

DEPARTMENT OF
HIGHER EDUCATION &
WORKFORCE DEVELOPMENT

New Program Report

Date Submitted:

02/12/2024

Institution

University of Missouri-Kansas City

Site Information

Implementation Date:

8/1/2024 12:00:00 AM

Added Site(s):

Selected Site(s):

University of Missouri-Kansas City, 5100 Rockhill Road, Kansas City, MO, 64110

CIP Information

CIP Code:

110701

CIP Description:

A program that focuses on computer theory, computing problems and solutions, and the design of computer systems and user interfaces from a scientific perspective. Includes instruction in the principles of computational science, computer development and programming, and applications to a variety of end-use situations.

CIP Program Title:

Computer Science

Institution Program Title:

Computer Science

Degree Level/Type

Degree Level:

Doctoral Degree (Research PhD)

Degree Type:

Doctor of Philosophy (PHD)

Options Added:

Collaborative Program:

N

Mode of Delivery

Current Mode of Delivery

Classroom

Student Preparation



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Special Admissions Procedure or Student Qualifications required:

A student who meets the minimum discipline requirements stated below will be considered for regular admission to the Ph.D. program. A student, who does not meet some of the requirements but shows high potential for advanced-level work, may be considered for provisional admission.

Admission also depends on factors such as number of seats available, resources available in the area of student's interest, the quality of previous work, etc. A student who does not qualify for admission to the Ph.D. program, may be considered for admission to the M.S. in computer science program. Requirements for admission are similar, whether the applicant is requesting computer science as the primary or co-discipline. Minimum Recommended Ph.D. Admission Requirements:

1. GPA (Bachelor or equivalent Degree): 3.5 in the scale of 4 (or equivalent)
2. GPA (MS or equivalent Degree if any): 3.5 in the scale of 4 (or equivalent)
3. GRE (Quantitative) minimum score: 80%
4. TOEFL iBT minimum Score: 89 or IELTS minimum score: 6.5
5. Prior Projects or Publications (Preferred)*
6. Internationally Acceptable Accreditation of the Prior Degree Awarding Institutes

* Prior research project and/or publication record is not required for admission into CS Ph.D. program. However, doctoral faculty members give very high value to the students with such backgrounds.

Specific Population Characteristics to be served:

n/a

Faculty Characteristics

Special Requirements for Assignment of Teaching for this Degree/Certificate:

All faculty with teaching responsibilities in the PhD, Computer Science program will have a terminal degree, PhD or professional doctoral degree (MD, DDS, PharmD).

Estimate Percentage of Credit Hours that will be assigned to full time faculty:

Full time faculty will teach 100% of coursework/credit hours in the program.

Expectations for professional activities, special student contact, teaching/learning innovation:

Faculty teaching in the program will be expected to engage in professional activities and teaching/learning innovation activities

including research, and participation and presentations at professional organizations and societies.

Faculty will also be expected to mentor and advise students while enrolled in the program and while engaging in independent research.

Student Enrollment Projections Year One-Five

Year 1	Full Time: 27	Part Time: 0	
Year 2	Full Time: 32	Part Time: 0	
Year 3	Full Time: 32	Part Time: 0	Number of Graduates: 5
Year 4	Full Time: 32	Part Time: 0	
Year 5	Full Time: 32	Part Time: 0	Number of Graduates: 5



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Percentage Statement:

n/a

Program Accreditation

Institutional Plans for Accreditation:

Like the current I PhD program, the proposed PhD program in Computer Science at UMKC falls under the purview of the university's institutional accreditation. The university is accredited by the Higher Learning Commission, one of the regional accrediting bodies recognized by the U.S. Department of Education, which ensures that the institution and all its programs, including the proposed PhD program, meet the established standards of academic quality.

While ABET is indeed a recognized accrediting body for programs in applied and natural science, computing, engineering, and engineering technology, its scope primarily covers associate, bachelor's, and master's degree programs, rather than doctoral ones. To ensure our PhD program meets the highest standards, we will adhere to guidelines and curricular recommendations provided by influential professional organizations such as the Association for Computing Machinery (ACM) and the Institute of Electrical and Electronics Engineers (IEEE). These guidelines, although not equivalent to accreditation, offer a robust framework for maintaining academic and research excellence. Additionally, we will continually monitor and evaluate the program's performance in areas like faculty research output, student success, and alignment with industry trends and demands. This continuous assessment will aid in enhancing our program's reputation and ensuring we deliver a high-quality education to our doctoral students. Lastly, while there is no specific timeline for accreditation given the context of doctoral programs, we commit to maintaining the university's existing institutional accreditation status and upholding the standards expected by our accrediting body, the Higher Learning Commission.

Program Structure

Total Credits:

42

Residency Requirements:

Ph.D. students must satisfy the doctoral residency requirement by satisfactory completion of at least 18 credits in no more than 24 consecutive months. When satisfying the residency requirement, all Ph.D. students are subject to the following restrictions:

- The doctoral residency requirement must be satisfied no later than the end of the semester in which the student completes his or her comprehensive examinations.
- Students must achieve a cumulative graduate grade-point average of at least 3.0 in all courses counted toward satisfying the residency requirement.

