Theme Overview

Access to unprecedented amounts of information is creating new opportunities for students and faculty, working together in interdisciplinary teams, to actively engage with the world around them. At the same time, the unparalleled availability of personal information published by smartphones, websites and social media is exposing society to new risks. We 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

The ISIS certificate requires students to take one gateway course, one capstone course, two relevant courses, and engage in two “learning experiences” (e.g., working on a project team, participating in a workshop).

All students are eligible to take a gateway course or FOCUS cluster to learn about the theme. There are also a number of affiliate courses with INFO content already available (more information below). Students will have the opportunity to participate in numerous co-curricular activities (more information below).

Graduate & Professional Students

A graduate-level Information Studies degree is currently being reviewed. Currently, graduate and professional students may participate by: (1) serving as a TA for a gateway course; (2) serving as a TA for ISIS 240; (3) participating on a project team

Contact Information

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Details

Information, Society & Culture Project Teams 2016 - 2017:

(1) Performance in the Community (2016 – 2017 Academic Year)

Led by Martin Brooke (Pratt Electrical Computer Engineering) and Thomas DeFrantz (Trinity - College African & American Studies, Dance)

Description: This project will build on the Phase Mirror, developed in a previous Bass Connections project, to create a mobile performance platform that will enable Duke student-created performances to be presented in the community with little effort and great mobility.

Using interactive video/sound/motion-sensitive technology, the Phase Mirror has been used in live performances at Duke’s Reynolds Industries Theater. However, a stage environment does not take advantage of the Phase Mirror’s ability to interact directly with a live audience. Therefore we will combine the Phase Mirror with a battery-powered electric cart to enable a quiet, environmentally-friendly platform to project the sounds and visions of Duke Student artists and performers in an interactive environment powered by onboard computing and remote Internet data (click here for more information).

(2) Digital Cities and Polysensing Environments (2016 – 2017 Academic Year)

Led by Maurizio Forte (Trinity - Classical Studies/Art, Art History & Visual Studies); David Johnston (Nicholas School Marine Science and Conservation); Regis Kopper (Visualization Technology Group); William Seaman (Trinity - Art, Art History & Visual Studies)

Description: The project will involve an integrated use of spatial technologies for recording massive quantities of data, and implementing and standardizing them for virtual reality platforms, visualization systems and open-access digital repositories in polysensing environments. The case studies will be the archaeological site of Vulci, a well-known Etruscan and Roman city in Italy, and the archaeological site of Burgaz (Burgaz Harbors Project, in collaboration with Stanford University), from the 4th century BCE in Turkey.

This cross-disciplinary program is comprised of selective excavation and survey with geomorphology, geochemistry, remote sensing, and geographic information systems (GIS) modeling and materials analysis. The project investigates the cultural, environmental and economic processes behind constructed landscapes, the interrelated effects of technological development and socioeconomic change and the complementary roles played by diverse nodes (click here for more information).

(3) SSNAP: Scientific Social Network Analysis Project (2016 – 2017 Academic Year)

Led by James Moody (Trinity - Sociology); Lawrence Appelbaum (School of Medicine Brain Stimulation & Neurophysiology); Christopher Bail, (Trinity - Sociology); David Banks (Trinity - Statistical Science); Scott Huettel (Trinity - Psychology and Neuroscience); Katharina Koelle (Trinity - Biology); Seth Sanders (Trinity - Economics); Angela Zoss (Duke University Libraries)

Description: This project’s goals are to understand the social dynamics of scientific production by modeling and mapping the social and topical structure of science production across the social and natural sciences.

Team members will come to understand the collaborative and organic nature of scientific production and field debates, becoming better informed about the nature of scientific progress and debates. They will learn methods for large-scale data collection, managing large free-form data files (electronic publication and grant records), including techniques for text parsing and disambiguation. They will learn social network analysis, including how to construct networks, build measures on networks and statistically model network dynamics. As collaborators on papers or proposals coming out of the project, they will gain hands-on research production and writing experience. All teams will combine during the first semester for a set of lectures that will lay out
basic theory and computation for network models, including statistical and sociological perspectives that shape this effort. Additionally, there will be focused training in programming tools needed for this research (click here for more information).

(4) NC Jukebox (SPRING 2017 ONLY)

Led by Victoria Szabo (Trinity - Art, Art History & Visual Studies); Trudi Abel (Rubenstein Library and Information Science); Winston Atkins (Duke University Libraries); Megan Brown (Duke Libraries); Louise Meintjes (Trinity - Music); Laura Williams (Duke University Libraries)

**Description:** This project transforms an inaccessible audio archive of historic North Carolina folk music into a vital, publicly accessible digital archive and museum exhibition. As a digital cultural heritage project, NC Jukebox provokes critical questions around authority, appropriation and control of cultural artifacts preserved in wax and glass. At the same time, it opens up possibilities for academic and community collaboration around a living set of traditions and practices.

The project includes an exhibition and online playlist of the “greatest hits” of the Frank Clyde Brown collection. It also necessitates metadata standards and library infrastructure. In addition to foregrounding the music itself, NC Jukebox team members will explore biographies of the singers, transcribe the songs and trace the Scotch-English history, variations and contemporary analogues of the songs. Interactive touchscreens, period photos and hybrid analog-digital audio playback machines will invoke the historical conditions of production and reception (click here for more information).


