1. **Name of the proposed degree/major**
   Information Science

2. **Home department/department-like unit and School/College**
   Information School, College of Letters & Science

3. **Mode of delivery (face-to-face, online, other-specify)**
   Face-to-face

4. **Primary faculty contact person**

Sunny Kim, Professor and Director, Information School ksksim@ischool.wisc.edu
(Staff contact: Nicole Weissinger, Associate Director:nicole.wiessinger@wisc.edu)

5. **A description of the new program**

Information science is a field concerned with information and data, and with people's relationships to information and data. Information science encompasses study of the gathering, organizing, storing, retrieving, dissemination, use and disuse of information and data. In today's world, this includes the uses of computational tools needed to support all the above activities.

Information science encompasses the following types of questions:

- Psychological and sociological questions: How do people relate to, seek, and use (or not use) information and data? How has this varied across time and cultures?
- Design questions: How can access to, or use of information and data be made rapid, effective and fair?
- Features questions: What are the inherent characteristics of data or information, and what are the patterns in collections of data and information?[1]

The proposed iSci major provides the students with the opportunity to examine issues in the *nexus of people, data, information and computing.* ISci emphases the ethical, cultural, and social challenges inherent in the design and use of information technology-based solutions, and emphasizes design of systems for the good of people, organizations, and society. The proposed major will produce critical thinkers, creative innovators, and future leaders adept in the creation, management, retrieval, and curation of data and information, and skilled in the design and application of information technologies to solve problems. Graduates will seek to increase access to and understanding of information and data in ways that expand both individual and collective knowledge, enhance productivity, and foster well-being and civic responsibility in Wisconsin, the United States, and beyond.

Students majoring in Information Science at UW-Madison shall:

1) Understand ways in which the policies, ethics, and values associated with information

[1] Marcia J. Bates. The Invisible Substrate of Information Science. Journal of the American Society for Information Science 50, #12 (1999) 1043-1050.

systems can affect society;
2) Understand the relationships between information, cognition, and human social activity;
3) Apply design principles and information science concepts to improve information systems and solve problems;
4) Apply introductory data analysis and data quality management approaches and communicate results;
5) Apply computational tools to accomplish goals and meet human needs;
6) Communicate well in oral, written, and visual forms.

There are 53 iSchools in North America and 115 world-wide and most of them host undergraduate majors.[2]

6. Program content and level, relationship to other UW-Madison majors

The curriculum will be based on 30 credit hours of coursework that will include (1) the completion of four required core courses covering learning goals of the major; (2) one coding/programming course; (3) one ethics/values course; and (4) four elective courses.

The proposed iSci major is related to several existing UW-Madison majors, but offers a distinct educational experience. The major in "Information Systems" from the Business School also offers technology and data analytics curriculum. However, the major is available only to students who have been admitted through a competitive application process and who have completed a suite of prerequisite courses. In contrast, the proposed degree would be open to any student and would not have any prerequisites beyond good standing. Moreover, business programs examine information technology and data through the lens of business theory or business problems, while the proposed major would focus more on the societal or cultural impacts of information, data and computing. The iSci major also offers unique coursework not contained in the BBA Information Systems.

The UW-Madison major in Computer Science: The proposed iSci Major augments the university's existing computing curricula while offering a greater focus on design, impacts on society and ethics. The iSci major has a more flexible minimum technology learning requirements, but also offers a technical pathway that includes many CS courses as electives. CS aims to create computer scientists; in contrast, the iSci major aims to create more computationally literate citizens that may go into a variety of fields.

The UW-Madison major in Data Science is administratively housed in the Department of Statistics, but governed by a collaborative including the Information School. The proposed iSci major will draw on introductory Data Science courses as electives, offering students a pathway to earn the Data Science certificate. The iSci major will augment the university's existing data science curriculum by offering additional coursework in the social and ethical aspects of the data sciences. The Data Science major aims to educate data scientists; in contrast, the iSci major aims to create data literate citizens that may pursue a variety of career and life goals.

7. Resources required to deliver the program

[2] The iSchools Organization (https://ischools.org/About)

The Information School (iSchool) will administer and govern the curriculum. It has sufficient faculty (14 tenure track faculty, 4 full time faculty associates, and a cluster hire in computing, data, and information ethics in 2022) to offer the program. The iSchool already fields 6-8 undergraduate courses per year for the Digital Studies undergraduate certificate, and these courses will be included in the new iSci major. The iSchool will field all required coursework to ensure its availability. The iSchool will offer many of the electives, but it will also partner with other departments to include their electives in the major.

The iSchool will ensure administrative capacity to support the major by appointing a Director of Undergraduate Studies from the faculty. The Information School is aware of the need for, and committed to funding, both dedicated undergraduate advising and increased curricular services capacity to support the proposed major. Expanded administrative and advising resources will be supported by program revenues from professional graduate programs.

