INTERACTIVE TELECOMMUNICATIONS PROGRAM (ITP)
FALL 2019 COURSE DESCRIPTIONS

TIER 1 – FOUNDATION COURSES

Applications (4.0 units)
ITPG-GT 2000-001 (7596)   Tu 3:30pm - 6:30pm (09/03 - 12/10)
Nancy Hechinger   370 Jay Street, Room 202

This introductory class is designed to allow students to engage in a critical dialogue with leaders drawn from the artistic, non-profit and commercial sectors of the new media field, and to learn the value of collaborative projects by undertaking group presentations in response to issues raised by the guest speakers. Interactive media projects and approaches to the design of new media applications are presented weekly; students are thus exposed to both commercial as well as mission-driven applications by the actual designers and creators of these innovative and experimental projects. By way of this process, all first-year students, for the first and only time in their ITP experience, are together in one room at one time, and as a community, encounter, and respond to, the challenges posed by the invited guests. The course at once provides an overview of current developments in this emerging field, and asks students to consider many questions about the state of the art. For example, with the new technologies and applications making their way into almost every phase of the economy and rooting themselves in our day to day lives, what can we learn from both the failures and successes? What are the impacts on our society? What is ubiquitous computing, embedded computing, physical computing? How is cyberspace merging with physical space? Class participation, group presentations, and a final paper are required.

Comm Lab: Animation (2.0 units)
ITPG-GT 2002-001 (23007)   Th 12:10pm - 2:40pm (10/24 - 12/12)
Instructor TBD   370 Jay Street, Room 407

ITPG-GT 2002-002 (23008)   Th 3:20pm - 5:50pm (10/24 - 12/12)
Instructor TBD   370 Jay Street, Room 410

ITPG-GT 2002-003 (23009)   Fr 9:00am - 11:30am (10/25 - 12/13)
Instructor TBD   370 Jay Street, Room 410

ITPG-GT 2002-004 (23010)   Tu 12:10pm - 2:40pm (10/29 - 12/10)
Instructor TBD   370 Jay Street, Room 412

ITPG-GT 2002-005 (23011)   We 6:30pm - 9:00pm (10/23 - 12/11)
Instructor TBD   370 Jay Street, Room 407

This course explores the fundamentals of storytelling through animation. Students will create two short animation pieces over the course of seven weeks. The first part of the course is devoted

to the stop motion using Dragon Stop Motion. The second part of the course is devoted to digital collage animation using After Effects. Drawing skills are not necessary for this class, however, you will keep a sketchbook. Basic video and sound skills are required.

[Syllabus](#)

Comm Lab: Video and Sound (2.0 units)
ITPG-GT 2001-001 (23012)	Th 3:20pm - 5:50pm (09/05 - 10/17)
Instructor TBD	370 Jay Street, Room 413
ITPG-GT 2001-002 (23013)	We 6:30pm - 9:00pm (09/04 - 10/16)
Instructor TBD	370 Jay Street, Room 407
ITPG-GT 2001-003 (23014)	Tu 12:10pm - 2:40pm (09/03 - 10/22)
Instructor TBD	370 Jay Street, Room 412

This course explores the fundamentals of sound and video. Students will learn the basics of both audio and video recording using audio field recorders and a variety of cameras as well as editing and exporting in Adobe Premiere. Students will work in teams to produce both an audio soundscape in Adobe Audition and a three-minute video short. This 2-credit course meets for the first seven weeks of the semester.

[Syllabus](#)

Comm Lab: Visual Language (2.0 units)
ITPG-GT 2005-001 (23018)	Th 6:30pm - 9:25pm (09/05 - 10/10)
Instructor TBD	370 Jay Street, Room 407
ITPG-GT 2005-002 (23019)	We 3:20pm – 6:15pm (10/23 - 12/04)
Instructor TBD	370 Jay Street, Room 413
ITPG-GT 2005-003 (23020)	We 3:20pm – 6:15pm (09/04 - 10/09)
Instructor TBD	370 Jay Street, Room 413

The goal of this course is to provide students who are new to the principles of visual design with the practical knowledge, critical skills and confidence to effectively express their ideas in a visually pleasing and effective way. Over the course of 7-weeks an overview of the many tools and techniques available to convey an idea, communicate a message and influence an experience will be presented, discussed and applied. Topics covered in the course include: typography, color, composition, branding, logo and information design. This class is intended for students who do not have formal graphic design or visual arts training but recognize the powerful impact of visual decisions in their work.

COURSE OUTLINE
Class 1 – Principles of Visual Communication
Class 2 – Signage and Information Systems
Class 3 – Typography/Composition
Class 4 – Logo and Brand Design
Class 5 – Color Theory
Class 6 – Information Design

Each meeting a new topic will be presented. The format will be a class discussion with a focus on examples of the theme for the week. Each topic will have a related assignment that will done by each student individually and presented and critiqued in the following class. For students, new to or with limited skills in Photoshop or Adobe Illustrator there will be a series of informal weekly workshops led by residents to teach the basics and answer questions on use of the software. Completion of the assignments and participation in the class discussion is required. Students must maintain a blog where they post their assignments.

Syllabus

Introduction to Computational Media (4.0 units)

ITPG-GT 2233-001 (23021)	We 3:20pm - 5:50pm (09/04 - 12/11)
Instructor TBD	370 Jay Street, Room 408
ITPG-GT 2233-002 (TBD)	Th 5:30pm - 8:00pm (09/05 - 12/12)
Instructor TBD	370 Jay Street, Room 411
ITPG-GT 2233-003 (23022)	We 12:10pm - 2:40pm (09/04 - 12/11)
Instructor TBD	370 Jay Street, Room 411
ITPG-GT 2233-004 (23023)	We 12:10pm - 2:40pm (09/04 - 12/11)
Instructor TBD	370 Jay Street, Room 408
ITPG-GT 2233-005 (23024)	We 3:20pm - 5:50pm (09/04 - 12/11)
Instructor TBD	370 Jay Street, Room 410
ITPG-GT 2233-006 (23025)	Tu 12:10pm - 2:40pm (09/03 - 12/10)
Instructor TBD	370 Jay Street, Room 411
ITPG-GT 2233-007 (23026)	We 9:00am - 11:30am (09/04 - 12/11)
Instructor TBD	370 Jay Street, Room 408

The 17th century philosopher Spinoza described "wonder" as a state of suspension in the mind, a paralysis resulting from a confrontation with something wholly new, disconnected from past experience such that judgements of whether it is good or bad are not possible. At this moment in

time, we are caught in such a state of suspension with digital technologies. Creating computer applications instead of simply using them will provide you with a deeper understanding for the essential possibilities, limitations and unknowns of computation.

The first half of Introduction to Computational Media focuses on the fundamentals of programming the computer (variables, conditionals, iteration, functions, and objects) and includes a basic introduction to HTML5/DOM. The JavaScript-based 'p5.js' programming framework is the primary vehicle for the class. All sections assume no programming experience at all.

The second half focuses on applying fundamental programming concepts to generate and manipulate various media including imagery, sound and text and data. This course assumes a working knowledge of JavaScript and the 'p5.js' programming framework. Students who already have experience with programming in JavaScript and p5.js may join the course in the second half. Pre-requisite: ICM: Code or equivalent programming experience.

