Theme Overview

Access to unprecedented amounts of information is creating new opportunities for students and faculty, working together in multidisciplinary teams, to actively engage with the world around them. At the same time, the unparalleled availability of personal information published by smartphones, web browsers and social media is exposing society to new risks. We will combine coursework, co-curricular experiences and integrated project teams to explore the evolution of society and culture through the lens of information, using the latest computational methods to understand society’s most pressing problems in new and creative ways.

Student Opportunities

Undergraduate Students
All students are eligible to take the gateway course or FOCUS cluster to learn about the theme. There is also a wide range of courses with INFO content already available (see below). Students also have the opportunity to participate in numerous co-curricular activities (see below). A new INFO certificate is planned—this will require students to take the gateway course, a capstone course, two relevant courses, and two “learning experiences” (e.g., working on a project team, participating in a workshop).

Graduate & Professional Students
A parallel graduate-level INFO certificate is planned. At present, graduate students and professional students may participate by: (1) taking courses with INFO content (see below); (2) joining a project team; (3) serving as a TA for the gateway course; (4) serving as an RA to help organize INFO events (see below); and, (5) engaging in INFO co-curricular experiences (see below).

Contact Information

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Information, Society & Culture
Led by Robert Calderbank (CS/ECE) and Hans Van Miegroet (AAHVS)

SYNOPSIS:

Fall 2014 Gateway Courses
- Information, Society & Culture (Cross-listed in Computer Science, ISIS, Philosophy, and the Sanford School—see below for details)
- Introduction to Mathematical Modeling in Biology (FOCUS cluster—see below for details)

Summer/Fall 2014 Project Teams (details below)
- The Digital Landscape
- Regulatory Disaster Scene Investigation
- Public Access to Government Information
- Technology and Innovation Policy Lab
- Live Processing and Live Art

Future Courses (examples)
- Course in ISIS and Romance Studies: “History and Future of the Book” (David Bell & Cathy Davidson)
- Course cross-listed in several departments: “Master Class in Information”
Details

Gateway Courses

ISIS 110D/PHIL 110D: Information, Society & Culture (FALL ONLY)
This course explores how all aspects of information theory and practice, including computational and mathematical and those from social sciences and the humanities, are transforming research, reframing intellectual questions in research and its application, and having an impact on interactions within societies, cultures, ideologies, economics, politics. Modules are presented by faculty from all areas and schools, contrasting and comparing perspectives in research-driven modules focused on interdisciplinary project questions and ideas. The gateway course will integrate lectures by its two “convenors” with a series of innovative modules led by guest faculty members. The pair of professors leading each module will have a humanist or social scientist and a computational scientist.

Math 161FS: Introduction to Mathematical Modeling in Biology (FOCUS cluster)
This course introduces techniques used in the construction, analysis, and evaluation of mathematical models. How do we frame a scientific question in mathematical terms? How do we formulate a mathematical description or representation of the system in question? How do we study the model using mathematical tools and techniques? How do we interpret the results and put them back into a scientific context? Modeling topics will primarily be in biology. Instructor: Anita Layton

New Courses Now Available

AAHVS/ECE 590S/VMS 590S: “3D Design/Programming in Art & Medicine”
Students will design proof-of-concept gesture-based interfaces for interacting with 3D digital representations, with special focus on prototypes for augmented reality display of art & sculpture and on tools for home diagnosis of Parkinson’s disease. Team-project-based learning pairs computer scientists, engineers, medical students, multimedia artists, and art historians. Technologies include: Kinect/PrimeSense, Leap Motion, and webcam motion tracking. Basic programming experience required for computer science students. Application domain knowledge required for arts and medicine students. Consent of instructor required. Opportunity to continue development in future, including participation in a 2015 Nasher exhibition and/or interaction with neuroscientists to further refine the Parkinson’s system. Instructors: Mark Olson, Mariano Tepper, Carolina A. Bruzelius, Guillermo Sapiro