General Education Total Credits:

42

Major Requirements Total Credits:

42

Course(s) Added

COURSE NUMBER	CREDITS	COURSE TITLE
Comp Sci 5590	3	Special Topics "Distributed Computing"
Comp Sci 5565	3	Intro to Statistical Learning



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XXXX	12	Dissertation
Comp Sci 5540	3	Principles of Big Data Management
Comp Sci 5590	3	Special Topics â€” Intro to Blockchain
Comp Sci 5590	3	Special Topics â€” Intro to Blockchain
CSEE 5690	3	Adv. Special Topics â€” Research and Experimental Design
CSEE 5690	3	Adv. Special Topics â€” Deep Learning
Comp Sci 5590	3	Special Topics â€” Internet of Things / Embedded Systems
Comp Sci 5590	3	Special Topics â€” Multimedia Communication
Comp Sci 5582	3	Computer Vision

Free Elective Credits:

0

Internship or other Capstone Experience:

12 credit hours of dissertation are required.

Assurances

I certify that the program is clearly within the institution's CBHE-approved mission. The proposed new program must be consistent with the institutional mission, as well as the principal planning priorities of the public institution, as set forth in the public institution's approved plan or plan update.

I certify that the program will be offered within the proposing institution's main campus or CBHE-approved off-site location.

I certify that the program will not unnecessarily duplicate an existing program of another Missouri institution in accordance with 6 CSR 10-4.010, subsection (9)(C) Submission of Academic Information, Data and New Programs.

I certify that the program will build upon existing programs and faculty expertise.

I certify that the program can be launched with minimal expense and falls within the institution's current operating budget.

I certify that the institution has conducted research on the feasibility of the proposal and it is likely the program will be successful. Institutions' decision to implement a program shall be based upon demand and/or need for the program in terms of meeting present and future needs of the locale, state, and nation based upon societal needs, and/or student needs.

Contact Information

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Kent

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New Degree Proposal

FULL PROPOSAL

Basic Program Information

Sponsoring University: University of Missouri – Kansas City

College or School: School of Science and Engineering

Department: Computing, Analytics, and Mathematics (CAM)

Proposed Program Title: Computer Science, PhD

Degree Level/Type: Doctoral

Emphasis Areas: None

Program Modality: In-person

If online component: n/a

Program CIP Code¹: CIP 11.0701

Implementation: August 2024

Expected Date of First Graduation: May 2025

Proposal Author(s): Dianxiang Xu, Professor and CAM Division Director

Name, phone, and email of person primarily responsible for the proposal:

Professor Dianxiang Xu, 816-235-6218 – dxu@umkc.edu

Individual(s) Responsible for Success of the Program:

Dianxiang Xu, CAM Division Director

Kevin Truman, SSE Dean

¹ A selection of CIP codes can be viewed on the National Center for Education Statistics website: <https://nces.ed.gov/ipeds/cipcode/browse.aspx?y=55>

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Executive Summary

UMKC currently offers a PhD in Interdisciplinary Studies under CIP code 30.0000 (Multi-/Interdisciplinary Studies, Other; Defined as “any instructional program multi/interdisciplinary studies not listed above,” National Center for Education Statistics). As part of a comprehensive strategy to improve academic and research excellence, inclusive of Carnegie R1 classification, UMKC seeks to close the current, catch-all interdisciplinary PhD and create eight (8) discipline-specific and more narrow interdisciplinary PhD programs from the over 20 primary disciplines within it.

This transition will allow for the following: Carnegie credit for degree conferrals across STEM, Social Science, and Humanities disciplines, improved research ranking and reputation as a discovery enterprise, advantage in recruiting high quality students and faculty, and enhanced clarity and validity with students and employers regarding the curricula offered as part of our doctoral degrees.

This proposal focuses on a new **Computer Science PhD** that can be delivered with existing courses, faculty, staff, student support services, assistantship funding, and other resources currently allocated to the computer science primary discipline within the Interdisciplinary PhD.

The primary aim of the Computer Science (CS) PhD program is to shape research scholars who are proficient in computing principles and practices, capable of generating new knowledge through research, while being adept at communicating their expertise. The program, like the current computer science primary discipline within the Interdisciplinary PhD program, seeks to enhance the understanding of computer science as a discipline of abstraction, design, and innovation. Its comprehensive curriculum and research opportunities are designed to impart both the fundamental principles of computing and the latest technological advancements, as well as the methodologies essential for advanced research. The program underscores the importance of fostering independent critical thinking, problem-solving abilities, and innovative skills within the computer science arena. Its goal is to equip graduates with the necessary tools to assume roles as thought leaders, researchers, and educators, thereby spearheading future technological advancements. The program also emphasizes the importance of ethical computing practices, data privacy, and security due to the extensive influence of technology on society. With this new program, we will continue producing graduates capable of carrying out significant original research in computer science, pushing the boundaries of current knowledge, contributing to the scholarly corpus in computer science, and paving the way for future advancements in this rapidly evolving field.

Curriculum

The proposed PhD program in Computer Science mirrors the existing doctoral program, maintaining academic rigor through a balanced curriculum. This curriculum includes foundational courses, advanced coursework, research seminars, and a comprehensive doctoral dissertation, all drawn from the existing structure and resources of the doctoral program.