Syllabus

Introduction to Physical Computing (4.0 units)

ITPG-GT 2301-001 (23048)
Instructor TBD

Th 9:00am - 11:30am (09/05 - 12/12)
370 Jay Street, Room 408

ITPG-GT 2301-002 (23027)
Instructor TBD

We 3:20pm - 5:50pm (09/04 - 12/11)
370 Jay Street, Room 411

ITPG-GT 2301-003 (23028)
Instructor TBD

Th 12:25pm - 2:55pm (09/04 - 12/12)
370 Jay Street, Room 412

ITPG-GT 2301-004 (23029)
Instructor TBD

We 9:00am - 11:30am (09/04 - 12/11)
370 Jay Street, Room 410

ITPG-GT 2301-005 (23049)
Instructor TBD

We 3:20pm - 5:50pm (09/04 - 12/11)
370 Jay Street, Room 412

ITPG-GT 2301-006 (23030)
Instructor TBD

Fr 9:00am - 11:30am (09/06 - 12/13)
370 Jay Street, Room 408

ITPG-GT 2301-007 (23031)
Instructor TBD

We 9:00am - 11:30am (09/04 - 12/11)
370 Jay Street, Room 411

This course expands the students' palette for physical interaction design with computational media. We look away from the limitations of the mouse, keyboard and monitor interface of today's computers, and start instead with the expressive capabilities of the human body. We consider uses of the computer for more than just information retrieval and processing, and at

locations other than the home or the office. The platform for the class is a microcontroller, a single-chip computer that can fit in your hand. The core technical concepts include digital, analog and serial input and output. Core interaction design concepts include user observation, affordances, and converting physical action into digital information. Students have weekly lab exercises to build skills with the microcontroller and related tools, and longer assignments in which they apply the principles from weekly labs in creative applications. Both individual work and group work is required.

Syllabus

TIER 2 – ELECTIVE COURSES

Topics in Digital Media: Developing Assistive Technology (3.0 units)
DM-GY 9103 – A (15698)   Tu 6:45pm - 9:00pm (09/03 - 12/13)
Anita Perr & Amy Hurst   370 Jay Street, Room 316A

This multidisciplinary course allows students from a variety of backgrounds to work together to learn about and develop assistive technology. Partnering with outside organizations, students will work in teams to identify a clinical need relevant to a certain clinical site or client population, and learn the process of developing an idea and following that through to the development of a prototype product.

This course provides an overview of some of the assistive technologies currently used by people with disabilities to participate in life's activities, including those used for computer access, mobility, and activities of daily living (ADLs). Working in small groups, you will work with a mentor with a disability to solve a problem by creating a tech solution making the problem easier to deal with. We have a number of ongoing projects such as developing interactive activities to improve balance of preschoolers with hearing impairments and cochlear implants, or working with a deaf woman in Argentina to develop a tool that can allow her to participate in group discussions. Other projects may include working with people with physical and sensory disabilities. This course provides you your own evidence of the benefit of using client centered design with input from multiple professionals.

Topics in Digtal Media: Motion Capture (3.0 units)
DM-GY 9103 – B (16150)   Th 6:30pm - 9:00pm (09/03 - 12/13)
Kathleen Sullivan & Todd Bryant   370 Jay Street, Room 308

This course provides an introduction to the concepts of motion capture and the motion capture production pipeline to perform and record 3D animations for film and video games as well as stream for live performances. Students will learn all of the tools for tracking props and

performers using MAGNET's cutting-edge motion capture studio. Students will also develop concepts around the technology and integrate their data into 3D computer graphics along with keyframe and procedural animation and custom 3D assets to build final projects using the Unreal game engine.

Syllabus

Big Screens (4.0 units)
GAMES-GT 236 – 001 (23260)   Mo 9:00am - 11:45am (09/03 - 12/13)
Mattia Romeo   370 Jay Street, Room 312

This class is dedicated to experimenting with interactivity on large-scale screens. Students will work to develop one project over the course of the semester, culminating with a showing at InterActive Corps' 120 X 11-foot video wall at their corporate headquarters on 18th St. and the West Side Highway. A mock-up of the system is available for testing. Class time is divided between independent project development, critique, technical demonstrations, and field trips to IAC.

Syllabus

Drawing it Together (1.0 unit)
ITPG-GT 2538 – 001 (22976)   Sa 12:00pm - 6:00pm (10/5)
Alon Chitayat   Su 12:00pm - 3:00pm (10/6)
                                                     370 Jay Street, Room 407

Drawing is one of the most ancient forms of communication – it has the power to engage users like no other technology. Drawing can connect people beyond language or culture, helping humans express emotions and abstract ideas where words fail. But often times people are too self-conscious to even pick up the pen, let alone draw something someone else will see. How can new interactive interfaces give people the confidence to draw without inhibition, and inspire previously impossible collaborations and creations?

In this weekend workshop, we'll examine the game design behind analog drawing games and how to translate them into digital experiences.

Past class deck:
https://docs.google.com/presentation/d/1XD6aTw6nxSYQ9_fQLCi7jxQ5m9p-Ph6VGDBvb_kUS9Y/edit#slide=id.g43bf3213f3_0_13

Knitting: Beyond the Scarf (Even if it Kinda Looks Like a Scarf) (1.0 unit)

ITPG-GT 2029 – 001 (23490)   Sa 12:00pm - 6:00pm (10/26)
Janusz Jaworski   Su 12:00pm - 3:00pm (10/27)
                                                          370 Jay Street, Room 407

Knitting, a relatively modern (only eleven to twelve hundred years old) technique for making stretchy fabrics, got its beginnings in the Middle East, and spread via trade routes into Europe, and then on into the rest of the world. Knitted items were initially a rare luxury, and then sailors and peasants learned to knit and make things for themselves, and the art took a turn into the realm of a common handicraft. Later, in the 1500s, machines were created that could knit, but it was still cheaper for people to make their own clothes. With the introduction of synthetic fibers, along widespread colonizations and the globalization of the garment industries, manufactured knitted clothing became so inexpensive as to be disposable. Today, hand-knit (and even hand-drawn knitting machine made) items straddle the line between handicrafts and luxury items (and the process sometimes becomes a performative art). With the use of new/non-traditional materials, knitted objects are also being used in healthcare and industry.

[Syllabus](#)

Making Media Making Devices (1.0 unit)
ITPG-GT 2998 – 001 (22977)   Sa 12:00pm - 6:00pm (09/14)
Matt Richardson   Su 12:00pm - 3:00pm (09/15)
                                                          370 Jay Street, Room 407

Small, affordable single board computers enable you to blend the principles of Physical Computing with media playback and capture. This course uses the Raspberry Pi computer as a platform for creating portable devices that have the capability to display graphics, play video, play audio, take photographs, and capture video. As a foundation for the course, students will learn the basic workflow of using the Raspberry Pi computer for physical projects. This foundation includes gaining an understanding of the Linux software, Python, and digital input and output. Students will work independently or collaboratively to build on this foundation to create their own media playback and capture devices.

Masquerade (1.0 unit)
ITPG-GT 2044 – 001 (23749)   Sa 12:00pm - 6:00pm (10/19)
Ziv Schneider   Su 12:00pm - 3:00pm (10/20)
                                                          370 Jay Street, Room 410

Masks have been used around the world since antiquity for ceremonial and practical purposes, as devices for protection, disguise, entertainment and bodily transformation, made to be worn or displayed.

Sociologist Erving Goffman wrote about the everyday life as a masked theatrical performance. The performative aspect of our lives today is ever so present in our use of social media, where we present a curated version ourselves for the immediate visual consumption of others. In our "Selfies", we can assume a multitude of identities and characters.

Recent tools and platforms have evolved social media portraiture to an art form and have created new opportunities for artists to create and distribute interactive augmentations, forming new relationships between artists and viewers. This class explores the developing language of social media portraiture enhanced by Augmented Reality.

Students will:
- study masks in art history, leading up to today
- ideate, design and develop interactive masks, starting from physical objects and moving towards real-time distributed digital masks (AKA effects/lenses/filters)
- learn to use the Spark AR Studio software and other tools

Textile Interfaces (1.0 unit)
ITPG-GT 2030 – 001 (23491)   Sa 12:00pm - 6:00pm (11/02)
Kathryn Hartman   Su 12:00pm - 3:00pm (11/03)
                                         370 Jay Street, Room 407

Want to make an interface that can be squished, stretched, stroked, or smooshed? This course will introduce the use of electronic textiles as sensors. Focus will be placed on physical interaction design - working with the affordances of these materials to create interfaces designed to invite or demand diverse types of physical interaction. This course does not require knowledge or love of sewing - a variety of construction methods will be introduced. It will rely on a physical computing approach, with Arduino being used to read sensor values. Working with a breadth of conductive and resistive materials, students will learn to design and create bespoke alternative interfaces that can live in our clothing, furniture, and built environments.