MATH 477S: “Mathematical Modeling”
In this course, students will learn how to formulate mathematical models that can be used to answer scientific questions. They will also learn a variety of techniques for studying the models, including mathematical analysis, computations, and simulations. The ability to identify essential features of a system that must be represented in a model, and then to properly interpret model outputs in the appropriate scientific context, is a valuable skill that will be useful in many fields. Instructor: Anita Layton

DANCE 308 / ECE 496 / ISIS 376 / THEATRST 364: “Performance and Technology”
This workshop will explore technologies embedded in performance: robots, media, computer interface. Students create performance projects and discuss theoretical and historical implications of technologies in performance. Open to dancers, actors, musicians, spoken word artists and all those interested in technology and the arts. No previous experience or programming skills required. Instructors: Thomas DeFrantz, Martin Brooke and Tyler Walters
PHIL/ISIS 310: Information and Philosophy: Personal Identity, Knowledge and Ethics”

We live in a new information society. More and more of what we do, how we interact, and what we value is informational in nature. The rapid development of information and communication technologies, such as computers, internet, mobile devices, Facebook, Google, and Wikipedia, has certainly changed our human world profoundly. What can we learn from this change? We can learn something about the world, but also we can learn something about ourselves. We learn that information is important in our world, it is a resource (something we exploit), a tool (something we act with), and infrastructure (something that organizes our environment). But, we also learn that information is important in us, in how we think, in how we communicate and in who we are. So, the change magnifies and highlights something constant about us and our world: we have always been informational organisms leaving in an informational world. Thus, some of the most profound philosophical question: ‘What are we?’, ‘How do we know?’; ‘What is our world?’, ‘What do we value?’, and ‘How is society organized?’, can benefit from an informational perspective. This is what the course investigates. Instructor: Orlin Vakarelov

VMS 89S: “Mapping and Modeling Early Modern Venice”

Beginning with Napoleon’s forced entry into the city in 1797, the urban landscape of Venice experienced notable change. Significant intervention included the destruction of many Renaissance monuments and, therefore, great loss to the architectural and artistic patrimony of the city. The goal of this Wired! freshman seminar is to map the urban landscape of early modern Venice by reconstructing lost architectural gems of the fifteenth and sixteenth century along with their immediate surroundings. To accomplish this, students will use digital tools, such as Sketch Up, to translate historical and modern maps, prints, engravings, and paintings into 3-D models. These monuments will be mapped onto present-day Venice. Instructor: Kristin Huffman Lanzoni

Project Teams Forming Now for Summer and Fall 2014

(1) The Digital Landscape: New Technologies to Visualize Ancient Landscapes (FALL)
Led by Maurizio Forte (AAHVS) and Regis Kopper (DiVE)

Description: What was the lagoon’s appearance when ancient Venetians were looking from their windows? What plants were growing close to Etruscan tombs? What would a Neolithic inhabitant of Catalhoyuk in Turkey see in their environment? Virtual reality allows us to see with our ancestors’ eyes, “diving” into ancient landscapes using sophisticated 3D visualizing systems such as DiVE, Oculus Rift and zSpace. Students will use virtual reality tools to learn how to implement data found in archives and historical maps to build a mosaic of information, recreating our ancestors’ world. Once the geographic information database is complete, students will learn how to create the objects that will compose the final virtual landscape.