As with the current doctoral program, a minimum of 30 classroom credits are required, including fundamental and advanced courses along with seminars. Additionally, a doctoral dissertation requires a minimum of 12 research credits.

1. Introduction

The PhD in Interdisciplinary Studies (30.0000) was launched in 1989. For many years it has provided UMKC students the opportunity to develop as scientists and scholars in their chosen field by combining two or more disciplines of study. The Interdisciplinary PhD at UMKC originally included 26 distinct disciplines, ranging from STEM to social sciences to the humanities. Despite its strength as a highly flexible doctoral degree, it limits our ability to attract highly competitive PhD students who want a narrower disciplinary focus, as well as prospective students who are seeking STEM certified doctoral education. Most recently, we have learned that the current Interdisciplinary PhD program is not recognized by Carnegie in their university classification system—a significant barrier in our progress toward becoming a Carnegie R1 institution.

To address these challenges, we aim to transition the current Interdisciplinary PhD program into eight (8) distinct PhD programs that will be attractive to students (evidenced by historical enrollment data) and that will be recognized by Carnegie. These include **Computer Science, Economics, Education, Engineering (Electrical and Computing; Civil; and Mechanical), Humanities, plus a multidisciplinary PhD in Natural Sciences**. These doctoral research programs were selected after extensive review and discussion with doctoral faculty across the university because they are the strongest historic enrollments, core faculty of active researchers, and greatest potential for ongoing success at UMKC. Together they promise to have a significant impact on our ranking as a research institution, and the workforce in the Kansas City and greater MO area through the research and post-graduate employment outcomes produced by the graduates.

This proposal focuses on the **PhD in Computer Science**.

Impact:

The impact of this broad degree transition, including the **PhD in Computer Science**, will be the following: Carnegie credit for degree conferrals across STEM, Social Science, and Humanities disciplines, improved research ranking and reputation as a discovery enterprise, advantage in recruiting high quality students and faculty, and enhanced clarity and validity with students and employers regarding the curricula offered as part of our doctoral degrees.

2. University Mission & Program Analysis

2.A. Alignment with University Mission & Goals

The PhD program in Computer Science is in perfect harmony with the broader research aspirations of the university. At UMKC, our ethos and our students share a forward-looking perspective, embodied in our ambitious vision for the future, succinctly encapsulated in our guiding mantra: Changing the world starts here. This new program echoes UMKC's steadfast commitment to research, innovation, and community involvement at the campus level, with an emphasis on original research, the advancement of technology, and impacts that are regional, national, and international. This initiative will serve to further cultivate UMKC's research culture, advancing the frontiers of computer science knowledge, and positioning our campus as a hub for technological innovation. Within the college framework, the program is in step with the mission of promoting rigorous academic pursuit, encouraging interdisciplinary collaboration, and driving excellence in education. By encouraging pioneering research and interdisciplinary studies in burgeoning fields such as data science, cybersecurity, AI, and their healthcare applications, the program bolsters the academic stature of the college. Additionally, the program pledges to continually nurture top-tier educators who will play a pivotal role in fulfilling the college's commitment to superior educational quality.

From a departmental perspective, the proposed program supports the Computer Science Department's goals of providing innovative education, fostering research, and preparing students for leadership roles in industry and academia. Like the existing doctoral program, the program will help the department stay ahead of the rapid advancements in the field, ensuring its curriculum and research initiatives remain relevant and impactful. Therefore, the PhD program in Computer Science aligns well with the mission and goals at various levels of the institution - campus, college, and department - enhancing UMKC's overall educational and research stature.

2.B. Duplication & Collaboration within Campus, Across System

There is no new duplication within the University of Missouri System because our program's unique framework already exists, thereby posing no new duplication risk to other campuses. While our current doctoral program provides students with an opportunity to delve into computer science research within an interdisciplinary framework, our proposed Computer Science PhD program introduces a specialized focus, a necessity borne out of the rapid advancement and increasing specialization in the field. The proposed program aims to address the escalating demand for specialized expertise in computer science, both within academic circles and the wider employment landscape. It prioritizes vital domains such as data science, artificial intelligence, the hardware and software aspects of data science, cybersecurity, and the application of these technologies in the healthcare sector.

Moreover, although similar programs may exist within the University of Missouri System, our proposed program is specifically designed to cater to the unique needs of the Kansas City region.

Kansas City, with its diverse industrial base and growing tech sector, has distinctive demands best addressed by a specialized program rooted in the community but with national and international appeal and applications.

In conclusion, potential duplication concerns are recognized, but the specificity and focus of the degree programs, the market responsiveness, the national and international appeal and applications, and the proven track record of success reinforce the validity of our proposed Computer Science PhD program.

3. Business-Related Criteria & Justification

3.A. Market Analysis

3.A.1. Rationale & Workforce Demand for the Program

Technology's ubiquitous role across all economic sectors has magnified the need for advanced expertise in computer science fields, such as data science, cybersecurity, artificial intelligence, and related healthcare applications. UMKC plays a pivotal role in nurturing this vital talent pool. Current trends in the Kansas City job market underscore a compelling need for PhD graduates equipped with a research-based understanding of computer science and innovative problem-solving skills. Such individuals are crucial to the dynamic evolution of the tech industry and play a significant role in the education of future computer science professionals.

