AI, Data & The Performing Body
TPA4930 & TPA6930, Sect 1501 (3 credits)
T& TH - 12:50-2:45 pm
Professor: Dr. Heidi Boisvert
Location: Constans Theatre, G015
Email: hboisvert@ufl.edu
Office Hours: Tuesday & Thursday 3-5 pm (or by Appointment)
Office Location: Nadine McGuire Theatre & Dance Pavilion,
Room #233
Office Phone: 352-273-0513 (email is best)

Course Content —> Canvas Site: https://ufl.instructure.com/courses/447565
Course Collaboration —> Slack Workspace: aidataperformingbody.slack.com

Course Description:
This course challenges students to deconstruct and reimagine how emerging technology can be used to expand the language of performance. We’ll explore technosomatic, multi-sensorial experiences. Students will experiment with motion capture, wearable sensors, depth cameras, virtual & augmented reality, artificial intelligence, machine learning and theatrical control systems using game engines and other real-time interactive environments. The course is a mix of theory and practice. It blends seminar-style creative research investigation, both technical and artistic, with hands-on participation in interdisciplinary group productions.

Prerequisites: None

Course Goals:
To give students an introduction to:
– the history and contemporary field of experimental networked performance employing emerging technology.
– tools and techniques for creating experimental, multi-media performances and building networked infrastructure.
– collaborative strategies for working on teams with different disciplinary skills and backgrounds.

Learning Outcomes:
By the end of the course students will be able to:
– learn correct terminology for technical and design aspects of the field.
– incorporate emerging technology (machine learning, biophysical sensors, virtual reality) into their artistic practice.
– explore different interdisciplinary methods of collaboration in order to function as part of a team.
– understand and employ different modalities of design and production and integrate those modalities into an experimental performance experience.
– clearly communicate ideas using contemporary methods and critique the work of their peers.
– discuss the evolving technologies and innovative approaches used by professionals in the field of experimental performance.
– think critically about the role of the body, data & the future of artificial intelligence.

Course Materials:
– Canvas
– Slack
– GitHub
– Flash drive & other portable drives or DropBox account to back up files
– Required Readings - Provided as PDFs
– Software Tutorials - Links will be provided
– Journal (Digital or Physical)
– Laptop (Mac or PC)

Relevant Hardware & Software:
– Max/MSP (https://cycling74.com/)
– PureData (https://puredata.info/)
– Processing (https://processing.org/)
– Isadora (https://troikatronix.com/)
– Mad Mapper (http://madmapper.com/)
– QLab (https://figure53.com/qlab/)
– TouchDesigner (https://www.derivative.ca/)
– Medialon (https://medialon.com/)
– Field (http://openendedgroup.com/field/)
– Unity (https://www.unity.com/)
– Unreal (https://www.unrealengine.com/)
– Maya (https://www.autodesk.com/products/maya/overview)
– Rokoko (https://www.rokoko.com/)
– Oculus (https://www.oculus.com/)
– Vive (https://www.vive.com/us/)
– Magic Leap (https://www.magicleap.com/)
– Emotibit (https://www.emotibit.com/)
– OpenBCI (https://openbci.com/)
– Mimu (https://www.mimugloves.com/)
– Faceware (http://facewaretech.com/)
– Affectiva (https://www.affectiva.com/)

Recommended Reading List:


Industry Essentials:

https://www.dance-tech.net/
https://isea-archives.siggraph.org/
https://eyeofestival.com/
https://grayarea.org/
https://www.eyebeam.org/
https://pnw.ai/
https://www.siggraph.org/
https://nips.cc/
https://www.acm.org/
https://www.leonardo.info/
https://ars.electronica.art/about/en/archive/

Grading Policy*:
– 20% reading/experience responses
– 20% in class exercises
– 40% final project
– 10% documentation
– 10% participation & attendance
* University grading policy can be found here: https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/.