Led by: Nicolas Buchler (Trinity – Biology/Physics); Charles Gersbach (Pratt Biomedical Engineering); Michael Lynch (Pratt Biomedical Engineering)

**Description:** This project team will work to 1) identify contemporary problems facing the larger community, 2) propose and 3) build a synthetic biological solution composed of a genetically engineered microbial machine.

Anticipated projects may be formed to address numerous challenges including those to human health and disease, global health, sustainability and bioenergy. The team will use advanced synthetic biology and metabolic engineering methodologies in their proposed solutions. In addition to the technical aspects of the project, a substantial policy component encourages team members to think creatively about the societal landscape of synthetic biology and develop innovative tools to improve access and education. Toward this aim the team will interface with professors in public policy and ethics to explore synthetic biology’s legal, ethical and economic impact.

iGEM projects have several key components: 1) implementing the design-build-test cycle for synthetic biology in the lab; 2) evaluation of the ethical and societal impacts of the project; 3) education and dissemination through an iGEM website, local high school student outreach and team representation at the annual international iGEM competition (click here for more information).

Gateway Courses (Fall 2016 Only):

**ISIS 110D/PHIL 110D/COMPSCI 110D/PUBPOL 110D: "Information, Society & Culture"

This course takes the students on a journey through the world of information. It shows how questions such as "What is a digital song?", "Can we own information?", "What is privacy?", "Do we have friends on Facebook?", "How does the internet work?", "Is the mind a computer?" and "How has the informational revolution changed society?" are deeply connected. By taking a holistic and multi-faceted approach to these and other questions, the course creates a mature preparation for participation in the ISIS certificate program. It also gives the students opportunity to enter the various research teams of the Information, Society and Culture theme of Bass Connections. Students will be introduced to the various projects by meeting the participants and by understanding the relevance of the team's research projects. As a result, the students will be able to better structure their Duke experience and come out more competent and socially engaged citizens of the global information society. The hallmark of the
information society is enhanced collaboration and creativity. To foster this, the course is structured around small group projects based on student-initiated socially relevant topics related to the class discussion. Students create a portfolio that combines exploration in information science, philosophy, public policy, and computer science, but may also involve art, video production, history or social science.

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

Courses: Check listings for availability

ISIS 240: “Web Multimedia Communications”

Multimedia information systems, including presentation media, hypermedia, graphics, animation, sound, video, and integrated authoring techniques; underlying technologies that make them possible. Practice in the design innovation, programming, and assessment of web-based digital multimedia information systems.


Students will transform this inaccessible audio archive of historic North Carolina folk and popular music into a vital, publicly-accessible digital archive and museum exhibition. Course participants will build a proof-of-concept NC Jukebox from the Frank C. Brown collection of 400 digitized audio tracks in the Rubenstein Library. They will also use Brown’s handwritten field notes and his manuscript letters to research the history of music making in early twentieth-century North Carolina. Additionally, students will use vintage audio recordings and field notes to create a digital NC Jukebox, and accompanying print or multimedia material, for use by a mountain music museum in Spruce Pine, North Carolina.

COMP SCI 260: “Intro to Computational Genomics”

A computational perspective on the analysis of genomic and genome-scale information. Focus on exploration and analysis of large genomic sequences, but also attention to issues in structural and functional genomics. Topics include genome sequence assembly, local and global alignment, gene and motif finding, protein threading and folding, and the clustering and classification of genes and tissues using gene expression data. Students to learn computational approaches to genomics as well as to develop practical experience with handling, analyzing, and visualizing information at a genome-scale.

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: Carolina A. Bruzelius, Mark Olson, Guillermo Sapiro, Mariano Tepper

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, and 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

AFFILIATE Information, Society & Culture Project Teams:

(Click on each team for more information)

(2) The Construction of Memory at Duke & in Durham (2016 – 2017 Academic Year)
(3) Beauty in Balance & Balance in Beauty (2016 – 2017 Academic Year)

BASS CONNECTIONS ISC Certificate Option:

Students can pursue an Information Science + Information Studies Certificate and use their Bass Connections project participation towards Certificate Credit. For more info see: http://isis.duke.edu/undergraduate/certificate

Campus Partners for Co-sponsorship of Future Endeavors:

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

Co-curricular Experiences

Data+ (http://bigdata.duke.edu/data)

Data+ is a 10-week summer research experience that welcomes Duke Undergraduates interested in exploring new data-driven approaches to interdisciplinary challenges. Students join small project teams, working alongside other teams in a communal environment. They learn how to marshal, analyze, and visualize data, while gaining broad exposure to the modern world of data science. Participants will receive a stipend. Learn more about the program, or browse the projects below for more details.

Data Expeditions (http://bigdata.duke.edu/data-expeditions)

A Data Expedition is an element of an undergraduate course that introduces students to exploratory data analysis. Pairs of graduate students, often from different disciplines, work with the course instructor to formulate a question that will engage the students, and a pathway through a dataset that will provide insight. Graduate student participants will receive a travel grant. Browse our current projects to find opportunities.
Workshops ([http://library.duke.edu/data/news](http://library.duke.edu/data/news))

*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)

Experiential Learning ([www.fhi.duke.edu/labs/phd](http://www.fhi.duke.edu/labs/phd))

*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)