iSchool 2025: Part II
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At the December assembly, I shared a basic vision for the iSchool. It described an evolutionary change over the current state, and didn't identify new opportunities for the iSchool. In this document, I extend this vision by suggesting some new opportunities and directions for research, and with only a small attention paid to development of education and partnerships with external partners. Note that any plan must contain a vision for these other aspects as well.

Many issues of information, technology, and people are becoming prominent in society. These issues present opportunities for the iSchool. To create a stronger and more effective iSchool, we can identify opportunities that fit within our existing research and programmatic areas of excellence[1], strengthen relationships with current external stakeholders, engage new stakeholders, and address important societal trends.

We commonly refer to the iSchool as being interested in the interplay of information, technology, and people. Much of what concerns us is focused on information: the creation, curation, and management of information; techniques, technologies, systems, and institutions that empower individuals, communities, and organizations to access, analyze and use information to expand their capabilities and make positive social contributions. We also have considerable interest in people-centered design: the design of applications, interfaces, and systems with a primary focus on the needs of the people who use them. This interest includes HCI, UX design, socio-technical system design, and values in design.

Our external stakeholders include our students and the organizations that hire them, our alumni, the organizations that fund our research and that benefit from our research (including libraries, archives, museums, and Federal agencies), the other units at the University of Maryland, and the State government and the residents of Maryland.

In imagining our iSchool five to ten years in the future, I identify four long-term societal and technical trends that impact the research mission of the iSchool. To stay on the forefront of these trends, I give two strategic directions for the college; both require building capacity.

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[1] We can also identify new areas of excellence, but I haven't considered this direction because we can continue to grow our impact with our current areas.

SUMMARY

Societal and Technical Trends
1. New methods for research based on the availability of massive amounts of data and novel collaboration models
2. Declining trust in institutions and authority
3. Rapidly increasing integration of technology into our lives and environments
4. Advancements in AI affecting people and economies in both positive and negative ways

Strategic Directions for the iSchool
1. *Trustworthy Information in an Untrusted World* Contribute towards increasing both the value of and the trust in information by the public in the face of declining trust in institutions. Achieve this through growing our expertise in information management and economics; in the cognitive, perceptual, and social factors that enable us to make sense of large data collections, and the application of these in developing novel methods and tools for interactive visual analysis and visual communication; partnering with other University units who share these goals.
2. *ICT and Social Good* Establish our leadership in the design of technology that increase social good, in policies on ICT design, development and deployment that increase social good, and in information and institutions that can help our understanding of and reaction to the impact of ICT on society. Achieve this through growing our expertise in algorithmic integrity and transparency; expanding YX efforts to poorly educated and underemployed adults; partnering with other University units who share these goals.

Trend One: New methods supporting research It's been eight years since Microsoft Press published "The Fourth Paradigm" by Hey, Tansley and Tolle. This book argued that a new paradigm of scientific inquiry was developing: that of data-intensive science. During my time at NSF starting in 2010, I participated in the discussions about what was truly new about this "fourth paradigm". At the time, I argued that scientific inquiry of the early part of the 21st century would make use of all four paradigms - empirical, theoretical, computational and data exploration - as well as a "fifth paradigm" of developing and using new ways to collaborate, exemplified by projects such as Polymath, the Galaxy Zoo, FoldIt, and OldWeather by NARA/NOAA (which also date from around 2007 - 2010).

As we know, these paradigms support more than scientific research. In many ways, the humanities pioneered the use of technology in expanding access to scholarly material through digitization and enhanced textual data analytic capabilities. The same technology is also increasingly being used to support policy decisions. In the meantime, the hype around "new paradigms" has died down as they have become more normalized within science, while the the application of data intensive science and humanities continues to expand. Increasing corpora of

data, from both governments and NGOs, are being made available to assist decision making by both the public and private sector, and new ways to organize researchers (both professional and citizens) continue to be developed and exploited.

Obviously, this is an important trend for the iSchool: it aligns very well with our interests, and because of this trend, the number of organizations interested in our students and our research is growing. We are developing the foundations – technical, organizational, and institutional – both of data-intensive inquiry and for new ways to collaborate, and are educating our students to excel in using these new paradigms.