**Grading Rubric:**

<table>
<thead>
<tr>
<th>VALUES</th>
<th>Excellent (90-100)</th>
<th>Good (80-89)</th>
<th>Fair (70-79)</th>
<th>Poor (60-69)</th>
<th>Unsatisfactory (0-59)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Concept</strong></td>
<td>Core concept is intriguing, original, and well-explored</td>
<td>Core concept is intriguing but lacking in examination</td>
<td>Core concept is present and supported by the work</td>
<td>Core ideas are scattered without consideration</td>
<td>No clear concept, or work doesn’t reflect it</td>
</tr>
<tr>
<td><strong>Progress</strong></td>
<td>Clear and consistent progress from ideation to execution</td>
<td>Progress was made, but was not consistent</td>
<td>Evidence of procrastination, “last minute” pushes or crunch</td>
<td>Lack of progress in 1-2 areas resulting in project deficiencies</td>
<td>Little to no progress shown on the project</td>
</tr>
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<td><strong>Presentation</strong></td>
<td>Concept is clearly presented and strongly supported through audio, visuals, interaction, and narrative (if applicable)</td>
<td>Concept is supported through presentation, but 2 or more areas of the design are lacking or distracting</td>
<td>Concept is weakly supported through presentation, project requirements met at a “bare minimum” level</td>
<td>1-2 presentation requirements are not met.</td>
<td>3+ presentation requirements are not met.</td>
</tr>
<tr>
<td><strong>Skills</strong></td>
<td>Clear demonstration of skills in all development areas (visual, text, audio, interaction, programming)</td>
<td>Clear demonstration of skill in 2+ development areas</td>
<td>Demonstrates skills, but omits topics covered in class.</td>
<td>Evidence of skills, but underutilization of techniques learned in class</td>
<td>Does not use any techniques learned in class.</td>
</tr>
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Expectations:

- **Arrive on time** and attend all classes— see below for attendance policy.
- Spend at least **2-4 additional hours a week** (outside of class) on class projects, readings, experimenting with tech & writing in journal.
- **Check Canvas** for assignments and materials (typically announced and posted at the end of class on Tuesday & Thursday).
- **Check Slack** regularly for group and private messages.
- Post weekly reading responses to Canvas **by midnight on Mondays** unless otherwise specified in the assignment.
- **Actively participate** in class discussions & group critiques.
- **Back up your work** regularly.
- **Follow good device etiquette**: No cell phone use during class. Laptops only used for lecture note-taking and related class activities.
- **Thoughtfully contribute** to a positive classroom environment, while actively supporting and challenging your classmates’ ideas.
- **Push yourself creatively and technically**. Be ambitious. Work hard. Stay open and curious!

**Communication:**

- To contact your instructor with a brief, private question or message, **send a DM (Direct Message) through Slack**.
- If you have a question that may be relevant to the group (about homework, etc.), **post in the #general channel** on Slack for all to see and comment on.

- Use Slack for easy communications with your classmates as well—you can DM individuals or selected groups.
- To discuss a longer matter with your instructor, DM to set up an appointment for office hours.

**Attendance Policy:**

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<td>Collaboration</td>
<td>Consistently provides honest, supportive feedback to peers, responsible in meeting team goals, communicates effectively.</td>
<td>Generally supportive, responsible, and good communicatio, with a few issues</td>
<td>Multiple issues/ problems with collaboration, meeting goals, or communicatin</td>
<td>Little to no evidence of communicatio, goal setting, and collaboration in a team setting.</td>
<td>Disrespectful to fellow students work, with negative impacts to class/team dynamics.</td>
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• Students are expected to attend every class, arrive on time, and actively engage/participate.
• If you will be absent, or if you are running late, DM your instructor ASAP.

• In the case of an absence, contact a classmate for notes and what you missed, check Canvas for assignments, and contact the instructor if you have additional questions.
• Lateness and absences will impact your grade. Worse, not showing up will impact everyone else in the class. As most of our projects are collaborative, we are dependent on everyone’s presence and full participation.
• All in-class activities are graded for participation. Unexcused absences will result in a 0 for participation for the day.
• Unexcused lateness counts as 1/3 absence when up to 25 minutes late, 1/2 absence when 26-50 minutes late, and a full absence beyond that point.
• Absences may be excused in the following cases: documentation of illness provided by a doctor, religious observance with advance notice, official school-related activity (with documentation and advanced notice), and on a case-by-case basis for other critical events.
• Project critiques are mandatory and cannot be made up. Missing a critique will result in a deduction of one letter grade for the corresponding project.

