate that the number of advertisements for academic positions in communication has increased steadily since 2009, climbing to 802 relevant advertisements in 2015 (Figure 3.7).

The NCA adds that more than one-half of job postings in 2015 (57 percent) "sought individuals for tenured or tenure-track positions, with 319 of those postings specifically seeking an assistant professor."<sup>49</sup> Furthermore, it is evident that the PhD in Digital Culture and Communication program's main foci are generally in line with what academic departments are seeking. The most common research and/or teaching specialties mentioned in academic communications job postings include the following:<sup>50</sup>

- Strategic/Public Relations/Advertising (155 mentions in 2015)
- Mass Communication/Media Studies (126)
- Organizational (82)
- Digital/Emerging/New Media (76)
- Journalism (68)

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<sup>46</sup> "Report on the *MLA Job Information List, 2014-15.*" Modern Language Association. December 2015. p. 1. [https://www.mla.org/content/download/40038/1744556/Rpt\\_JIL\\_14-15.pdf](https://www.mla.org/content/download/40038/1744556/Rpt_JIL_14-15.pdf)

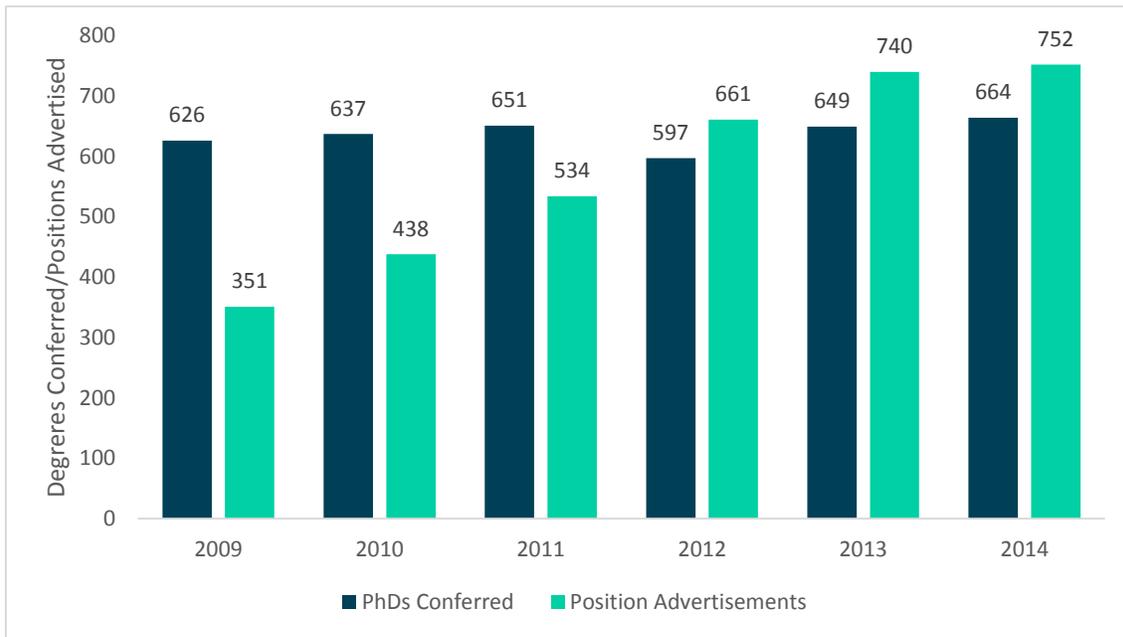
<sup>47</sup> Ibid.

<sup>48</sup> "2015 Academic Job Listings in Communication Report." National Communication Association. March 2016. p. 1. [https://www.natcom.org/uploadedFiles/More\\_Scholarly\\_Resources/Data\\_about\\_the\\_Discipline/NCA\\_JobListings\\_2015\\_V4.pdf](https://www.natcom.org/uploadedFiles/More_Scholarly_Resources/Data_about_the_Discipline/NCA_JobListings_2015_V4.pdf)

<sup>49</sup> Ibid., p. 4.

<sup>50</sup> Ibid., p. 3.

**Figure 3.7: PhDs Conferred vs. Advertised Academic Jobs in Communication, 2009-2014**



Source: National Communication Association<sup>51</sup>

In order to provide further insight into the potential labor market demand for doctoral-level communications graduates pursuing academic roles, Hanover conducted a scan of academic job postings on the publically-accessible 2014-2015 MLA’s Job Information List.<sup>52</sup> A sample of relevant job postings—along with job descriptions and necessary qualifications—is shown in Figure 3.11 (at the end of this section).

Overall, Hanover’s review of the 2014-2015 MLA list of job postings suggests that **graduates of a PhD program in Digital Culture and Communication would likely be qualified for many roles in academic departments across the country and abroad.** Specifically, graduates of the proposed program would have the potential to pursue a number of roles as professors and/or directors of communications departments, including:

- Director of Writing and Communication Arts
- Assistant Professor of Digital Journalism and Communications
- Assistant Professor of Communication Studies
- Department Head and Professor, Communication, and Media

The MLA also provides a list of overseas institutions that are seeking to hire English and/or communications graduates. Though none of the listed positions in the 2014-2015 directory specifically target digital culture and/or communication graduates, individuals may apply to more general positions, such as an Assistant and/or Associate Professor of English position

<sup>51</sup> Ibid., p. 1.

<sup>52</sup> “Job Information List.” Modern Language Association. 2014-2015. <https://www.mla.org/content/download/32241/1702997>

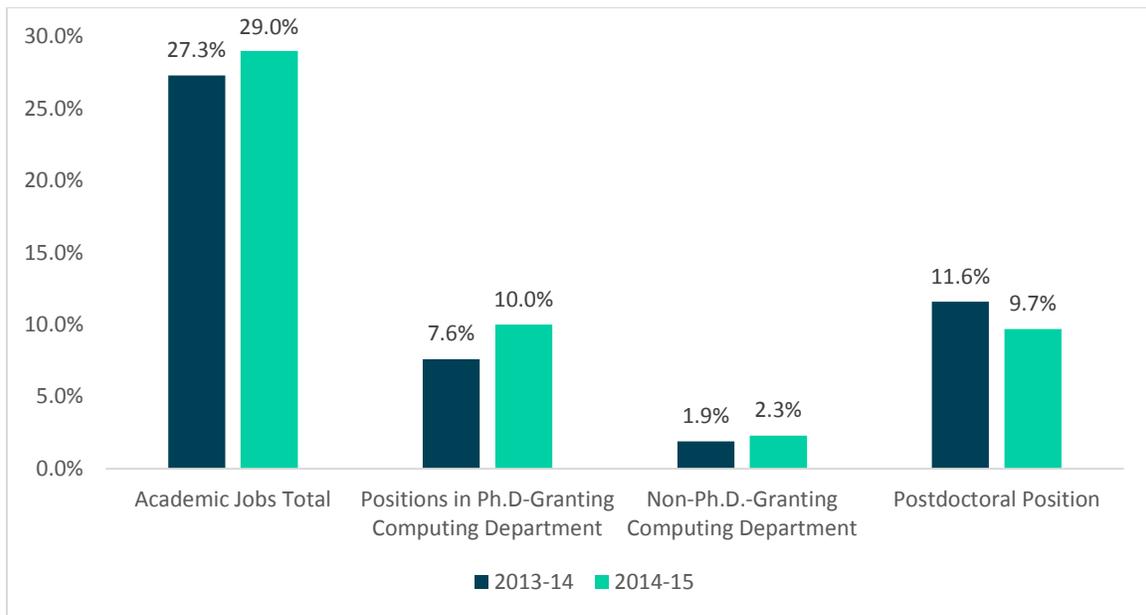
(Alfaisal University, Saudi Arabia),<sup>53</sup> another Assistant Professor position (American University of Kuwait),<sup>54</sup> or various faculty positions in Literature (Yale-NUS College, Singapore).<sup>55</sup>

Furthermore, the MLA notes that “the minimum salary for full-time appointments at the entry level should be at least \$47,370 to \$51,660 for those at the rank of instructor and at least \$59,800 to \$64,520 for those at the rank of beginning assistant professor,” and that organizations should also provide health care benefits and retirement plan options.<sup>56</sup>

### COMPUTER SCIENCE

The Computing Research Association (CRA) documents trends in graduate employment and faculty salaries using data from PhD-granting computer science departments. In their 2015 survey, CRA reports a slight increase in the percentage of computer science graduates accepting jobs in academia, suggesting that job opportunities within computer science remain strong. In 2014-15, the percentage of graduates taking academic jobs in North America rose to 29 percent from the previous year’s low of 27.3 percent.<sup>57</sup> Within academia, most students accept tenure-track positions in PhD-granting computer science departments (10 percent), or postdoctoral fellow positions (9.7 percent). Relatively few graduates accept positions at non-PhD-granting departments.

**Figure 3.8: Percentage of 2014-15 Graduates taking Academic Jobs in North America**



Source: CRA<sup>58</sup>

<sup>53</sup> Ibid., p. 403.

<sup>54</sup> Ibid., p. 406.

<sup>55</sup> Ibid., p. 419.