Trend Two: Declining trust in institutions It is widely reported that public trust in institutions is dropping. The annual Edelman Trust Barometer surveys tens of thousands of people across 28 countries about four institutions: business, media, government, and NGOs. Their 2017 survey reported a decline of trust in all four institutions for the first time since the survey began in 2001. They reported that government was the least trusted institution, and media, taking its biggest ever year-on-year hit, is now distrusted in 82% of the countries that were surveyed.

The reasons for this loss of trust may be debated, but most agree that it has been coming on for some time. Princeton political scientist Ron Inglehart proposed in his 1977 *The Silent Revolution: Changing Values and Political Styles Among Western Publics* that as societies grow wealthier and less concerned about basic survival, there is a shift from communal to individual values: people trust authorities less. So, while the forces behind it are positive and there is little desire to return to a highly regimented society, the result is that communal action becomes more difficult, many people feel more adrift, and inequity is more likely to increase.

Contrary to the general trend of decreasing trust in institutions, the iSchool's traditional stakeholders of libraries, archives and museums remain widely trusted by the public. The Pew 2016 Survey on Libraries revealed that public attitudes are largely positive about the library's role in communities: many Americans are interested in libraries offering a range of services, including those that help people improve their digital skills and learn how to determine what information is trustworthy. People see libraries as major contributors to their communities in providing a safe place to spend time, creating educational opportunities for people of all ages, and sparking creativity among young people.

These two trends point my first proposed direction for the iSchool.

Direction One: *Trustworthy Information in an Untrusted World* The combination of these two trends is very troubling: more sensitive information is being collected, extracted, and disseminated, but we trust less the organizations that are doing the collecting, extracting and disseminating. For example, much of the current concerns about privacy, both in the United States and worldwide, is driven by the increasing abilities of organizations that aren't necessarily trusted with personal information. And, even though the issue of "fake news" seems recent because it is being highlighted by the current administration, it reflects long standing

concerns about information literacy and trust in institutions. This combination of the two trends suggests a strategic direction around developing ways to assess, assure, or establish the trustworthiness of information. I call this direction *Trustworthy Information in an Untrusted World*.

Our interests in information make us well suited to address *Trustworthy Information in an Untrusted World*. And, our connections with trusted institutions give the iSchool unique leverage as well as the responsibility to increase the value of these institutions while preserving the wide trust the public places in them. There are several areas, however, in which we should grow to address the issues in this direction:

● We need to grow our expertise on what it takes to create and maintain effective, trustworthy, and trusted information-focused institutions. This includes effective management, new organizational forms, and information economics. This expertise touches on much of what we do, including our research in digital curation, archives, data science, re-envisioning libraries, and open government data, and feature in our MLIS, MIM, and BSIS programs.

● We need to deepen our strength in visualization, since it is becoming increasingly important in enhancing our understanding of information. Research in the cognitive, perceptual, and social factors that enable us to make sense of large data collections will lead to novel methods and tools for interactive visual analysis and visual communication.

● We can strengthen our ties with Behavioral and Social Sciences (BSOS). The Joint Program in Survey Methodology (JPSM) is a recognized international leader in data collection and analysis methodologies to inform social policy, and has strength in data repositories and data institutions. We have recently made a joint hire with JPSM and are working with them on interdisciplinary traineeships. Similarly, the Department of Geography (GEOG) has deep expertise in GIS and sensor data, which are of growing importance in socio-technical design and in knowledge creation. We are currently pursuing a joint hire with GEOG, supported in part from the Provost's office. We will continue these activities and can look for other opportunities to partner.

● Our ties with Journalism can be strengthened. We have previously benefited from working with Journalism Professor Nicholas Diakopoulos and his understanding of how journalists "interview data", which involves both finding stories in data and visualizing what is found. Given his recent departure to Northwestern, we are pursuing a joint hire with Journalism in roughly the same area (this hire is supported by the Provost's Office). In addition, the two colleges are developing joint interests in data integrity and cybersecurity, and we have overlapping interests in the area of "fake news". In the future, and our students could benefit from the projects that arise from their Capital News Service. We have also had preliminary and exploratory discussions with Journalism about a joint "data lab", which would benefit researchers and students in both colleges interested in information from social media and news organizations.