• For University Attendance Policy, please refer to this link: https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/.

Academic Integrity Policy:

UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Conduct Code specifies a number of behaviors that are in violation of this code and the possible sanctions. Click here to read the Conduct Code. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Instructor Note: Code borrowed from another source at more than four lines in length must be attributed as a //comment within the code itself. If you are unsure of whether or not your work may constitute plagiarism, please check with your instructor before submitting.

In-Class Recording:

• Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a
complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A “class lecture” is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

Course Accommodations for Students with Disabilities:

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center here: https://disability.ufl.edu/get-started/. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Student Evaluation Requirements:

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

Course Structure (Lecture, Lab & Demos):
Lecture/Demo - Context setting and introducing tools & techniques

Lab/In Class Exercise - Scaffold development pipeline and experimentation

Read/Respond - Critically engage with readings/videos by writing up a short reaction to key points in preparation for discussion

Experience/De-construct - Research new immersive works & identify narrative devices, experience design strategies and technology employed to build a collective toolbox

Studio - Hands-on, collaborative project development

Course Schedule:

// Week 1 - INTRO - PERFORMANCE & TECHNOLOGY

Thursday - January 6th - Overview of Course, Structure & Ideas

Lecture - Brief History of Early Performance & Technology Innovation

Read/Respond:
Birringer, Johannes. *Kinetic Atmospheres: Performance & Immersion* - Chapter 1

Experience/Deconstruct:
Troika Ranch (Loop Diver)
Palindrome Dance Company (Heartbeat Duett)
Chunky Move (Glow)
OpenEnded Group (How Long)
Builders Association (Super Visions)

// Week 2 - THE BODY: MATERIALITY

Tuesday - January 11th - Lecture - Cybernetics & Cyberpunk’s Rejection of the Body

Thursday - January 13th - Lab - Speculative Design Workshop

In Class Exercise 1: Future of the Performing Body

Read/Respond:

Experience/Deconstruct:
*Ghost in the Shell*, 1995 (FILM)
Stelarc (Third Hand)
Neil Harbisson (Cyborg Antenna) & Moon Ribas (Waiting for Earthquakes)
Anouk Wiprech (FashionTech)
Andrew Schneider (Nervous/System)

// Week 3 - THE BODY: IMAGE

Tuesday - January 18th - Lecture - Performing Body as Medium & Metonymy of the Self

Thursday - January 20th - Lab - Live Projections - Cameras & Projectors

In Class Exercise 2: Creating Scene = 2 performers + 1 camera + 1 projector

Read-Respond:

Experience/Deconstruct:
Pipilotti Rist (Selfless in the Bath of Lava)
Tony Oursler (Influence of Machines)
Bill Viola (Chapel of Frustrated Actions & Futile Gestures)
Nuum Collective (Doppelganger)
Nao Bustamante (America, the Beautiful)

// Week 4 - DATA: EMOTIONS

Tuesday - January 25th - Lecture - Data Bodies & Biophysical Expressivity

Thursday - January 27th - Lab - Biosensors - XTH Sense & Emotibit

In Class Exercise 3: Remapping Biophysical Data to Sound Using Isadora

Read/Respond:
Thacker, Eugene. “Biomedia.”
Donnarumma, Marco. “Music for Flesh II: informing interactive music performance with the viscerality of the body system” and “On Biophysical Music.”
Montgomery, Sean. “Brain-Computer Interfaces, Open-Source, and Democratizing the Future of Augmented Consciousness.”