<sup>56</sup> Ibid., p. ii.

<sup>57</sup> “2015 Taulbee Survey.” *Computing Research News*. 28:5. May 2016. p. 9. <http://cra.org/wp-content/uploads/2016/05/2015-Taulbee-Survey.pdf>

<sup>58</sup> Ibid., p. 9.

CRA further reports projected increases in faculty department size continuing to 2018, indicating promising job prospects for students interested in academic careers. From 2013, tenure-track faculty department sizes increased about 9 percent across all departments – with average faculty size per-department increases from 27.4 to 28.1.<sup>59</sup> Within these departments, the average number of both teaching faculty and postdoctoral positions increased, while the average number of research faculty fell over this same period. By 2018, CRA projects almost 15 percent growth in faculty size for all academic positions, with the most growth seen in postdoc positions (19.6 percent).

**Figure 3.9: Actual and Anticipated Faculty Sizes by Position, 2015-2017**

	2015-16 AVERAGE SIZE (ACTUAL)	2016-17 AVERAGE SIZE (PROJECTED)	2017-18 AVERAGE SIZE (PROJECTED)	EXPECTED TWO YEAR GROWTH
Tenure Track	28.1	30.3	31.7	12.9%
Teaching	6.9	7.7	8.2	17.8%
Research	5.4	5.9	6.4	16.2%
Postdoc	6.5	7.0	7.6	19.6%
<b>Total</b>	<b>40.7</b>	<b>44.3</b>	<b>46.7</b>	<b>14.6%</b>

Source: CRA<sup>60</sup>

Trends in faculty hiring suggest increased opportunity for graduate students interested in academic computer science positions. From 2013 to 2014, success rates for hiring tenure-track faculty fell from 80.2 percent in 2013 to 70.8 percent in 2014.<sup>61</sup> Of the 723 vacant positions in computer science departments for 2014, just 584 were filled, with the largest hiring gap occurring for tenure-track faculty – only 245 of 346 open positions were filled in 2014.<sup>62</sup>

In addition, CRA reports median salary averages across computer science department faculty for faculty with varying levels of experience and job titles. For the purposes of this analysis, Hanover uses data for faculty with zero to seven years of experience. Faculty salaries in computer science range from \$141,273 for full professors to \$54,155 for postdoc positions. For non-tenure track positions, research faculty tend to have higher salaries than teaching faculty.

**Figure 3.10: Median Salaries for Faculty Computer Science Positions**

TENURE-TRACK POSITIONS			NON-TENURE-TRACK POSITIONS		
Full Professor	Associate	Assistant	Teaching	Research	Postdoc
\$141,273	\$113,873	\$99,115	\$75,712	\$85,900	\$54,155

Source: CRA<sup>63</sup>

<sup>59</sup> Ibid., p. 24.

<sup>60</sup> Ibid., p. 25

<sup>61</sup> Ibid., p. 24.

<sup>62</sup> Ibid., p. 26.

<sup>63</sup> Ibid., p. 36.

To provide further insight into the potential labor market demand for doctoral-level graduates pursuing academic roles in computer science, Hanover conducted a scan of academic job postings through the Association for Computing Machinery and the Computing Research Association’s job posting databases.<sup>64</sup> These postings include relevant faculty positions in addition to research positions in academic settings. A sample of available job postings – along with job descriptions and necessary qualifications – is shown in Figure 3.12 (at the end of this section).

Hanover’s review of the ACM and CRA job databases suggests that graduates of a PhD in Digital Culture and Communication may be qualified for a variety of academic positions in the computer science field. Most faculty and research positions require a PhD in computer science or a related field coupled with relevant research and teaching experience. Graduates of a digital culture and communication program, however, may not be qualified for positions in the computer science field that require a more focused area of specialization such as artificial intelligence, data mining, or software engineering.

### EMPLOYMENT OUTLOOK: NON-ACADEMIC SETTINGS

Hanover also analyzed the employment outlook for doctoral-level communications graduates pursuing non-academic roles. In order to highlight the types of industry and government positions available to applicants with credentials resembling those of the proposed program’s graduates, Hanover examined relevant postings on Indeed.com, a non-academic job board. A sample of relevant job postings in the state of North Carolina – along with job descriptions and necessary qualifications – is shown in Figure 3.13 (at the end of this section).

Hanover’s review of Indeed job postings suggests that in North Carolina, there are **a number of roles available for high-level communications or digital culture experts in both industry and government**. Some roles are more humanities- or social sciences-oriented (e.g., Digital Media Marketer, LexisNexis, while others are more computer science-focused (e.g., Strategic Initiatives Manager, State of North Carolina).

It is important to note, however, that the majority of relevant roles only require a bachelor’s degree in a related field (e.g., communications, journalism, English, public relations, marketing, etc.). **For the majority of non-academic job postings, it appears that having relevant work experience is significantly more important than holding an advanced degree.**

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<sup>64</sup> [1] “Career and Job Center.” Association for Computing Machinery. <http://jobs.acm.org/>  
[2] “CRA Job Announcements.” Computing Research Association. <http://cra.org/ads/>

**Figure 3.11: Sample of Current Communications-Related Job Postings in Academic Settings**

JOB TITLE	ORGANIZATION	LOCATION	JOB DESCRIPTION	QUALIFICATIONS
Director of Writing and Communication Arts <sup>65</sup>	Samford University	Birmingham, AL	<ul style="list-style-type: none"> <li>▪ Carry a 2-2 teaching load and oversee university-wide initiatives related to strengthening the teaching of writing and communication</li> <li>▪ Oversee the first-year Communication Arts courses in the core curriculum</li> <li>▪ Coordinate with the director of the Communication Resource Center</li> <li>▪ Collaborate with the Center for Teaching, Learning, and Scholarship to design faculty seminars and workshops on discipline-based writing and communication pedagogy</li> </ul>	<ul style="list-style-type: none"> <li>▪ PhD in English-related field</li> <li>▪ Demonstrated record of scholarship and teaching in the disciplines of English, rhetoric, or communication studies</li> <li>▪ Special interest in writing and communication pedagogy</li> <li>▪ Experience in directing a writing or communication program strongly preferred</li> </ul>
Tenure-Track Assistant Professor of Technical Communication <sup>66</sup>	Georgia Institute of Technology	Atlanta, GA	<ul style="list-style-type: none"> <li>▪ Develop a strong program of research and grant application commensurate with work at a major research university</li> <li>▪ Commit to teaching writing/communication courses including technical/professional/business communication, composition, media studies, visual rhetoric/design, technical narratives, and communicating science and technology to public audiences</li> </ul>	<ul style="list-style-type: none"> <li>▪ PhD in technical communication or a closely related field</li> <li>▪ Expertise in technical, professional, and business communication</li> <li>▪ Firm theoretical grounding in rhetoric</li> <li>▪ Facility with the functional application of theory as a foundational basis for research and teaching in technical communication</li> </ul>

<sup>65</sup> Ibid., p. 4.

<sup>66</sup> Ibid., pp. 76-77.

JOB TITLE	ORGANIZATION	LOCATION	JOB DESCRIPTION	QUALIFICATIONS
Faculty Positions in Computation and Communication/ Media Studies/ Organizations and Networks <sup>67</sup>	Northwestern University	Evanston, IL	<ul style="list-style-type: none"> <li>▪ Publish innovative research, teach undergraduate and graduate courses, and perform professional service commensurate with rank</li> <li>▪ Play a substantive role in the development of the recently-launched Master of Science in Leadership for Creative Enterprises program</li> </ul>	<ul style="list-style-type: none"> <li>▪ <i>Computation and Communication</i>: expertise in human-computer interaction, social media, big data, collective intelligence, crowdsourcing, collaboration and coordination online</li> <li>▪ <i>Media Studies</i>: expertise in digital media uses, media institutions, social media, big data, gaming and entertainment, advertising and marketing</li> <li>▪ <i>Organizations and Networks</i>: expertise in team dynamics, social media and online networks, inter and intra-organizational networks, entrepreneurship and innovation, leadership, collective action, project management</li> </ul>
Associate or Full Professor and ISUComm Director <sup>68</sup>	Iowa State University	Ames, IA	<ul style="list-style-type: none"> <li>▪ Lead nationally-recognized undergraduate communication curriculum (ISUComm) and related research initiative</li> <li>▪ Conduct and publish programmatic assessment on multimodal pedagogy across the curriculum</li> <li>▪ Teach undergraduate and graduate courses in the English Department</li> </ul>	<ul style="list-style-type: none"> <li>▪ National profile in the pedagogy of written, oral, visual, and electronic communication skills and communication across the curriculum</li> </ul>
Assistant Professor of Digital Journalism and Communications <sup>69</sup>	Massachusetts College of Liberal Arts	North Adams, MA	<ul style="list-style-type: none"> <li>▪ Provide leadership for a digital media curriculum that emphasizes exceptional writing</li> <li>▪ Advise the student newspaper and its related website, as well as coursework in general education</li> <li>▪ Offer courses in at least two of the following areas: newswriting, scriptwriting, or magazine writing</li> </ul>	<ul style="list-style-type: none"> <li>▪ PhD or MFA in an appropriate field</li> <li>▪ Preference given to candidates with at least three years of successful teaching experience at the college level and professional experience in journalism</li> </ul>

<sup>67</sup> Ibid., pp. 97-98.