Art Toy Design (2.0 units)
ITPG-GT 2196 – 001 (22978)   Tu 9:00am - 11:30am (09/03 - 10/22)
Benjamin Light   370 Jay Street, Room 412

Is it a plaything? Sculpture? Nostalgia? A Product? Art toys exist at the center of a unique Venn diagram. Each student in this class will develop an original limited-edition art toy. We will cover toy fabrication, character design, material selection, packaging design, and art toy culture. The class will be fabrication heavy, there will be weekly assignments, and a final project.

Design Research (2.0 units)

ITPG-GT 2997 – 001 (22980) Fr 9:00am - 11:55am (09/06 - 10/18)
Dave Derby & Heidi Brant 370 Jay Street, Room 410

This course will focus on different design research and innovation workshop methodologies including Design Thinking, LEGO Serious Play, Service Design and Systems Design. The format will be a combination of seminar, presentation and practical application with students leading workshops both in and out of class. Students will learn how to create deliverables such as roadmaps, journey maps and service blueprints along the way. The workshop methodologies and exercises we will cover include: Futurecasting and scenario planning, Life Design, Google Ventures Design Sprints and Gamestorming. The course will ask students to consider practical applications in a variety of contexts from personal to group to community to country to global and beyond. Students will be required to apply one or more of these workshop methodologies to an issue they've identified in one area of their daily life.

Designing Club Culture (2.0 units)
ITPG-GT 2047 – 001 (23819) We 6:30pm - 9:00pm (09/04 - 10/16)
Ari Melenciano 370 Jay Street, Room 412

How can light, sound and design transform the human experience within a given space? How can psycho-geography be manipulated through audio-visual techniques? In what ways have and will technology allow spaces for sonic entertainment to be more immersive and experimental? Through an exploration of audio-visual techniques (i.e. VJing, MIDI-ing devices, sound synthesis, projection mapping, experiments with spatial sonic composition) along with discussions on how counterculture movements have used music and design as a vehicle for political dissent and community building, students will be invited to imagine new club spaces for social contexts beyond pure aesthetics. Assignments will include the development of different forms of interactive spaces for expression. Ableton (and free DAWs), MaxMSP, Isadora, and Unity will be used within this course.

Faking the News (2.0 units)
ITPG-GT 2151 – 001 (22981) Mo 6:30pm - 9:25pm (10/28 - 12/02)
Ben Moskowitz 370 Jay Street, Room 410

Lies. Hoaxes. Conspiracies. Rumors. Propaganda. Fake news is an age-old phenomenon—but the internet is making targeted misinformation cheap and scalable. That is affecting politics, public opinion, and the everyday experience of the internet.

In this 6-week class, we will explore the cutting edge of "fake news" by engaging in ethical research and fabrication. Participants will manufacture and observe a controlled "fake news" event. We will experiment with command-line tools for doctoring video, neural nets and deepfakes to fabricate reality, Twitter bots, behavioral psychology, and the dark underbelly of the ad economy.

Immersive Listening: Designing Sound for VR (2.0 units)

ITPG-GT 2022 – 001 (23067)	Mo 6:30pm - 9:00pm (09/09 - 10/21)
T. K. Broderick	370 Jay Street, Room 407

Until recently 3D sound was a novelty reserved for special uses and reaching a limited audience, no medium in popular culture has been as inherently dependent upon spatial audio as virtual reality. The widespread and standardized implementation of surround sound in film brought cinema to a new level of immersion, but is limited to theatrical exhibition and home theater systems. Today a considerable amount of content is consumed on mobile devices and laptops which excludes the cinematic experience of spatial sound. With the current rise of cinematic VR and the blurring line between gaming and experiential VR, spatial audio is no longer just an added bonus, but rather a necessity in designing immersive VR experiences. In this course, we will explore the emerging field of 3D sound design and for both 360 video and game engine-built VR using a digital audio workstation, game engines, and 3D audio plugins.

Intro to Fabrication (2.0 units)

ITPG-GT 2637 – 001 (23069)	We 9:00am - 11:30am (09/04 - 10/16)
Benjamin Light	370 Jay Street, Room 407

ITPG-GT 2637 – 002 (23070)	We 9:00am - 11:30am (10/23 - 12/11)
Benjamin Light	370 Jay Street, Room 407

ITPG-GT 2637 – 003 (23083)	Tu 9:00am - 11:30am (10/29 - 12/10)
Benjamin Light	370 Jay Street, Room 408

ITPG-GT 2637 – 004 (23085)	Th 12:10pm - 2:40pm (09/05 - 10/17)
Mark Kleback	370 Jay Street, Room 407

Time to get your hands dirty. Prototypes need to be created, motors have to be mounted, enclosures must be built. Understanding how things are fabricated makes you a better maker.

But hardware is hard. You can't simply copy and paste an object or working device (not yet anyway), fabrication skills and techniques need to be developed and practiced in order to create quality work. You learn to make by doing.

In this class, you will become familiar and comfortable with all the ITP shop has to offer. We will cover everything from basic hand tools to the beginnings of digital fabrication. You will learn to use the right tool for the job.

There will be weekly assignments created to develop your fabrication techniques. There will be in class lectures, demos, and building assignments. Emphasis will be put on good design practices, material choice, and craftsmanship.

[Syllabus](#)

Listening Machines (2.0 units)
ITPG-GT 2043 – 001 (23697)   Fr 3:20pm - 5:50pm (09/06 - 10/18)
Michael Simpson   370 Jay Street, Room 410

This course will provide students with an introduction to the area of machine listening. Machine listening is the general field studying algorithms and systems for audio understanding by machine. It deals exclusively with general audio as opposed to speech recognition.

The most basic goal of all machine listening systems is to reliably recognize and react to very specific sounds. Over the course of the semester, we will create our own unique machine listening systems that provide us with new and interesting ways to interact with our projects. We will use live coding and real-time data visualization to demystify some of the more daunting underlying topics like digital signal analysis, music information retrieval, and machine learning.

Mindfulness and Transformative Technologies (2.0 units)
ITPG-GT 2145 – 001 (22990)   Mo 3:20pm - 6:15pm (09/09 - 10/15)
Zoran Josipovic   370 Jay Street, Room 413

Transformative technologies (a.k.a. Transtech) are the wave of the future, yet many challenges remain before their use can become as effective and widespread as that of personal computers and cell phones today. This course will introduce students to this exciting field, starting with the examination of the potential for optimizing experience through mindfulness and meditation, the understanding of basic issues in obtaining and interpreting physiological signals, toward the aim of generating ideas for wearable transtech projects.

Students will examine the ideas behind efforts to optimize human experience; practice different meditation techniques to experience the variety of cognitive and affective strategies they use and the varied effects they generate; explore the basic issues in obtaining and interpreting physiological data, and the use of brain stimulation methods such as TMS, dTCS, etc., and use this info to come up with ideas for wearable transtech devices.

The class will be mix of lectures, exercises and demos.

Performative Avatars (2.0 units)
ITPG-GT 2153 – 001 (22991)   Th 3:20pm - 5:50pm (10/24 - 12/12)
Matt Romein   370 Jay Street, Room 413

Whether it's through photo realistic scans found in current-gen video games or the cartoonish and low-fi aesthetic of Bitmoji there is no limit to ways in which the body and the self are represented in digital spaces.