Experience/Deconstruct:
Marco Donnarumma (Music for Flesh II & Ominous)
Tjasa Ferma (Female Role Model)
Ellen Pearlman (Noor Brain Opera)
Lisa Park (Eunoia)

Tutorials: XTH Sense & Emotibit Set Up + Isadora

// Week 5 - DATA: MOTION

Tuesday - February 1st - Lecture - From Motion Pictures to Motion Capture
Thursday - February 3rd - Lab - Motion Capture - Kinect Azure & Rokoko

In Class Exercise 4: Retargeting Gesture to Visuals

Read/Respond:
Munster, Anna. Materializing New Media: Embodiment in Information Aesthetics, Chapter 3 (p. 86-116).
Boucher, Marc. “Virtual Dance and Motion Capture.”
McCarren, Felicia. Dancing Machines: Choreographies in the Age of Mechanical Reproduction, Chapter 2.

Experience/Deconstruct:
Merce Cunningham (BIPED)
Bill T. Jones (Ghostcatcher)
Royal Shakespeare Co. (Dreams)
Gibson & Martelli (Dazzle & Expanded Fields)

Tutorials: Rokoko & Kinect Azure Set Up

// Week 6 - AI & ML: AUTOMATION

Tuesday - February 8th - Lecture - Extended Cognition, Machine Intelligence & Human Agency
Thursday - February 10th - Lab - Machine Learning - RunwayML & OpenAI

In Class Exercise 5: Writing a play with GPT-3
Read/Respond:
Clark, Andy and David Chalmers, “The Extended Mind.”
Hong, Sun-Ha. *Technologies of Speculation: The Limits of Knowledge in a Data-Driven Society*, Chapter 4 (p. 76-113).
TheAltre + GPT-2, *AI: When a robot writes a play*.

Experience/Deconstruct:
Dinner Party AI on Twitch
Memo Atkins (Learning to See)
Refik Annabel (Machine Hallucinations)

Tutorials: RunwayML & OpenAI

// Week 7 - AI & ML: CO-CREATION

Tuesday - February 15th - Lecture - Co-Evolution of Human-Data-Machine Creativity
Thursday - February 17th - Lab - Generative Algorithms - Processing & PureData or MaxMSP

In Class Exercise 6: Generate Real-Time Music and Visuals with Algorithms

Read/Respond:
Lewis, Jason. “Making Kin with Machines.”

Experience/Deconstruct:
Sougwen Chung (Drawing Operation Unit: Generation 1 & 2)
Stephanie Dinkins (Conversations with Bina48)
Lauren Lee McCarthy (Lauren)
Catie Cuan (Output)

Tutorials: Processing & PureData or MaxMSP

// Week 8 - GAMES: SIMULATION

Tuesday - February 22nd - Lecture - Ludic Performance & Embodied Simulation
Thursday - February 24th - Lab - Game Engines - Unity or Unreal
In Class Exercise 7: Asset Creation and Level Design in Unity or Unreal

Read/Respond:
Erler, Michael. “Playing Intelligence.”
Leigh-Foster, Susan. Choreographing Empathy, (p. 115-172).
Pezzulo, Giovanni and Barsalou, Lawrence. “The mechanics of embodiment: a dialog on embodiment and computational modeling.”

Experience/Deconstruct:
David O’Reilly (Everything)
Ian Cheng (Life of Bob)
Paolo Pedercini (Unmanned)
I/O Designs (Connected Worlds & The Pack)

Tutorials: Unity or Unreal

// Week 9 - GAMES: IMMERSION

Tuesday - March 1st - Lecture - Mixed Reality for Immersive Worlds - Extending Beyond Our Biology

Thursday - March 3rd - Lab - Virtual Reality - Oculus or Vive

In Class Exercise 8: Integrate Virtual Reality Framework into Unity Project

Read/Respond:
Benford, Steve and Gabriella Giannachi. Performing Mixed Reality, Chapter 5 (p 229-268).
Marco Gillies, “Mixed Reality Immersive Theatre.”