A seamless transition to the newly coded and titled program will be facilitated by leveraging existing resources, faculty, and infrastructure that are currently dedicated to the interdisciplinary PhD program. No new faculty, staff, student support services, or other resources are needed.

Impact:

The proposed PhD program in Computer Science at UMKC continues our impact at regional, state, and national levels. First, the program already contributes to the cultivation of a highly skilled talent pool in computer science, bolstering the technological capabilities within Kansas City and the wider Missouri area. This expertise attracts, and will continue to attract, more technology-based businesses to the region, enhancing local economic growth and diversifying the job market. Second, graduates from the interdisciplinary PhD program already find prominent roles within local industries and academia, becoming drivers of innovation and technological advancement. By being at the forefront of research in critical areas such as data science, cybersecurity, AI, and their applications in healthcare, these individuals foster technological advancements that improve the region's quality of life and healthcare outcomes.

The program's impact will extend even further into the educational sector once our CIP code is more amenable to a prominent research profile. A strong PhD program has the potential to promote sustained growth in STEM education within the state. The revised code and title will make the program an even more noted hub for computer science education and research in the Midwest, drawing students and researchers from the surrounding areas and enhancing Missouri's

reputation in the tech education sphere. In conclusion, the proposed change from an interdisciplinary PhD to a PhD in Computer Science at UMKC has the potential to improve our success in making transformative changes in the regional and state-level economy, technology sector, and educational landscape.

3.A.2. Student Demand for the Program

Student demand is evidenced by our previous five-year enrollment trends in the Computer Science primary discipline within the current UMKC interdisciplinary PhD program. The Computer Science primary discipline has ranged from 27-36 students/year with an average of 31.4 students/year. The Computer Science PhD program is estimated to have approximately 32 students/year. Pending approval, we will encourage current interdisciplinary PhD students to switch to the new degree program in Fall 24; those who want to complete their degree within the existing interdisciplinary PhD program will be allowed to do so. Admission to the existing interdisciplinary PhD program will be suspended in Fall 24 and program teach out will begin. This period of transition is reflected in the enrollment projections below.

Table 1a. Student Enrollment Projections (anticipated total number of students enrolled in the program during the first five fall semesters following implementation.)

Year:	1	2	3	4	5
Full-time	27	32	32	32	32
Part-time	0	0	0	0	0
Total	27	32	32	32	32

Table 1b. Projected Number of Degrees Awarded

Year:	1	2	3	4	5	6	7	8	9	10
# of Degrees Awarded	5	5	5	5	5	5	5	5	5	5

3.B. Financial Projections

Research-based doctoral education (i.e., PhD) differs in key ways from professional doctoral education (e.g., JD, MD, PharmD, DDS, etc.). These differences can be found in the curricular and academic experiences, size of the student cohorts, and relationship of the program to the University mission. As such, there are significant differences in the financial models between research-based and professional doctoral programs. Research-based doctoral programs (e.g., PhD), in contrast to professional doctoral programs (e.g., JD, MD, PharmD, etc.), generally accept a smaller cohort of new students each year and often offer full or partial financial support in the form of tuition waivers and graduate assistantships. PhD students, in turn, make significant contributions to faculty research through their work on research studies (e.g., data collection), dissemination of research findings (e.g., manuscript/monograph writing), and grant writing. PhD students also provide critical support to the educational mission of the University through mentorship and instruction of undergraduate students. In most instances, PhD programs are revenue neutral or have a financial cost that is offset by positive impact on university research productivity and support of undergraduate education.

In the sections that follow, we have estimated the costs and revenues associated with the PhD in Computer Science. *Notably, because we are using the same resources, the net revenue and financial impact of the PhD in Computer Science is the same as the Computer Science primary discipline within the existing interdisciplinary PhD program.*

3.B.1. Additional Resources Needed

No new resources are needed, inclusive of instructional costs, assistantship funding, marketing, or other university overhead.

3.B.2. Revenue

Revenues are generated from tuition (net scholarshiping) and remain the same as the existing interdisciplinary PhD program.

3.B.3. Net Revenue

No new one-time expenses are needed because all resources exist within the current interdisciplinary PhD program. Similarly, recurring expenses are not new, and are estimated based on the current interdisciplinary PhD program. Existing recurring expenses and revenues will shift from the interdisciplinary PhD to the new PhD, with the majority of that shift happening in year 1, as most current students transfer to the new degree program.

Faculty salaries are estimated at .10 FTE (representing 25% of their overall teaching workload) for the current faculty who participate in teaching and mentorship within the interdisciplinary PhD. Notably, most courses are co-taught with master’s students, thereby inflating the FTE specific to PhD students; this inflation is offset by the variable amount of time spent mentoring dissertations. Staff estimates represent staff support time within the academic unit. Institutional overhead includes library and all central campus enrollment management and student support staff. Other includes assistantship stipends and associated tuition remission.

Table 2. Financial Projections for Proposed Program for Years 1 Through 5.