<sup>68</sup> Ibid., p. 118.

<sup>69</sup> Ibid., pp. 156-157.

JOB TITLE	ORGANIZATION	LOCATION	JOB DESCRIPTION	QUALIFICATIONS
Assistant Professor in Writing for Digital and New Media <sup>70</sup>	University of Massachusetts – Dartmouth	North Dartmouth, MA	<ul style="list-style-type: none"> <li>▪ Teach in undergraduate program in Writing, Rhetoric, and Communication and in graduate program in Professional Writing</li> <li>▪ Teach professional writing in new and digital media as it relates to science and technology writing, journalism, public advocacy, strategic communication, PR, or media production</li> <li>▪ Contribute to curriculum development, emphasizing the integration of social and new media</li> </ul>	<ul style="list-style-type: none"> <li>▪ PhD in Rhetoric, Communications, or Journalism</li> <li>▪ Academic and practical experience</li> <li>▪ Active in research</li> <li>▪ Strong record of publishing in print and digital media</li> </ul>
Assistant Professor of Communication Studies <sup>71</sup>	Millsaps College	Jackson, MS	<ul style="list-style-type: none"> <li>▪ Teach in the Communication Studies major’s conceptual core and the major’s media production sequence</li> <li>▪ Develop new elective courses in area of active scholarship and creative practice</li> <li>▪ Contribute to departmental responsibilities for interdisciplinary general education courses</li> </ul>	<ul style="list-style-type: none"> <li>▪ PhD in Communication, Media Studies, Film Studies, or related field</li> <li>▪ Preferred: expertise in digital film production and ability to teach a related genre of creative writing</li> </ul>
Department Head and Professor, Communication and Media <sup>72</sup>	Rensselaer Polytechnic Institute	Troy, NY	<ul style="list-style-type: none"> <li>▪ Assist Dean with strategic leadership in developing proactive curricula; recruiting and retaining students; obtaining research grants and contracts; coaching and mentoring faculty; and developing strategies to recruit and retain productive faculty</li> </ul>	<ul style="list-style-type: none"> <li>▪ PhD, appropriate terminal degree, or foreign degree equivalent in Communication, Media, or similar field</li> <li>▪ Outstanding leadership, administrative skills, and substantial body of high-quality research</li> <li>▪ Record of securing external funding is desirable</li> </ul>
Open Rank Position in Emerging Media and Communication <sup>73</sup>	University of Texas – Dallas	Richardson, TX	<ul style="list-style-type: none"> <li>▪ Teach, conduct research, and develop creative projects in the programs of Art and Technology and Emerging Media and Communication</li> </ul>	<ul style="list-style-type: none"> <li>▪ MFA or PhD</li> <li>▪ Open rank position available (rank dependent upon qualifications)</li> </ul>

<sup>70</sup> Ibid., pp. 165-166.

<sup>71</sup> Ibid., p. 186.

<sup>72</sup> Ibid., pp. 245-246.

<sup>73</sup> Ibid., p 361.

**Figure 3.12: Sample of Current Computer Science-Related Job Postings in Academic Settings**

JOB TITLE	ORGANIZATION	LOCATION	JOB DESCRIPTION	QUALIFICATIONS
Assistant Professor <sup>74</sup>	City University of New York	New York, New York	<ul style="list-style-type: none"> <li>▪ Involved in research, teaching undergraduate and graduate level courses</li> <li>▪ Mentor undergraduate and graduate students</li> <li>▪ Share responsibility for committee and department assignments including administrative, supervisory, and other functions</li> </ul>	<ul style="list-style-type: none"> <li>▪ Outstanding academic or industrial record and Ph.D. in Computer Science or related field</li> <li>▪ Demonstrate commitment to excellence in teaching and have the ability to attract significant research funding</li> </ul>
Tenure-Track Position – Assistant Professor in Computer Science <sup>75</sup>	Berea College	Berea, Kentucky	<ul style="list-style-type: none"> <li>▪ Demonstrate strong interest in teaching in a liberal arts context and make connections with other disciplines</li> <li>▪ Interest in engaging students from traditionally underrepresented groups in computing</li> <li>▪ Interest in using active and engaged learning techniques such as flipped classrooms, project-based learning, and pair programming</li> </ul>	<ul style="list-style-type: none"> <li>▪ Terminal degree in computer science or closely related field</li> <li>▪ Especially seeking candidates from underrepresented groups in computing</li> </ul>
Instructor <sup>76</sup>	Kansas State University	Manhattan, Kansas	<ul style="list-style-type: none"> <li>▪ Teach courses in computer science including programming, data structures, and software engineering</li> <li>▪ Participation in student engagement activities such as advising and team competitions</li> </ul>	<ul style="list-style-type: none"> <li>▪ Required: MS in Computer Science or related field</li> <li>▪ Preferred: PhD and relevant teaching or industrial experience</li> </ul>

<sup>74</sup> Job Posting from Association for Computing Machinery. [https://home.cunyfirst.cuny.edu/psp/cnyepprd/GUEST/HRMS/c/HRS\\_HRAM.HRS\\_CE.GBL](https://home.cunyfirst.cuny.edu/psp/cnyepprd/GUEST/HRMS/c/HRS_HRAM.HRS_CE.GBL)

<sup>75</sup> Job Posting from Association for Computing Machinery. <https://mp84e1c1k7z1e4nhfo24nnf7-wpengine.netdna-ssl.com/human-resources/wp-content/uploads/sites/129/2012/07/CSC-Tenure-Track-Position-2017.pdf>

<sup>76</sup> Job Posting from Association for Computing Machinery. <http://careers.k-state.edu/cw/en-us/job/500181/instructor-computer-science>

JOB TITLE	ORGANIZATION	LOCATION	JOB DESCRIPTION	QUALIFICATIONS
Postdoctoral Fellows/Assistant Professors <sup>77</sup>	New York University	New York, New York	<ul style="list-style-type: none"> <li>▪ Two to three year appointments with teaching load of one course per semester (non-tenure-track)</li> <li>▪ Department strengths include theoretical computer science and cryptography, distributed computing and networking, machine learning and data science, computer vision and graphics, scientific computing and optimization, and verification and programming languages</li> </ul>	<ul style="list-style-type: none"> <li>▪ PhD in Computer Science or related field</li> </ul>
Research Scientist <sup>78</sup>	Allen Institute for Artificial Intelligence	Seattle, Washington	<ul style="list-style-type: none"> <li>▪ Construct AI systems with reasoning, learning, and reading capabilities</li> <li>▪ May lead R&amp;D projects, oversee and implement software systems, author and present scientific papers, develop collaborative and strategic relationships with relevant academic, industrial, government, and standards organizations</li> <li>▪ Primary research areas include: language and vision, reasoning, semantic search, machine learning and theory formation, information extraction</li> </ul>	<ul style="list-style-type: none"> <li>▪ PhD in one of following areas: natural language processing, textual inference and entailment, computer vision and machine learning</li> <li>▪ Preferred: extensive work experience and published application of research</li> </ul>
Research Staff Member <sup>79</sup>	IBM Research – Almaden	San Jose, California	<ul style="list-style-type: none"> <li>▪ Conduct research in theoretical computer science in areas such as complexity, optimization, logic in computer science, database principles, information retrieval, and computational finance</li> </ul>	<ul style="list-style-type: none"> <li>▪ PhD with strong record of publications in theoretical computer science</li> <li>▪ Ability to make professional connections and collaborate with systems builders in related fields</li> </ul>

<sup>77</sup> Job Posting from Computing Research Association. <https://apply.interfolio.com/39948>

<sup>78</sup> Job Posting from Computing Research Association. [https://boards.greenhouse.io/thealleninstitute/jobs/209509?gh\\_src=1ubxan1](https://boards.greenhouse.io/thealleninstitute/jobs/209509?gh_src=1ubxan1)

<sup>79</sup> Job Posting from Computing Research Association. [http://researcher.watson.ibm.com/researcher/view\\_group\\_subpage.php?id=4491](http://researcher.watson.ibm.com/researcher/view_group_subpage.php?id=4491)