This 2-credit class will look at how avatars have been historically used in the realm of art, commerce, and entertainment and utilize existing avatar creation tools to develop projects that examine identity, body politics, and contemporary performance. In class, we will cover the basics of Unreal Engine, photogrammetry, 3D scanning, and model rigging although students will be encouraged to use existing skill sets and creative thinking to complete some of the smaller week-by-week assignments. The class will culminate with a short performance, small installation or single/multi-channel video piece using one or more of the techniques covered in class. This can be a solo project or a group project.

In this class students will:
– Explore how avatars can be utilized in your creative practice
– Gain an introductory understanding of Unreal Engine, photogrammetry, model rigging, and 3D scanning.
– Learn how to recontextualize digital spaces for the purposes of art, installation, and performance.
– Broaden your thinking of what performance can be, both in a physical setting and digital setting.
– Think critically about how physical bodies inhabit digital spaces and how the hardware and software we use reinforces the acceptance and value of certain kinds of bodies.

Performing Reality (2.0 units)
ITPG-GT 2032 – 001 (23493)   Mo 3:20pm - 6:15pm (09/09 - 10/21)
Andrew Schneider   370 Jay Street, Room 410

Time-based art, performance - and theater most specifically - should be perfect manipulators of experience. Many creators of time-based art look for the "universal" in content and overlook what we all have in common in form: brains. What happens in the minds of all truly happens (what happens in the lobby also truly happens). How can we use art to make our brains experience the same things? What behind-the-scenes work can we employ to manipulate

experience. Film scoring works on us in ways we don't perceive in the moment. Can we pay closer attention to this when making work? Sometimes what we have for lunch effects our experience of art more than the hours of labor that went into the most minuscule of decisions when making that art. Is empathy always ethical?

Show don't tell. How does the art take place in the room in front of us? How can public performance not be awkward? How do we experience a performance rather than watch it?

Population Infinite: The Future of Identity (2.0 units)
ITPG-GT 2041 – 001 (23494)   We 6:30pm - 9:25pm (09/04 - 10/09)
Anastasios Germanidis   370 Jay Street, Room 408

"Being a person is not the essence of humanity, only – as the world's history suggests – one of its masks." -- John Gray

"my main concern with someone stealing my identity is that they would be a better me" -- @BrandyLJensen

"A caterpillar who seeks to know himself would never become a butterfly." -- André Gide

We are currently living in a society that operates under the principle that one body equals one agent, one vantage point, one identity. But emerging technologies may create a future in which the notion of a single personal identity becomes outdated. That future includes: machine learning techniques that make emulating the style and behavior of other people fast and easy; widely available AR/VR headsets that get people to identify with however many faces and bodies they choose, instead of just those they were born with; cryptocurrencies enabling the use of pseudonymous economic identities to transact across the planet in a permissionless manner. This is a course where we will get to explore and anticipate the utopian and dystopian aspects of this weird future of identity, by: designing weekly interventions for obfuscating, simulating, multiplying, and merging ourselves online and offline, using tools like Puppeteer and Runway; looking at projects that seek to redefine, expand, or dissolve concepts of personal and social identity, from artists such as Lynn Hershman Leeson and Stelarc; and reading widely about the historical, philosophical, and psychological underpinnings of identity.

Syllabus

Prediction as Planning: Wayfinding for Future Thinkers (2.0 units)
ITPG-GT 2033 – 001 (23496)   Mo 6:30pm - 9:00pm (09/09 - 10/21)
Michelle Shevin   370 Jay Street, Room 410

In an age of pressing and complex problems like climate change, extreme inequality, and surveillance capitalism, "problem solving" is a central feature of innovation, design, and

planning. But can these wicked problems actually be "solved"? And why does the cutting edge of problem solving look so limited? Machine learning. Predictive analytics. Algorithmic decision-making…Is planning for the future being outsourced to machines? In this class, we'll take back control of the future by learning how it has historically been predicted, planned, and produced in board meetings, think tanks, writers' rooms, and policy circles, and how those methods are being impacted by new technologies. During a series of discussions and hands-on workshops, we will learn specific, tangible, and collaborative practices for prediction and planning that can augment and transcend computational capabilities, making for marketable future-proof skills that can help redefine the future for humanity.

[Syllabus](#)

Social Innovation Design (2.0 units)

ITPG-GT 2990 – 001 (22992)   We 6:30pm - 9:00pm (10/23 - 12/11)
Lyel Resner   370 Jay Street, Room 408

This course will challenge students to reflect on the concept of value creation, specifically the growing intersection of economic, social, and environmental value in the context of an interconnected and interdependent global society, and the role that technology and design can play in the advancement of social good. In the tradition of ITP, this class will take a deeply interdisciplinary and cross-sector lens. Students will survey a breadth of innovations that represent an exciting new toolkit for creating and scaling social value including social entrepreneurship, business-minded NGOs, impact investing, venture philanthropy, and public-private partnerships. These innovations are being used to tackle the world's biggest problems in a variety of fields – education, healthcare, financial empowerment, poverty alleviation, climate change, civics, and so on.

Students will learn to identify motivations and pathways for traditional private and public-sector actors to develop social impact strategies, as well as motivations and pathways for social sector actors to access and leverage the capital markets and private sector methodologies. In particular, students will focus on how the application of design and technology principles can advance leading-edge work in these contexts.

The class will be structured as a 7-week seminar. Each week will be a module featuring a major concept Social Innovation. Students will learn about the innovation mechanics and evolution, modern examples, and will consider problems and opportunities for design and technology-driven interventions. We will also aim for at least one expert guest speaker per module.

Final Project: Business Plan, Product Plan, or Installation that addresses one of the following questions:

How can we create a world where people can more easily express their values through their participation in the economy (as consumers, producers, or otherwise)?

How can we create a world where private sector actors are more transparent about their social and environmental accounting?

Students may also use an existing idea for a social enterprise or product pending instructor approval.

[Syllabus](#)

Spatial Justice: Design + Tech for Equity (2.0 units)
ITPG-GT 2034 – 001 (23497)   Fr 3:20pm - 5:50pm (10/25 - 12/13)
Quardean Lewis-Allen   370 Jay Street, Room 410

Designers are at the forefront of shaping space and have the power to reinforce or destabilize inequitable power relationships with space.

With that context, how can we design for human equity? What does it look like to co-create spaces/projects under the pressure of gentrifying forces? How might technology and design be anchors for safe and equitable spaces/projects of the future?

This course will explore these questions and the multiple facets that complicate and enrich design processes within communities. We will learn about models of community design center practices, civic vs. community participatory engagements, and the systems, tools and actors needed to produce legible works within a place to design for an inclusive future.

Talking and Storytelling: The Art of Effective Communication (2.0 units)
ITPG-GT 2157 – 001 (22993)   Mo 3:20pm - 6:15pm (10/28 - 12/02)
Adaora Udoji   370 Jay Street, Room 413

Successfully communicating is a critical skill not only for a graduate thesis, but also in the career that will follow. It boils down to this question: Are you persuading, influencing, or communicating your thoughts and ideas effectively, to any audience be it three people or three hundred? In this class, we will systematically work our way through a four-step method to improve your ability to connect with your audience. We will explore the science that explains why stories work. We will tackle a basic framework for what a story is, using a process and foundation to develop any talk or presentation. Now that we have what you are going to say, we will also focus on how you say it, along with strategies to give you confidence to be your best self when speaking in front of a crowd. This is a particularly good class to take in preparation for your thesis in the Spring. This seminar examines and deconstructs verbal storytelling as a discipline in its own right. It is an exploration of speaking and storytelling as a fundamental building block of human evolution and innovation. We will look at the learnings from ancient times through modern scientific research—looking at theories attempting to explain what happens physiologically and psychologically when we are moved by a spoken narrative. This is a

contextual approach that will focus on both the theory and the application in the marketplace of developing and delivering narrative as it relates to presenting oneself, a product or a service. As such, we seek to understand what drives current trends toward narrative education and storytelling as a competitive advantage in learning, communicating, persuading and influencing. Students will also contribute to designing a collaborative verbal communication template for the class and for the Final Project: a presentation that applies some of the concepts learned to themselves or their projects, products, ventures and/or service concepts.