	Year 1	Year 2	Year 3	Year 4	Year 5
1. Expenses per year					
A. One-time					
<i>New/Renovated Space</i>	0	0	0	0	0
<i>Equipment</i>	0	0	0	0	0
<i>Library</i>	0	0	0	0	0
<i>Consultants</i>	0	0	0	0	0
<i>Other</i>	0	0	0	0	0
Total one-time	0	0	0	0	0
B. Recurring					

<i>Faculty</i>	83510	83510	83510	83510	83510
<i>Staff</i>	5000	5000	5000	5000	5000
<i>Benefits</i>	31863	31863	31863	31863	31863
<i>Equipment</i>	0	0	0	0	0
<i>Library</i>	0	0	0	0	0
<i>Institutional Overhead</i>	9072	10752	10752	10752	10752
<i>Other</i>	393624	447300	447300	447300	447300
Total recurring	523,069	578425	578425	578425	578425
Total expenses (A+B)	523,069	578,425	578,425	578,425	578,425
2. Revenue per year					
<i>Tuition/Fees</i>	135853	161011	161011	161011	161011
<i>Institutional Resources</i>	0	0	0	0	0
<i>State Aid -- CBHE</i>	0	0	0	0	0
<i>State Aid -- Other</i>	0	0	0	0	0
Total revenue	135,853	161,011	161,011	161,011	161,011
3. Net revenue (loss) per year					
	(387,216)	(417,414)	(417,414)	(417,414)	(417,414)

3.B.4. Academic and Financial Viability

There is no net difference in academic and financial viability between the existing computer science primary discipline within the interdisciplinary PhD and the new PhD in Computer Science. The enrollment projections described above will ensure we achieve a degree conferral threshold consistent with MDHE expectations, as well as advance our Carnegie ranking. There is a financial cost, consistent with doctoral education in general, and funds will be reallocated from the existing PhD program to the new PhD program so that we remain financially net neutral.

3.C. Business Plan: Marketing, Student Success, Transition & Exit Strategies

3.C.1. Marketing Plan

UMKC's proposed PhD program in Computer Science will extend current marketing initiatives with a broad, multi-channel strategy. The primary audience—comprising current students in computer science and related disciplines, professionals pursuing advanced skills in computer science, and international students—will continue to be our focus. Our proven engagement activities like research-a-thons, providing hands-on research exposure, and revealing UMKC opportunities, will persist. Regular online information sessions, detailing the program, faculty, and prospective career paths, will continue to reach a broad audience. Alumni testimonials, currently shared via our website and social media platforms, will remain a crucial marketing tool, offering a realistic portrayal of program benefits. We'll also uphold partnerships with local

industries and institutions, highlighting practical opportunities to entice students seeking career progression in a range of regional, national, and international industries. Lastly, we will persist with our digital-focused strategy on platforms such as LinkedIn, Facebook, and academic forums, connecting with potential students on various scales. Hence, the marketing strategy for our PhD program in Computer Science will require no new resources, instead, it will amplify existing efforts to attract a diverse student base.

3.C.2. Student Success Plan

No additional student support services will be needed to support or retain students in the PhD in Computer Science program. Current enrollment, retention and graduation trends for this program are on track with institution and national averages, and the program will continue to provide current levels of faculty and staff resources to support students through graduation.

3.C.3. Transition Plan

The people primarily responsible for the success of the PhD in Computer Science program are: Dianxiang Xu, CAM Division Director Kevin Truman, SSE Dean. Program leadership is supported by program faculty and the School of Graduate Studies staff.

3.C.4. Exit Strategy

If full-time enrollment in the PhD in Computer Science drops below 20 students, the School of Science and Engineering will evaluate a temporary hiatus or program closure, depending on the reason for the low enrollment (e.g., temporary funding challenge, market demand, etc.).

4. Institutional Capacity

The proposed PhD program in Computer Science at UMKC will leverage the existing infrastructure, faculty, and resources of the current doctoral program. This approach eliminates the need for any significant additional expenses, ensuring an efficient and cost-effective operation. The faculty and staff resources, laboratories, equipment, and technology from the current program will serve as the backbone for the new program without the need for any additional resources. The primary focus of this proposal is to gain credit for the research and degrees we already offer, while attracting students, faculty, and grant opportunities. A new CIP code classification raises our research profile at the federal level, thus enhancing our ability to attract grant dollars. This improved positioning will generate interest among potential students, academics, and federal agencies, boosting enrollments, faculty recruitment, and research funding opportunities respectively. Moreover, the specialization of the PhD program in pivotal areas like data science, AI, and cybersecurity provides a robust platform to secure research funding from federal agencies, private foundations, and industry partners. The possibility of fruitful collaborations with local industries can foster sponsorships or endowments to support the

program, given the shared interest in cultivating a highly skilled workforce with the ability to make regional, national, and international contributions.

In conclusion, the new PhD program in Computer Science is designed to be cost-efficient by utilizing the existing resources of the interdisciplinary PhD program. At the same time, it strategically positions UMKC to attract grant dollars, students, faculty, and industry partnerships in the future.

5. Program Characteristics

5.A. Program Outcomes

Program Goals

Students in the Ph.D. Program will acquire:

- grounding in the discipline
- the ability to integrate the principles and theories of the disciplines
- the ability to effectively communicate findings and approaches to solving research problems;
- research skills, such as approaches, methods, ethical principles, and tools to pursue a research line of inquiry;
- the ability to form effective teams to solve novel research questions

5.B. Program Design & Content

The course requirements for the Computer Science Ph.D. program will remain consistent with those of the previous Interdisciplinary PhD program. No new resources will be required. The coursework requirements include:

- A total of at least 30 credit hours of coursework.
- And at least 12 dissertation hours in the primary area.