JOB TITLE	ORGANIZATION	LOCATION	JOB DESCRIPTION	QUALIFICATIONS
Professor of the Practice <sup>80</sup>	UNC Chapel Hill	Chapel Hill, North Carolina	<ul style="list-style-type: none"> <li>▪ Four-year lecturer term, periodically renewable</li> <li>▪ Teach courses in mobile applications development and oversee operation of software maker-space</li> <li>▪ Train and evaluate undergraduate and graduate student instructors</li> </ul>	<ul style="list-style-type: none"> <li>▪ MS in Computer Science</li> <li>▪ Preferred: PhD</li> <li>▪ Experience in teaching or developing mobile applications</li> </ul>
Department Chair <sup>81</sup>	Missouri University of Science and Technology	Rolla, Missouri	<ul style="list-style-type: none"> <li>▪ Guide department to further elevate national and international stature while enhancing student and faculty success</li> <li>▪ Recruit and retain diverse group of faculty, promote collaboration, acquire resources and balance teaching, research, and service missions of the department</li> </ul>	<ul style="list-style-type: none"> <li>▪ PhD in Computer Science or related field</li> <li>▪ Demonstrated record of scholarly accomplishments, effective teaching, and overall academic leadership</li> <li>▪ Must meet requirements of tenured full professor</li> </ul>
Assistant Professor <sup>82</sup>	University of Alabama in Huntsville	Huntsville, Alabama	<ul style="list-style-type: none"> <li>▪ Augment department emphases in cloud computing, secure cloud computing, mobile computing, or data science</li> <li>▪ Candidates who couple cybersecurity with other areas of computing also considered</li> </ul>	<ul style="list-style-type: none"> <li>▪ PhD in Computer Science</li> <li>▪ Funded research experience and ability to carry out research in areas for publication in well-regarded academic conference and journal venues</li> </ul>

<sup>80</sup> Job Posting from Computing Research Association. <http://cs.unc.edu/recruiting/professor-of-the-practice/>

<sup>81</sup> Job Posting from Computing Research Association. <http://cs.mst.edu/departmentchairsearch/>

<sup>82</sup> Job posting from Association for Computing Machinery. <http://www.uah.edu/hr/careers/faculty-careers>

**Figure 3.13: Sample of Current Communications-Related Job Postings in Non-Academic Settings, North Carolina**

JOB TITLE	ORGANIZATION	LOCATION	JOB DESCRIPTION	QUALIFICATIONS
Communication Manger <sup>83</sup>	Vallen	Charlotte, NC	<ul style="list-style-type: none"> <li>▪ Provide input for the organization’s communication, marketing, and social media strategies</li> <li>▪ Use communication theories and standards to develop, publish, and distribute key message content with subject matter experts</li> <li>▪ Recommend flow of process for media utilizing social media, podcast, and other media channels</li> <li>▪ Lead and/or participate in various external communication and marketing activities</li> </ul>	<ul style="list-style-type: none"> <li>▪ Bachelor’s degree in related field (e.g., Communications, Journalism, English, Public Relations, Political Science)</li> <li>▪ At least five years of applicable experience</li> <li>▪ Exceptional oral and written communication skills with adaptability across multiple writing styles and platforms</li> <li>▪ Demonstrated leadership, collaboration, and change management skills</li> </ul>
Digital Media Marketer <sup>84</sup>	LexisNexis	Raleigh, NC	<ul style="list-style-type: none"> <li>▪ Partner with internal clients to develop, execute, manage, and optimize digital marketing campaigns</li> <li>▪ Help to reach broader audiences online through paid search, search engine marketing, remarketing, search engine optimization, etc.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Bachelor’s degree in Marketing, English, or related field</li> <li>▪ At least three years online marketing experience</li> <li>▪ Hands-on experience managing effectively pay-per-click (PPC) and search engine optimization (SEO) campaigns</li> </ul>
E-Commerce/Digital Marketing Manager <sup>85</sup>	Mood & Mind	Asheville, NC	<ul style="list-style-type: none"> <li>▪ Control and oversee all company websites, Amazon sales, and digital marketing (SEO, SEM, social media, etc.)</li> <li>▪ Team lead onsite and offsite staff for web development, digital marketing, and data entry</li> <li>▪ Prepare and implement comprehensive digital marketing budget plans and analytics</li> </ul>	<ul style="list-style-type: none"> <li>▪ Bachelor’s degree</li> <li>▪ At least three years’ experience in e-commerce/digital marketing</li> <li>▪ Excellent organizational and self-directing skills</li> <li>▪ Outstanding analytical and problem-solving abilities</li> </ul>

<sup>83</sup> Job posting from Indeed.com. <https://www.pcrecruiter.net/pcrbin/reg5.exe?db=NtuptzWSK6xmcsnRWyOzvUkD9t1EX%2f9DE6udLoMo0thylzMH8fv5ZcppluN7&id=152155181642644&src=Indeed&rid=www%2Eindeed%2Ecom>

<sup>84</sup> Job posting from Indeed.com. <https://reedelsevier.taleo.net/careersection/50/jobdetail.ftl?lang=en&job=717734&src=JB-11660>

<sup>85</sup> Job posting from Indeed.com. [http://www.indeed.com/cmp/MoodandMind.com/jobs/E-Commerce-56a303161f98fc5f?sjdu=QwrRXKrqZ3CNX5W-O9jEva940-FkAbit2jvGNA9ByX44ZP7r4QZmttxvCFR0MPgtJPqmDzTeBVgt\\_TNupviDSLHrS2bV92ePlq3U7laq5c](http://www.indeed.com/cmp/MoodandMind.com/jobs/E-Commerce-56a303161f98fc5f?sjdu=QwrRXKrqZ3CNX5W-O9jEva940-FkAbit2jvGNA9ByX44ZP7r4QZmttxvCFR0MPgtJPqmDzTeBVgt_TNupviDSLHrS2bV92ePlq3U7laq5c)

JOB TITLE	ORGANIZATION	LOCATION	JOB DESCRIPTION	QUALIFICATIONS
Communications Manager <sup>86</sup>	Cisco	Raleigh, NC	<ul style="list-style-type: none"> <li>▪ Lead and supervise a team supporting Learning@Cisco’s branding, messaging, communications, and PR/event planning strategy</li> <li>▪ Plan, coordinate, and implement strategic marketing communications initiatives to both internal and external customers</li> <li>▪ Work closely with the digital marketing department to promote the organization’s increased use of social and digital media</li> </ul>	<ul style="list-style-type: none"> <li>▪ Bachelor’s degree</li> <li>▪ At least 10 years of global marketing communications and business development experience</li> <li>▪ Demonstrated experience managing and executing integrated marketing campaigns</li> <li>▪ Broad understanding of content marketing, external communications, and digital/social media</li> </ul>
Information and Communications Specialist II <sup>87</sup>	State of North Carolina	Wake County, NC	<ul style="list-style-type: none"> <li>▪ Responsible for direct supervision of the Entry Department (Department of Agriculture and Consumer Services)</li> <li>▪ Serve as Competitive Exhibits Process Administrator and editor of the State Fair Premium Book</li> <li>▪ Provide customer service and public relations for competitive exhibitors</li> <li>▪ Serve as the concept designer and editor of print and web materials for promotion of State Fair competitions</li> </ul>	<ul style="list-style-type: none"> <li>▪ Bachelor’s degree with a major in journalism or English</li> <li>▪ Two years’ experience in communications, public relations, or publicity work</li> <li>▪ Considerable knowledge of the techniques for disseminating information to the public through a variety of media</li> </ul>
Strategic Initiatives Manager <sup>88</sup>	State of North Carolina	Wake County, NC	<ul style="list-style-type: none"> <li>▪ Oversee cybersecurity projects and incident response efforts</li> <li>▪ Manage compliance with statewide information security standards</li> <li>▪ Manage technical direction of projects and direct/supervise all support resources</li> </ul>	<ul style="list-style-type: none"> <li>▪ Bachelor’s degree in Computer Science, Computer Information Systems, Information Management, or related degree</li> <li>▪ Six years experience in IT security or closely related area</li> <li>▪ Strong team-oriented interpersonal skills</li> </ul>

<sup>86</sup> Job posting from Indeed.com. [https://jobs.cisco.com/job/Raleigh-Communications-Manager-NC-27601/375875400/?feedId=90500&utm\\_source=Indeed&utm\\_campaign=JB\\_Indeed\\_Cisco](https://jobs.cisco.com/job/Raleigh-Communications-Manager-NC-27601/375875400/?feedId=90500&utm_source=Indeed&utm_campaign=JB_Indeed_Cisco)

<sup>87</sup> Job posting from Indeed.com. <https://www.governmentjobs.com/careers/northcarolina/jobs/1591137/information-communications-specialist-ii>

<sup>88</sup> Job posting from Indeed.com. <https://www.governmentjobs.com/careers/northcarolina/jobs/1583904/strategic-initiatives-manager>

## SECTION IV: SELECTED PEER AND COMPETITOR PROGRAM PROFILES

This section provides an overview of three potential peer and competitor PhD programs. Hanover’s selection of the profiled programs is based in part on the program summaries provided in the competitive landscape analysis in Section I. The prominent national programs summarized in Figure 1.1 and Figure 1.4 reflect a diverse range of program design choices and organizational structures, and the profiled programs are chosen because they represent differing approaches to program design. They also reflect different approaches to organizing the program and facilitating interdisciplinary collaboration, as well as a variety of departmental or center-based organization structures. The profiled programs are listed below, along with a brief explanation of their major features and rationale for inclusion in this section.