The Uses of Discomfort (2.0 units)
ITPG-GT 2159 – 001 (22979)   Th 6:30pm - 9:25pm (10/24 - 12/05)
Nicholas Hubbard   370 Jay Street, Room 407

Meaningful growth involves discomfort. For individuals, in relationships, for communities it can be a key aspect in the process of reaching a desired outcome, in what Ida Benedetto calls "patterns of transformation". Our unique insights as designers, artists, and creative technologists can lead to innovative applications of this unorthodox tool.

The Uses of Discomfort is an experience design course where we will spend six weeks delving into how this response functions, why it's of interest to us, and what we might be able to do with it. We'll look at four broad categories (visceral, intimacy-related, control-related, and cultural) through assigned readings, in-class lectures, and creative challenges. These challenges will ask you to manage safe risks for yourself and others, putting your ideas to the test as you critically explore the course content.

Conceptual in nature, you will be expected to explore how you can apply your favored skills, technical approaches and design tools to the questions and opportunities presented. At the end of the session, you will be empowered to incorporate the course learnings into your ongoing work as designers, artists, and creative technologists. You will benefit from some prior familiarity with one or more of the following: speculative design, art-practice, concept development, or user-experience design.

Note: this class was previously called Design for Discomfort.

[Syllabus](#)

Thesis Part 1: Research and Development (2.0 units)
ITPG-GT 2098 – 001 (23498)   Mo 12:10pm - 2:40pm (10/28 - 12/09)
Nancy Hechinger   370 Jay Street, Room 408

ITPG-GT 2098 – 002 (23499)   Tu 12:10pm - 2:40pm (10/29 - 12/10)
Kathleen Wilson   370 Jay Street, Room 407

ITPG-GT 2098 – 003 (23867)   Th 6:30pm - 9:00pm (10/31 - 12/12)
Margaret Smith   370 Jay Street, Room 410

We are experimenting with a change to Thesis with this pilot class. The idea is to extend thesis over both semesters, each with a 2-point class that meets every other week.

Part 1 focuses on research and concept development. Students will have the time to explore deeply into their areas of interest, narrow their focus and, finally, develop a concept and plan for their final thesis project. They will be structured assignments throughout on research methodologies and concept development techniques. They will end the semester with a paper and a plan for design and production.

World in a Box: From the Aquarium to the Terrarium and Beyond (2.0 units)
ITPG-GT 2035 – 001 (23502)   Mo 12:10pm - 3:05pm (10/28 - 12/02)
Brian E. Jones   370 Jay Street, Room 410

This open studio class is for students wishing to explore the design and construction of living systems: both terrestrial and aquatic. The labs and lectures are designed to lend clarity to the individual's pursuit, as they create their chosen 'World in a Box.' For those endeavoring to create 'smart' systems; instructor developed infrastructure will be made available to support and accelerate project velocity. Our toolkit for exploration and expression will include Raspberry Pi, building and deploying applications on Google Cloud Platform (authored in python), designing systems in Fusion 360, remote system monitoring, and motor control.

Culinary Physics (3.0 units)
ITPG-GT 2569 – 001 (22997)   Th 7:00pm - 8:40pm (09/03 - 12/13)
Stefani Bardin   Bldg: EDUC, Room:1079

This studio and seminar course explores the basic principles of food biochemistry, enzymology and food processing and how they relate to memory, the senses and the processing of information. Students will also learn basic principles of molecular gastronomy and modernist cuisine as framing devices for understanding how food also functions in the context of bodily health, environmental health as well as cultural and political narratives. Our food system consists of more than food production and consumption and this class will address how science and food science plays a more integral role in this system and how this knowledge can be mined for work that creatively and functionally contributes to this emerging field. Assignments for the class will be based on the incorporation of food science into design and technology projects that uses food as a substrate to explore and illuminate information within the food system. Workshops involve using liquid nitrogen + hydrocolloids as well as creating performative food objects and a Futurist meal.

Syllabus

Citizen Science: Biotechnology (4.0 units)
ITPG-GT 2995 – 001 (22998)   Th 3:20pm - 6:15pm (09/05 - 11/21)
Stefani Bardin & Daniel Grushkin   370 Jay Street, Room 412

Genspace is collaborating on this course with ITP so that students can learn science literacy through several specialized workshops that will take place Genspace – topics include Biohacking (with an introduction to CRISPR) + Biomaterials. Students will create projects throughout the semester utilizing both Genspace and ITP resources. Additionally, students will learn the basics of biodesign and bioinformatics to help them frame and conceptualize their research and their projects and how best to use these skills ethically and responsibly in aesthetic and scientific ways.

Since 2009 Genspace has operated a community biology laboratory in Brooklyn stemming from the hacking, biohacking, and DIYbio movements. It currently supports citizen science and public access to biology, biotechnology, synthetic biology, genetic engineering, citizen science, open source software, open source hardware.

Computational Approaches to Narrative (4.0 units)
ITPG-GT 2198 – 001 (23533)   Th 12:10pm - 2:40pm (09/05 - 12/12)
Allison Parrish   370 Jay Street, Room 410

Beginning with the release of Crowther and Woods' "Colossal Cave Adventure" in 1977, the potential and unique affordances of computation as a means of storytelling have become more and more apparent. Combining approaches from literary theory, anthropology, computational creativity and game design, this class considers how narrative structure can be represented as data and enacted through computation, and invites students to implement practical prototypes of their own interactive and procedurally-generated narratives using a variety of technologies.

Topics include (but are not limited to) hypertext fiction, "choose your own adventure"-style branching narratives, text adventures, visual novels, story generation from grammars and agent-based simulations. Students will complete a series of bite-size weekly assignments to present for in-class critique. Each session will also feature lectures, class discussion, and technical tutorials.

Prerequisites: Introduction to Computational Media or equivalent programming experience.

Data Art (4.0 units)
ITPG-GT 2571 – 001 (22999)   Tu 9:00am - 11:30am (09/03 - 12/10)
Genevieve Hoffman   370 Jay Street, Room 411

Fascinating and terrifying things are happening at the intersection of data and culture. Our lives are being constantly measured, and information about us is being surveilled, stolen, and commodified. Dialogue around this data revolution has been dominated by corporations, governments, and industry - but what about the arts? In this class, we'll investigate the means by which artists can engage (and are engaging) in the collection, processing, and representation of data. Using a research-focused, prototype-based approach, we'll build a series of collective and individual projects to interrogate the 'new data reality'. Students will use p5.js, along with a variety of analog media or open-source data tools (such as D3.js, Miso, OpenRefine, MapBox & Leaflet).

Desert of the Real: Deep Dive into Social VR (4.0 units)
ITPG-GT 2461 – 001 (23000)   Tu 3:20pm - 6:15pm (09/03 - 11/26)
Igal Nassima   370 Jay Street, Room 408

The virtual expansion of screens began during the 1960's with the exploration of head-mounted displays. Since the 60's, virtual reality has been explored in a multi-disciplinary context including philosophy, design, arts, behavioral therapy.

Baudrillard, with his publication of Simulacra and Simulation (1981), declared that human experience is being replaced by a simulation of reality (HyperReality). His theories brought the dystopian narrative of the virtual to mainstream pop-culture, as seen in films such as The Lawnmower Man and The Matrix.

Contrary to Baudrillard, Canadian VR Pioneer Char Davies brings a more positive perspective to Virtual Reality, "facilitating a temporary release from our haitial perceptions and culturally biased assumptions about being in the world, to enable us, however momentarily, to perceive ourselves and the world us freshly."

Throughout the class, the friction between Baudrillard and Davies will create the foundation of our exploration of Virtual Reality, where we will use room scale headsets and game engines to create meaningful "temporal experiences" exploring themes from behavioral sciences to narrative storytelling.