5.C. Program Structure

5.C.1. Program Structure Form

- 1. Total Credits Required for Graduation: 42**
- 2. Residence requirements, if any:** Ph.D. students must satisfy the doctoral residency requirement by satisfactory completion of at least 18 credits in no more than 24 consecutive months. When satisfying the residency requirement, all Ph.D. students are subject to the following restrictions:
 - The doctoral residency requirement must be satisfied no later than the end of the semester in which the student completes his or her comprehensive examinations.

- Students must achieve a cumulative graduate grade-point average of at least 3.0 in all courses counted toward satisfying the residency requirement.

3. General education

- a. Total general education credits: **n/a.**

Courses (specific courses and credit hours):

The course requirements for the Computer Science Ph.D. program will remain consistent with those of the previous Interdisciplinary PhD program. No new resources will be required. The coursework requirements include:

- A total of at least 30 credit hours of coursework.
- And at least 12 dissertation hours in the primary area.

Computer Science has a list of suggested coursework in their area for students to use as a guide when working with their advisors to choose appropriate courses.

Coursework in Computer Science		
<ul style="list-style-type: none"> • A minimum of 12 credit hours in coursework and 12 dissertation hours • Courses are selected from those offered in the discipline and in conjunction with a primary advisor 		
Course Number	Course Title	Credit Hours
Comp Sci 5540	Principles of Big Data Management	3
Comp Sci 5565	Intro to Statistical Learning	3
Comp Sci 5582	Computer Vision	3
Comp Sci 5590	Special Topics – Multimedia Communication	3
Comp Sci 5590	Special Topics – Distributed Computing	3
CSEE 5690	Adv. Special Topics – Deep Learning	3
Comp Sci 5590	Special Topics – Intro to Blockchain	3
Comp Sci 5590	Special Topics – Internet of Things / Embedded Systems	3
Comp Sci 5590	Special Topics – Intro to Blockchain	3
CSEE 5690	Adv. Special Topics – Research and Experimental Design	3
	Dissertation	12
	Total hours toward the degree:	42

4. Free elective credits

- a. Total free elective credits: **n/a.**

5. Requirement for thesis, internship or other capstone experience:

12 credit hours of dissertation are required.

6. Any unique features such as interdepartmental cooperation:

n/a.

5.D. Program Goals and Assessment

All UMKC programs are required to submit an annual summary of program assessment efforts (assessment plans, findings & discussions, and recommendations). The Computer Science Ph.D. program will maintain the established assessment protocol currently in place for all Interdisciplinary Ph.D. disciplines. The following outcomes have been identified:

1. Students will demonstrate a thorough degree of knowledge in the discipline.
2. Students will demonstrate an ability to use proper investigation techniques for the discipline.
3. Students will effectively use oral and written forms of communication to convey their ideas.

Applicable student learning outcomes will be assessed at the following program, academic milestones: 1) Comprehensive Exams; 2) Dissertation/Research Proposal; and 3) Dissertation Defense.

At the milestone of Dissertation Defense, program targets for student performance across all Student Learning Outcomes have been set to meet or exceed average ratings of 3.5 for all (100% of) students assessed. For example, one component of students' ability to use proper investigation techniques will be evaluated by the following rubric and rating scale:

Superior (4)	Good (3)	Acceptable (2)	Unacceptable (1)	Cannot Judge
Cutting edge methodology or novel application of existing method	Incremental advance in application of methodology and careful plan for execution of research	Conventional use of methodology and adequate plan for execution of research	Inappropriate use of method; use of method that cannot adequately address research question	Outside area of expertise

5.E. Student Preparation

The minimum criteria for admission to the UMKC graduate school can be found via the [UMKC catalog](#).

Computer Science Program Admission Requirements

A student who meets the minimum discipline requirements stated below will be considered for regular admission to the Ph.D. program. A student, who does not meet some of the requirements but shows high potential for advanced-level work, may be considered for provisional admission.

Admission also depends on factors such as number of seats available, resources available in the area of student's interest, the quality of previous work, etc. A student who does not qualify for admission to the Ph.D. program, may be considered for admission to the M.S. in computer science program. Requirements for admission are similar, whether the applicant is requesting computer science as the primary or co-discipline. Minimum Recommended Ph.D. Admission Requirements:

1. GPA (Bachelor or equivalent Degree): 3.5 in the scale of 4 (or equivalent)
2. GPA (MS or equivalent Degree if any): 3.5 in the scale of 4 (or equivalent)
3. GRE (Quantitative) minimum score: 80%
4. TOEFL iBTS minimum Score: 89 or IELTS minimum score: 6.5
5. Prior Projects or Publications (Preferred)*
6. Internationally Acceptable Accreditation of the Prior Degree Awarding Institutes

* Prior research project and/or publication record is not required for admission into CS Ph.D. program. However, doctoral faculty members give very high value to the students with such backgrounds.