The second pair of trends also combines technical and societal issues:

Trend Three: Increased integration of technology into our lives The development and deployment of the Internet and then the Web continue to be major economic drivers for the United States as well as the rest of the world. More recent advances, including cloud computing and widely available broadband communications, are enabling an explosion in ubiquitous computing. The CSTB "Tire Tracks" report compellingly illustrates the size of this economic impact (http://sites.nationalacademies.org/CSTB/CSTB_181872). To pick just one example, which is too recent to be called out in the latest TIre Tracks report, a project spanning Berkeley and Stanford created a technology called Software Defined Networking (SDN) which has radically changed internetwork communications. SDN has grown from being a research prototype at about the same time that "The Fourth Paradigm" was published to over a $6.6 billion industry today; the value of this industry is predicted to surpass $13 billion by 2021.

The "Internet of Things" (and the closely related "smart cities/connected communities", "cyber-physical systems" or "Industrial Internet") will most likely have at least as large an economic impact as the Internet and the Web, and is driving information and communications technology (ICT) deeper into our lives. This trend already has a major impact on how we live, and that impact is increasing. Much of the impact will be good: NIST's Global Cities Teams Challenge, for example, has led to smart city projects in continuity of care, aging in place, education, and emergency response. Locally, the iSchool has several researchers working on technology that helps individuals, communities, and organizations.

The impact, however, is also highly disruptive. For example, there are reasonable predictions that 25% of shopping malls will close in the next five years, in part due to the rise of online shopping, and the crisis of journalism is often blamed on the "click bait" model of reader engagement. Of course, the disruption is not uniformly felt: the "digital divide" persists, the market caters to the wealthier and healthier, and there is insufficient interest by foundations in helping the disadvantaged, underemployed and poorly educated.

Trend Four: Disruptive effects of technological advances in AI Machine learning, along with other forms of AI, are proving to be highly useful, as well as highly disruptive. Some view this technology as being the way to regain trust in institutions because, somehow, algorithms will be more trustworthy than people (I find it unlikely). At the same time, there are countless "future of work" summits and symposia asking what the economy will be like – indeed, what people will do with themselves – because of concerns that AI and ICT will together automate many careers.

These two trends are similar: each has to do with the rapid growth in technology that affects people, communities and institutions, and the economic drivers behind its accelerating adoption, are creating deep social problems as well as increasing social good. They lead to my second suggested direction for the iSchool.

Direction Two: *ICT and Social Good* The term "ICT for Social Good" refers to technology-based projects that increase social good. I'll generalize this to the topic *ICT and Social Good*, by which I include the design problems of ICT for Social Good along with policies on ICT design, development and deployment that increase social good, and information and institutions that can help our understanding of and reaction to the impact of ICT on society.

The iSchool's area of expertise in design is well suited to address the direction of *ICT and Social Good.* In particular, our strengths in human-centered design, socio-technical design, and in inclusive design, and as exemplified in our research in urban computing, accessibility, and health informatics put us in a leadership position for this topic. We can further strengthen our leadership through near-term hiring and through partnerships that build our strategic capabilities and enable us to pursue emerging opportunities.

- Given the growing and disruptive impact of machine learning, we need to build our strength in algorithmic integrity and transparency. We also need to build our strength in constructive uses of machine learning (as well as other emerging technologies, such as VR/AR, exascale, and human-brain interfaces, just to list three) for individuals, communities, and organizations.

- Along with our focus on youth experience, we can develop a parallel focus on underemployed and poorly educated adults. Doing so would build on our strengths of diversity and inclusion, as well as support the goals of the Maryland State Library Agency.

- Existing ties with Architecture, Planning and Preservation (ARCH) can be strengthened. In particular, our ties with the ARCH's National Center for Smart Growth Research and Education include a joint hire and joint research projects in smart cities and connected communities (supported by grant money and funds from the Provost's Office). Their relationships with city managers provide capstone projects for our MIM program, and we are currently looking into similar opportunities through their connections with the City of Baltimore's Office of the CIO/CDO. This national center would be an excellent partner for further developing and deploying our "smart city/connected communities" efforts.