We will be exploring:
- existing VR projects, popular culture references and theory.
- concepts such as sense of embodiment (SoE), social VR design, and interactive storytelling techniques.
- methods for designing, modeling and rigging avatars for VR.
- live and pre-recorded animation.
- spatial audio techniques such as ambisonic sounds engines.
- packaging and distributing applications for social VR.

This is a production class, along with a theoretical foundation, in which we will prototype projects with networking, inverse kinematics, raycasting and face tracking technologies to

explore questions such as "how does the viewer become part of the experience?" and "how does the real space relate to the virtual worlds we design?"

In the second half of the class, students will work in groups to build a final social VR project based on their exploration of the above framework.

Designing for Digital Fabrication (4.0 units)
ITPG-GT 2890 – 001 (23086)   Th 3:20pm - 5:50pm (09/05 - 12/12)
Daniel Rozin   370 Jay Street, Room 408

The ability to digitally fabricate parts and whole pieces directly from our computers or design files used to be an exotic and expensive option not really suitable for student or designer projects, but changes in this field in the past 5 years have brought these capabilities much closer to our means, especially as ITP students. ITP and NYU now offer us access to laser cutting, CNC routing, and 3D stereolithography. In this class, we will learn how to design for and operate these machines. Emphasis will be put on designing functional parts that can fit into a larger project or support other components as well as being successful on a conceptual and aesthetic level. In this class, we will discover methods to design projects on CAD applications for total control of the result, and we will develop algorithmic ways to create designs from software (Processing) to take advantage of the ability to make parts and projects that are unique, customizable, dependent on external data or random. The class will include 3 assignments to create projects using the three machines (laser, router, 3D) and the opportunity to work on a final project.

Syllabus

Designing for Live Performance (4.0 units)
ITPG-GT 2521 – 001 (23001)   Mo 6:30pm - 9:25pm (09/09 - 11/25)
Andrew Lazarow   370 Jay Street, Room 412

For centuries, great works of music, theater, and dance, have combined art and science to make integrated performances that move audiences. Today, we are seeing exciting changes as artists experiment with video and real-time interactivity to draw audiences even deeper into the performance, and enhance the shared experience of the moment. This class explores conceptual approaches to design, industry-standard software, prototyping frameworks, and data flow programming to provide student designers with the cutting-edge tools necessary to confidently collaborate with writers, directors, and performers. Structured as a studio course, students will make designs for contemporary performance pieces, and collaborate with working artists to design original projects.

Syllabus

Electronics for Inventors (4.0 units)
ITPG-GT 2036 – 001 (23540)   Mo 3:20pm - 6:15pm (09/09 - 11/25)
Pedro Galvao Cesar de Oliveira   370 Jay Street, Room 408

Today we no longer solely connected to the digital world through computers. The result of this push to connect the digital and the analog world is the increasing necessity for low cost, low power, and self-contained electronics.

This course is an applications-driven intro to electronics for inventors. Through a hands-on approach, students will learn basic concepts about analog circuits, Boolean logic, digital devices interfaces, and low-cost code-free electronics.

Topics will include basic principles of electricity, as well as an understanding of electronics components such as resistors, capacitors, diodes, transistors, audio amplifiers, and timers.

This class will use as a backbone the book "Practical Electronics for Inventors - 4th Edition" by Paul Scherz and Simon Monk.

Format: Lectures + In-class LABs + Readings

Experiments in Augmented Reality (4.0 units)
ITPG-GT 2037 – 001 (23541)   Tu 6:30pm - 9:00pm (09/03 - 12/10)
Irene Alvarado   370 Jay Street, Room 410

Is augmented reality technology about to enter the mainstream? AR platforms have finally become widely accessible to artists, designers, and technologists thanks to recent advances in mobile performance and a new collection of powerful computer vision techniques. As such, the medium offers rich possibilities for experimentation and a chance to rethink how we experience the intersection of the physical and digital.

In this course, students will acquire an understanding of basic concepts and techniques necessary to prototype and build simple AR experiences - with a consideration of not just visual but also aural AR. We'll supplement practical exercises with an overview of the history of AR, and discuss the ethical, legal, and societal considerations cropping up around this topic.

Our tool of choice will be Unity, but we will go over prototyping techniques outside of the platform to speed up the design process. If there is interest, we will cover how to get started building projects in openFrameworks, mobile, or web AR - and discuss why or when you might want to work within other platforms.

Even though code samples will be provided, students are highly encouraged to have a basic understanding of Unity or at least have taken an introductory programming course. A working

knowledge of Unity can be gained through Unity tutorials (https://unity3d.com/learn/tutorials) or Lynda (https://www.nyu.edu/lynda).

Game Design and the Psychology of Choice (4.0 units)

ITPG-GT 2161 – 001 (23087)	Mo 12:10pm - 3:05pm (09/09 - 11/25)
Greg Trefry & Jenny Lim	370 Jay Street, Room 413

As game and interaction designers we create systems and choices that can either prey upon our psychological foibles or help us avoid decision pitfalls. It is our responsibility to understand how we decide, to consider the ethics of the systems we create and to practice designing systems in a purposeful manner.

Game Design & The Psychology of Choice will provide interaction and game designers with an understanding of the factors that influence behavior and decision-making by looking at the intertwining of cognitive psychology and economics through the development of behavioral economics. These disciplines study behavior on the individual and group level, often revealing some of the why behind the rules of thumb and folk wisdom that game designers come to intuitively. But understanding the why—why we fall into decision traps; why certain tradeoffs tax our brain more than others; why we are overconfident about our abilities; why certain decisions make us uncomfortable—allows us to more purposefully apply our design craft, both in and out of games.   Finally, as a class, we will take what we learn about how we think and create series of game experiences based around key cognitive science concepts.

Assignments may include:
• Mod a cognitive science experiment into a game or experience
• Analyze and present a game through the lens of cognitive science and behavioral economics
• Create game or experience based around a particular insight from cognitive science or behavioral economics

Syllabus

Joy and Games (4.0 units)

ITPG-GT 2042 – 001 (23545)	Mo 9:00am - 11:30am (09/09 - 12/09)
Jane Friedhoff	370 Jay Street, Room 407

What does it mean to feel joy while playing a game? How is it distinct from fun, and what can it bring to the table--both to our design practices, and the world at large? In this class, we'll be exploring how to create mechanics and interactions that invoke a visceral, rather than purely intellectual, sense of delight. From Roger Callois' definition of ilinx to Bernie DeKoven's transcendent collaboration and beyond, we'll dive deep into finding new and weird ways to make games, toys, and interactives that spark joy and facilitate connection--among both individuals

and groups. We'll also pull in readings from modern arts practitioners and activists thinking about the politics of joy and pleasure, and what joyful games can bring to the world.

The course will involve weekly design exercises, using a variety of paper prototyping and digital production techniques. We'll define games broadly, welcoming a variety of playful, interactive approaches and outcomes. Assignments will include a blend of reading, writing, making, and playing (low-cost/accessible titles), to help students sharpen their prototyping skills as well as their ability to hone in on meaningful interaction mechanics. The primary coding platform for lessons and examples will be 2D and 3D games in Unity, but there will be options to explore platforms like Twine and Tracery, or delve into experimental media like augmented reality. For their final project, students will develop a game/interactive in small groups.

[Syllabus](#)

Light as a Medium of Art: Ways of Seeing Now (4.0 units)
ITPG-GT 2038 – 001 (23546)   Th 9:00am - 11:55am (09/05 - 11/21)
James Clar   370 Jay Street, Room 411

This class presents the diverse trends of light art. This includes film and animation systems, light systems, and visual information systems; their context, meaning, and manipulation. We will look at the historical relationship of technological discoveries on artistic methodologies and ways communicating information and ideas.

The core of this course lies in ways of seeing; breaking down the physics of light and human perception, to the cultural, conceptual, political, and art historical context of these visual systems.