(2) Regulatory Disaster Scene Investigation (RDSI): Constructing an Independent Institution to Study and Recommend Policies Related to Crises, Disasters, and Near Misses (SUMMER)
Led by Lori Bennear (NSOE), Jonathan Wiener (Law), Edward Balleisen (HIST), and Kim Krawiec (Law)

Description: What is the best way for governments to learn from disasters/crises such as financial crashes, offshore oil spills, and nuclear accidents? This project team explores that question as part of the larger research effort, “Recalibrating Risk” at the Kenan Institute for Ethics. Almost always these disasters/crises prompt special inquiries by legislative committees or blue-ribbon commissions that are convened as one-off investigations. We wish to explore the potential expansion of more permanent investigative bodies such as the United States National Transportation Safety Board (NTSB) and Chemical Safety Board (CSB). Students will examine the NTSB and CSB including their origins and evolution and their institutional strengths and weaknesses. The project will include travel to Washington, D.C. to interview NTSB and CSB officials, as a means of fleshing out their organizational culture, professional ethos, and sense of independence. Students will also interview officials at financial, energy, and environmental agencies to explore whether and how investigatory institutions might be used in these policy domains. Research outputs will include policy briefs and a white paper.
(3) **Public Access to Government Information: Implementation, Voter Behavior, and Rights (FALL)**
Led by Kenneth Rogerson (Sanford) and Orlin Vakarelov (Philosophy)

**Description:** Interested in learning more about how to wade through the gigabytes of information on Wikileaks or the documents released by Edward Snowden? What can the science of visual attention teach us about the best way to present data on government spending? And what about whether, as citizens, we have a right to have government information given to us in an accessible way? Students will explore the answers to these questions, including how information is presented and interpreted, or the intersection of technology, information, transparency and politics.

(4) **Technology and Innovation Policy Lab (OPTIONAL SUMMER AND ENTIRE 2014-2015 ACADEMIC YEAR)**
Led by Jason Cross (Law, Sanford) and Gary Gereffi (SOC)

**Description:** Technology is a game changer in the promotion of sustainable development and human rights. Clean wood stoves reduce carbon emissions and respiratory diseases disproportionately affecting women and children. New medicines save millions of lives. Mobile networks enable new kinds of local entrepreneurship. However, the law and policy regulating control of technology often steers the kinds of development impacts that result: Who has affordable access? Who is allowed to adapt and improve upon new technologies? Who has say over the ways new technologies become part of people's lives? The Technology & Innovation Policy Lab brings together faculty, undergrads and graduate students to conduct case study research of innovators for development around the world and examine their intellectual property strategies.

(5) **Live Processing and Live Art (FALL)**
Led by Thomas F. DeFrantz (Dance) and Tyler Walters (Theater)

**Description:** This highly interdisciplinary module combines design in electrical and computer engineering, live art and performance, and cultural studies methods to transform the world around us. Using the huge amounts of data that represent our real and virtual presence in the world, we will employ data-intensive live processing to understand the relationships between these data and their impact on real life, and then use these materials to create live art that questions these relationships.

**Campus Partners for Co-sponsorship of Future Endeavors**

1. Wired!
2. Information Initiative @ Duke
3. Visual Studies Initiative
4. HASTAC
5. Duke Art, Law & Markets Initiative (DALMI)
6. Digital Scholarship (Duke Libraries)
7. PhD Lab in Digital Knowledge (Franklin Hum. Institute)
8. Duke STEAM challenge

**Co-curricular Experiences**

**Workshops**

*Scholarly Communications:* New models for publishing and scholarly discourse: technologies, policies, and economics (w/ Duke Libraries)

*GIS/Data:* How to gather, manipulate, analyze, and visualize data (w/ Duke Libraries)

*6th International Workshop on Philosophy of Information:* Durham, NC Spring 2014 (w/ Society for Philosophy of Information)

**Experiential Learning**

*Publishing Focus:* Visits to Independent newspaper, Duke Univ. Press, Durham-based letter-press office, etc. (w/PhD Lab)

*Production Focus:* Build website to analyze and exhibit the past and future of publishing (w/PhD Lab)

*Summer Internships:* Web page/social media development for a nonprofit (w/Sanford School).

**Modules on Demand**

*Digital Scholarship:* Tools & methods of new technological approaches to interdisciplinary research (e.g., text-mining) (w/ Duke Libraries)