New hires and new partnerships take time to develop. The ones that I've listed above are on our immediate horizon. There are additional new hires and strategic partnerships we can explore for supporting both *Trustworthy Information in an Untrusted World* and *ICT and Social Good* that could come to fruition in the early 2020s. For example, we can build on our strong ties with ARHU (LSC, MITH, and others), Education (TLPL), CMNS (CS) and Public Health, and look for new opportunities to share directions and faculty. We must, of course, be careful to attend to our core strengths at the same time.

Institutional Implications of iSchool Strategic Growth

Depending on how one counts, we have approximately five degree programs, 800 students, 40 faculty members involved in instruction (TTK and teaching PTK together), and 25 staff members. We are currently engaged in four active TTK searches (and will launch another one in the Spring, joint with GEOG), one active staff search, and may make additional teaching PTK hires. I anticipate that the 2025 iSchool would have at least six programs, at least 2,000 students on the College Park and Shady Grove campuses combined, and approximately 70 FTE faculty members and 36 staff members.[2]

Clearly, the iSchool will need more space! But, its structure will also need to adapt to accommodate the increased scale and complexity that growth will bring while maintaining the coordination and integration that is key to our success as an interdisciplinary College.

- This growth will encourage us to operate more like a departmentalized college (though we may not want to create departments). We can have multiple Bachelors and PhD programs and could offer minors and concentrations. We will need more decentralized governance to make sure decisions are made in a timely manner by those closest to the situation. We will also need to grow our development efforts to secure the resources needed to enable and support a larger iSchool.

- We will need to continue to find ways to remain integrated despite our larger size and increasing interdisciplinarity. Many of our faculty will likely continue to teach courses in multiple programs. We are already making it easier for students to construct degrees that cross our Masters programs, and creating pathways from our BSIS program to our MLIS and MIM programs. Centers bring faculty and students together; CASCI, iPAC, HCIL and Trace have overlapping memberships and benefit from being inclusive, and DCIC is providing educational value to most of our programs.

- Senior faculty play a vital role in mentoring and service, enabling junior faculty to focus on launching their academic careers. They provide leadership for our programs and our college administration, and serve on university-level committees. We do not have enough senior faculty to fully participate in all of these roles and the needs will only grow as the College expands its activities. While, in general, I lean towards hiring at the junior level and we are seeing our junior hires achieving promotion, we are also seeing losses at the senior level and the current pipeline will not be sufficient; we will need to make good hires at the senior levels as well.

- To succeed as a College with strong professional programs and cutting edge research, we need to continue full college engagement and citizenship for professional track

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[2] To estimate the required number of future staff, I assume a fixed staff of ten, a fixed staff per program of two, a staff member for every 200 students, and a staff member for every 20 faculty (TTK and teaching-involved PTK).

faculty. I expect that we will maintain, roughly, our current two TTK :: one teaching PTK ratio (with additional PTK engaged primarily in research activities). In addition, our adjunct faculty are a significant strength of our professional programs and we will continue to draw on their experience and capabilities to enrich the classroom experience. In my first year here, I have been moved by the stories of our MLS graduates about their favorite instructors, the ones who have a major impact on their careers: more often than not, the instructor was an adjunct.

Final Thoughts

This is an exciting time to be charting the directions of the iSchool over the next ten years. The knowledge we have amassed, the methods and institutions we have developed and supported, and the values we have promoted over the last 50 years are increasingly important. We have the opportunity to make the discoveries, invent the technologies, educate the workforce, develop the leaders, and provide the thought leadership necessary to create and maintain effective, trustworthy, and trusted information while improving the lives of individuals and contributing to a better society. With planning and work, in ten years the iSchool will have extraordinary reach and impact at all levels: within UMD, the state, the nation, and the world.

This vision – which can contribute to a strategic plan – builds on our considerable strengths in information creation, curation, and management to empower individuals, communities and organizations and in people-centered design of applications, interfaces and systems. It engages current trends in new methods supporting research and declining trust in institutions by focusing on trustworthy information in an untrusted world. It addresses the increased integration of technology into our lives and the disruptive effects of technological advances like AI by focusing on ICT and social good. I've outlined some areas for growth through new hires in strategic areas and deeper partnerships with other UMD units that will allow us to leverage the existing strengths of other Colleges.