The production work will include light manipulating materials and systems, the technologies influencing how we see, and methods on how to control and manipulate these systems.

Live Web (4.0 units)
ITPG-GT 2734 – 001 (23002)   We 12:10pm - 2:40pm (09/04 - 12/11)
Shawn Van Every   370 Jay Street, Room 410

The World Wide Web has grown up to be a great platform for asynchronous communication such as email and message boards which has extended into media posting and sharing. Recently, with the rise of broadband, more powerful computers and the prevalence of networked media devices, synchronous communications have become more viable. Streaming media, audio and video conference rooms and text based chat give us the ability to create new forms of interactive content for live participants.

In this course, we'll focus on the types of content and interaction that can be supported through web based and live interactive technologies as well as explore new concepts around

participation. Specifically, we'll look at new and emerging platforms on the web such as HTML5, WebSockets and WebRTC using JavaScript and Node.js.

Experience with web technologies are (HTML and JavaScript) are helpful but not required. ICM level programming experience is required. (Social Software, Internet, Video)

Syllabus

Machine Learning for the Web (4.0 units)
ITPG-GT 2465 – 001 (23543)   Tu 6:30pm - 9:00pm (09/03 - 12/10)
Yining Shi   370 Jay Street, Room 411

Libraries like TensorFlow.js and ml5.js unlocked new opportunities for interactive machine learning projects in the browser. The goal of this class is to learn and understand common machine learning techniques and apply them to generate creative outputs in the browser.

This class will start with running pre-trained models and re-training models in the browser using high-level APIs from ml5.js, as well as explore the Layer APIs from TensorFlow.js to create models from scratch using custom data. This class will also cover preparing the dataset for training models.

At the completion of this course, students will have a better understanding of common and popular machine learning models, how do they work, how to train these models, and their use case to creative projects. The output of the class will be examples of interactive ML web applications.

The topics that will be covered are Image/Sound/Doodle Classification, Face/Pose Recognition, Image Style Transfer, pix2pix Image Transformation, and Image Synthesis. The techniques and neural networks we will use and build include Transfer Learning, Convolutional Neural Network, Generative Adversarial Network, Reinforcement Learning, and more.

Prospective students are expected to have taken an ICM (Introduction to Computational Media) course, or have equivalent programming experience with JavaScript, HTML, CSS.

Syllabus

New Interfaces for Musical Expression (4.0 units)
ITPG-GT 2227 – 001 (23550)   Fr 3:20pm - 5:50pm (09/06 - 12/13)
Luisa Pereira Hors   370 Jay Street, Room 407

In this course students create digital musical instruments and do a live performance using them. Over the semester, we look at examples of current work by creators of musical interfaces, and

discuss a wide range of issues facing technology-enabled performance - such as novice versus virtuoso performers, discrete versus continuous data control, and the relationship between musical performance and visual display. Readings and case studies provide background for class discussions on the theory and practice of designing controllers for musical performance. Students design and prototype a musical instrument - a complete system encompassing musical controller, algorithm for mapping input to sound, and the sound output itself. A technical framework for prototyping performance controllers is made available. Students focus on musical composition and improvisation techniques as they prepare their prototypes for live performance. The class culminates in a musical performance where students (or invited musicians) will demonstrate their instruments. Prerequisites: ITPG-GT.2233 (Introduction to Computational Media) and ITPG-GT.2301 (Physical Computing)

[Syllabus](#)

Performing the Internet (4.0 units)
ITPG-GT 2989 – 001 (23544)   Fr 3:20pm - 5:50pm (09/06 - 12/13)
Todd Anderson & Kate Bergstrom   370 Jay Street, Room 408

This class seeks to use the internet and web browsers in new and disruptive ways. Rather than the traditional use of websites as static means of one-to-many communication, we will use websites as stages to perform and intervene in front of a live audience. Students will learn HTML/JavaScript as a means of making interactive websites/instruments to be played for an audience and chrome extensions that will allow us to modify the content of existing websites to political or dramatic ends. We will draw on the art historical traditions of detournement and culture jamming to study what it means to make art out of other material with received authority. The class will also include readings and discussions on digital performing arts, and the implications of digital tools on the aesthetics of theater and performance art.

Students will learn HTML and Javascript with a focus on interaction design with themselves or another skilled performer as the intended user, a departure from traditional user experience design. They will read and discuss critical theory and artistic examples of digital performing arts, culture jamming, mashup culture and performance art. Students will create digital instruments and performances and thoughtfully workshop the work of their classmates. Students will perform their work in front of strangers and learn to do so confidently.

The first-third of the course will be focused on making single-page instruments, first in p5js and then in HTML/jQuery. The next third of the course will focus on chrome extensions, both applying the same interactive principles onto existing web pages and making site-specific interventions for dramatic effect. In the final third of the class students will create and rehearse a larger more polished performance using the techniques practiced thus far in the course and culminating in a public performance night for the larger ITP community.

Prototyping Electronic Devices (4.0 units)
ITPG-GT 2845 – 001 (23003)   Tu 6:30pm - 9:00pm (09/03 - 12/10)
Deqing Sun   370 Jay Street, Room 407

The most difficult part of prototyping is not the building process, but the process of deciding how to build. If we choose proper technology for prototypes, we can improve their robustness and simplicity.

This course will cover available and affordable technologies for ITP students to build prototypes. The course will start with soldering, wiring and LED basics. Then students will design an Arduino compatible board in Eagle, get it fabricated, assembled. And then using the debugger to dig deeper to understand how a microcontroller works.

The class will also cover multitasking, signal processing, communication, document writing and advanced skills beyond the Intro to Physical Computing class.

Each session will have lectures followed by in-class practices with guidance. The 14-week long assignment is called Do It Once – Do It Again. Bringing an idea or ongoing projects is highly encouraged.

Syllabus

Reality Captured (4.0 units)
ITPG-GT 2045 – 001 (23750)   Th 6:30pm - 9:00pm (09/05 - 12/12)
Matthew Niederhauser   370 Jay Street, Room 412

This class focuses on the exciting creative possibilities of emerging ambisonic, photogrammetric, volumetric, and depth capture technologies including their respective applications within XR. Instead of creating scenes, objects, and characters on a computer, more compelling and resonant opportunities for experiential storytelling can now be produced by recording real environments, things, and people. Students will be asked to stretch their imaginations, embrace the distinct technical and aesthetic affordances of each capture technology, and then weave them together into experiential montages.

The format of the class will change week-to-week but combine lectures on experiential storytelling, group critiques, and hands-on workshops diving into ambisonic audio recording, monoscopic and stereoscopic 360 video, DSLR photogrammetry, and volumetric video capture. All of these tools are becoming part of a greater developmental ecosystem for evolving immersive and social media platforms. Students will then stylize and blend captured assets within Unity to create a demo or project based on an original idea.

While various exercises will help familiarize students with capture technologies presented in class, as well as how to utilize captured assets in Unity, experiential design will still be paramount. A major component of the curriculum will be the discussion and critique of student

ideas as well as a presentation of a final project. This combined conceptual and technical focus will challenge students to experiment with an expanded sense of possibility, while also preparing them to pitch ideas for labs, residencies, and festivals.

Research Methods in Art and Design (4.0 units)
ITPG-GT 2046 – 001 (23820)   We 12:00pm - 3:00pm (09/04 - 12/11)
Mitchell Joachim   370 Jay Street, Room 412

This course is intended for students planning to conduct qualitative research in a variety of different operational settings. Its topics include- case studies, data, documentary evidence, participant observation, surveys, and supportive technologies. The primary goal of this course is to assist students in preparing their thesis proposals/ projects.

Description: A survey of creative and qualitative research methods applicable to the design, media and visual arts in practice.

Purpose: To assist current graduate students in comprehensive research processes and practices and, additionally, to initiate students' preparation for executing scholarly activities and descriptive analysis. A third objective is for aspirants in the field to learn to critically unpack both quantitative and qualitative research.