**Figure 4.1: Overview of Profiled Programs**

INSTITUTION	PROGRAM NAME	BRIEF DESCRIPTION/RATIONALE FOR INCLUSION
Georgia Institute of Technology	PhD in Digital Media, School of Literature, Media, and Communication	This is an example of a mid-size, robustly interdisciplinary digital media program housed in a communications department
Iowa State University	Human Computer Interaction PhD, Virtual Reality Applications Center	This program is a large, broadly interdisciplinary offering with a more technical focus, which is housed in an interdisciplinary center; most students belong to participating departments, rather than the center itself
Indiana University Bloomington	Informatics – Human-Computer Interaction Design, School of Informatics and Computing	This program is housed within the University’s School of Computing and Informatics and has a more technical, design-oriented focus; students do extensive research in media, data visualization, and learning systems, among other topics

Source: Section III Profiles

### GEORGIA INSTITUTE OF TECHNOLOGY – COMMUNICATIONS EMPHASIS

As noted in Section I (see Figure 1.1 and Figure 1.4) Georgia Institute of Technology (Georgia Tech) offers two PhD programs that are potentially relevant to the proposed Digital Culture and Communication program. These include the PhD in Digital Media offered by the School of Literature, Media, and Communication<sup>89</sup> and the Human-Centered Computing PhD program offered by the College of Computing.<sup>90</sup> **This profile will focus on the PhD in Digital Media, while also highlighting its ties to other programs and departments.**

<sup>89</sup> “PhD in Digital Media – School of Literature, Media, and Communication.” Georgia Institute of Technology. Op. cit.

<sup>90</sup> “Human-Centered Computing Ph.D. Program.” Georgia Institute of Technology. Op. cit.

**Figure 4.2: Summary of Digital Media Program Attributes**

ATTRIBUTE	DESCRIPTION
Program name and focus areas	<b>PhD in Digital Media:</b> Combines faculty from English, art, law, classics, film, performance studies, mathematics, and computer science
IPEDS five-year completions, 2011-2015 and Program Size	<ul style="list-style-type: none"> <li>▪ 14 IPEDS completions</li> <li>▪ Program admits 3-5 students annually</li> </ul>
Related program(s) or initiative(s)	<ul style="list-style-type: none"> <li>▪ Georgia Tech GVU Center</li> <li>▪ Various corporate sponsors and internship hosts</li> </ul>
Graduate student funding	Most PhD students receive a stipend and tuition remission via Graduate Teaching or Research Assistantships; support lasts for four years
Faculty	14 School of Literature, Media, and Communication faculty
Major program requirements	<ul style="list-style-type: none"> <li>▪ 60 credits of coursework, 9 of which must be outside of the School of Literature, Media, and Communication</li> <li>▪ Portfolio review</li> <li>▪ Comprehensive exam</li> <li>▪ Dissertation proposal and proposal defense</li> <li>▪ Dissertation and defense</li> </ul>

Source: Georgia Institute of Technology Digital Media Profile

### PROGRAM OVERVIEW AND OBJECTIVES

The PhD in Digital Media is designed to provide graduates with a “theoretical and the practical foundation for careers as digital media researchers in academia and industry.”<sup>91</sup> This program’s interdisciplinary nature is highlighted in its description of the field:

The advent of a new medium of human communication and representation is a significant event in human social and cultural history, and introduces the possibility of new genres of artistic expression as well as new forms of information and knowledge transmission. The study of these new forms, from the point of view of the creators and the analysts, is an emerging field, one that requires a convergence of the methodologies of several traditional disciplines, and one that is also defining its own methodologies of research and practice.<sup>92</sup>

**In order to provide the type of interdisciplinary instruction the curriculum requires, the Digital Media PhD program draws on Georgia Tech faculty who hold degrees in English, art, law,**

#### Georgia Tech Digital Media PhD Concentrations

- Critical design
- Interaction design
- Augmented reality
- Educational computing
- Online communities
- Responsive environments
- Artificial intelligence
- Bioinformatics
- Interactive video
- Game design

*-Source: Digital Media PhD Program Handbook, p. 4, Georgia Institute of Technology*

<sup>91</sup> “PhD in Digital Media – School of Literature, Media, and Communication.” Georgia Institute of Technology. Op. cit.

<sup>92</sup> Ibid.

classics, film, performance studies, mathematics, and computer science. It offers concentrations in “three main categories” that include “arts and entertainment, knowledge and creativity, and civic media.” Within these subfields, program literature names a variety of possible research emphases which are shown in the inset text box above.<sup>93</sup>

The program enrolls three to five students each year and recruits “from a range of educational backgrounds,” including “acting, anthropology, architecture, communications, computer science, engineering, English studies, graphic design, history, journalism, law, library science, management, marketing, philosophy, social work, software development, technical writing, and television production.”<sup>94</sup> Program applicants are typically required to submit both a writing sample—usually a scholarly paper—and a “work sample” that highlights the applicant’s “creative and technical abilities in expressive computing” and aligns with his or her research interests.<sup>95</sup> Program marketing materials indicate that it receives approximately 50 to 100 applicants each year, and admits up to five students.<sup>96</sup>

Graduates of the PhD program have taken positions as “information architects, interactive television producers, game designers, web designers and developers, and educators.”<sup>97</sup> The department’s list of organizations that have hired master’s- or PhD-level Digital Media graduates is provided in Figure 4.3. Some of these organizations also sponsor the program.<sup>98</sup>

**Figure 4.3: Recent Employers of Digital Media Program Graduates**

ORGANIZATIONS THAT HAVE HIRED DIGITAL MEDIA GRADUATES		
<ul style="list-style-type: none"> <li>▪ Apple</li> <li>▪ Bell South</li> <li>▪ Cartoon Network</li> <li>▪ CNN</li> <li>▪ Coca Cola</li> <li>▪ Direct TV</li> <li>▪ Disney Imagineering</li> <li>▪ Electronic Arts</li> </ul>	<ul style="list-style-type: none"> <li>▪ Emory University</li> <li>▪ EZ Gov</li> <li>▪ General Electric</li> <li>▪ Georgia Public Broadcasting</li> <li>▪ Google</li> <li>▪ IBM</li> <li>▪ Interactual</li> <li>▪ IQTV</li> </ul>	<ul style="list-style-type: none"> <li>▪ Microsoft</li> <li>▪ Neilson Norman Group</li> <li>▪ Schematic</li> <li>▪ SGI</li> <li>▪ Showtime</li> <li>▪ Turner Broadcasting</li> <li>▪ Yahoo</li> </ul>

Source: Georgia Institute of Technology <sup>99</sup>

<sup>93</sup> “Digital Media PhD Student Handbook 2016-2017.” Georgia Institute of Technology. p. 4. <http://dm.lmc.gatech.edu/documents/handbooks/DRhandbook2016.pdf>

<sup>94</sup> Ibid. p. 4.

<sup>95</sup> “PhD Applicants, Application Guidelines.” Georgia Institute of Technology. <http://dm.lmc.gatech.edu/admissions/ph-d-applicants/>

<sup>96</sup> Ibid.

<sup>97</sup> Ibid.

<sup>98</sup> “Sponsors-Digital Media.” Georgia Institute of Technology. <http://dm.lmc.gatech.edu/partnerships/sponsors/>

<sup>99</sup> “Careers-Digital Media.” Georgia Institute of Technology. <http://dm.lmc.gatech.edu/partnerships/careers/>

## FUNDING AND RESOURCES

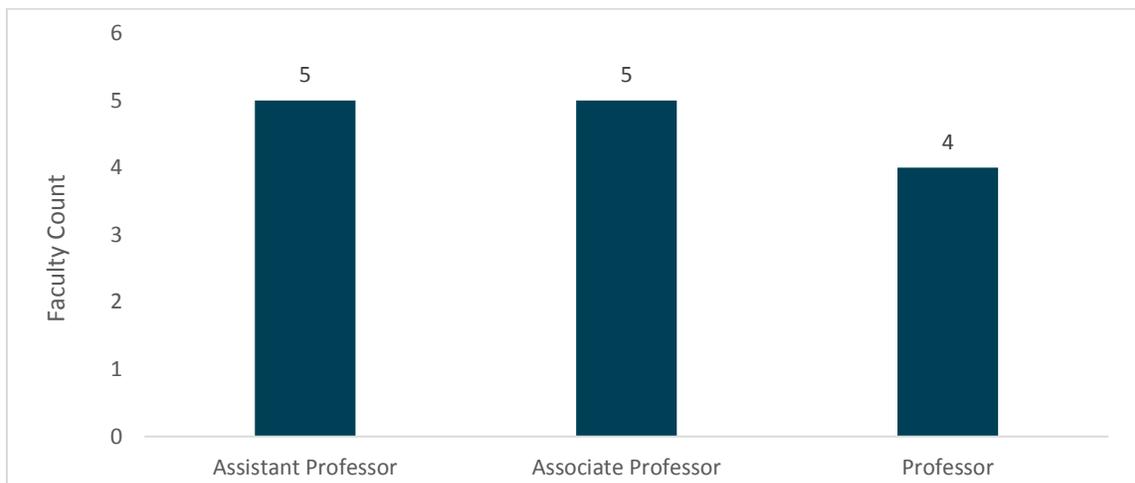
The PhD program handbook indicates that the program “offers most PhD students support on a year-to-year basis in the form of one half time” graduate assistantships. Assistantships can take the form of Research Assistantships, in which students conduct research for a faculty member, or Teaching Assistantships, in which they teach one undergraduate course per semester. Assistantships typically include tuition remission, though students are required to pay mandatory fees out of pocket. Most students receive a maximum of four years of funding, and there are also options for limited summer funding.<sup>100</sup>

Georgia Tech provides a number of resources for the digital media program. These include learning and research labs, workspaces, offices, and labs in the Technology Square Research Building, and access to the Gvu Center. The Center is “an interdisciplinary research facility that brings together people and expertise from all six Georgia Tech colleges in order to solve complex problems.”<sup>101</sup> Initially known as the Graphics, Visualization, and Usability Center, the Gvu Center now hosts a broad array of computer-related research projects, including work

...in the areas of 3D compression, animation, augmented reality, collaborative work, educational technologies, gaming, graphics, human-computer interaction, information visualization, new media, online communities, perception, robotics, ubiquitous computing, virtual reality and wearable computing.<sup>102</sup>

The Digital Media program includes 14 full-time, tenure-track professors, most of whom have appointments in the School of Literature, Media, and Communication. They are broken down by academic rank in Figure 4.4.