Experience/Deconstruct:
Hyphen Labs (NeuroSpeculative AfroFeminism)
BeAnother Lab (Body Swap)
National Theatre of London (Draw Me Close)
MapDesign Lab (HEROS: A Duet in Mixed Reality)
Kiira Benzing (Love Seat)
MCCS Goldsmiths (Dancing into the Metaverse)

Tutorials: Oculus or Vive Set Up

MID-TERM DUE - March 6th

SPRING BREAK - March 7th-13th
// Week 10 - SHOW CONTROL

Tuesday - March 15th - Lecture - Control Systems and Responsive Environments

Thursday - March 17th - Lab - TouchDesigner

In Class Exercise 9: Input & Output Paper Tech

Read/Respond: Huntington, John. Show Networks & Control Systems (Supplementary Videos)

Experience/Deconstruct:
Complex Movements (Beware of the Dandelions)
Volvox Labs (Dub Fire, Lunar Landing)
TeamLab (Every Wall is a Door & Ephemeral Solidified Light)
David Byrne (Theatre of the Mind)
Moment Factory (Perplexiplex)

Tutorial: TouchDesigner

// Week 11 - CONCEPT DEVELOPMENT - BRINGING IT ALL TOGETHER

Tuesday - March 22nd - Lecture - Ideation & Rapid Prototyping Workshop

Thursday - March 24th - Lab - Concept & Design Document, Technology Spec & Pitch Development

In Class Exercise 10: Pitch Presentation

Tutorial: TBD (depends on needs of the project)

// Week 12 - PROJECT DEVELOPMENT

Tuesday - March 29th - Studio

Thursday - March 31st - Studio

// Week 13 - PROJECT DEVELOPMENT

Tuesday - April 5th - Studio

Thursday - April 7th - Studio

// Week 14 - PROJECT DEVELOPMENT
Tuesday - April 12th - Studio

Thursday - April 14th - Studio

// Week 15 - PROJECT DEVELOPMENT

Tuesday - April 19th - Studio

Thursday - April 21st - Studio

// Week 16 - FINAL PRESENTATIONS

Tuesday - April 28th - Performance Showcase & Crits

FINAL DOCUMENTATION DUE - April 29th
PROJECTS:

MID-TERM - WRITE A JOURNAL ARTICLE (2-3 pages) informed by deconstructions on the Future of Performance

FINAL - CREATE A SHORT PERFORMANCE (10-15 minutes) employing technology and centering the body as a driver of the experience
Additional Campus Resources:

Health and Wellness

_U Matter, We Care:_ If you or someone you know is in distress, please contact umatter@ufl.edu, 352-392-1575, or visit U Matter, We Care website to refer or report a concern and a team member will reach out to the student in distress.

_Counseling and Wellness Center:_ Visit the Counseling and Wellness Center website or call 352-392-1575 for information on crisis services as well as non-crisis services.

_Student Health Care Center:_ Call 352-392-1161 for 24/7 information to help you find the care you need, or visit the Student Health Care Center website.

_University Police Department:_ Visit UF Police Department website or call 352-392-1111 (or 9-1-1 for emergencies).

_UF Health Shands Emergency Room / Trauma Center:_ For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32608; Visit the UF Health Emergency Room and Trauma Center website.

_GatorWell Health Promotion Services:_ For prevention services focused on optimal wellbeing, including Wellness Coaching for Academic Success, visit the GatorWell website or call 352-273-4450.

Academic Resources

_E-learning technical support:_ Contact the UF Computing Help Desk at 352-392-4357 or via e-mail at helpdesk@ufl.edu. 
_Career Connections Center:_ Reitz Union Suite 1300, 352-392-1601. Career assistance and counseling services.

_Library Support:_ Various ways to receive assistance with respect to using the libraries or finding resources.

_Teaching Center:_ Broward Hall, 352-392-2010 or to make an appointment 352-392-6420. General study skills and tutoring.

_Writing Studio:_ 2215 Turlington Hall, 352-846-1138. Help brainstorming, formatting, and writing papers.
Student Complaints On-Campus: Visit the Student Honor Code and Student Conduct Code webpage for more information.

On-Line Students Complaints: View the Distance Learning Student Complaint Process.