5.F. Faculty and Administration

The faculty and administration primarily responsible for the success of this program are: Dianxiang Xu, CAM Division Director and Kevin Truman, SSE Dean.

All faculty with teaching responsibilities in the PhD, Computer Science program will have a terminal degree, PhD or professional doctoral degree (MD, DDS, PharmD). Full time faculty will teach 100% of coursework/credit hours in the program. Faculty teaching in the program will be expected to engage in professional activities and teaching/learning innovation activities including research, and participation and presentations at professional organizations and societies. Faculty will also be expected to mentor and advise students while enrolled in the program and while engaging in independent research.

5.G. Alumni and Employer Survey

The UMKC Alumni Affairs Office, and External Relations team engage with UMKC alumni and the community through several opportunities designed to maintain connections, gather feedback, provide engagement opportunities, and create an environment of continuous improvement.

Graduating students are surveyed through an exit survey at the point of graduation and followed up with at 6-months post degree conferral if the student was still seeking employment at graduation or did not respond to the initial survey request. Alumni affairs and external relations provides opportunities for alumni to participate in student research competitions such as the Three Minute Thesis. Alumni are also engaged through on campus events, opportunities to serve on boards, volunteer, and nominate and receive alumni awards.

5.H. Program Accreditation

Like the current I PhD program, the proposed PhD program in Computer Science at UMKC falls under the purview of the university's institutional accreditation. The university is accredited by the Higher Learning Commission, one of the regional accrediting bodies recognized by the U.S. Department of Education, which ensures that the institution and all its programs, including the proposed PhD program, meet the established standards of academic quality.

While ABET is indeed a recognized accrediting body for programs in applied and natural science, computing, engineering, and engineering technology, its scope primarily covers associate, bachelor's, and master's degree programs, rather than doctoral ones. To ensure our PhD program meets the highest standards, we will adhere to guidelines and curricular recommendations provided by influential professional organizations such as the Association for Computing Machinery (ACM) and the Institute of Electrical and Electronics Engineers (IEEE). These guidelines, although not equivalent to accreditation, offer a robust framework for maintaining academic and research excellence. Additionally, we will continually monitor and evaluate the program's performance in areas like faculty research output, student success, and alignment with industry trends and demands. This continuous assessment will aid in enhancing our program's reputation and ensuring we deliver a high-quality education to our doctoral students. Lastly, while there is no specific timeline for accreditation given the context of doctoral programs, we commit to maintaining the university's existing institutional accreditation status and upholding the standards expected by our accrediting body, the Higher Learning Commission.

6. Appendices

- Letters of Support
 - Jennifer Lundgren; Provost and Executive Vice Chancellor- UMKC
 - Stephen John Dilkes; Associate Dean, School of Graduate Studies- UMKC
 - Kevin Truman; Dean, School of Science and Engineering- UMKC
 - Ravi Chandra; SVP, Engineering- Cisco Systems

**Letters of Support for
the PhD Program in
Computer Science**



School of Science and Engineering
Office of the Dean

September 29, 2023

To: University of Missouri Board of Curators

Re: Support and Commitment to the SSE's iPhD to Ph.D. Transition

As Dean of the School of Science and Engineering I am writing to express my full commitment to transitioning our interdisciplinary Ph.D. (iPhD) degrees to Ph.D. for the School of Science and Engineering (SSE)'s Computer Science, Engineering, and Natural Sciences programs.

I want to emphasize that this transition primarily consists of code and title changes that do not necessitate allocating new resources. We intend to name programs with industry and academic standards, ensuring that we are appropriately recognized for the exceptional work already underway at our school, and improve our faculty and student recruitment and retention.

By transitioning to standard and well-known Ph.D. designations, we strategically position UMKC to enhance its research status especially through Carnegie ranking: historically, under the iPhD moniker, our related activities have not been correctly recognized given that we could not use the right CIP codes. Further, our international students have struggled to justify this unconventional naming to their host countries and institutions. This no-cost move is essential to rectify these issues, ensuring that our institution receives the recognition it deserves for its outstanding contributions to STEM research in our state and beyond.

In conclusion, I would like to reiterate the dedication of my team and myself to this transition. We believe these changes will strengthen our institution's reputation and bolster our research and enrollment, making us an even more effective member of the UM system. We look forward to accomplishing this positive shift together.

Sincerely,

A handwritten signature in black ink, appearing to read 'K. Z. Truman', written in a cursive style.

Kevin Z. Truman, Ph.D., F.ASCE
Dean, School of Science and Engineering

UNIVERSITY OF MISSOURI-KANSAS CITY

Flarsheim Hall, Room 534 | 5110 Rockhill Road | Kansas City, MO 64110
☎: 816-235-1285 | sse.umkc.edu

From: Ravi Chandra (rchandra) rchandra@cisco.com
Subject: Transition from iPh.D to Ph.D
Date: October 9, 2023 at 2:44 PM
To: Truman, Kevin Z. trumank@umkc.edu, Vogl, Jane voglj@umkc.edu

WARNING: This message has originated from an External Source. This may be a phishing expedition that can result in unauthorized access to our IT System. Please use proper judgment and caution when opening attachments, clicking links, or responding to this email.