Figure 4.4: Digital Media Department Faculty by Rank



Source: Georgia Institute of Technology<sup>103</sup>

<sup>100</sup> “Digital Media PhD Student Handbook 2016-2017.” Georgia Institute of Technology. Op. cit. p. 6.

<sup>101</sup> Ibid. pp. 7-8.

<sup>102</sup> “Values and Mission.” Gvu Center, Georgia Institute of Technology. <http://www.gvu.gatech.edu/about/vision>

<sup>103</sup> “People.” Georgia Institute of Technology. <http://dm.lmc.gatech.edu/people/faculty-and-staff/>

## CURRICULUM

**The Digital Media PhD requires students to complete 60 credits of coursework.** This requirement includes 36 credits of “Foundational and Required Courses” designed to cover three essential topics:<sup>104</sup>

- Critical history, theory, and practice of using of computing technologies for expressive purposes
- Advanced principles of interaction design
- Applied research methods in digital media

Students must also complete a nine-credit minor in a field outside of the School of Literature, Media, and Communication, such as computer science. Finally, students must complete 15 credits of elective courses in Literature, Media, and Communication or, where appropriate, other fields.

Coursework culminates in a Portfolio Review at the end of each student’s first year. Students need to “demonstrate programming competency through course work and/or research projects,” compose a research statement synthesizing their coursework and plotting a future research trajectory, and give a formal presentation to the faculty.<sup>105</sup>

**After coursework and the Portfolio Review, students complete a three-part Comprehensive Exam that includes two written components and a final oral defense.** The written component consists of a Common Examination, usually administered during the spring of a student’s first year of enrollment, followed by an Individualized Examination, which students take at the end of their fourth semester. This latter exam covers topics related to each student’s research project and culminates in the Oral Examination. In order to advance to candidacy and begin their dissertation, students must identify a dissertation committee and compose and defend a Dissertation Prospectus. The program requires students to complete the dissertation within seven years of passing their comprehensive exams.<sup>106</sup>

## IOWA STATE UNIVERSITY – HUMAN-COMPUTER INTERACTION EMPHASIS

As noted in Section I, Iowa State University (Iowa State) offers a program in Human-Computer Interaction (HCI) as part of its Virtual Reality Applications Center (VRAC). **This program is “an interdisciplinary degree program that prepares students for careers in business and industry as well as academia.”** Its attributes are summarized in Figure 4.5.

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<sup>104</sup> “Digital Media PhD Student Handbook 2016-2017.” Georgia Institute of Technology. Op. cit. p. 9.

<sup>105</sup> Ibid. pp. 10-11.

<sup>106</sup> Ibid. pp. 11-14.

**Figure 4.5: Summary of Human-Computer Interaction Program Attributes**

ATTRIBUTE	DESCRIPTION
Program name and focus areas	<b>PhD in Human-Computer Interaction:</b> Combines faculty from 32 academic fields in the humanities, sciences, social sciences, and engineering, among other disciplines
IPEDS five-year completions, 2011-2015 and Program Size	<ul style="list-style-type: none"> <li>▪ 35 IPEDS completions in Human-Computer Interaction; many other completions are likely recorded under HCI students’ “home” departments</li> <li>▪ The HCI program currently hosts over 200 graduate students from departments across the University</li> </ul>
Related program(s) or initiative(s)	<ul style="list-style-type: none"> <li>▪ The program works with faculty from at least 32 academic fields</li> </ul>
Graduate student funding	Most graduate students receive a stipend and tuition remission via their “home” departments, as opposed to the HCI program
Faculty	<ul style="list-style-type: none"> <li>▪ 70 affiliated faculty from 32 academic fields</li> <li>▪ 8 faculty members form the interdisciplinary HCI Supervisory Committee, which administers the program</li> </ul>
Major program requirements	<ul style="list-style-type: none"> <li>▪ 72 credits of coursework, of which 31 must be in HCI</li> <li>▪ HCI Preliminary Examination</li> <li>▪ Applicable “home” department requirements</li> <li>▪ Dissertation and defense</li> </ul>

Source: Iowa State University Human-Computer Interaction Profile

### PROGRAM OVERVIEW AND OBJECTIVES

**The interdisciplinary nature of the HCI program is evident in its 32 academic areas of focus listed** in the 2014 HCI graduate program handbook, which is the most recent version available.<sup>107</sup> HCI degree candidates can work with over 70 Iowa State faculty members from multiple focus areas, and generally register with their dissertation/research director’s academic department for administrative purposes.<sup>108</sup> Students are required to take elective courses from a variety of disciplines across the University and specify a concentration in one of them.<sup>109</sup> Possible concentrations are listed below in Figure 4.6.

<sup>107</sup> “Human Computer Interaction – Interdepartmental Graduate Program Graduate Student Handbook.” Iowa State University. Spring 2014. p. 5. <http://www.vrac.iastate.edu/wp-content/uploads/2014/02/HCI.Handbook.Spring2014.pdf>

<sup>108</sup> Ibid. pp. 5-6, 9.

<sup>109</sup> “PhD Program in Human Computer Interaction.” Iowa State University. Op. cit.

**Figure 4.6: HCI Program Academic Focus Areas**

ACADEMIC FIELDS INVOLVED WITH HCI			
<ul style="list-style-type: none"> <li>▪ Aerospace Engineering and Engineering Mechanics</li> <li>▪ Agricultural and Biosystems Engineering</li> <li>▪ Apparel, Educational Studies &amp; Hospitality Management</li> <li>▪ Architecture</li> <li>▪ Art and Design</li> <li>▪ Biomedical Sciences</li> <li>▪ Chemistry</li> <li>▪ Civil, Construction, and Environmental Engineering</li> </ul>	<ul style="list-style-type: none"> <li>▪ Computer Science</li> <li>▪ Curriculum and Instruction</li> <li>▪ Ecology, Evolution, and Organismal Biology</li> <li>▪ Economics</li> <li>▪ Educational Leadership &amp; Policy Studies</li> <li>▪ Electrical and Computer Engineering</li> <li>▪ English</li> <li>▪ Genetics, Development, and Cell Biology</li> </ul>	<ul style="list-style-type: none"> <li>▪ Geological and Atmospheric Sciences</li> <li>▪ Gerontology</li> <li>▪ Greenlee School of Journalism and Communication</li> <li>▪ Human Development and Family Studies</li> <li>▪ Industrial Design</li> <li>▪ Industrial and Manufacturing Systems Engineering</li> <li>▪ Kinesiology</li> <li>▪ Logistics, Operations, and Management Information Systems</li> </ul>	<ul style="list-style-type: none"> <li>▪ Materials Science and Engineering</li> <li>▪ Mathematics</li> <li>▪ Mechanical Engineering</li> <li>▪ Music</li> <li>▪ Psychology</li> <li>▪ Statistics</li> <li>▪ Veterinary Microbiology, and Preventive Medicine</li> <li>▪ Veterinary Pathology</li> </ul>

Source: Iowa State University<sup>110</sup>

**The HCI program admits students from many academic backgrounds and does not require incoming students to have programming skills.** However, students who enter the program without a programming background are expected to complete one or more courses in the field.<sup>111</sup> Admissions committees generally look at applicants’ academic qualifications, interests, and the research needs of faculty when making decisions, but also prize creativity. Graduates find employment with a variety of major corporations and universities. A selection of organizations that have hired HCI graduates is listed in Figure 4.7.

**Figure 4.7: Recent Employers of Human-Computer Interaction Graduates**

ORGANIZATIONS THAT HAVE HIRED DIGITAL MEDIA GRADUATES		
<ul style="list-style-type: none"> <li>▪ Microsoft</li> <li>▪ Lockheed Martin</li> <li>▪ Boeing</li> <li>▪ Rockwell Collins</li> </ul>	<ul style="list-style-type: none"> <li>▪ Garmin</li> <li>▪ Saint Jude Medical Center</li> <li>▪ Raytheon</li> <li>▪ John Deere</li> </ul>	<ul style="list-style-type: none"> <li>▪ Hazen &amp; Sawyer</li> <li>▪ Electronic Arts</li> <li>▪ Oklahoma State University</li> </ul>

Source: Iowa State University<sup>112</sup>

<sup>110</sup> “Human Computer Interaction – Interdepartmental Graduate Program Graduate Student Handbook.” Iowa State University. Op. cit. pp. 5-6.