***8.* If relevant, information on other required approvals to offer the program beyond the Board of Regents (such as accreditation bodies, including the Higher Learning Commission [HLC])**

Like other programs that are not subject to specialized accreditation, the proposed major will be subject to the accreditation standards of the Higher Learning Commission.

9. Evidence of how the new program aligns with the institutional mission, strategic plan, and existing academic degree program array

In 2019, the UW's Computer Sciences, Statistics, and the Information Schools joined together to found the School of Computer, Data and Information Sciences (CDIS) as a division within the College of Letters & Science. A central goal of CDIS is to extend access to computing, data and information science educational opportunities across the UW-Madison campus.[3] This requires reaching a broader and more diverse set of students than current CDIS majors. Consequently, the curriculum of the iSci major will be designed to draw new intellectually and culturally diverse students to the information science curriculum. Another goal of CDIS is to increase the number of women, students of color, and first-generation college students graduating with majors related to computing, data and information sciences. National data show that information science major student bodies tend to be one of the most diverse among computing-related majors.[4] To attract these populations to the iSci major, the curriculum will emphasize the role of the impact of new technologies on society, and point students to how they can use information and data to solve problems and increase the social good.

The iSci curriculum is key component of the iSci strategy to promote diversity and inclusion. Specifically, the faculty will design the curriculum so that students who have had disruptions in their educational experiences have flexible pathways to complete the major. For example, there will multiple course options for fulfilling each program requirement. Students will have options to meet their requirements each term. Similarly, the major will not have prerequisites beyond good academic standing; hence, students who wish to make progress in the major will not need to depend on course offerings in other units in order to get started on the pathway

[3] 10 Facts to Know About CDIS (https://ls.wisc.edu/areas-of-study/cdis/10-facts-you-need-to-know-about-cdis)

[4] The 2018 Taulbee Survey by the Computer Research Association (https://cra.org/resources/taulbee-survey/) comparing computing-related majors found a higher percentage of women (26.8% ISci vs 20.9% CS) and students of color (ISci: 7.1% African American, 10.2% Hispanic; CS: 3.1% African American, 7.7% Hispanic) among ISci majors.

toward degree completion. Implementing strategies like these are sometimes referred to as making a major "highly recoverable."

According to its Mission Statement, UW-Madison's primary goal is to "help students to develop an **understanding and appreciation for the complex cultural and physical worlds** in which they live." Computer-based information and data systems have become central to students' lives as well as the many career fields they choose to pursue. The proposed iSci major will contribute to the liberal arts mission of creating a more informed citizenry able to grapple with the technologically complex issues facing today's society. The curriculum of the proposed iSci major will combine acquisition of critical "why this matters" analysis skills with technical "how to" knowledge. For example, students in the major will explore how information and data systems shape social interactions (e.g., recreation, shopping, political activity), and at the same time they will learn tools and techniques to design innovative new systems. The University of Wisconsin's strategic framework for 2020-2025 prioritizes **expanding "educational programming in areas of high student demand.**" The iSci major would expand access to information science coursework by creating new courses that appeal to and are accessible to a broad array of students. This will strengthen educational outcomes and enhance the overall college experience for an even broader range of our undergraduate student population.

The proposed major fill gaps in the current academic degree program array. UW-Madison currently offers focused and specialized programs in computer sciences and data sciences. The proposed degree is distinct in that it combines curriculum in applied computing and analytics with liberal arts curriculum including ethics and policy, digital design, relationships between information, cognition, and human social activity and communications. It focuses on the relationships between people, information/data and computing. Moreover, the proposed major will offer students unique educational opportunities not currently available in other majors. In the area of **user experience design**, the major will draw together existing coursework currently scattered throughout the UW-Madison campus, making it easier for students to find and follow a clear pathway of study. The iSci major will **increase student body literacies** in areas such as **information retrieval and text/data mining** with new courses oriented to the applied interests of students with social science and humanities backgrounds. The major will also draw together existing undergraduate coursework in the areas of **computing and data ethics, and policy.** The iSci major would also build on the popularity of the **Digital Studies** certificate. Because iSci courses are already built into the Digital Studies curriculum, interested Digital Studies students could easily continue into the iSci Major.

10. A link to the institution's academic strategic plan

https://chancellor.wisc.edu/blog/a-new-strategic-plan-for-the-next-five-years/

11. Need for the new program

Information Science majors are popular. Trends show an increase of 6.6% per year in US declarations of computing-related majors, including information science majors.[5] In 2017, information science degrees had an average of 127.6 declared majors each. Information

[5] 2018 Taulbee Survey. Computer Research Association (https://cra.org/resources/taulbee-survey/)

Science majors grow fast. For example, the University of Michigan iSci major started with 26 majors in 2015 and in 2019 it reported 129 graduates. The popularity of the related curriculum in the UW-Madison Digital Studies certificate suggests the proposed iSci major would see similar growth at UW-Madison. The Digital Studies certificate has 600 declared students and 200 graduates a year. The academic coordinator for the certificate attests that she is often asked by undergraduate students why there is no related major and if there is one in the works. The proposed information science major would fill this gap for students.