To: University of Missouri Board of Curators

The fields of engineering and computer science experience rapid changes as new technologies and systems are created and implemented at an accelerated rate compared to many fields. Typically, innovation in these fields is driven by state-of-the-art educated individuals through highly specialized programs. At Cisco Systems, we hire both master's and Ph.D. students. As a UMKC alum, I am aware that the iPh.D program is comparable to a Ph.D program. However, those not familiar with UMKC would be concerned that the education received under the iPh.D program was not comparable to a program designated as Ph.D.

In addition, as an alum I would be thrilled to see UMKC become a R1 ranked Carnegie institution which is impossible under the current designation's CIP codes. UMKC's potential elevation to Carnegie R1 status would benefit every student, faculty, and alumnus in their programs. It is my understanding this change is the first step needed for UMKC to pursue this very worthy goal.

In summary, I strongly recommend the proposed change to Ph.D designation be approved. Please let me know if you have any questions.

Sincerely,
Ravi Chandra
(SVP, Engineering, Cisco Systems.



Office of the Provost and Executive Vice Chancellor

October 5, 2023

Dear University of Missouri Board of Curators-

UMKC aims to achieve Carnegie R1 classification in the next 5-7 years. A critical action step toward this goal is to appropriately classify our research-based doctoral program CIP codes so that they are recognized in the Carnegie classification system. With this goal in mind, I am in full support of the transition of the PhD program in interdisciplinary studies (iPhD; not currently recognized by Carnegie) into eight independent PhD programs that are recognized in the Carnegie classification system. In addition to the critical role these programs will play in our degree program conferral data, this transition aligns with our strategic plan goals of: exceptional student learning, success, and experience (pillar one), helping UMKC become a thriving discovery enterprise (pillar two), transforming our community and region with impactful engagement (pillar three), and preparing students for the global workforce (pillar four). The program transition has been fully considered and planned by the faculty and leadership of UMKC, and is supported by the appropriate curricula, staffing, and market demand.

The **curricula** for the eight PhD programs will remain largely unchanged and is reviewed in detail on a program-by-program basis in the proposal. No additional instructional, student support, library, or assistantship resources will be necessary for this transition to be successful. Students will continue to be supported by existing faculty, staff, and student support structures on campus, and we will transition as many students as possible into the new degree programs by Fall 2024 to maximize doctoral degree conferrals in the coming years. Notably, students who do not want to transition will have the opportunity to remain in the iPhD program through degree completion; if our doctoral program proposal is approved, no new students will be admitted to the iPhD in the future and the program will be closed.

The **market demand** for each of these programs is currently strong, and we anticipate the transition will only enhance it. The 8 programs included in our proposal have the highest rates of student interest, graduation, employment, and long-term research synergy potential at UMKC. While we anticipate demand for each program to remain stable in the short term, the renaming of these programs is likely to have an immediate impact on our national and regional reputation as a

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o: 816-235-1107 | provost@umkc.edu | umkc.edu/provost

UMKC Doctor of Philosophy Program Letter of Support

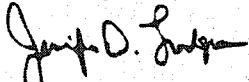
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October 5, 2023

research institution. Although we will keep our enrollments stable in the early years of this transition, faculty will be expected to increase assistantship funding through externally funded grants, thereby allowing us to increase student enrollment while also supporting our campus research goals.

I'm happy to answer any questions about this overall doctoral program transition or the individual programs included in it.

Best regards,



Jennifer D. Lundgren, PhD

Provost and Executive Vice Chancellor



School of Graduate Studies

October 5, 2023

Dear Members of the Board of Curators,

The Graduate Council at UMKC has voted to express its full support for the proposed transition from our current Interdisciplinary Ph D program to PhD's in the areas of Computer Science, Economics, Education, Engineering, Humanities, and Natural Sciences.

We are convinced that this transition would elevate the university's research status by giving us credit for doctoral research in the areas of STEM, Humanities, and Social Sciences. While we would be using new CIP codes and titles, these doctoral degrees can be delivered with existing faculty, courses, and administrative staff. The required courses for the newly titled and coded doctorates are unchanged from those required in the current Interdisciplinary PhD program, except that the secondary disciplines now only require nine hours of courses (under the current system, the "co-discipline" sometimes requires as many as fifteen hours of coursework). This promises to improve completion rates.

This change of codes and titles will better reflect the specialized research and academic focus within these designated areas, which can significantly contribute to elevating the university's research profile. This has the potential to increase funding opportunities from federal agencies, private organizations, and philanthropic sources. With focused academic programs, we can tailor our research proposals to meet the specific needs and priorities of these funding agencies, ultimately increasing our chances of securing research grants and contracts.

We strongly believe that these more narrowly focused doctoral programs will elevate our research reputation, improving our university's standing as a discovery enterprise, attracting a higher caliber of faculty and students, enhancing our regional, national, and international appeal as a go-to institution for advanced research and education.

In sum, because the proposed transition aligns with our university's long-term goals and aspirations, potentially giving us greater research prominence, increased funding, and a more dynamic academic environment that will advance the mission and reputation of UMKC and the entire UM-System, we request the Board of Curators to approve this proposal.

Thanks for your consideration.

Stephen Dilks

Stephen John Dilks,
Associate Dean, School of Graduate Studies
Chair, UMKC Graduate Council.