<sup>111</sup> “HCI: Frequently Asked Questions.” Iowa State University. <http://www.vrac.iastate.edu/hci/faq/>

<sup>112</sup> “Ibid.

## FUNDING AND RESOURCES

As noted above, HCI students are generally attached to a specific academic department that participates in the HCI graduate program. Similarly, **faculty members are typically appointed to a “home” department and advise graduate students in the HCI program as part of their workload.** The HCI program’s Supervisory Committee is composed of eight faculty members from Iowa State’s Mechanical Engineering, Graphic Design, Agricultural and Biosystems Engineering, Industrial Manufacturing and Systems Engineering, Veterinary Pathology, Psychology, and Engineering Administration programs.<sup>113</sup> The program lists over 200 graduate students (master’s and PhD level) whose home departmental affiliations range from engineering departments to psychology, computer science, bioinformatics and computational biology, liberal arts and sciences, arts and design, and journalism and communication.<sup>114</sup>

Funding for HCI program PhD students is widely available, but its sources vary. Funds can come from a student’s home department or from external sources, and the responsibilities students assume to earn their support also varies. Students admitted concurrently to the HCI program and a “home” department receive stipends from their home departments or the professor they are conducting their research under. No assistantship can be more than “half time,” or 20 hours per week. In addition to stipends, HCI students also receive health insurance through the University.<sup>115</sup> While the HCI program allows students to be admitted without specifying a home department upon matriculation, all students must align themselves with a department within one year of enrollment.<sup>116</sup>

## CURRICULUM

When a student is admitted to the HCI PhD program, it is generally expected that they will complete the degree within four to five years. All admitted students fall into one of two categories based upon whether they have applied directly to the HCI program or have already been admitted to another program and subsequently sought to study HCI:<sup>117</sup>

- **First year students:** New students admitted into HCI as a major will either be assigned an academic department or will take part in a rotation through the program until the student makes a final selection of an academic department. A rotation through HCI allows the program to admit students in cases in which a decision on the academic department needs some time for consideration or the major professor is not yet known.
- **Current ISU students admitted to HCI as “transfers,” “co-majors,” or “concurrent degree candidates”:** A student admitted to HCI as a transfer from another ISU department or program, or as a co-major or concurrent degree candidate usually has the same home department as that of his/her major professor.

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<sup>113</sup> “HCI Administration.” Iowa State University. <http://www.vrac.iastate.edu/hci/supervisory/>

<sup>114</sup> “Graduate Students-HCI.” Iowa State University. <http://www.vrac.iastate.edu/directory/graduates/>

<sup>115</sup> “Human Computer Interaction – Interdepartmental Graduate Program Graduate Student Handbook.” Iowa State University. Op. cit. pp. 25-26.

<sup>116</sup> Ibid. p. 9.

<sup>117</sup> Bulleted list quoted verbatim from: Ibid. p. 9.

As noted above, students must choose a home department within their first year of enrollment, and must then work with an advisor from that department to create a Program of Study Committee and devise a suitable program of study. For PhD students, the Program of Study Committee must consist of five members of the Iowa State Graduate College Faculty. One of the members must be from both the student's home department and the HCI program, and a second member must be a faculty member from outside of the HCI program and the student's home department.<sup>118</sup>

**PhD candidates must complete 72 credits of coursework, 31 of which fulfill HCI program requirements.** These courses are listed below in Figure 4.8. The HCI program also requires doctoral students to complete a Preliminary Examination prior to advancing to candidacy. This generally takes place at the end of the fall semester of each student's third year. Passing the Preliminary Examination allows the student to progress to the dissertation.

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<sup>118</sup> Ibid. pp. 18-19

**Figure 4.8: Iowa State University HCI Core Courses and Electives**

CORE COURSES (18 CREDITS); MUST INCLUDE ONE COURSE FROM EACH BOLDFACE CATEGORY	RECOMMENDED ELECTIVES (13 CREDITS)
<p style="text-align: center;"><b>Design</b></p> <ul style="list-style-type: none"> <li>▪ HCI 521 Cognitive Psychology of HCI</li> <li>▪ ArtGR 672B Graphic Design and Human Interaction: Design for Social Inclusion</li> </ul> <p style="text-align: center;"><b>Implementation</b></p> <ul style="list-style-type: none"> <li>▪ HCI 575 Computational Perception</li> <li>▪ HCI 574 Computational Implementation and Prototyping</li> <li>▪ HCI 573X User Interface Implementation for Web Applications</li> <li>▪ CprE/ME 557 Computer Graphics and Geometric Modeling</li> </ul> <p style="text-align: center;"><b>Phenomena</b></p> <ul style="list-style-type: none"> <li>▪ JLMC / TSC 574 Communication Technology and Social Change</li> <li>▪ HCI 589X Design and Ethics</li> </ul> <p style="text-align: center;"><b>Evaluation</b></p> <ul style="list-style-type: none"> <li>▪ ENGL/STAT 332 Visual Communication of Quantitative Information</li> <li>▪ PSYCH 501X Foundations of Behavioral Research</li> <li>▪ STAT 480 Statistical Computing Applications</li> <li>▪ HCI 504 Managing and Evaluating Instructional Technology Programs</li> <li>▪ HCI 522 Scientific Methods in HCI</li> </ul>	<ul style="list-style-type: none"> <li>▪ ArtIS 508 Computer Aided Visualization (Implementation)</li> <li>▪ CI 503 Theories of Designing Effective Learning and Teaching Environments (Design)</li> <li>▪ CI 511 Technology Diffusion Leadership and Change (Phenomena)</li> <li>▪ HCI 520 Computational Analysis of English (Implementation)</li> <li>▪ HCI 522 Scientific Methods in HCI (Evaluation)</li> <li>▪ HCI 558 Introduction to the 3D Visualization of Scientific Data (Implementation)</li> <li>▪ HCI 580X Virtual Worlds and Applications (Implementation)</li> <li>▪ HCI 585X Developmental Robotics (Implementation)</li> <li>▪ HCI 587X Models and Theories in Human Computer Interaction</li> <li>▪ HCI 594 Organizational Applications of Collaborative Technologies and Social Media</li> <li>▪ HCI 595 Visual Design for HCI (Design)</li> <li>▪ HCI 596 Emerging Practices in HCI (Evaluation)</li> <li>▪ HCI 603 Advanced Systems Design (Implementation)</li> <li>▪ HCI 681X Cognitive Engineering</li> <li>▪ IE 577 Human Factors</li> <li>▪ ME/FLNG 584 Technology, Globalization and Culture (Phenomena)</li> <li>▪ STAT 401 Statistical Methods for Research Workers (Evaluation)</li> </ul>

Source: Iowa State University<sup>119</sup>

<sup>119</sup> Ibid. pp. 12-13.

## INDIANA UNIVERSITY BLOOMINGTON – INFORMATICS AND DESIGN EMPHASIS

Indiana University Bloomington (IUB) offers a Human-Computer Interaction Design program that takes a design-inflected, highly interdisciplinary approach to HCI. Program literature states that while HCI “has traditionally been the domain of engineering and psychology... we approach it from the perspective of design.”<sup>120</sup> The program, abbreviated as HCI/d, offers both a “highly structured curriculum” and the chance for students to pursue their individual strengths and interests. Students are admitted from many academic backgrounds ranging from computer science to liberal arts.<sup>121</sup> Figure 4.9 summarizes the key attributes of the HCI/d PhD program.

**Figure 4.9: Summary of Human-Computer Interaction/Design Program Attributes**

ATTRIBUTE	DESCRIPTION
Program name and focus areas	<b>PhD in Informatics - Human-Computer Interaction/Design (HCI/d):</b> This program is one of several “majors” in the Informatics PhD; other concentrations include Bioinformatics, Complex Networks and Systems, Intelligent and Interactive Systems, Music Informatics, Proactive Health Informatics, and Security
IPEDS five-year completions, 2011-2015 and Program Size	<ul style="list-style-type: none"> <li>▪ 15 IPEDS completions in Information Science/Studies; many other completions are likely recorded under Informatics students’ specific majors</li> <li>▪ The Informatics program currently lists 97 PhD students, though the proportion of HCI/d students is not specified</li> </ul>
Related program(s) or initiative(s)	<ul style="list-style-type: none"> <li>▪ The HCI/d is one of six “majors” within the Informatics PhD program; there is significant overlap between these majors</li> </ul>
Graduate student funding	Most graduate students receive a stipend and tuition remission through the School of Informatics and Computing; the most common sources of funding are graduate assistantships
Faculty	<ul style="list-style-type: none"> <li>▪ The HCI/d graduate program lists 22 affiliated faculty</li> </ul>
Major program requirements	<ul style="list-style-type: none"> <li>▪ 60-71 credits of coursework, including a 6-12 credit minor in another Informatics subfield or a subfield beyond the School of Informatics and Computing</li> <li>▪ Oral and Written Qualifying Examination</li> <li>▪ Dissertation and defense</li> </ul>

Source: Indiana University Bloomington Informatics/Human-Computer Interaction Profile

<sup>120</sup> “Graduate-Human-Computer Interaction Design.” Indiana University Bloomington. <https://www.soic.indiana.edu/graduate/degrees/informatics/hcid/>

<sup>121</sup> Ibid.