Information science majors find employment in growing fields which make use of their information and data expertise. A survey of 2019 iSci graduates from the University of Michigan found that 85% of graduates found employment within 6 months of graduating. Similarly 81% of University of Washington iSci graduates were employed soon after graduation. Graduates found jobs in the technology industries, consulting, financial services, health services, government, consumer services, marketing/design and manufacturing.[6] These examples show that demand for graduates with Information Science related degrees is high.

The following job titles are listed as examplars on the careers pages of peer majors at University of Michigan, University of Washington and University of Illinois Urbana-Champaign:

- User Experience/Interaction designer, content strategist, information architect
- Analyst or consultant (data, product, program, business)
- Database manager, data manager
- Information governance analyst
- Product manager, project manager
- IT analyst, technology support specialist

While the Bureau of Labor Statistics Occupational Handbook does not report on the above specific titles, similar jobs that require a mix of technology, human behavior and design skills, have above average projected job growth (e.g., Web Designer 27% growth, Systems Analysts 21% growth). Other sources report similar above average growth in jobs related to data analytics and data analysis. (Educational Advisory Board, Bureau of Labor Statistics). Division of Continuing Studies interviews with employers emphasized the need for employees with applied research skills such as 'using statistics in a business setting' and 'understanding if data are credible' and data communications skills such as information visualization and how to 'persuade and influence' using data.

UW-Milwaukee has a successful major in Information Science & Technology with 229 graduates in 2018-2019. In 2018-2019 other related majors in the UW System reported the following: Computer Information Systems at Stevens Point had 43 graduates, Computer Networking and Information Technology at Stout with 61 graduates, Information Technologies at Whitewater with 65 graduates, Information Science at Green Bay had 8 graduates.[7] Having multiple

[6] Bachelors of Science in Information Employment Report 2020 University of Michigan School of Information (https://www.si.umich.edu/sites/default/files/umsi_bsi_employment_report_2020.pdf) Bachelors of Science in Informatics "Where are they Now?" University of Washington 2020. (https://ischool.uw.edu/sites/default/files/PDFs/Informatics%20career%20infographic.pdf) University of Illinois Urbana-Champaign, BS in Information Sciences (https://ischool.illinois.edu/degrees-programs/bs-information-sciences)

[7] 2018-2019 National Center for Educational Statistics, College Navigator (https://nces.ed.gov/collegenavigator/)

undergraduate majors in applied computing and information science in the UW System is desirable given the growing demand for computing-related degrees, and the expected employment growth in information technology related areas in the state and region. Additional opportunities for Wisconsin undergraduates to pursue technology degrees meet the UW System objective of meeting Wisconsin workforce needs and increasing the percent of degrees conferred in STEM areas.

APPENDIX

List of the program faculty who are central to the planning process

Consultants

- Rob Howard, Director, Digital Studies and DesignLab; Professor, Communication Arts, rghoward2@wisc.edu
- Kristin Eschenfelder, Professor, Information School, Associate Director School of Computer, Data & Information Sciences eschenfelder@wisc.edu

Faculty and Staff with Appointments in the Information School

1. Adams, Megan (Faculty Associate)
2. Arnott Smith, Catherine (Professor)
3. Caffrey, Alison (Instructional Design Librarian)
4. Downey, Greg (Professor)
5. Eschenfelder, Kristin (Professor)
6. Hutchins, Ian (Assistant Professor)
7. Jackson, Corey (Assistant Professor starts fall 2021)
8. Jiang, Jiepu (Assistant Professor)
9. Kaplan, Allison (Faculty Associate)
10. Kim, Kyung-Sun, "Sunny" (Professor & Director)
11. Lewis-Williams, Tracy (Faculty Associate)
12. Ni, Chaoqun (Assistant Professor)
13. Royston, Reginold (Assistant Professor)
14. Rubel, Alan (Associate Professor)
15. Rule, Adam (Assistant Professor starts fall 2021)
16. Salo, Dorothea (Distinguished Faculty Associate)
17. Senchyne, Jonathan (Associate Professor)
18. Shapiro, Debra (Distinguished Faculty Associate)
19. Thebault-Spieker, Jacob (Assistant Professor)
20. Ushman, Lori (Department Administrator)
21. Wiessinger, Nicole (Associate Director)
22. Willett, Rebekah (Associate Professor)

Information School Affiliates who may teach in the proposed major:
Matt Berland, Associate Professor, Curriculum and Instruction, School of Education
Anuj Desai, Professor, Law School
Robert Howard, Professor, Communication Arts, Director of Digital Studies & DesignLab

Letters of support or concurrence

L&S Center for Academic Excellence
The School of Computer, Data, and Information Sciences
Digital Studies

Communication Arts
The Department of Computer Science
The Department of Statistics
The Department of Design Studies