Methodologies: Research requires persistence, creativity, ingenuity, and refinement. There are several different types of design-based research directions that include experimental, analytical, investigative, and etc. Students will be introduced to a full range of possibilities and world-views. The course supports advanced students at ITP to evaluate and develop novel methods and methodologies specific and appropriate to their personal research projects at this level and in the context of a practice-led research environment. A key objective is to promote innovative, experimental and ambitious research that relates to academic study and creative practice at the forefront of the field of contemporary art/ media/ design and related disciplines.

Sensing Machines (4.0 units)
ITPG-GT 2039 – 001 (23547)   Mo 6:30pm - 9:20pm (09/09 - 11/25)
Elie Zananiri   370 Jay Street, Room 408

A programming course where we'll explore various techniques and solutions for tracking and sensing people or objects in space. Students will get familiar with the terminology and algorithms behind many sensing topics such as computer vision, depth cameras, positional tracking, coordinate mapping, machine learning, and pattern recognition. As these subjects are explored, we will also dig into communication, and how this information can be transmitted from one tool to another, for example using OSC, Spout/Syphon, MIDI, DMX/ArtNet. The goal being to use the right tool for the job and not limit ourselves to a particular piece of software.

The first classes will consist of theory and in-class exercises covering these techniques, and remaining classes will be dedicated to a special project, which should use a combination of what we've learned to create a new work. Students will work in small groups to build this special project, but we'll review proposals, milestones, and work in progress collectively on every class, encouraging discussion and collaboration.

Socially Engaged Art and Digital Practice (4.0 units)
ITPG-GT 2156 – 001 (23004)   Tu 3:20pm - 5:50pm (09/03 - 12/10)
Clarinda MacLow   370 Jay Street, Room 411

Digital tools of all kinds are deeply embedded in how our society operates. Innovations in basic communication, data processing, and image manipulation and have transformed our social worlds and our artistic practice. This course will explore how digital tools are and can be used in socially engaged art practice, where art and creative work intersect directly with people and civic life, looking at artists like Stephanie Dinkins, Meredith Lackey, and Mimi Onuoha. Students will be asked to propose several projects as thought experiments, and fully realize one online/digital socially engaged project. We will review and discuss the different definitions of "socially engaged practice", including discussions about "best practices" to use for working with different communities, and the politics of how we interact socially and how we approach the physical as well as social space around us. We will work on how digital tools have been used in socially engaged art and how they could be used further, and experiment with how online life can functions as a public space, guided by the understanding that working digitally with socially engaged concepts means both using digital tools within projects AND interrogating the inner workings of how digital practice operates socially and culturally. We will have some meetings and activities in public spaces, field trips to organizations such as Eyebeam, and practical applications of methodology, as well as two or three guest lecturers.

Syllabus

The Code of Music (4.0 units)
ITPG-GT 2653 – 001 (23005)   Th 12:25pm - 2:55pm (09/05 - 12/12)
Luisa Pereira Hors   370 Jay Street, Room 413

This course explores music through the lenses of computation and interactivity.

The first part of the semester is a structured exploration of rhythm, melody, timbre, and harmony. We will look into each of these elements from the standpoint of music, code, and design: each class, we will listen to examples from different periods and styles, manipulate the element programmaticaly, and create an interactive study around it.

During the second half of the semester we will cover algorithmic composition techniques such as Markov Chains, Neural Networks and L-systems. As students work toward their final projects,

the class takes on a more self-directed approach. Final projects might be digital applications, spatial installations, or physical devices.

In-class coding and exercises will be done in P5.js, but students will be free to use other languages and frameworks for their final projects. ICM or equivalent programming experience is required.

[Syllabus](#)

The Neural Aesthetic (4.0 units)
ITPG-GT 2994 – 001 (23088)   Tu 3:20pm - 6:15pm (09/03 - 11/26)
Gene Kogan   370 Jay Street, Room 410

This course introduces machine learning for art and creativity. It is a broad survey of the tools, techniques, and theory needed to understand emerging AI technology and re-appropriate it for critical inquiry and creative exploration.

The contents include an accessible introduction to how modern neural networks function and their real-time and non-real-time applications, as well as an overview of current state-of-the-art techniques in deep learning. We'll build interactive systems which incorporate real-time learning into creative code environments such as Processing, p5.js, openFrameworks, Max/MSP, and PureData, as well as control software instruments which produce music and visual art. We will also explore the frontiers of generative models such as GANs and autoencoders, showing how these methods can learn how to synthesize complex and information-rich images, sounds, and text.

Course materials will be based on the tools and instructional guides being developed on ml4a.github.io, along with a suite of deep learning libraries that perform important and novel tasks. A high-level, non-comprehensive introduction to coding machine learning in Python using Keras and Tensorflow will be included. Students will be provided with all of the code and supporting materials, integrated into a cloud-based computational environment ahead of time.

Although this course has no official pre-requisites, students will find it useful to catch up on fundamental computer science skills, including using a terminal and coding basic Python. One or more optional sessions for students who wish to catch up on or refresh these skills will be offered within the first two weeks.

Time (4.0 units)
ITPG-GT 2040 – 001 (23548)   We 12:10pm - 3:05pm (09/04 - 11/20)
Jeff Feddersen   370 Jay Street, Room 413

Time is at once fundamental and mysterious. From the 2000-year-old Antikythera Mechanism to modern cesium-fountain clocks, humans have long sought to understand temporal patterns in nature, and build mechanisms to measure, reflect and predict those patterns. We're at a unique moment, one in which we've developed the ability to perceive relativistic effects on time at the smallest scales, while struggling to think and plan across generations. In this course, we'll reflect on the deep mysteries of time while also gaining hands-on skills applicable to temporal media and technologies. Topics will range from historical clock and orrery design through modern computer architecture ("A computer is a clock with benefits" writes Paul Ford in Bloomberg's issue dedicated to code). Practically, we'll build mechanical and software clocks; experiment with time-series data and time protocols; and survey techniques for digital signal processing and real-time operating systems. Students will execute several short assignments and a final project.

Syllabus

Understanding Networks (4.0 units)
ITPG-GT 2808 – 001 (23006)   Tu 3:20pm - 5:50pm (09/03 - 12/10)
Thomas Igoe   370 Jay Street, Room 412

Interactive technologies seldom stand alone. They exist in networks, and they facilitate networked connections between people. Designing technologies for communications requires an understanding of networks. This course is a foundation in how networks work. Through weekly readings and class discussions and a series of short hands-on projects, students gain an understanding of network topologies, how the elements of a network are connected and addressed, what protocols hold them together, and what dynamics arise in networked environments. This class is intended to supplement the many network-centric classes at ITP. It is broad survey, both of contemporary thinking about networks, and of current technologies and methods used in creating them. Prerequisites: Students should have an understanding of basic programming (Intro to Computational Media or equivalent). Familiarity with physical computing (Intro to Physical Computing or equivalent) is helpful, but not essential. Some, though not all, production work in the class requires programming and possibly physical and electronic construction. There is a significant reading component to this class as well.

Possible topics include:

* topologies: how to think about them (nodes and links), how few workable ones there are, and how there's no topology so stupid it isn't in use some place.
* addressing and routing: what a namespace is, three ways to generate a name (nesting, serial uniqueness, random pseudo- uniqueness), the difference between smart and dumb networks, why the phone network and the internet differ even though they use the same wires
* protocols: envelopes and contents, the stack and the reference lie, end-to-end principles, reliability vs. speed tradeoffs
* scale: more is different, scale breaks otherwise workable systems, makes redundancy and degeneracy critical, tends to push systems
* a discussion of security and its effects

Possible exercises include:
* Basic socket communication, both software and embedded hardware versions
* Client-server programming
* A group protocol/messaging exercise
* An HTTP/RESTian model exercise

[Syllabus](#)