## PROGRAM OVERVIEW AND OBJECTIVES

The HCI/d graduate program is part of the School of Informatics and Computing, which offers both a PhD and a Master of Science option. Both of these degrees seek to help students “refine [their] personal design philosophy” via course work that:<sup>122</sup>

- Teaches the key history, literature, and research of HCI design (HCI/d)
- Introduces multiple frameworks, research techniques, and creative exercises
- Develops the skills necessary to use and design current and emerging applications
- Explores the socioeconomic consequences of implementing technologies in different cultures

**The PhD in Informatics—of which the HCI/d program is a specific concentration—focuses on multiple aspects of informatics and computing including complex systems, music informatics, security informatics, and social informatics.** Students can declare concentrations in Bioinformatics, Complex Networks and Systems, Intelligent and Interactive Systems, Music Informatics, Proactive Health Informatics, and Security.<sup>123</sup> Among the potential Informatics majors, two fields in particular span the intersection of humanities and technology. They are the HCI/d and Computing, Culture, and Society concentrations.<sup>124</sup>

**While the HCI/d program is discussed in more detail below, concentrations often overlap, and students are required select courses and advisors from different combinations of majors.** The Computing, Culture, and Society concentration, for instance, can involve

...course work in other fields within the School of Informatics and Computing—such as complex systems, bioinformatics, human-computer interaction, data visualization, music informatics, and secure computing—as well as courses offered through the Department of Information and Library Science and the Department of Telecommunications.<sup>125</sup>

### Indiana University Bloomington HCI/d PhD Concentrations

- Interaction design
- Computer-supported cooperative work (CSCW)
- New media
- Dynamic visualizations
- Computer-mediated communication
- Usability and evaluation methods
- Collaborative shared surfaces
- External representations
- Augmented reality
- Learning systems
- Design pedagogy

*-Source: HCI/d Program Website, Indiana University Bloomington*

<sup>122</sup> Bulleted list summarizes content from: Ibid.

<sup>123</sup> See: “Graduate: Informatics.” University of Indiana Bloomington.

<https://www.soic.indiana.edu/graduate/degrees/informatics/index.html>

<sup>124</sup> Ibid.

<sup>125</sup> “Computing, Culture and Society Ph.D. Requirements.” Indiana University Bloomington.

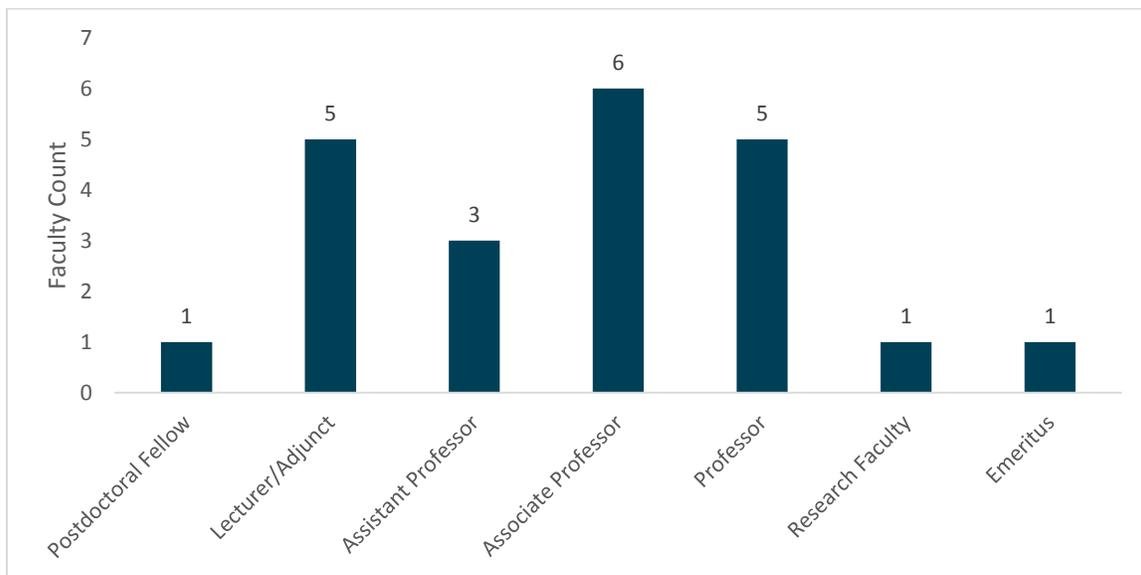
<https://www.soic.indiana.edu/graduate/degrees/informatics/social-informatics/phd-requirements.html>

The HCI/d program’s major research areas are displayed in the inset text box above. All students in the HCI/d program are required to declare a minor inside the School of Informatics and Computing or beyond.<sup>126</sup> While the HCI/d program recruits students from many disciplines, successful applicants generally have a “basic knowledge” of HCI or similar disciplines.<sup>127</sup> In general, Informatics program graduates—including HCI/d majors—go on to assume academic positions in teaching or research, or “conduct research for industries that use informatics.”<sup>128</sup>

### FUNDING AND RESOURCES

The HCI/d concentration relies on a core group of 22 School of Informatics and Computing faculty. Figure 4.10 breaks this group down by academic rank. There are 97 Informatics PhD students listed on the School of Informatics and Computing website, but it is not possible to determine how many of them are specializing in HCI/d, as opposed to the other Informatics concentrations named above.<sup>129</sup>

**Figure 4.10: HCI/d Program Faculty by Rank**



Source: Indiana University Bloomington<sup>130</sup>

Students in the HCI/d concentration and the Informatics PhD program more generally have several options for funding. The most commonly awarded funding package takes the form of half-time (20 hours per week) Research or Associate Instructorship (Teaching Assistantship)

<sup>126</sup> “HCI/d Ph.D. Requirements.” Indiana University Bloomington.

<https://www.soic.indiana.edu/graduate/degrees/informatics/hcid/phd-requirements.html>

<sup>127</sup> Ibid.

<sup>128</sup> “Doctor of Philosophy in Informatics 2014 Handbook.” University of Indiana Bloomington. p. 4.

<https://www.soic.indiana.edu/doc/graduate/graduate-forms/info-phd-handbook-2014.pdf>

<sup>129</sup> See: “Graduate Student Directory – School of Informatics and Computing.” Indiana University Bloomington.

<https://www.soic.indiana.edu/graduate/directory/index.html>

<sup>130</sup> “Graduate Faculty – Human Computer Interaction Design.” Indiana University Bloomington.

<https://www.soic.indiana.edu/graduate/degrees/informatics/hcid/faculty.html>

positions. Students holding these positions receive tuition remission and a monthly stipend whose value is determined by their academic performance and degree progress. The precise value of these awards is not specified.<sup>131</sup>

## CURRICULUM

In total, the Informatics PhD requires students to complete 90 credits. Thirty of these credits may transfer from a related master's degree, and another 21-30 are dissertation credits, leaving a total of 60-71 credits of graduate coursework for students who enter with a bachelor's degree. These credits are comprised over several different requirements, which are outlined below:<sup>132</sup>

- **Required Informatics Courses (18 cr.)**
  - INFO I501 Introduction to Informatics (3 cr.)
  - INFO I502 Human-Centered Research Methods in Informatics (3cr.)
  - Two advanced research seminars in Human-Computer Interaction Design (3 cr. each)
  - Two research rotations with student-selected faculty (3 cr. each)
- **Theory and Methodology (12 cr.):** Specific coursework, including research-oriented independent study, will be determined by the student's advisory committee.
- **Electives (12-21 cr.):** Research lab experience may be substituted for classroom courses upon approval of the advisor and the advisory committee.
- **Minor (6-12 cr.):** All students are required to have an appropriate minor inside or outside the school. Minors will be selected with the advisor's recommendation.

Minors should be appropriate to the student's research interests and approved by his or her faculty advisory committee. The program handbook lists "biology, chemistry, physics, cognitive science, computer science, history and philosophy of science, anthropology, statistics, information science, law, sociology, or learning sciences" as potentially relevant minors, though minors in other fields are also possible.<sup>133</sup>

All students are required to complete an in-depth Qualifying Examination as prescribed by the program faculty. Typically, the exam must be completed within the student's fourth year of enrollment and includes a written and oral component that must be completed before the dissertation can be started. Upon passing the Qualifying Examination and achieving candidacy, students must complete and defend a dissertation.

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<sup>131</sup> "Computer Science, Informatics, and Intelligent Systems Engineering – Financial Support." Indiana University Bloomington. <https://www.soic.indiana.edu/graduate/financial-aid/computer-science-informatics-intelligent-systems-engineering.html>

<sup>132</sup> List quoted verbatim from: "HCI/d Ph.D. Requirements." Indiana University Bloomington. Op. cit.

<sup>133</sup> "Doctor of Philosophy in Informatics 2014 Handbook." University of Indiana Bloomington. Op. cit. p. 5.

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